A Problem of Industries and Regions: Unemployment and Structural Change in Britain During the Interwar Years and 1980s



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Dedicated to my parents,
who have made everything possible for me.

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Table of Contents

Abstract **xii**

Introduction **1**

1 The Anomaly of Interwar Unemployment **17**
1.1 Introduction . . . 17
1.2 Related literature . . . 19
1.3 Interwar unemployment and the Kuhnian framework . . . 21
1.3.1 The anomaly of interwar unemployment . . . 22
1.3.2 Kuhnian framework . . . 24
1.4 Text analytic methods and primary sources . . . 26
1.4.1 The *Economic Journal* sample . . . 27
1.4.2 Text analysis and results . . . 27
1.4.3 Thirty economists . . . 28
1.5 Marshallian and sound money perspectives . . . 30
1.5.1 Arthur Cecil Pigou . . . 31
1.5.2 The return to gold . . . 38
1.5.3 Other Marshallian economists . . . 42
1.6 Structural change and regional and industrial perspectives . . . 44
1.6.1 Henry Clay . . . 45
1.6.2 Cotton perspectives . . . 54
1.6.3 Other economists focused on industry or regional perspectives . . . 55
1.7 Monetary policy and the business cycle . . . 58
1.7.1 John Rotherford Bellerby . . . 58
1.7.2 Other perspectives focused on the business cycle . . . 64
1.8 John Maynard Keynes before the *General Theory* . . . 66
1.9 Other economic perspectives . . . 89
1.9.1 Unemployment insurance and public works . . . 89
1.9.2 Technological change and seasonality . . . 93
1.10 Conclusion . . . 95

2 Industrial, Regional, and Gender Divides: Re-Evaluating British Unemployment Between the Wars **97**
2.1 Introduction . . . 97
2.1.1 Historical background . . . 101
2.2 Related literature . . . 103
2.3 Industrial and gender divides . . . 108
2.3.1 Gender . . . 109
2.3.2 Industries . . . 114
2.4 Regional effects . . . 117
2.4.1 Data . . . 118
2.4.2 Industrial specialization . . . 119
2.4.3 Decomposition into industry mix and regional effects . . . 120

2.5 The reallocation of labor across industries . . . 124
2.5.1 Empirical strategy . . . 126
2.5.2 Results . . . 129
2.6 The persistence of unemployment . . . 137
2.6.1 Empirical strategy . . . 137
2.6.2 Results . . . 140
2.6.3 Comparison of adjustment coefficient and Markov analyses . . . 149
2.7 The determinants of interwar unemployment . . . 149
2.7.1 Empirical strategy . . . 150
2.7.2 Expanded data . . . 152
2.7.3 Results . . . 153
2.8 Conclusion . . . 155

3 The Jobless Recovery After the 1980–1981 Recession 159
3.1 Introduction . . . 159
3.1.1 Historical background . . . 163
3.1.2 Comparison with the United States . . . 166
3.2 Jobless recovery from the early 1980s recession in Britain . . . 168
3.2.1 Jobless recoveries in the United States . . . 169
3.2.2 Jobless recovery from the early 1980s recession in Britain . . . 169
3.3 Possible causes of jobless recoveries . . . 173
3.3.1 Contribution to the literature . . . 177
3.4 Labor reallocation across industries and the jobless recovery . . . 177
3.4.1 Data . . . 178
3.4.2 Sectoral change in the early 1980s . . . 179
3.5 Regional disparities and industry labor reallocation . . . 182
3.5.1 Regional shifts in employment . . . 182
3.5.2 Regional shift-share analysis . . . 189
3.6 Job polarization and the jobless recovery . . . 192
3.6.1 Data and methods . . . 194
3.6.2 Abstract, service, and routine scores . . . 194
3.6.3 Shifts in occupational deciles . . . 198
3.7 Conclusion . . . 203

4 The Unequal Effects of the Early 1980s Recession and Rapid Structural Change 205
4.1 Introduction . . . 205
4.2 Related literature . . . 207
4.2.1 Gender . . . 208
4.2.2 Race and immigration status . . . 209
4.3 *General Household Survey* data . . . 213
4.4 Method . . . 215
4.5 Results . . . 216
4.5.1 Interviewer-assessed race . . . 216
4.5.2 First-generation immigrants . . . 219
4.5.3 Gender . . . 222
4.5.4 Region . . . 225
4.5.5 Industries . . . 228
4.6 Conclusion . . . 230

Conclusion 232

Appendices 242

A Appendices to Chapter 2 **242**
A.1 Data appendix 242
A.2 Adjustment coefficient analysis appendix 252
A.3 Details on estimating Markov transition probabilities from aggregate data 260
A.4 Markov analysis appendix 263
A.5 Determinants of industry-level unemployment rates appendix 264

B Appendices to Chapter 3 **267**
B.1 Non-disclosed employment figures in the QCEW 267
B.2 Abstract, service and routine task trends by region 268
B.3 Shifts in occupational deciles for the US, 1979–1984 268

C Appendices to Chapter 4 **271**
C.1 Robustness to probit specification 271
C.2 Robustness to estimation with a single model 272

Bibliography **279**

List of Figures

1.1 Unemployment rate for insured workers, 1921–1936 21

2.1 Monthly unemployment rate for Britain by gender, 1923–1936 109
2.2 Number of workers in industries excluded from unemployment insurance scheme 111
2.3 Unemployment rates by gender adjusted for excluded industries, 1931 112
2.4 Proportion of unemployment accounted for by top ten industries, 1923–1936 . . . 116
2.5 Numbers unemployed in staple vs. non-staple industries, 1923–1936 117
2.6 Regional unemployment rates and synthetic unemployment rates based on industrial mix, 1923–1936 123
2.7 North-South unemployment rate gap decomposed into industry mix and regional effects, 1923–1936 125
2.8 Heat map of regional adjustment coefficients over time 137
2.9 Predicted vs. actual change in proportion of the labor force in each industry category, 1923–1936 146

3.1 Unemployment rate in Britain, 1976–1988 160
3.2 Economic performance in Britain, 1979–1987 161
3.3 Net exports of crude oil and oil products from Britain, 1975–1990 164
3.4 Net exports of crude oil from the United States, 1973–1990 167
3.5 Employment growth after recent recessions in the United States 170
3.6 Employment growth after the early 1980s recession, Britain and United States . 171
3.7 Quarterly job loss in Britain decomposed by recovery status of region, 1978–1988 173
3.8 Sectoral change in Britain and the United States, 1978–1986 179
3.9 Regional change in Britain and the United States, 1978–1986 183
3.10 National industrial reallocation in Britain and the United States, 1978–1986 . . . 186
3.11 Industrial reallocation in selected regions of Britain and the United States 188
3.12 Industrial reallocation by region of Britain and the United States, 1978–1986 . . 189
3.13 Employment growth in tradeables and non-tradeables, selected regions 190
3.14 Dynamic shift-share analysis of regional employment change over the early 1980s recession-recovery, Britain and United States 192
3.15 Change in task composition in Britain, 1979–1987 196
3.16 Change in task composition in Britain by gender, 1979–1987 196
3.17 Change in task composition in Britain by full-time status, 1979–1987 197
3.18 Change in task composition in Britain and the United States, 1979–1987 197
3.19 Change in the proportion of employment by occupation decile in Britain, 1979–1987 199
3.20 Change in the proportion of employment by occupation decile in 1975, 1979, 1983, and 1987 in Britain 1975–1990 200
3.21 Change in the proportion of employment in the United States and Britain by occupation decile, 1979–1987 201

4.1 Difference in the probability of employment for non-white and white workers, 1976–1987 218

4.2 Difference in the probability of employment for immigrants and non-immigrants, 1976–1987 221
4.3 Difference in the probability of employment for men and women, 1976–1987 . . . 224
4.4 Difference in the probability of employment for outer regions and the South of England and Midlands, 1976–1987 227

A.1 Predicted vs. actual change in proportion of the labor force in each industry category, 1923–1936, men only 263
A.2 Predicted vs. actual change in proportion of the labor force in each industry category, 1923–1936, women only 264

B.1 Change in task composition in Britain by region, 1975–1995 269
B.2 Change in the proportion of employment by occupational decile in the United States, 1979–1984 270

List of Tables

1.1 Set of interwar economists from the *Economic Journal* who wrote on unemployment 29

2.1 Labor force participation by gender and marital status, 1931 *Census* 110
2.2 Relative unemployment rates and numbers insured for men and women, 1923–1936 113
2.3 Industries accounting for the most unemployed workers, 1923–1936, by gender . . 115
2.4 Regional unemployment rates in Britain, 1923–1936 118
2.5 Industries with a disproportionate share of regional labor force in 1931 119
2.6 Herfindahl-Hirschman index of regional specialization, 1921 and 1931 120
2.7 Magnitude and direction of regional effects on interwar unemployment rates . . . 123
2.8 Adjustment coefficients for all industries and by industry category 130
2.9 Adjustment coefficients by gender for all industries and by industry category . . 132
2.10 Adjustment coefficients by gender for expanding or contracting industries 134
2.11 Speed of adjustment by gender and industry category 135
2.12 Estimated average adjustment coefficients by region 136
2.13 Markov transition probabilities across employment-industry states 142
2.14 Markov transition probabilities across employment-industry states, men only . . 144
2.15 Markov transition probabilities across employment-industry states, women only . 145
2.16 Average proportion of time steps spent in unemployment by initial state 147
2.17 Determinants of industry-level unemployment rates in 1924 and 1931, service industries excluded 156

3.1 Growth in employment after early 1980s recession, international comparison . . . 162
3.2 The early 1980s recession in Britain and the United States 166
3.3 Employment recovery after recessions, United States and Britain 170
3.4 Change in industry share of employment over 1980s recession-recovery 181
3.5 Change in regional share of employment over 1980s recession-recovery 184
3.6 Decomposition of decile employment share change in Britain, 1979–1987 203

4.1 Summary statistics for GHS Data, 1976–1987 215
4.2 Model for differences in the probability of employment by interviewer-assessed race 217
4.3 Model for differences in the probability of employment by immigration status . . 220
4.4 Model for differences in the probability of employment by gender 223
4.5 Model for differences in the probability of employment by region 226
4.6 Model for differences in the probability of employment by industry 229

A.1 Industry categories, groups, and industries in the Ministry of Labour *Gazette* . . 244
A.2 Proportion insured, employed, and unemployed by gender in each industry category 245
A.3 Ranking of industries by the proportion of total unemployment they accounted for, by year and gender 246
A.4 Crosswalk between Labour Gazette (1923–1936) and Census of England and Wales (1931) industries 247
A.5 Mapping of *Census of Production* industries to the *Labour Gazette* 249
A.6 Robustness to full interaction model specification 252

A.7 Robustness to grouping of industries as expanding or contracting based on overall employment change . . . 253
A.8 Adjustment coefficients for expanding or contracting industries, by industry category 254
A.9 Speed of adjustment by time period . . . 255
A.10 Robustness of estimated average regional adjustment coefficients to 1921 industrial composition . . . 255
A.11 Speed of adjustment, men only . . . 256
A.12 Speed of adjustment, women only . . . 256
A.13 Speed of adjustment, metals only . . . 257
A.14 Speed of adjustment, textiles only . . . 257
A.15 Speed of adjustment, other manufacturing only . . . 258
A.16 Speed of adjustment, mining only . . . 258
A.17 Speed of adjustment, service only . . . 259
A.18 Speed of adjustment, building only . . . 259
A.19 Robustness to industry group clustered standard errors and industry category fixed effects . . . 265
A.20 Robustness to no lagged output control and to different measure of unemployment as the dependent variable . . . 266

C.1 Probit models for differences in the probability of employment by interviewer-assessed race, immigration status, and gender . . . 273
C.2 Probit model for differences in the probability of employment by region . . . 274
C.3 Probit model for differences in the probability of employment by industry . . . 275
C.4 Single model for differences in the probability of employment by race, immigration status, gender, and industry . . . 277

Abstract

The most serious employment crises in twentieth-century Britain occurred during the interwar years and the early 1980s, when, in both cases, the unemployment rate climbed to over 10% in aggregate and remained high for many years. Both downturns also coincided with periods of structural change in the economy: in the interwar years, export-oriented heavy industries lost out to expanding light manufacturing industries, and, during the early 1980s, the decline of manufacturing accelerated as the economy pivoted toward service industries and finance. A large literature on these recessions has dealt with aggregate demand fluctuations and supply factors, but this mainly macroeconomic focus has limited our understanding of the impacts of structural change. This thesis investigates the interaction of structural change and the business cycle in both the crises using newly-digitized industry microdata and econometric methods. How did structural change affect these employment downturns, and what were the consequences for workers and the labor market? I find that in both periods, secular structural change contributed significantly to, and was amplified by, the cyclical downturn. This interaction caused the impact of the interwar and early 1980s recessions to vary across industries, regions, gender, and demographic groups, with some workers experiencing persistent disadvantage.

Chapter I reviews how structural and cyclical unemployment were understood by economists in a pre-Keynesian setting. Chapter II analyzes interwar unemployment with novel data, finding that structurally-disadvantaged industries had higher unemployment and that the labor market was more flexible for some workers than others. On the early 1980s, Chapter III argues that structural change caused a jobless recovery from the 1980-1981 recession. Finally, Chapter IV uses individual-level data to demonstrate that this recession disproportionately affected workers from particular industries, regions, and demographic groups.

Long Abstract

The most serious employment crises in twentieth-century Britain occurred during the interwar years and the early 1980s, when, in both cases, the unemployment rate climbed to over 10% in aggregate and remained high for many years. Both downturns also coincided with periods of structural change in the economy: in the interwar years, export-oriented heavy industries lost out to expanding light manufacturing industries, and, during the early 1980s, the decline of manufacturing accelerated as the economy pivoted toward service industries and finance.

A large literature on the interwar and early 1980s recessions has dealt with aggregate demand fluctuations and supply factors, but this mainly macroeconomic focus has limited our understanding of the impacts of structural change. Macroeconomic models tend to emphasize

short-run fluctuations and abstract away from long-run trends such as structural change, which leaves unanswered questions about these real-world downturns in which business cycle fluctuations and structural change both occurred. It has also meant that the long-run distributional effects of these business cycle downturns, caused by structural factors, are not well understood.

The absence of data on unemployment at a disaggregated level for both the interwar and the early 1980s periods has presented another challenge. While there is some historical evidence of disparities in unemployment across industries, regions, and demographic groups in both of these recessions, it has been difficult to explore the role of structural change econometrically without disaggregated data. The wide availability of aggregate data for these periods has led most quantitative economic history research on these episodes to simply rely on macroeconomic approaches.

This thesis confronts both of these challenges in order to investigate the interaction of structural change and the business cycle in the interwar period and the early 1980s. By digitizing thousands of pages of British government documents, I develop novel datasets on unemployment by industry, region, and gender for both periods, offering new insight into unemployment at a disaggregated level. These rich datasets enable econometric methods to be used to analyze the complex interaction of structural change and the business cycle in both periods.

I find that secular structural change contributed significantly to, and was amplified by, these cyclical downturns. The coincidence of structural change and cyclical downturn led these major recessions to disproportionately affect certain groups of workers, often with persistent impacts. These findings offer new insight into the causes and consequences of the interwar and 1980s mass unemployment episodes, suggesting they were not, as is often assumed, simply national problems that required a broad solution. Mass unemployment was instead more of a "meso" problem, driven by the disadvantaged position of certain groups of workers.

After a general introduction, the thesis is divided into four substantive chapters, with Chapters 1 and 2 focusing on the interwar years and Chapters 3 and 4 investigating the early 1980s period. Chapter 1 reviews how structural and cyclical unemployment were understood by economists in a pre-Keynesian setting. In the interwar years, the prevailing Marshallian tradition predicted that market forces would act through wages to ensure that labor markets cleared, not addressing mass unemployment. Interwar unemployment was thus an empirical anomaly that could not be accommodated in this tradition. I explore how interwar economists responded to this anomaly with reference to a Kuhnian framework, using text analytic methods to identify economists who wrote on unemployment in interwar Britain and then giving a comprehensive review of their work on the topic. I find that while some economists focused on the role of high wages, in line with the Marshallian tradition, others explored how monetary policy, business cycles, and institutions such as unemployment insurance affected unemployment. Many interwar economists hypothesized a role for structural change in interwar unemployment, focusing on the competitive disadvantage of the export industries after World War I. These differing approaches to Britain's unemployment challenge reveal how the meaning of unemployment shifted in the interwar period from a short-term issue of markets finding equilibrium to a more multifaceted problem that was difficult to resolve.

Chapter 2 explores the role of structural change in interwar unemployment using econometric methods, finding that structurally-disadvantaged industries had higher unemployment and that the labor market was more flexible for some workers than others. By digitizing the complete

Ministry of Labour *Gazette* data from 1923 to 1936, I develop a rich dataset on monthly unemployment for 100 industries, disaggregated by gender. I first use this comprehensive dataset to provide new descriptive statistics on interwar unemployment, including a monthly unemployment rate series for men and women, the identification of the industries with which most unemployed workers were associated, and a new analysis of the role of industry mix in regional unemployment rate differentials. Then, I analyze the extent to which labor was reallocated across industries using two methods, estimating adjustment coefficients and Markov transition probabilities. These analyses reveal large differences in the flexibility of the labor market for different groups of workers, with structural rigidities causing certain workers to have a higher risk of persistent unemployment. I also estimate the determinants of industry-level unemployment differentials with a regression, which further highlights the importance of structural factors.

Chapter 3 moves to the 1980s, arguing that structural change caused a jobless recovery from the 1980–1981 recession. I link the slow employment recovery from the early 1980s recession in Britain to structural change through a comparison with the United States. While both countries experienced a severe recession in the early 1980s, in Britain that recession led to high unemployment rates for eight years while in the US, the labor market had a strong recovery. I use the framework of jobless recoveries to analyze the coincidence of output growth and employment contraction in Britain following the 1980–1981 recession, and then compare Britain and the US to identify differences that might have contributed to Britain's jobless recovery. I consider three possible drivers of jobless recoveries in detail: the reallocation of labor across industries, regional disparities, and job polarization. While all of these contributed in some way to the experience of Britain, structural change through the reallocation of labor across industries emerges as the key factor driving the jobless recovery experience in Britain in the early 1980s period.

Chapter 4 uses individual-level data to explore how the early 1980s recession and jobless recovery disproportionately affected workers from particular industries, regions, and demographic groups. Using data from the General Household Survey from 1976 to 1987, I estimate how the probability of employment varied for workers from different groups, controlling for many factors. I find large differences in employment probabilities, with nonwhite workers, men, workers in the North of England, and workers in production industries all disadvantaged. These employment penalties emerged during the 1980–1981 recession but often intensified during the jobless recovery period from 1982. In some cases, the differences in the likelihood of employment persisted through the end of the recession-recovery cycle in 1987. The consequences of structural change and the jobless recovery in the early 1980s period were thus borne disproportionately by workers from certain groups, many of whom experienced persistent disadvantage.

The thesis then concludes with a short summary of the findings and directions for future research. In both the interwar years and the early 1980s, the dramatic and persistent unemployment in Britain was linked inextricably with structural change processes. While this was noted by a few economists in the interwar years, a reliance on macroeconomic methods and aggregate data has limited our understanding of the role of structural change in these downturns. By re-evaluating both the interwar and early 1980s downturns, I find that structural change contributed to high unemployment levels and was amplified by the business cycle downturns in both periods. This interaction generated inequalities in the impacts of the recessions, disproportionately affecting workers from certain industries, regions, and demographic groups and often causing persistent disadvantage.

Introduction

> *You don't need a long memory in this country to remember the trauma of mass unemployment. As a recession sets in, hundreds of thousands of people are at risk of losing their jobs, and as recessions go on, long-term unemployment soars. That is a tragedy for the people involved, and it's a tragedy for us, too, for all of society.*
>
> – David Cameron, 2008 (Press Association 2008)

These words were uttered by the then-Leader of the Opposition David Cameron as the 2008 financial crisis and recession set in. Rejecting the *laissez-faire* approach taken by his party during the Thatcher regime, Cameron promised that the Conservatives would not just "stand aside and allow unemployment to claim livelihoods and ruin lives on a massive scale" — they had "learned the lessons of history" (Sparrow 2008). This is just one example of the enduring political legacy of the mass unemployment Britain experienced during the interwar years and the early 1980s. In both periods, severe recessions put millions out of work and caused high unemployment rates for several years.

In the interwar period, unemployment was a dominant economic and social issue. The unemployment rate reached over 21% in 1921 and remained elevated throughout the 1920s, compounded by deflationary pressure from the return to the gold standard and disturbances to trade from World War I. The General Strike in 1926 was in part a response to these poor economic conditions. The global Great Depression worsened unemployment in the early 1930s, causing the number of unemployed to triple to over three million. Britain was forced off the gold standard in 1931 and then had a relatively strong recovery from 1934, led by a boom in home construction and rearmament.

In 1979, the Second Oil Crisis restricted oil output from Iran, causing a major energy crisis and oil price shock. Despite benefits to British national income from the high value of oil, the price shock exacerbated the inflationary pressure that Britain had been struggling with since the mid-1970s. Policies of price and wage controls, intended to restrain inflation, led to industrial

unrest during the Winter of Discontent 1978–1979. When Margaret Thatcher became Prime Minister in May 1979, her government pursued a different strategy to bring down inflation that was guided by the doctrine of monetarism. Monetary and fiscal policies that aimed to keep the growth of the money supply within a targeted range resulted in a deep recession. Though inflation was dampened, the unemployment rate climbed to almost 10% and was still increasing even after the end of the recession, remaining high for eight years. Economic hardship also led to racially-charged riots in London, Liverpool, Birmingham, Leeds, and Manchester.

Politicians, commentators, and economists have often looked back on these two periods to gain insight into how the challenges of more recent recessions, such as those that began in 2008 and 2020, might be addressed. Yet, our academic understanding of these two critical unemployment episodes still leaves much to be desired. One reason for this is that macroeconomic models for the business cycle have taken a distinctly short-run approach, abstracting away from long-run trends including structural change. There has thus been a sharp separation in economics between macroeconomic research on short-run fluctuations and microeconomic research on long-run changes. This has limited our understanding of real-world economic downturns in which business cycle fluctuations and structural change occur at the same time. It has also meant that the long-run distributional effects of business cycles, caused by structural factors, are not well understood.

Another challenge has arisen from the absence of data. There is rich historical evidence of disparities in unemployment across industries, regions, and demographic groups in both of these recessions. But a lack of data on unemployment at a disaggregated level, especially by industry and region, has limited the ability of researchers to explore the role of structural change econometrically. Because aggregate data is widely available for both periods, most quantitative economic history research on these unemployment episodes has simply relied on macroeconomic approaches.

This thesis confronts both of these challenges in order to investigate how structural change affected the interwar and early 1980s employment downturns, and what the consequences were for those in the labor market. By digitizing thousands of pages of British government documents, I develop novel datasets on unemployment by industry, region, and gender for the interwar years and early 1980s, offering new insight into unemployment at a disaggregated level. I study the complex interaction of structural change and the business cycle from many angles: for the interwar period, I provide evidence of contemporary understanding (Chapter 1), estimate

the effect of structural disadvantage on industry unemployment rates (Chapter 2), and link structural rigidities to persistent unemployment (Chapter 2), while for the early 1980s, I conduct a comparative analysis with the United States (Chapter 3) and demonstrate the persistence of employment impacts over the business cycle (Chapter 4).

The results of these analyses suggest that in both the interwar period and the early 1980s, secular structural change contributed significantly to, and was amplified by, the cyclical downturn. This interaction caused the impact of these recessions to vary across industries, regions, gender, and demographic groups, with some workers experiencing persistent disadvantage. I find that in the interwar period, workers in textiles and mining, those located in the North of England and Wales, and women had relatively fewer labor market opportunities and thus were at a higher risk of long-term unemployment. In the early 1980s, rapid structural change disadvantaged workers in the North of England, Scotland, and Wales, and those in production industries. Nonwhite workers, first-generation immigrants, and men were also less likely to be employed. These findings offer new insight into the causes and consequences of the interwar and 1980s mass unemployment episodes, suggesting they were not, as is often assumed, simply national problems that required a broad solution. Rather, each episode generated inequalities in economic outcomes, disproportionately affecting certain workers that were often already experiencing marginalization or disadvantage. Because the unequal effects of these recessions were in part driven by structural factors, in some cases inequality became entrenched and did not resolve with economic recovery. Mass unemployment was thus, in many ways, a "meso" problem, and more attention needs to be given to the experiences of workers left out of, or left behind by, economic progress.

There are thus two themes, with both historical and modern importance, that lie at the core of this thesis. One theme is how structural change interacts with the business cycle. If structural change amplifies business cycle downturns or contributes to their unequal effects, it is more likely that cyclical inequalities will become entrenched and permanent. This can be framed in terms of two hypotheses from the economics literature about the cause of the uneven effects of recessions. One hypothesis is that the workers most affected by recessions are concentrated in the industries that are hardest hit by business cycle downturns. Industries with greater cyclical sensitivity experience more job loss during business cycle downturns — for example, the construction industry contracted significantly during the Great Recession, contributing to gender differences in unemployment. If cyclical sensitivities of industries drive the demographic

inequalities of recessions, these inequalities may be less of a concern (Pissarides 2013, p. 387). This is because we expect cyclically sensitive industries to rebound quickly during business cycle recoveries. The employment of marginalized workers may also be more cyclically sensitive in general and thus most affected by deficient aggregate labor demand (Rothstein 2017).

Alternatively, the different experiences of demographic groups could be attributed to processes of structural transformation. Secular trends in the size and growth rates of industries reflect long-term shifts in the economy such as changes in sectoral productivity, the composition of the workforce, consumer demand, technological innovation, and globalization. This amalgam of forces often leads to structural change: labor is reallocated across industries, or, when adjustment is slow, persistent skill and geographic mismatch in labor markets occurs (Sahin et al. 2014). Recent research has explored how structural change processes amplify business cycle downturns, finding that skill mismatch (Restrepo 2015) and the reallocation of labor across industries (Chodorow-Reich and Wieland 2020) tend to deepen recessions and slow recoveries. These mechanisms could also drive some of the longer-term consequences of recessions.

Historians have long been aware of both of these components when considering the disproportionate impact of recessions. The role of structural change in the interwar employment downturn has been expounded and debated (Aldcroft 1969b, for example), and the disproportionate impact of the 1980–1981 recession on manufacturing is well-known (Edgerton 2019, pp. 452-453, for example). Bernstein (1987) explores similar issues for the United States, finding that the interaction of cyclical and secular structural forces delayed recovery from the Great Depression. Chapters 1 and 2 in the present work contribute to these debates on the interwar period, while Chapter 3 considers the role of structural change in the early 1980s recession and recovery.

A second, related theme is the impact of recessions on inequality. How do recessions exacerbate inequality? Do they affect certain workers more than others in the long run, and what are the consequences? This is an issue that directly connects the present with the past. The increase in income inequality in Britain over the past forty years (Joyce and Xu 2019) has renewed interest in the long-term trends of inequality in Europe and in the consequences of inequality for twentieth-century economies (Piketty and Saez 2006; Baines, Cummins, and Schulze 2012, for example). The persistence of regional disparities has kept geographical inequalities at the forefront of public discussion (see UK2070 Commission 2020), while a renewed interest in confronting Britain's long history of slavery and empire has put the persistent economic disadvantages of nonwhite workers into sharp relief (see Equality and Human Rights Commission

2016). Women, who struggled to establish a position for themselves in the economy in the twentieth century, have experienced a slippage of their relative economic position in Britain in recent years (World Economic Forum 2019), likely exacerbated by the 2020 COVID-19 crisis and recession (see United Nations 2020). There is a growing sense, though by no means for the first time in history, that the economy works better for those with privileges of birth or wealth, as the gains and opportunities of economic growth benefit some but not all.

The effect of recessions is often to amplify these trends in the short term. For example, the burdens of the Great Recession were not shared equally throughout the British population. Men were more likely to experience job loss, with the unemployment rate for men increasing by almost twice as much as the unemployment rate for women from 2007 to 2009.[1] Over the same years, the unemployment rate for white workers increased 2 percentage points to 7%, while it increased by 5 percentage points to 18% for black workers, and by 1 percentage point to 11% for Asian workers.[2] The Great Recession also impacted the North East, West Midlands, Yorkshire and the Humber, North West, and Wales regions than others (Dolphin 2009).

These differences in employment outcomes have been found to have persistent, negative consequences on individuals' long-term employment opportunities, earnings, educational attainment, and health in developed countries. Among university graduates, those who enter the labor force during a recession face decreased employment and earnings for a decade or more (L. B. Kahn 2010; Rothstein 2020; Oreopoulos, Wachter, and Heisz 2012; Cutler, Huang, and Lleras-Muney 2015). Employment and income losses persisted even after the end of the Great Recession (Yagan 2019; Rinz 2019). Recessions decrease young students' performance in mathematics and in English (Shores and Steinberg 2019). Opioid deaths and emergency department visits increase during recessions (Hollingsworth, Ruhm, and Simon 2017), and recession-induced early retirements are associated with poor long-term health outcomes (Antonova, Bucher-Koenen, and Mazzonna 2017).

Recessions and their associated employment and income losses can thus have significant, long-term consequences for workers. To the extent that certain groups of workers are disproportionately affected by the recession, these costs of recession are borne unequally throughout the labor force. In researching historical business cycles, it is therefore essential to consider the long-run distributive impacts of recessions. Scarring effects from historical recessions could

1. See ONS male and female unemployment rate series MGSY and MGSZ.
2. Source: https://www.ethnicity-facts-figures.service.gov.uk/work-pay-and-benefits/unemployment-and-economic-inactivity/unemployment/latest

have caused income, wealth, and demographic inequalities to persist, contributing to the path-dependent patterns that exist today. Chapters 2 and 4 explore the question of the unequal effects of recessions for the interwar years and the early 1980s, respectively.

The interwar years and the early 1980s provide good settings in which to explore these two themes. These business cycle downturns were the worst in terms of employment loss and output contraction of any during the twentieth century. Each represented a major aberration in the economic performance of Britain, with serious consequences for workers and firms. The severity of these downturns provides strong cyclical contractions to analyze while also accentuating the varied impact on industries, regions, and demographic groups.

Both recessions also interrupted and contributed to secular structural change processes that represented significant shifts in the industrial composition of the British economy. In the interwar period, export industries that had driven economic growth in the nineteenth century faced new competition and a loss of markets, including coal, cotton textiles, shipbuilding, and iron and steel. At the same time, "new" industries such as rayon, electrical engineering, motor vehicles, chemicals, and paper and printing gained prominence, and the service and retail sector expanded (see Aldcroft 1969b; Jeffreys 1954). From 1923–1936, the share of employment in mining and textiles decreased by 5.8 and 2.2 percentage points, respectively, while the share of employment in services increased by 6.2 percentage points (Chapter 2 Figure 2.9). Likewise, the late 1970s and early 1980s period was one of dramatic deindustrialization. The secular decline of manufacturing accelerated with the early 1980s recession as the service and finance sectors boomed (see Tomlinson 2016; Millward 2004). From 1979–1987, the share of employment in manufacturing decreased by 8.0 percentage points, while it increased by 3.7 percentage points in finance and 4.2 percentage points in services (Chapter 3 Table 3.4). The interwar period and early 1980s are thus good cases in which to analyze the interaction of structural change and recessions.

The interwar years and early 1980s had three other broad similarities which make them interesting to consider jointly. One similarity was the importance of regional disparities in economic performance. The North-South divide in economic growth and employment is thought to have widened in the interwar period, with regions in the South and Midlands of England outperforming those in the North and West of England, in Scotland, and in Wales.[3] Structural change deepened the industrial divide, as export industries in the depressed industrial periphery

3. Whether this represents a reversal of fortune from before World War I has been the subject of debate; see Massey (1986, p. 31), Southall (1988), Lewis and Townsend (1989, pp. 22-28), and Crafts (2005) for example.

declined and failed to diversify, while expanding industries that did not rely on the same factors of production drove economic growth in the more prosperous South (Heim 1984). The gap in unemployment rates between the North of England, Wales, and Scotland and the South of England increased from just over 2 percentage points in 1923 to over 15 percentage points in 1934 (Chapter 2 Figure 2.7).

Regional inequalities that expanded during the interwar period decreased dramatically through the early 1970s, driven in part by the strong economic performance of regions outside of the South East of England (Geary and Stark 2016). This convergence was halted abruptly in the 1980s when regional inequalities re-emerged along the same lines as in the interwar period. The North of England, Scotland, and Wales again lagged behind the South of England in many economic indicators, especially employment. Structural change contributed to these patterns, as the majority of manufacturing was concentrated in the North. Over the period 1979 to 1987, employment increased 5.4% in the South and decreased 8.5% in the North, Wales, and Scotland (Lewis and Townsend 1989, p. 9).[4]

A second similarity between the interwar years and early 1980s was the overvaluation of the pound, which created deflationary pressure in the economy. In the interwar period, a commitment to return to the gold standard at its pre-war parity with the dollar led to contractionary government and monetary policy in the early 1920s (Broadberry 1990). The gold standard was restored at this parity in 1925, fixing the pound at an overvalued level and creating trouble for export industries, which faced different real costs at home and abroad. The gold standard system also constrained monetary policy as, during the Great Depression, the Bank of England was forced to defend its gold reserves by raising interest rates several times. When the gold standard was finally abandoned in 1931, Britain benefited relative to other countries from cheap money and the release of this deflationary pressure.

Movements in the exchange rate drove monetary policy and shaped the performance of the economy in the 1980s as well. The 1970s were a decade of high inflation, which Britain had unsuccessfully attempted to limit through wage and price controls. Investors believed that this inflation had caused the pound to be overvalued relative to the dollar in the mid-1970s, so the government borrowed funds in order to stabilize the currency. This 1976 exchange rate crisis led to Britain's first steps toward monetarism (Goodhart 1989, p. 300), but it was a second exchange rate crisis that really squeezed export industries. In order to meet the monetary targets set by

4. Note that in their analysis, the West Midlands region is considered with the North and the East Midlands with the South. See also Chapter 3 in this thesis, Table 3.5.

the new Thatcher government, the minimum lending rate was set to 17% in 1979. The foreign capital inflows this attracted caused an appreciation of the real exchange rate by over 30% from 1978 to 1980 (Maynard 1988, p. 60). Though not the focus of this thesis, the broad similarity in the currency valuation between the interwar and early 1980s period, despite differences in the monetary system, is striking.

This commitment to sound money in the interwar period and the aversion to inflation under the Thatcher regime reveals a final similarity between the interwar and 1980s periods: a remarkably similar political economy. In both periods, there was a strong commitment to *laissez-faire*, with the achievement of efficient market equilibria as an overriding policy goal.[5] Chapter 1 describes how the belief that labor markets would clear in the interwar period derived from the prevailing Marshallian economic tradition, which focused on short-term adjustments in individual labor markets. High wages were seen as an obstacle preventing the achievement of labor market equilibrium and full employment, and thus were decried. By the 1980–1981 recession, there was a better understanding, both economically and politically, of the nuances of unemployment, yet the Thatcher government still attributed it to high wages making British industry uncompetitive.[6] The Thatcher government's focus on market solutions to unemployment allowed them to ignore the complicating factors of regional disparities, deindustrialization, and the disproportionate impacts on ethnic minorities (Rieger 2018, p. 652). Likewise, in the interwar period, disadvantaged regions and industries were pressured to become more competitive through rationalization and wage reductions, rather than the government confronting more directly the longer-term problems of structural decline due to changes in trading relationships, market structure, and the labor supply.

Despite these broad similarities, there were major social changes between the interwar years and the early 1980s that are important to keep in mind. In the interwar years, the workforce was largely ethnically homogeneous. Divisions in society formed around class and education lines, which were deepened by the divides in regional performance. After World War II, immigration from the Caribbean, India, Pakistan, and parts of Africa increased. These workers were given the right to reside and work in Britain, and they ended up playing an essential role in addressing post-war labor shortages. Immigration from the Commonwealth was restricted in the late 1960s, and the Immigration Act of 1971 made it so that only immigrants with a British ancestor were guaranteed a right to abode. Though immigration laws were stricter, by the early 1980s first

5. The shift to protectionism in 1931 was a major exception to this.

6. See, for example, the statements of the Secretary of State for Employment, James Prior, in June 1981 (HC Deb 24 June 1981 vol 7 cc252-340).

and second-generation Windrush and Indian subcontinent immigrants made up a small but significant portion of the population. This added a new dimension to historical social divides, and Chapter 4 analyzes the marginalization of some of these workers in the labor force.

The position of women also shifted from the interwar period to the 1980s. The interwar years saw a reversal of the economic progress of women in some ways. Many women who had contributed work during World War I were forced out of their positions by the Restoration of Pre-War Practices Act (1919), which gave "back" jobs to ex-servicemen, as well as by the closure of munitions factories. All told, almost 750,000 women lost their jobs directly after the war, with many moving back into the domestic sphere (Pyecroft 1994). Though women made gains in other areas, including suffrage and the ability to enter professions and earn degrees, they faced deeply segregated labor markets, the marriage bar, and discriminatory pay. In the 1980s, the increasing labor force participation of women, driven by an increase in the participation of married women, and better access to educational qualifications advanced the position of women in the economy. The economic gains of women during this period, however, varied along class, educational, and regional lines, with higher-status jobs and better pay accruing to some women while others still faced precarious employment in low-wage jobs (Humphries and Rubery 1992).

The interwar years and early 1980s thus provide rich settings in which to explore the impact of structural change and recession on labor markets. The methodological approach of the thesis, however, is not directly comparative. Each period is considered independently, and econometric techniques, rather than comparative historical methods, are typically used to answer the research question for each chapter. The link between the interwar period and the early 1980s is drawn by asking the same questions of both periods: how did structural change and the business cycle interact, and how did the consequences for the labor market vary across industries, regions, and demographic groups?

The thesis is organized around four substantive chapters, with the first two relating to interwar Britain and the final two relating to Britain in the early 1980s. The major themes of the interaction of structural change and the business cycle and the unequal effects of recessions are mixed throughout Chapters 1 and 2 on the interwar period. For the 1980s, Chapter 3 investigates the first theme directly, while Chapter 4 focuses on the second theme.

A unifying feature of the chapters of this thesis is data production. For each chapter, I construct novel datasets from archival records and online sources to offer new insights into the structure and functioning of historical labor markets at a disaggregated level. The most

significant data production effort is in Chapter 2, where I present the first complete digitization of the Ministry of Labour's *Gazette* data on monthly unemployment in the interwar period for 100 industries, disaggregated by gender. Chapter 2 also relies on a digitization of the 1924 and 1930 *Census of Production*, which is linked to the *Labour Gazette* for the first time. The other chapters also incorporate major data digitization and construction efforts. The analysis in Chapter 4 relies on a new construction of the General Household Survey from 1976 to 1987 that I built from the individual-year files. Chapter 3 explores industry-level employment by region, based on my digitization of printed copies of the *Employment Gazette* which contain the data prior to 1981. Finally, the sample of economists analyzed in Chapter 1 is derived from an analysis of a complete text corpus of the *Economic Journal* from 1921 to 1935 that I constructed.

The analytic approach of each chapter thus varies based on the research question, data availability, and suitability of econometric models. I close this introduction by summarizing in detail the research questions addressed by each chapter, the data and methods, the findings, and the chapter's contribution to the literature.

Chapter 1 lays the groundwork for the rest of the dissertation by providing an account of the contemporary academic understanding of the concept of unemployment. During the interwar period, there was a shift in how unemployment was understood in the field of economics. The prevailing Marshallian tradition did not address mass unemployment, predicting that market forces would act through wages to ensure that individual labor markets cleared (Marshall 1920, p. 532). As Britain grappled with persistent unemployment throughout the 1920s and 1930s, new explanations of mass unemployment were put forth that incorporated cyclical, monetary, structural, and macroeconomic forces. Chapter 1 explores this transformation in the field of economics away from a strictly Marshallian interpretation of unemployment toward a broader understanding of unemployment as a deeply-seated social problem with many causes and multiple forms.

Chapter 1 thus investigates what was meant by unemployment in the interwar years; why, and to what extent, unemployment was considered a problem; and how structural and cyclical unemployment were understood in a pre-Keynesian setting. To identify economists writing on unemployment in the interwar period, a text corpus is constructed containing every article published in the *Economic Journal* from 1921 to 1935. Using text analytic methods, thirty authors that wrote on unemployment are identified in the corpus. The bulk of the chapter is then devoted to analyzing all of the works on unemployment that these thirty economists produced during the

period. The analysis of these thirty economists' writings makes reference to Thomas Kuhn's *The Structure of Scientific Revolutions* (Kuhn 1970). The Marshallian microeconomic tradition that unified most economic work before World War I is taken as a Kuhnian "normal science." We can then observe how interwar economists responded to the "anomaly" of persistent unemployment, which could not easily be explained by Marshall's economics, before the publication of Keynes' *General Theory* (Keynes 2013c).

The discussion of the works of these thirty economists reveals that some economists remained committed to a largely Marshallian interpretation of interwar unemployment, arguing that unemployment could be resolved by a reduction of wages. Many, however, departed from this "normal science." Some, such as Henry Clay, focused on the role of structural change and the unique challenges facing the export industries. Others connected unemployment to the business cycle, exploring various monetary policy interventions. Interest in the operation of unemployment insurance, public works as a remedy for unemployment, and technological unemployment also expanded. Keynes adopted several explanations of unemployment prior to the *General Theory* (Keynes 2013c), supporting monetary reform, rationalization, public works, and loan-financed government expenditure throughout the period.

The differing approaches of interwar economists to Britain's unemployment challenge reveal how the meaning of unemployment shifted in this period. By the end of the interwar period, unemployment was no longer considered a short-term problem of getting markets to clear. The Marshallian consensus had been disrupted, revealing unemployment to be a multifaceted problem that was much more difficult to resolve. Chapter 2 is thus motivated and shaped by the work of interwar economists that hypothesized a role for both cyclical and structural forces and suggested that their interaction had a disproportionate impact on certain workers.

Chapter 2 provides new econometric evidence on the characteristics and causes of interwar unemployment, evaluating the role of structural change using novel microdata for industries, regions, and gender. I find that structural change played an integral role in interwar unemployment, causing the impact of the interwar recession to vary significantly across industries, regions, and gender, and creating, in some cases, persistent disadvantage.

A large literature, sparked by Benjamin and Kochin (1979), has debated the causes of the prolonged interwar employment downturn. This macroeconomic literature has generally focused on whether depressed aggregate demand (Broadberry 1983; Dimsdale, Nickell, and Horsewood 1989; Turner and Bowden 1997) or aggregate and institutional labor market rigidities such as inflexible

wages, unemployment insurance, and trade unionization (Beenstock and Warburton 1986, 1991; Hatton 1988; Hatton and Thomas 2013) contributed to high levels of overall unemployment. These perspectives contrast with the descriptive accounts of contemporary economists, such as those discussed in Chapter 1 Section 1.6, and some historians (notably Aldcroft and Richardson 1969) that emphasize the role of the structural transformation of the economy away from traditional export industries, with a distinct regional component.

Chapter 2 builds on both of these approaches, using econometric methods to evaluate the influence of structural change on interwar unemployment. The analysis relies on the digitization of the Ministry of Labour *Gazette* data on unemployment among insured workers for 1923–1936, giving monthly counts of the numbers unemployed for 100 industries, disaggregated by gender. Since their publication, hand-collected subsets of this unemployment insurance data have been used in reference works and in early empirical research on the interwar period (Beck 1951; Chapman and Knight 1953; Feinstein 1972, for example). Some recent papers have also used subsets or aggregates of the *Labour Gazette* data (Gazeley and Rice 1992, 1996; Bowden, Higgins, and Price 2006; Luzardo-Luna 2020). With the complete data, Chapter 2 is able to analyze four times as many industries as any previous paper, while also disaggregating by gender.

This rich, disaggregated data reveals that interwar unemployment varied significantly by industry and gender and was not just a problem of the staple industries. Regional effects above and beyond industrial mix also increased unemployment in the North of England and Wales and decreased unemployment in the other regions of Britain. This created the conditions for the reallocation of labor across industries — a structural transformation of the economy toward the industries and regions with the most growth potential. Our understanding of the extent to which this reallocation actually occurred has been limited by the reliance on aggregate, macroeconomic approaches in the literature, and no previous work has been able to explore the flexibility of the labor market by gender, by region, and by sector.

Chapter 2 is able to overcome some of these data and methodological limitations, asking how much reallocation of labor across industries occurred in interwar Britain, and how this varied by industry, region, and gender. Was the labor market more flexible for some workers and industries than others? To answer these questions, I capture reallocation econometrically in two ways. First, I estimate adjustment coefficients using OLS that represent the extent to which workers in an industry were able to transition into other industries — a measure of labor market flexibility. I explore how these adjustment coefficients varied over time, for men and women, by sector, and

by region. Then, I estimate Markov transition probabilities between industry categories, using these estimates in a simulation to link adjustment rigidities to persistent unemployment.

I find that labor market rigidities that generated persistent unemployment affected some groups of workers much more than others. Workers in services and in some types of manufacturing, those in the South East of England, and men, relative to women, were better off than has been previously thought, with many labor market opportunities and a low risk of long-term unemployment. Other workers had fewer opportunities to move to other industries and a higher risk of persistent unemployment, including workers in textiles and mining, those in the North of England, and women. The Great Depression increased differences in labor market flexibility between these groups, accelerating the movement of workers into expanding industries while further limiting the options for workers in structurally disadvantaged industries. This is new econometric evidence that certain groups were disadvantaged in the interwar labor market — some workers faced not only a higher risk of becoming unemployed from the demand shock, but also fewer options to move into other industries.

Chapter 2 also explores the determinants of unemployment on an industry and gender level. I link the *Labour Gazette* with the *Census of Production*, constructing a rich dataset with industrial characteristics and unemployment trends for 100 industries. Then, I estimate the determinants of unemployment by regressing traditional supply-side explanations for interwar unemployment (e.g., high wages, trade unions) and structural explanations (e.g., overexpansion during World War I, export exposure) on industry unemployment rates in 1924 and 1930. These structural factors account for a significant portion of the unemployment differentials between industries, demonstrating that, on an industry level, structural transformation directly affected the incidence of unemployment in the interwar years.

Chapter 3 moves to the early 1980s period, arguing that the slow employment recovery in Britain from the 1980–1981 recession can be considered an early example of a "jobless recovery." The chapter introduces the jobless recovery framework and seeks to understand why the recovery of employment was so slow in the early 1980s, despite the strong output recovery from the recession.

A large literature has developed around the concept of jobless recoveries and their possible causes, focused primarily on the US from the 1990s. Chapter 3 presents evidence that Britain had a jobless recovery from the early 1980s recession, even with issues of recession dating and composition effects taken into account. This pushes back the date at which jobless recoveries were

thought to have begun by a decade. Three possible causes of jobless recoveries in the US case have been identified in the literature: industrial reallocation and structural change (Groshen and Potter 2003, for example), job polarization and technological change (Jaimovich and Siu 2020, for example), and employment overhang (Koenders and Rogerson 2005, for example). Chapter 3 tests two of these explanations for the British case, the reallocation of labor across industries and job polarization. Additionally, I evaluate the interaction of the reallocation of labor across industries and regional change.

For each possible explanation of the jobless recovery, the experience of Britain is compared to the United States, which did not have a jobless recovery from the early 1980s recession. This is an interesting comparison as there were many similarities in the British and American experiences in the early 1980s, including their monetary policy response to the recession, dramatic deindustrialization, and in the effects of the oil price shock.

The comparison is based on newly-digitized data from the *Employment Gazette*, offering the quarterly number employed by industry and region in the late 1970s and early 1980s. Comparable data for the US is taken from the Quarterly Census of Employment and Wages (QCEW). The analysis of job polarization also uses restricted-access ONS data from the Annual Survey of Hours and Earnings (ASHE), previously called the New Earnings Survey (NES).

Though the US and Britain were similar in many ways, I find that Britain experienced rapid, permanent labor reallocation across industries that was more significant than that in the US. The decline in the employment share of manufacturing and the increase in the employment share of banking and finance in Britain were especially large relative to the US. Both Britain and the US had significant changes in their regional distribution of employment during the early 1980s period, but in Britain a shift-share analysis reveals these were in large part due to industrial mix effects. Finally, job polarization was more significant in Britain than in the US over the recession and recovery period, but a large portion of this polarization was between industries rather than within industries.

Chapter 3 thus concludes that labor reallocation across industries was the key factor behind the early 1980s jobless recovery. The regional disparities that did emerge in Britain were driven in large part by the experiences of industries, and polarization mostly occurred between industries as well. Structural change thus shaped the early 1980s recession by slowing the employment recovery, creating a jobless recovery that left many out of work despite the strong recovery of other parts of the economy.

Chapter 4 explores how this rapid structural change and jobless recovery from the 1980–1981 recession had unequal effects across demographic groups, industries, and regions. Specifically, the chapter investigates which workers were disproportionately impacted by the recession and recovery and whether these effects were persistent. Chapter 2 demonstrated that in the interwar period, some workers had fewer opportunities to move to other industries, leading them to be more likely to experience persistent unemployment. Chapter 4 looks at a similar question for the 1980s, conducting the analysis on an individual level.

The focus of Chapter 4 is on the labor market consequences of the recession and recovery for nonwhite workers, immigrant workers, and women, as their position in the labor market was contested in the early 1980s. Contemporary analyses of their disadvantage were limited by a lack of individual-level data (Rubery and Tarling 1988, for example) or by a focus on single-year datasets (Chiswick 1980; Blackaby 1986, for example). Chapter 4 deepens our understanding of the labor market experiences of these workers by developing a nationally-representative individual-level dataset for 1976 through 1987 and by implementing now-standard econometric techniques for identifying differences in employment outcomes between groups.

The analysis is based on a new dataset I constructed from the individual-year files of the General Household Survey (GHS). Careful linking of these files allows many individual and employment characteristics, such as race, immigration status, educational attainment, industry, and occupational class to feature in the analysis. The difference in the probability of employment for workers with similar characteristics from different demographic groups, industries, or regions is then estimated using a series of linear probability models. The main effect is interacted with a year time trend, showing how the employment gap between groups changed over the recession-recovery cycle.

Chapter 4 finds that the 1980–1981 recession decreased the relative probability of employment for workers who were nonwhite, first-generation immigrants, men, in the North of England, in Wales and Scotland, and in production industries, holding all else equal. But the most unequal impacts of the recession were actually felt during the jobless recovery period from 1982. As jobs were lost and gained during the early recovery period, the position of disadvantaged workers worsened. A portion of these effects persisted through the end of the recession-recovery cycle in 1987, especially the gap in employment outcomes between white and nonwhite workers.

This chapter provides new evidence that nonwhite workers faced a significant employment penalty during the early 1980s recession and recovery, all else equal. First-generation immigrants

were further disadvantaged, even when race is taken into account. Women in the labor force were more likely than men to be employed throughout the period, though the effect becomes smaller when industry is taken into account. This suggests that segmentation into certain industries and occupations protected women from some of the effects of the recession, but also that women were substituted for men generally in the period, possibly because of being cheaper to employ. Finally, the findings of Chapter 3 are confirmed, as workers from certain industries and regions faced large and persistent disadvantage. These results demonstrate that the early 1980s recession and jobless recovery disproportionately affected certain workers, and, in some cases, generated employment inequality that was persistent.

The thesis concludes with a short summary of the findings and directions for future research. In both the interwar years and the early 1980s, structural change is found to have contributed to, and amplified, the cyclical downturn. This interaction caused these recessions to have a disproportionate impact on certain industries, regions, and demographic groups, with some workers experiencing persistent disadvantage. This reshapes our understanding of these two employment downturns, suggesting that mass unemployment was actually more of a "meso" problem that was disproportionately borne by certain workers. It also opens up avenues for future research that will continue to deepen our understanding of these downturns and explore the complex interaction between structural change and the business cycle.

Chapter 1

The Anomaly of Interwar Unemployment

1.1 Introduction

In both the interwar period and the early 1980s, major recessions coincided with periods of dramatic structural changes in the economy. The upcoming chapters explore the interaction of these twin forces of structural change and the business cycle. I will argue that structural change contributed significantly to each cyclical downturn, which had the effect of generating persistent inequalities in labor market outcomes.

In order to make sense of this quantitative analysis of two very distinct episodes, it is necessary to first engage directly with the central concept of unemployment. Economic theory is a product of location and time, conditioned by prevailing economic conditions, intellectual trends and fashions, and the ability of new approaches to revise and update our understanding of economic phenomena. The political economy of the interwar period and the 1980s was remarkably similar, with a strong belief in markets and commitment to market clearing. But the field of economics in these two periods was distinct.

In the 1980s, the theory and methods available to economists seeking to understand persistent unemployment was almost as rich as it is today, with lively debates in the macroeconomic literature about models that are still in use. In the interwar period the field of macroeconomics had not yet been developed, and the concept of unemployment as a social problem was only a few decades old. It is therefore necessary to give special attention to the economic research on unemployment from the interwar period.

The present chapter thus lays the groundwork for the rest of the thesis by providing essential

context for the interwar period on central concepts in the quantitative work. A close analysis of economic writings on unemployment from the interwar period will help to clarify what is meant by unemployment; why, and to what extent, unemployment was considered a problem; and how structural and cyclical unemployment were understood in a pre-Keynesian setting. This analysis both motivates and aids our understanding of the results of Chapter 2.

To answer these questions, I first systematically identify economists writing on unemployment in the interwar period. I construct a text corpus of all of the articles published from 1921 to 1935 in the *Economic Journal*, the premier British economics journal. I use text analytic methods in Python to determine whether an author wrote on unemployment during the period. This generates a sample of thirty economists from a wide variety of institutions who studied unemployment in the interwar period.

Then, I examine the works of these economists from the interwar period, with special focus on any texts that discussed unemployment. I analyze their writings using a framework that takes the development of John Maynard Keynes' *The General Theory of Employment, Interest and Money* (1936) as a Kuhnian revolution or paradigm shift. Prior to the paradigm shift, researchers are engaged in "normal science" solving open questions ("puzzles") using traditional tools. These scientists are confronted with an anomaly that is not addressed in and thus cannot be explained under the existing paradigm — in this case, persistent unemployment. Attempts to resolve this crisis then lead to the development of a new paradigm — the *General Theory*.

This framework is helpful for understanding the writings of economists prior to the development of the *General Theory* because it gives due weight to the prevailing Marshallian economic tradition. Unlike in the 1980s, economists in the interwar period were not choosing among a multitude of fully-fledged, and often ideological, models for the macroeconomy. Instead, economics was largely unified in a Marshallian microeconomic tradition that emphasized market clearing. Wages brought the supply and demand for labor into equilibrium in individual markets, and long-term unemployment was not considered. By taking this conception as Kuhnian normal science, we can observe how interwar economists responded to anomalous persistent unemployment. This helps to understand how the concept of unemployment shifted during the interwar period from a short-term effect of markets converging toward equilibrium to a multifaceted challenge that, in the Keynesian case, might not resolve on its own.

The bulk of this chapter is thus devoted to analyzing the economic perspectives of all thirty economists in the *Economic Journal* sample with reference to the Kuhnian framework. Their

writings reveal extremely varied approaches to the unemployment challenge interwar Britain faced. Some clung optimistically to the Marshallian framework with the expectation that a reduction in wage rigidity would permit markets to clear. Others began to expand their understanding of unemployment to encompass unemployment of different forms, especially that from structural changes in the economy. A growing number focused on the business cycle and its connection to monetary policy, developing concepts of cyclical unemployment. Finally, the works of John Maynard Keynes, Arthur Cecil Pigou, John Rotherford Bellerby, and Henry Clay are highlighted for their detailed, changing response to the Kuhnian anomaly of persistent unemployment.

The meaning of unemployment shifted over the interwar period from a short-term problem of markets finding equilibrium to a complex, deeply-seated social problem with many forms and possible policy responses. This affects our understanding of the analysis in Chapter 2, which seeks to disentangle unemployment at a disaggregated level rather than approach it with an aggregate, macroeconomic perspective. The work of interwar economists helps us understand why structural change needs to be taken into account in our understanding of cyclical downturns, and how this interaction can disproportionately affect certain workers. Marshall's "normal science" was disrupted not just by the Great Depression, but by secular structural trends in the British economy and monetary policy choices, making the causes of interwar British unemployment, and their remedies, more complex than was previously thought.

1.2 Related literature

British unemployment in the interwar period has been studied extensively, but few attempts have been made to systematically review the work of British economists on the problem in the 1920s and early 1930s. Keith Hancock considered the question directly for the 1920s in a survey article "Unemployment and the Economists of the 1920's," published in 1960. Though limited in scope, this article considered the work of many of the economists surveyed here and argued that more progress on unemployment would have been made in the decade if research had been more empirical and less dogmatic (Hancock 1960). My project expands and deepens Hancock's survey, using a greater range of sources and extending through 1935. Mark Casson's *Economics of Unemployment: An Historical Perspective* discussed the work of Pigou, Clay, and Edwin Cannan, abstracting their ideas on unemployment into a single structural model (Casson 1983). My analysis reveals significant differences in these economists' positions on

unemployment, suggesting a single model might not be suitable.[1] Finally, a number of histories of unemployment in the interwar period devote some pages or chapters to the work of economists in the period in comparison; Garside (1990), Garraty (1978), and Winch (1972) are notable examples.

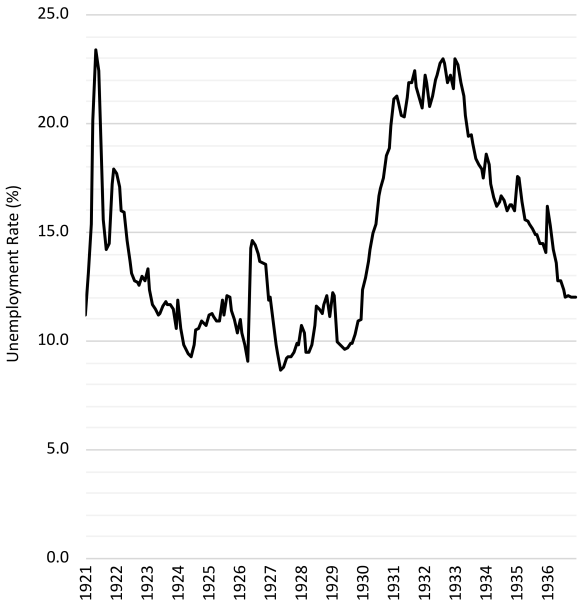
Much of the secondary literature on Keynes contributes to a general understanding of the approach and perspectives of economists in this period. Peter Clarke's *The Keynesian Revolution in the Making* offers rich historical detail on Keynes, his fellow economists, and government personnel, with a focus on the early 1930s (Clarke 1988). Offering similar archival detail, G. C. Peden's *Keynes and His Critics: Treasury Responses to the Keynesian Revolution, 1925–1946* describes the influence of economists on government policy in this period while reproducing a number of important Treasury documents (Peden 2004).

This chapter discusses the work of both prominent economists and economists whose contributions have been neglected in the secondary literature. For those economists with a vast secondary literature, this chapter offers a comprehensive critical reading of their works in the 1920s and early 1930s with a focus on their writings on unemployment. By engaging closely with their writings on this single issue, I am able to draw out the subtleties of their positions and trace how their views changed throughout the period. I refer to selected secondary literature in each of these economists' sections. For the economists who are less well-remembered, this chapter aims to bring to light their work, highlighting their unique innovations or perspectives and situating them in the intellectual history of the time.

Most recent research on interwar British unemployment has used statistical techniques to uncover the extent and causes of the downturn. A comprehensive literature review on this research is given in Chapter 2. In using Kuhn's *The Structure of Scientific Revolutions*, I also make reference to a large philosophy of economics literature on the development and testing of scientific models. As discussed in Section 1.3.2, however, I do not make any inference about the general validity of this model beyond the limited historical episode at hand.

1. Blaug (1996, p. 645) also groups Pigou, Clay, and Cannan, presumably based on Casson (1983), calling them "structuralists... who attributed unemployment to real wages being too high, especially in declining staple industries." Subsection 1.6.1 demonstrates Clay in fact held the opposite view, especially with reference to the staple export industries.

Figure 1.1: Unemployment rate for insured workers, 1921–1936



Source: FRED, National Bureau of Economic Research, Insured Workers Unemployed for United Kingdom [M082ABGBM513NNBR]. Percent of insured workers unemployed each month, as printed in the *Labour Gazette*

1.3 Interwar unemployment and the Kuhnian framework

The expansion of the National Insurance scheme to over 11 million individuals at the end of World War I led to the systematic collection and distribution of comprehensive unemployment figures for the insured in Britain. Every July, the number of people registered under the Unemployment Insurance Act was determined by the new issue of Unemployment Books at local unemployment exchanges. If an insured worker was unable to find employment, their book would remain lodged at the exchange. The Ministry of Labour's *Labour Gazette* estimates of unemployment were thus calculated as the "Books Lodged" on a given day of the month in question divided by the total insured in July (Garside 1980, pp. 33-36). These are presented in Figure 1.1 above.[2]

Taken as they are, these unemployment figures are astounding. The average unemployment rate from 1921 to 1936 was 14.5%. The unemployment rate peaked sharply at 23.4% with the economic downturn in May 1921, recovering dramatically before climbing again to around 14.5% with the General Strike in the summer of 1926. Despite this volatility, the unemployment rate during the 1920s was typically well over 10%, with an average for the decade of 12.4%. The

2. This unemployment rate only includes workers in insured industries. Workers in domestic service, agriculture, forestry, and public administration and defense were excluded from the scheme, as well as workers in non-manual jobs earning more than £250 per year. These excluded industries tended to have lower unemployment rates than the insured industries. See Section 2.3 for more details.

Great Depression then exacerbated unemployment, causing the unemployment rate to rapidly increase to over 23% in 1932 and 1933. The unemployment rate fell somewhat from 1934 to 1936, declining to about 12%.

This time series suggests that throughout the interwar period — including the decade before the global Great Depression — Britain experienced persistently elevated unemployment levels. The unemployment rate in Britain never fully declined to its pre-1921 level, and labor market performance was poor throughout the 1920s. The effect of the Great Depression was to increase unemployment even further. Though Britain had a strong recovery from the Great Depression relative to other nations from 1934 to 1936, unemployment still did not fall to its 1920s or pre-World War I level.

1.3.1 The anomaly of interwar unemployment

The scale and duration of unemployment in the 1920s and early 1930s was unprecedented in comparison to the pre-World War I and post-World War II periods, even once differences in the way in which unemployment was measured are taken into account.

While interwar unemployment estimates were based on the comprehensive National Insurance scheme, pre-war unemployment estimates were derived from an assortment of trade union returns. The unemployment estimates were compiled by the Board of Trade based on the total membership and number of unemployed in various trade unions. This gives an average unemployment rate of 4.8% for 1883–1913. The industries represented in these figures — including building, woodworking, coal mining, engineering, shipbuilding, and textiles, among others — totaled 993,000 workers in 1914. This is only about a fourth of the total workers associated with a trade union, and significantly less than the 11.5 million insured population forming the base of the 1921 statistics (Garside 1980, p. 13). The small sample of the trade union-based unemployment estimates would not be an issue if it were representative, but there is evidence that these figures were unrepresentative of unemployment both within the industries covered and in the population at large. For example, the statistics on the building trades which were included only reflected a portion of the industry, reporting unemployment among carpenters but not among bricklayers. Other unionized industries like dock work were excluded from the figures. All unorganized labor was also excluded (Garside 1980, pp. 17-18).

Because these are the best pre-war unemployment statistics available, attempts have been made to make them more comparable with the interwar National Insurance statistics. William

Beveridge argued that the trade union statistics understate pre-1914 unemployment, suggesting the average unemployment from 1883–1913 should be raised from 4.8% to 6.0% based on *ad hoc* adjustments to reflect unorganized workers, temporary unemployment, and increased trade union unemployment insurance coverage (Garside 1980, p. 58). Feinstein also presented an adjusted series based on Census data but without the industry-level adjustments of his interwar series. He found the average unemployment over the same years to be 4.8% (Feinstein 1972, T125-126, my calculation). Boyer and Hatton (2002) make these sectoral-level adjustments, estimating that the average unemployment rate was 6.2 percent from 1892–1913.

The limitations of the trade union data in the pre-war period need to be kept in mind when comparing directly to the interwar period. That said, there is not even suggestive evidence for the claims of some economists that the national unemployment rates in the interwar period were on par with the unemployment rates in the pre-war period (Booth and Glynn 1975, p. 614, for example). The evidence we do have, from the original series and from these two revisions, suggests that unemployment rates in the pre-war period were lower than in the interwar period — perhaps around 4.5–6.2% on average in the pre-war period, and around 8.1%–14.5% on average from 1921 to 1935.

Though the post-World War II data was not available to economists in interwar Britain, it highlights the severity of the interwar unemployment episode. From 1948, the National Insurance scheme was extended to almost all workers, and the count of insured workers unemployed was drawn from a 25% sample of those registered (Garside 1980, p. 62). Because the uninsured during the interwar period most likely had a lower unemployment rate than those insured, these new unemployment estimates are artificially deflated so cannot be compared directly to the interwar estimates. However, even when the interwar series is decreased by a fifth, in line with Feinstein (1972, T57), and the post-war series is increased by a third, average unemployment in the interwar period was still at least three times higher than average unemployment in the post-war period (Metcalf, Nickell, and Floros 1982).[3] From 1948 to 1965, the highest annual unemployment rate (increased by a third) is still more than 2.5 times lower than the lowest annual unemployment rate in the interwar period (Feinstein 1972, T125-127, my calculation). Unemployment in interwar Britain was thus much more severe than after World War II.

3. The unemployment rate series in Feinstein (1972) is revised downward to reflect the lower unemployment rates among those excluded from the insurance scheme (see footnote 1.3). For the years 1921–1930, his series relied on the assumption that a constant 16.8% of the unemployed population was not covered under the National Insurance scheme. This is the proportion of the unemployed that was uninsured in the 1931 Census (Feinstein 1972, p. 221).

1.3.2 Kuhnian framework

Throughout this chapter, I use a Kuhnian framework to analyze interwar economists' work on unemployment. Though controversial, the Kuhnian framework provides a useful heuristic for observing how economists responded to the anomalous unemployment of the interwar period.

Thomas Kuhn's *The Structure of Scientific Revolutions* is one of the most cited works of all time (Martín-Martín et al. 2016; Green 2016), offering an alternative to the tradition of logical positivism in the philosophy of science. Originally trained as a physicist, Kuhn restyled himself as a historian of science after achieving his PhD from Harvard. In *Scientific Revolutions*, Kuhn argues for a new theory of scientific change from a historical and sociological perspective.

For Kuhn, science progresses through a series of discipline-specific revolutions, where one "paradigm" is replaced by another. A paradigm consists of the coherent rules, methods, and consensus knowledge a group of scientists agree upon and employ regularly within a discipline. In periods of "normal science," these scientists develop and deepen the paradigm by sharpening definitions and answering outstanding questions. Kuhn likens this activity to puzzle-solving, because the open questions, acceptable tools, and type of answer are specified by the paradigm (Kuhn 1970, pp. 35-42).

The paradigm offers a clear sense of what is expected from work in a discipline, but occasionally an "anomaly" that has not been addressed by this framework is encountered. An anomaly can be a fact discovered that was not predicted or some improvement in method which leads to unexpected results. At first the anomaly is not disturbing to most normal scientists, and they attempt to reconcile the anomaly with the existing paradigm. However, true anomalies will continually fail to be resolved, drawing scientists away from the dominant paradigm. These scientists will develop separate facts and methods around this anomaly until it constitutes a full-fledged paradigm that can compete with the dominant paradigm (Kuhn 1970, pp. 52-65).

This commences a period of "crisis," where the two paradigms compete for dominance in a discipline. Periods of crisis are characterized by disagreements about the use of terms and about the questions the discipline should be addressing. Eventually the crisis fizzles out, and in some cases the new paradigm displaces the old. The choice between paradigms at this stage is a real choice influenced by sociological and psychological factors, rather than a logical choice (Redman 1991, pp. 18-19). In many cases, the transition is driven by the newest members of the field, who find the new paradigm more useful and convincing than the old (Kuhn 1970, p. 90).

Work then transitions back to normal science under this new paradigm, concluding the process of "scientific revolution."

The Structure of Scientific Revolutions has been criticized by philosophers, scientists, and historians alike. It faces serious charges of relativism (Popper 1970, pp. 56-57; Kunin and Stirton Weaver 1971, p. 396), relies on a process of discovery that could be irrational (Lakatos 1970, p. 93), and requires a difficult demarcation of periods and disciplines (Baumberger 1977, pp. 14-15). It is not even clear that a valid philosophy of science can be drawn from historical experience (Blaug 1975, p. 405). Many of these criticisms are especially salient for economics, but this has not prevented numerous, largely uncritical, attempts to classify various episodes in the history of economic thought as scientific revolutions (Worland 1972; Stanfield 1974; Dillard 1978, for example). Kuhn himself even suggests that economics might fall under his theory (Kuhn 1970, p. 161). My project does not follow this classification literature and does not engage directly with Kuhn's *Scientific Revolutions* on a philosophical level. Instead, Kuhn provides a helpful heuristic framework for understanding the context of the problem of unemployment in the interwar period, providing a structure from which to analyze varied perspectives on the issue.

Using this framework, we can think of economics from 1890 through World War I as a sort of normal science period, where economists approached questions defined by the Marshallian tradition. It is difficult to overstate the importance of economist Alfred Marshall to the field of economics. In a reflection on the discipline of economics delivered in 1939, Pigou wrote, "Forty years ago, indeed down to the catastrophe of the War, economic thought in this country was dominated to a quite extraordinary degree by one man — Marshall. He was our leader, practically unchallenged" (Pigou 1939, p. 219).

Marshall founded the Tripos in Economics and Politics at Cambridge and taught both Pigou and Keynes. His 1890 text *Principles of Economics* defined the field in Britain, undergoing eight editions through 1920 (Marshall 1920). This work brought together the concepts and methods of a variety of nineteenth-century economists into an almost cohesive whole. Marshall united marginal utility theory with diminishing returns, elasticity, consumer surplus, and partial equilibrium models, shifting economics away from the classical theory of value towards price-based value. Marshall's work was so influential and authoritative that it constrained the questions and methods of economic research. Pigou described, "The broader problems of economics being safe in Marshall's keeping, we were content in our early theses to attack narrow issues reasonably within our compass" (Pigou 1939, p. 219). The Marshallian tradition was thus pervasive and

largely unquestioned at the beginning of the interwar period.

In the Marshallian labor market model, wages are assumed to equilibrate the demand and supply of labor. Marshall wrote, "Thus again we see that demand and supply exert coordinate influences on wages; neither has a claim to predominance; any more than either blade of a pair of scissors, or either pier of an arch ... wages are not governed by demand-price nor by supply-price, but by the whole set of causes which govern demand and supply" (Marshall 1920, p. 532). Marshall's model thus focuses on individual labor markets being brought back into equilibrium through wage adjustments, not addressing long-term involuntary unemployment.[4]

With Marshallian economics as *modus operandi*, interwar economists faced a problem. How could a long-term disequilibrium of employment be explained? Persistent unemployment posed a challenge to the dominant Marshallian normal science. We can use this framework to explore how interwar economists responded to this anomaly, clearly identifying their innovations, or in some cases, identifying when they turned a blind eye to the problem. In this application, the incongruity between long-term, mass unemployment and the Marshallian tradition eventually led to Keynes' reworking of the determinants of employment in the *General Theory* — the revolution at the end of this period of crisis. While Keynes' focus on aggregate employment represented a important departure from the Marshallian paradigm, the ultimate choice between paradigms constituting this revolution is not considered in this thesis. The Kuhnian framework provides a useful heuristic for organizing the work of interwar economists in the period up to the *General Theory*, but it is still a subject of debate whether the Marshallian paradigm was truly overturned or replaced by a Keynesian one after its publication.

1.4 Text analytic methods and primary sources

Who was writing on unemployment in the 1920s and early 1930s? By developing and analyzing a text corpus of all of the articles in the *Economic Journal* from 1921 to 1935, economists who researched unemployment can be identified in a systematic way.

4. This model is complicated when nominal wage reductions are considered. Nominal wage reductions cause prices to fall proportionately in the short run because all short-run variable costs are from labor. Real (product) wages are thus unchanged, and so the demand for labor is also unchanged. Nominal wage cuts must affect employment in the short run either indirectly, by affecting other factors such as tax burdens, the balance of payments, the interest rate, etc., or via lags between wage reductions and price changes.

1.4.1 The *Economic Journal* sample

The *Economic Journal* was founded in 1891 and was the dominant academic economic publication outlet in Britain during the 1920s and early 1930s, perhaps only for lack of available alternatives. The only other British economic journal was the London School of Economics' house journal *Economica*, established in 1921. A small assortment of journals from other countries were available but not widely used by British economists,[5] and economists could also publish in various periodicals for the general public.[6]

The *Economic Journal* was also intended from its founding to represent diverse views fairly, making it an excellent source. The first editor of the journal, Francis Ysidro Edgeworth, wrote in the opening issue that, "it will be the task of the Editor and his coadjutors, unbiassed by their personal convictions, to select the ablest representatives of each important interest" (Edgeworth 1891, pp. 1-2). It was in this tradition that Keynes became the effective editor of the *Journal* from 1912–1944, a period in which the *Journal* published articles on an impressively wide array of topics, including work from writers not associated with the academy, women, and international scholars. Indeed, Keynes was remembered as committed to publishing strong economic work regardless of the author (Robinson 1947, p. 30). During the 1920s and early 1930s, the editorship was always shared, offering additional balance. Edgeworth returned to edit the journal from the end of World War I until his death in 1926, when he was then replaced by his successor at Oxford, David Hutchinson MacGregor.

The corpus of articles from the *Economic Journal* is thus largely representative of the economic work published in article form in Britain in the 1920s and early 1930s.

1.4.2 Text analysis and results

After collecting all of the articles from 1921 to 1935 published in the *Economic Journal*, I used optical character recognition to convert the articles into text files and wrote a Python script to extract information. I found that 514 articles were published by 277 unique authors during this time period. For each article, I counted the number of times unemployment was referred to by summing instances of the words "employment," "unemployment," and "unemployed." I found that 123 of the 514 articles contained more than three mentions of unemployment (23.9%),

5. *Journal des Economistes* (France, 1841), *Quarterly Journal of Economics* (Harvard, 1886), *Journal of Political Economy* (Chicago, 1892), *PAEA/AEAQ/American Economic Review* (1886, AER from 1911).

6. *The Times*, *The Manchester Guardian*, *The Economist*, *The Statist*, *The Nation and Athenaeum* (from 1923), and *The New Statesman*, for example.

reflecting 84 unique authors (30.3%). However, a large number of these articles concerned unemployment in other countries, especially India and Australia, or only discussed unemployment indirectly while addressing other questions. To determine the true proportion of articles about British unemployment, I read all 123 articles to eliminate false positives. This left only 50 articles by 30 unique authors written on unemployment, or 9.7% of the 514 articles published in the *Economic Journal* in the 1920s and early 1930s.

Is 9.7% of articles a large or a small proportion? To understand this figure, I developed a second text corpus representing the 174 articles published in the *Economic Journal* from 1910–1919. In this period, using the same method, I find again that just under 10% of articles were written on unemployment (17 out of 174). Because the average unemployment rate from 1910–1919 was less than 5%, whereas the average rate for the 1920s and early 1930s was over 14%, one would expect that more articles would have been written on the problem in the latter period. This was not the case. Additionally, I consulted a list of theses in progress on economics at all British universities in 1925 to ensure that barriers to publication were not driving my results. Of the 78 theses being written on economics, only 8 were on unemployment (10%) (N.a. 1925a, 1925b).

The proportion of articles published in the *Economic Journal* about unemployment changed over the period. The highest proportion occurred from 1926–1931, a period in which unemployment was especially severe and politically relevant. From 1926–1931, 30.6% of all articles met the criterion of mentioning unemployment three times. In contrast, only 16.4% met this criterion from 1921–1925, and only 23.7% from 1932–1935. The pattern is qualitatively similar when only articles discussing British unemployment are considered.

Finally, it is notable that of the 277 unique authors published in the *Economic Journal* in the 1920s and early 1930s, only thirty wrote directly on the British unemployment problem (10.8%). The thirty economists identified by this method are the focus of the rest of the chapter.

1.4.3 Thirty economists

The authors identified who considered questions of unemployment were from diverse locations, with concentrations in Cambridge, London, and Manchester. There was also some diversity in occupations — one did not need to be a professional economist to publish in the *Economic Journal*, but the paper published had to be economic work. To understand the relative influence of these authors, I developed an internal citation count within the corpus. Table 1.1 shows that

Table 1.1: Set of interwar economists from the *Economic Journal* who wrote on unemployment

Economist	Location	Profession	Citations
A. C. Pigou	Cambridge	Professor of Economics	359
J. M. Keynes	Cambridge	Fellow of King's College	351
Edwin Cannan	London School of Economics	Professor of Political Economy	98
R. G. Hawtrey	London (Treasury)	Director of Financial Inquiries	92
Colin Clark	Cambridge	Lecturer in Statistics	82
Henry Clay	University of Manchester	Professor of Social Economics	72
W. H. Beveridge	London School of Economics	Director	54
T. E. Gregory	London School of Economics	Professor of Economics	37
P. Sargant Florence	Birmingham	Professor of Commerce	27
J. H. Jones	Leeds	Professor of Economics	26
R. F. Kahn	Cambridge	Fellow of King's College	26
C. T. Saunders	University of Manchester	Economics Research Section	16
J. Jewkes	University of Manchester	Lecturer in Economics	10
J. W. F. Rowe	London School of Economics	London and Cambridge Economic Service	8
Lynda Grier	Oxford	Principal of Lady Margaret Hall	8
G. W. Daniels	University of Manchester	Professor of Political Economy	5
Ely Devons	Manchester	Joint Committee of Cotton Trades	4
G. C. Allen	Hull	Professor of Economics and Commerce	4
H. Campion	Manchester	Cotton Trade Statistics Bureau	4
J. R. Bellerby	Cambridge	Research Fellow of Gonville and Caius	2
H. Stanley Jevons	University College of South Wales	Professor of Economics	1
James Southworth	Unknown	Unknown	1
A. Winterbottom	University of Manchester	Economics Research Section	0
Alfred Morgan	Glamorgan	Colliery official	0
Arthur Michael Samuel	London (Parliament)	Conservative MP	0
Brinley Thomas	London School of Economics	PhD Student and Research Assistant	0
Felix Morley	Oxford	Rhodes Scholar	0
Harry Dawes	Unknown	Unknown	0
Jens Warming	University of Copenhagen	Professor of Statistics	0
John P. Bibby	Liverpool	Financial Director, J. Bibby and Sons	0

Set of economists who wrote on unemployment in the *Economic Journal*, 1921–1935. Citation count is the total number of references to the economist in other articles in the *Economic Journal* text corpus for the period.

the most famous economists were cited over three hundred times, while lesser-known economists were never cited.

For each of these thirty authors, I examined their works during the 1920s and early 1930s, focusing on any texts that discussed the problem of unemployment. While there are over a thousand pages of primary sources by Keynes in his *Collected Writings*, other authors had very few published works. The differing lengths of discussion given to each of these thirty authors thus reflect the differing levels of detail I was able to obtain on their views on unemployment.

Five statisticians are included in the sample from the *Economic Journal* but not discussed extensively in this chapter. Felix Morley (1894–1982), a Rhodes Scholar at Oxford and eventual journalist for the *Washington Post*, utilized the National Insurance employment exchange data in 1922 to publish a paper on the differences in unemployment rates by gender and age (Morley 1922). Philip Sargant Florence (1890–1982), a lecturer at Cambridge and Professor of Commerce at the University of Birmingham, described the results of the Industrial Fatigue Research Board (Florence 1923) and examined women's labor supply constraints using statistical methods (Florence 1931). John Wilkinson Foster Rowe (born 1897), who worked with Arthur Bowley in

the London and Cambridge Economic Service, published a paper in the 1927 *Economic Journal* offering preliminary estimates of national production (Rowe 1927).

In the 1930s, three studies by Colin G. Clark (1905–1989) were published in the *Economic Journal* while he was a lecturer in statistics at Cambridge during and after the publication of his influential 1932 book *The National Income, 1924-1931*. These articles engage directly with the Ministry of Labour unemployment data to aid in estimation of the national income and descriptions of the current economic conditions in Britain (Clark 1931, 1933, 1934). Finally, Ely Devons (1913–1967) published a portion of his master's thesis in the *Economic Journal* in 1935, offering a revision to Clark's estimates of output per head in Britain (Devons 1935). At the time, he was working as an economist for the Joint Committee of Cotton Trades Organisations in Manchester, but he would go on to establish the field of applied economics at Manchester and at the London School of Economics.

Though these five authors did write on unemployment in these articles and in a handful of other works from the period,[7] they did not expound a theory of unemployment in sufficient detail to be examined closely in this study. The remaining economists are categorized by their general approach: Marshallian and sound money perspectives, structural change and industry perspectives, monetary policy and business cycle perspectives, and a focus on other issues such as unemployment insurance, public works, or technological change. This categorization is, necessarily, a simplification, as many economists incorporated multiple perspectives into their work during the interwar period. The work of Keynes is discussed in a standalone section, though it fits most closely with the monetary policy and public works perspectives.

1.5 Marshallian and sound money perspectives

During the interwar years Britain experienced a prolonged employment downturn more severe than any in the pre-war period. The response of many economists, politicians, and commentators was to analyze this episode using the existing concepts of economics. Relying on their understanding of Marshallian economics, a popular refrain throughout the interwar period was that wages needed to be lowered in order for unemployment to be resolved. If real wages were being held above the market-clearing rate, the supply of labor would be greater than the demand for labor causing unemployment. These Marshallian approaches aimed to accommodate the anomaly of interwar unemployment within the prevailing normal science.

7. Morley 1924; Rowe 1928, 1930; Florence 1924, 1933.

Another traditional approach to the problem of unemployment stemmed from ideas of "sound money." In the early 1920s, Britain was committed to restoring the pound to the gold standard at its pre-war parity with the dollar. The gold standard was considered a "sound" basis for the currency because a commitment to the gold standard stabilized exchanged rates and limited long-run price growth. Throughout the 1920s, deflationary policies were pursued in order to restore the pound to the gold standard, which occurred in 1925, and then to keep the gold standard system operational. Proponents of "sound money" believed that some amount of unemployment was justified and necessary in order to return to the gold standard and restore stability to the currency.

This section first considers the writings of Arthur Cecil Pigou in detail. Pigou is best remembered for his arguments, on Marshallian lines, that wage reductions would resolve interwar unemployment. Then, the works of Theodore Emmanuel Gregory and Edwin Cannan are discussed, both of whom were rather unconcerned with unemployment given their commitment to sound money and belief that Marshallian adjustments needed to occur. The last subsection briefly reviews the work of John Pye Bibby, John Harry Jones, and Lynda Grier.

1.5.1 Arthur Cecil Pigou

Pigou was the foremost young economist of pre-war Britain, selected by Alfred Marshall to be his successor as the Professor of Political Economy at Cambridge in 1908. He is best remembered for his contributions to welfare economics. His 1912 book *Wealth and Welfare*, laid the foundations for a consumption-based welfare economics that combined a Sidgwickian utilitarianism with the partial equilibrium methods of Marshall (Edgeworth 1913, 62). Pigou also maintained an energetic social and physical life, spending months climbing in the Alps or walking in Cumbria, and hosting reading parties for young undergraduate men at his retreat on Buttermere. These happy times were disrupted by World War I. Though never officially a conscientious objector, Pigou opposed the war and faced professional repercussions for his views, including failing repeatedly to be elected to the British Academy. He escaped conscription after John Neville Keynes argued his teaching was "indispensable" to the university, though it had dwindled to less than 20% of its population of students in 1910 (Kumekawa 2017, 88-89). After the war, Pigou became more of a recluse, suffering ill health and writing tomes of economic theory throughout the interwar period.

Though his position on unemployment changed throughout the period, Pigou ultimately

believed that wages in interwar Britain were being maintained at a level higher than the market clearing rate, driving excess unemployment. This straightforward Marshallian explanation of interwar unemployment differed substantially from the variety of theoretical models he developed in the period that explored real cyclical unemployment and monetary frictions. These attempts to advance theory surrounding unemployment and the business cycle contrasted with Pigou's policy prescriptions for interwar unemployment that focused on lowering real wages to a more economical level.

The Economics of Welfare

In 1920, Pigou revised and expanded *Wealth and Welfare* into *The Economics of Welfare*, which introduced externalities and Pigovian taxes. *The Economics of Welfare* was explicitly intended to serve as a scientific guide to ethical economic policy, imbued with optimism about the ability of economics to meaningfully affect the world. Pigou wrote in the preface:[8]

> I would add one word for any student beginning economic study who may be discouraged by the severity of the effort which the study, as he will find exemplified here, seems to require of him. The complicated analyses which economists endeavour to carry through are not mere gymnastic. They are instruments for the bettering of human life. The misery and squalor that surround us, the dying fire of hope in many millions of European homes, the injurious luxury of some wealthy families, the terrible uncertainty overshadowing many families of the poor — these are evils too plain to be ignored. By the knowledge that our science seeks it is possible that they might be restrained. Out of the darkness light! To search for it is the task, to find it, perhaps, the prize, which the 'dismal science of Political Economy' offers to those who face its discipline (Pigou 1920b, p. vii).

Though motivated by the ability of economic analysis to improve the lived experience of individuals, *The Economics of Welfare* does not touch on unemployment directly.

In addition to preparing *The Economics of Welfare*, Pigou served on the Cunliffe Committee in 1918 and the 1919–1920 Royal Commission on the Income Tax. He argued for a capital levy to pay down the national war debt (Pigou 1918, 1919) but was reluctant to stray from an objective, scientific approach in his advocacy. He wrote, "I have not concealed my own view as to what the right policy is, but I have endeavoured to write in a scientific spirit, setting out both sides fairly and not as a partisan" (Pigou 1920a, p. 10), This led to his scientific treatment of the economic issues of war in his 1921 text *The Political Economy of War* (Pigou 1921).

8. For the second edition, released in 1924, Pigou removed this paragraph from the preface, though he reincorporated the text again in the third edition in 1929.

Unemployment and the great slump, 1923-1924

Pigou's first systematic treatment of unemployment in the 1920s was the essay "Unemployment and the Great Slump," written in 1921 but published in his 1923 collection *Essays in Applied Economics*. Pigou attributed unemployment to real factors driving the trade cycle as well as to monetary factors.

When business owners in one industry contracted production because of "bad harvests, war, labour troubles, or some other cause," other groups also changed their output, leading to general unemployment (Pigou 1923, p. 35). This unemployment was an involuntary effect of the decision of businessmen to reduce their scale of production. Pigou wrote, "Workpeople in periods of industrial depression do not choose to be out of work. They are compelled by circumstances wholly outside their control" (Pigou 1923, p. 36). Indeed, Pigou attributed most of the 16% unemployment rate in 1921 to the cyclical downturn, writing that "[t]he slump has been abnormally intense because the boom it followed was abnormally intense" (Pigou 1923, 40).

Monetary factors also aggravated unemployment through wages. Because of slow-adjusting nominal wages, when the price level falls, businessmen are forced to pay higher real wages at the same level of real revenue, causing them to lay off workers in order to remain solvent (Pigou 1923, p. 37). Pigou thus believed that price stability should be a goal of monetary policy, writing, "The monetary arrangements of the modern world thus play an important part in the causation of periodic outbursts of unemployment... currency devices designed to make general prices more stable, were far from being, as it is sometimes supposed, an academic amusement irrelevant to practical affairs" (Pigou 1923, p. 37). In order for recovery to occur, business confidence needed to be restored, but the inability of governments to remedy currency disorders impeded this restoration of confidence (Pigou 1923, p. 40).

Pigou expanded on this argument in an essay for *Is Unemployment Inevitable?* in 1924. The essay, "Correctives of the Trade Cycle," again presented unemployment as an effect of fluctuations in trade and monetary factors. As before, Pigou cited business confidence based on real factors as a primary driver of these cycles, but he recognized that monetary reactions intensify these cyclical trends (Pigou 1924, pp. 96-101). He supported policies of price stabilization through the central bank's discount rate or through currency control, and also supported the transfer of government spending to depressed periods, especially on a local level (Pigou 1924, pp. 117-118, 128-131).[9]

9. Pigou supported smoothing demand for employment over the business cycle in both the private and public

In 1924, Pigou also served on the Committee on the Currency and Bank of England Note Issues (Chamberlain-Bradbury Committee). Despite missing most of the testimony because of a hike in the Alps (Kumekawa 2017, p. 105), Pigou prepared an early draft of the committee's report which favored a return to gold but after a longer period of waiting. While this differed meaningfully from the final report (Arthmar and McLure 2016), Pigou was only loosely committed to this position. His reluctance to advocate an immediate return to the pre-war parity was combined with his reluctance as an academic to advocate any policy. Pigou described the issue in 1924 as "one of practical politics rather than economics" (cited in Moggridge 1972, p. 49) and did not strongly advocate for his position. The committee ultimately recommended a rapid return to the gold standard and not Pigou's more moderate approach.

Industrial fluctuations and wage policy, 1927-1928

Industrial Fluctuations (1927) expanded Pigou's earlier work, presenting a theoretical model of business cycles based on real, psychological, and monetary fluctuations in the expectations of businessmen. Despite its relevance to the 1920s, Pigou distanced himself from the contemporary challenge of unemployment and the fluctuations of industry. He wrote in the preface, "The conditions prevailing in the great post-war boom and subsequent depression have been so abnormal that I have not examined them here" (Pigou 1927a, p. v). The following 397 pages of dense analysis, tables, and graphs develop theory without reference to the prevailing economic conditions.

Industrial Fluctuations does, however, extensively consider remedies for *theoretical* fluctuations in the trade cycle. He supported monetary policy to stabilize prices through the central bank discount rate and also argued for the flexibility of wages (Pigou 1927a, pp. 254-262, 281-288). However, he was careful to clarify that wage flexibility should be limited by concerns of social welfare: "But a wage system plastic in the degree we are here contemplating would, on occasions, involve rates of wages per man so low as to be out of harmony with the moral sense of the time and incompatible with our social structure" (Pigou 1927a, p. 285). Unlike Keynes, who also was concerned about the social acceptability of wage cuts, Pigou never connected social unrest or instability with these concerns. Instead, Pigou was motivated by the effect of poverty and unemployment on individuals, describing "the haunting sense of insecurity and danger" faced by "the unfortunate few" who bear the brunt of unemployment and wage cuts (Pigou 1927a,

sectors before World War I; see Pigou (1912), p. 477, for example.

pp. 222, 219). As before, Pigou also supported fiscal remedies like transferring state spending from good times to bad and compulsory unemployment insurance (Pigou 1927a, pp. 303-312, 329-350).

In the secondary literature, Pigou is sometimes characterized as attributing unemployment in general to rigid, high real wages (Hancock 1960, p. 313, for example). However, from 1923 Pigou argued consistently in his theoretical models that industrial fluctuations have monetary remedies as well as wage policy remedies. In *Industrial Fluctuations*, Pigou stated that half of the amplitude of general fluctuations could be remedied by a monetary policy of price stabilization, whereas only an eighth of the amplitude could be remedied through a decrease in wage rigidity once social welfare is taken into account (Pigou 1927a, pp. 198, 285). These comments have led some to argue that Pigou was more concerned with monetary remedies of fluctuations than with wage policy remedies (Takami 2007), but, importantly, this concern was without reference to the experience of interwar Britain.

Wage policy and *The Theory of Unemployment*

In the same issue of the *Economic Journal* that contained Josiah Stamp's review of *Industrial Fluctuations*, Pigou's "Wage Policy and Unemployment" addressed the 1920s unemployment specifically. In this article, Pigou takes a strictly Marshallian stance, suggesting that at least 5 percentage points of the excess unemployment was because of "the maintenance of rates of real wages above the level that would establish equilibrium between the demand for and the supply of labour" (Pigou 1927c, pp. 356-357). This is a departure from the abstract model set out in *Industrial Fluctuations*, which attributed only one-eighth of general unemployment increases to high wages.[10]

By replicating an analysis of French economist Jacques Rueff, Pigou found that average real wages were correlated with the unemployment rate (Pigou 1927c, pp. 357-358). While this was only a suggestive result, Pigou believed that remedies for unemployment that did not involve a reduction of wages would be ineffective. For example, import restrictions would relieve unemployment for non-export industries while maintaining "uneconomically high" wages, but they would cause additional harm for export industries or for domestic industries that did not face foreign competition (Pigou 1927c, pp. 360-362). Subsidizing wages through income taxes could work well in the non-export industries but might encourage movements to declining industries

10. The average unemployment rate in 1927 was 9.7%, so one-eighth would have been around 1.2 percentage points of unemployment.

or pressure wages to rise even more (Pigou 1927c, pp. 362-365).

Therefore, wage-earners should not insist on such high wages because this "must involve large unemployment and associated social evils, and... in a democracy such as ours, these evils cannot be effectively cancelled" (Pigou 1927c, p. 366). To Pigou, this was the only solution that would be in "the interest of the community as a whole" (Pigou 1927c, p. 366). Despite this conclusion, Pigou was not unsympathetic to the experiences of the unemployed, suggesting that the state could offer endowments for large families to make up for the fall in real wages (Pigou 1927c, p. 366). Finally, if there were no interventions to reduce wage rates, Pigou believed that the problem of unemployment would still remedy itself with time. Economic growth would increase the demand for labor while still outpacing population, and then, so long as wages were prevented from rising with this growth, unemployment could be solved (Pigou 1927c, pp. 367-368).

Pigou repeated this argument in *Special Memorandum No. 23: The Economic Position of Great Britain*, a pamphlet published by the London and Cambridge Economic Service in 1927 (Pigou 1927b). Additionally, in the third edition of *The Economics of Welfare*, published in 1929, he added the chapter "Subsidies to Wages," which reprinted almost exactly his discussion of subsidies from "Wage Policy and Unemployment." One of the only changes Pigou made was softening the conclusion that a subsidies scheme would be impractical. While the 1927 article concluded "in practice it is almost certain that the application of such a [subsidy] system would be bungled" (Pigou 1927c, p. 366), in his more academic work, Pigou described this bungling as only "probable" (Pigou 1929b, p. 702).

In 1933, Pigou published *The Theory of Unemployment*, which attempts to provide a formal theoretical basis for unemployment. Pigou's stated goal for the text, however, was not to discuss current economic conditions — he wrote, "While it is natural and right in the present deplorable state of the world's affairs that many economists should seek to play a part in guiding conduct, that is not their primary business... I offer no apology, therefore, for publishing, in a period when the tragedy of unemployment is of an unexampled magnitude, a book on that subject strictly academic in tone and content" (Pigou 1933, p. v).

As in *Industrial Fluctuations*, Pigou considered real factors and monetary factors in separate sections of *The Theory of Unemployment*, but his overwhelming concern is wage rigidity. Much of Part V, "The Causation of Unemployment and Changes in Unemployment," restates the argument from his 1927 article "Wage Policy and Unemployment." In one of his rare discussions of the current economic conditions in Britain, Pigou suggested wage policy had played such an

important role that it might need to be considered a determinant of long-run unemployment. He wrote, "...the unemployment situation has been very different from what it was before the war...This circumstance suggests strongly that the goal of long-run tendencies in recent times has been a wage level substantially above that proper to nil unemployment, and that a substantial part of post-war unemployment is attributable to that fact...Wage policy as a possible long-run determinant of unemployment calls, therefore, at the present time, for closer study than would have been thought necessary twenty years ago" (Pigou 1933, p. 256). This is a stronger statement than in his article, which only focuses on high wages in the short-to-medium run.

The Theory of Unemployment might be best remembered, however, as Keynes' straw man for "classical economics" in the *General Theory*. Keynes wrote that it was "the only detailed account of the classical theory of employment which exists" (Keynes 2013c, p. 7) and gave a lengthy critique of the work in his appendix to Chapter 19. Keynes concluded, "Thus Professor Pigou believes that in the long run unemployment can be cured by wage adjustments" (Keynes 2013c, p. 278). This was not an entirely fair assessment, as Pigou deals with many aspects of unemployment outside of wages in the *Theory of Unemployment*. Mark Blaug writes on this part of the *General Theory*, "Summing up, yes, Keynes did not imagine all the things he read into Pigou but he selected the worst, most obtuse book that Pigou ever wrote and even then, he read it extremely unsympathetically" (Blaug 1996, p. 664).

Monetary theories of the trade cycle and other works

Despite this focus on wages, Pigou continued developing his theory of the business cycle. Ralph Hawtrey ruthlessly criticized *Industrial Fluctuations* in his 1928 book *Trade and Credit*, arguing that the trade cycle was a "purely monetary phenomenon." Pigou responded to these critiques in a polite and professional manner in two articles in the *Economic Journal* in 1929, ultimately conceding some points and attributing the debate to a misunderstanding (Hawtrey and Pigou 1929).

In another article in the *Economic Journal* in 1929, "Disturbances of Equilibrium in International Trade," Pigou elaborated on how monetary factors amplify unemployment. A fall in the demand for a country's exports decreases their real ratio of interchange by either decreasing the rate of exchange or by causing the price level to fall (Pigou 1929a, pp. 355-356). While both adjustments cause unemployment due to frictions in labor markets, a fall in the price level

adds additional frictions that produce additional unemployment. Pigou wrote, "The sum-total of frictional resistance, and so of the unemployment that this generates, will, therefore, be pro tanto larger if the new equilibrium has to be reached through a fall in the price level than if it is reached through a fall in the rate of exchange" (Pigou 1929a, p. 356). He concluded the article by suggesting that the state could tax non-wage-earners to subsidize wage-earners — the subsidization policy he had been developing since 1927 (Pigou 1929a, p. 356).

Pigou also wrote a number of articles in the 1930s on points on theory. He wrote on the derivation of demand curves, elasticities of substitution and demand, and capital depletion. In 1935, he published *The Economics of Stationary States*, which attempted to model systems of multiple economies with trade and cooperative production. He also published a new edition of his 1906 text *Protective and Preferential Import Duties*.

Pigou's policy prescriptions for persistent interwar unemployment were thus largely Marshallian, reflecting the prevailing normal science, while his theoretical work departed from this paradigm. In his discussions on current economic conditions in "Wage Policy and Unemployment," *Special Memorandum No. 23: The Economic Position of Great Britain*, and *The Theory of Unemployment*, he argued that interwar unemployment was because of high real wages and that interventions to reduce wages would be the most effective way of reducing unemployment. However, Pigou was not quite as "classical" in his approach as Keynes asserted in the *General Theory*, with a position on unemployment that was complex and that changed throughout the interwar period. *Industrial Fluctuations* and some of his other works consider broader cyclical and monetary forces than just wages, offering support (in abstract) for alternative remedies for unemployment. Pigou's Sidney Ball lecture in May of 1929 provides a clue to these disparate approaches to unemployment. He wrote that "...every economist knows that in a world of economists it would be easy to set up a monetary machine much superior to the gold standard: but in the world of actual men with their prejudices and ingrained beliefs...it may well be held that an attempt to do this would lead to disaster" (Pigou 1929c, p. 21). This pessimism may have led Pigou to believe that more systemic interventions to remedy unemployment would be infeasible, causing him to advocate wage reductions in his discussions of policy.

1.5.2 The return to gold

Two economists, Theodore Emmanuel Gregory and Edwin Cannan, primarily viewed unemployment as a justified and necessary cost of preventing inflation and restoring a sound currency.

They remained committed to the Marshallian normal science, believing that market forces would cause wage reductions or induce labor mobility that would ultimately alleviate this necessary unemployment.

Theodore Emmanuel Gregory

Theodore Emmanuel Gregory (1890–1970) was educated at the London School of Economics and went on to hold academic posts at the University of London and University College London. During the interwar period, he served on the Macmillan Committee of Industry and Finance (1929-1931) and was briefly president of Section F of the British Association for the Advancement of Science.

Of all the economists surveyed here, Gregory was the least concerned about unemployment, despite writing on currency questions and the gold standard throughout the period. In 1924, he described in lively terms the debate between the "London School" and "Cambridge School" of thought on currency reform, writing that "[t]he London and the Cambridge schools of economists are engaged in fruitful co-operation in many fields of intellectual endeavour: over currency theory and policy they meet in battle" (Gregory 1924b, 101). In a 1924 review of recent works by Keynes, Hawtrey, and Bellerby (Gregory 1924a), Gregory took issue with Keynes' conclusion that deflation is worse than inflation because it is worse "to provoke unemployment than to disappoint the rentier" (Keynes 2013a, 36). Gregory argued that deflation could be justified in many cases if it strengthened the long-run economy. He wrote, "The question of deflation is not to be disposed of by showing that it will lead to unemployment. For it may be worth while to pay this price, not merely to 'do justice to the rentier,' but, e.g., to get back to a sound currency" (Gregory 1924a, p. 166). As he would argue in *The Return to Gold* (1925), restoring the gold standard at its pre-war parity was the only way the currency could be made "sound" again, especially because it prevented inflationary government finance (Gregory 1925, p. 60). The alternative, which he described in *The First Year of the Gold Standard* (1926), would have been to return to gold at a devalued level. While this would have led to a smoother transition, Gregory viewed such a policy as wrongly ceding monetary decisions to "working class sentiment" (Gregory 1926, p. 45). Gregory did not object, however, to the influence of international finance on the monetary objectives of Britain at this time.

Gregory addressed unemployment again in "Rationalisation and Technological Unemployment," published in the 1930 *Economic Journal.* Gregory acknowledged that rationalization

and improvements in technology often caused short-run unemployment. Again he argued that this unemployment should not be a concern, though, because measures to increase the long-term competitiveness of industry were essential in an open economy, even if they raised the "normal" level of unemployment (Gregory 1930, pp. 535-536). Unemployment was driven in part by a need to reduce costs to increase competitiveness, and thus would be alleviated by the re-absorption of unemployed workers into new positions at lower wage rates (Gregory 1934, pp. 44-47).

Thus, to Gregory, unemployment was an unsurprising result of the return to the gold standard and the technological progress of industry. The costs of these policies in terms of employment were justified in order to achieve these economic goals, and Marshallian wage adjustments would eventually provide a remedy.

Edwin Cannan

Edwin Cannan (1861–1935) was also notable for his indifference to the problem of unemployment. A member of an older generation of economists, Cannan was born in Madeira and attended Marshall's lectures from 1891–1892. He was employed by the London School of Economics from its opening in 1895 until his retirement in 1926, where he established himself as a capable user and critic of Marshallian economics. He became a Professor of Political Economy in 1907 and was a founding editor of the journal *Economica* in 1921 with Graham Wallas and Arthur Bowley (Tribe 2004). Cannan lived in Oxford and commuted regularly to London by train. When the trains were stopped during the General Strike of 1926, Cannan cycled from Oxford to London rather than canceling class (Donnelly 2015). He passed away in 1935.

Cannan's work in the interwar period seemed to have his legacy in mind. He issued new editions of three previously published books and published a collection of his Principles of Economics lectures in 1929, *A Review of Economic Theory*. His new work primarily addressed questions of currency, where he demonstrated strong support for the return to the gold standard and serious concerns about inflation (Cannan 1920, 1922c, 1931b, for example). Cannan summarized his general perspective on economic problems in *An Economist's Protest* (1927), describing how much economic suffering was well-justified: "Modern civilization, nearly all civilization, is based on the principle of making things pleasant for those who please the market and unpleasant for those who fail to do so, and whatever defects this principle may have, it is better than none" (Cannan 1927, pp. vi-vii). Throughout the 1920s and early 1930s, Cannan consistently demonstrated that, to him, unemployment was one of these beneficial economic pressures.

In 1922, Cannan suggested that remedying the trade cycle might not be a worthwhile goal. He wrote that business cycle downturns and their associated unemployment actually made the population as a whole better off, either absolutely or relatively: "Yet though the position of the unemployed is unpleasant, there seems little doubt that in depression the whole mass seems not only more industrious but also more contented and happy than in boom" (Cannan 1922b, p. 359).

Later that year, in the *Economic Journal*, Cannan described unemployment as a justified cost of preventing inflation. He wrote, "Though we have many unemployed, we have the satisfaction of knowing that the employed in this and other deflated countries are better off than the employed where the inflation boom is still in full swing" (Cannan 1922a, p. 512). Despite the high unemployment in 1922, deflationary countries like Britain were objectively "more happier and contented" than the inflationary countries. Cannan elaborated on these fears of inflation in his 1924 critique of Keynes' *A Tract on Monetary Reform*, where he argued that the control of credit rather than currency would be ineffective at limiting the inflationary tendencies of governments (Cannan 1924).

Cannan addressed the causes of unemployment in a 1925 letter to the industrialist Sir Hugh Bell, which Cannan published in *An Economist's Protest* (1927). In the letter, he wrote that unemployment insurance made workers less mobile and encouraged them to resist reductions in wages (Cannan 1927, p. 411). Cannan wrote, "The absolutely fraudulent dole-taker is a red herring: the real point is the greater reluctance of the perfectly honest person to do what doesn't precisely suit him or move to some place he doesn't much want to go to, and still more, I think, the greater reluctance of the unions to agree to a drop in wages now they have each to think less about the unemployed in their own trade" (Cannan 1927, p. 411). In an article from 1926, Cannan described again how government assistance impeded the mobility of workers (Cannan 1927, pp. 416-417). In 1930, Cannan wrote that he did not believe any interventions needed to be taken to increase the mobility of labor, but simply that it was a process that had not yet been completed (Cannan 1930, p. 55).

In the early 1930s, Cannan was particularly concerned with the relationship between population growth and employment. He argued that population decline would not solve the problem of unemployment, but instead "[i]t will provide more rather than less reason for promoting mobility of labour in place and occupation, and we shall have to take more care... to secure that arrangements which seem superficially desirable do not hinder that mobility" (Cannan 1931c,

p. 531). In a later article, he described these hindrances to mobility as trade unions, restrictive training schemes and apprenticeships, and uniform wage laws causing some workers to be overpaid (Cannan 1932, pp. 366-367). In his conception of the economy, the amount of employment was primarily limited "by the number of potential workers and their willingness to 'go anywhere and do anything' on such terms as could be got" (Cannan 1932, p. 363). Cannan was also critical of concerns over the balance of trade in these years, especially of the idea that exports deserved special preference for creating jobs (Cannan 1931a, p. 11; 1933a, p. 76; 1933b, p. 371).

In summary, to Cannan unemployment was preferable to inflation and should have been easy to remedy through labor mobility. Cannan thus viewed the unemployment of the 1920s and early 1930s as part of a normal process of readjustment that was proceeding slowly because of policies inhibiting the mobility of workers.

1.5.3 Other Marshallian economists

This subsection briefly discusses the work of three other authors. John Pye Bibby and John Harry Jones both operated within the Marshallian normal science, while Lynda Grier criticized the calls to reduce wages.

John Pye Bibby

John Pye Bibby (born 1883) was the Financial and Research Director of J. Bibby & Sons, an animal feed and soap manufacturer based in Liverpool. Despite his position in industry, Bibby felt compelled to write an article and a book on unemployment in 1929. In his book, *Unemployment: An Analysis and Suggested Solution*, Bibby wrote, "There is little, in fact, in this book that would not be generally accepted by orthodox economists... The author, nevertheless, holds the view that economists have to some extent failed in rousing a public interest in their important field of inquiry" (Bibby 1929b, p. 128). Bibby's remedy for unemployment was simply a reduction in wages in the depressed industries by about 5% (Bibby 1929b, p. 135). However, his argument relied on the outdated wages-fund theory and made a number of other errors (Hansen 1930). In the September 1929 *Economic Journal*, Bibby again argued for increased flexibility of wages (Bibby 1929a, p. 645). He also pointed out that the limited quantity of currency in the economy under the gold standard restricted the ability of productivity gains to permit nominal wage increases (Bibby 1929a, pp. 645-646).

John Harry Jones

John Harry Jones (1881–1973) was an economics professor and Head of Department at the University of Leeds during the interwar period. He published an article in the *Economic Journal* in 1926 about the Coal Commission's determination of the subsistence wage (J. H. Jones 1926b). His other work during the interwar period comprised a number of introductory books for the public including *Social Economics* (1920), *The Federal Reserve System* (1926), *The Economics of Private Enterprise* (1926), and *The Economics of Saving* (1934). In *The Economics of Private Enterprise*, he emphasized that unemployment was "a normal feature of economic society" (J. H. Jones 1926a, p. 396). He discussed possible sources of unemployment including seasonal unemployment, unemployment in casualized industries such as dock work, frictional unemployment, unemployment of those who have just finished school, technological unemployment, and unemployment due to declining industries. He also expressed concern about "blind-alley" occupations, where workers began in an industry at a young age only to be laid off when they become an adult. To Jones, "[i]t should not be inferred that such employment is necessarily bad. It would be folly to employ an adult on work which can be adequately performed by youths. The weakness of the present system is that such youths learn nothing while so employed, and are left afterwards to drift into unskilled or casual work" (J. H. Jones 1926a, p. 397). His discussion is simple and general without specific reference to the employment crisis of the 1920s.

Lynda Dorothea Grier

After growing up deaf and poor, Lynda Grier (1880–1967) became one of only two students to achieve a first in Part II of the Economics Tripos at Cambridge in 1908 (Tullberg 2004). Supported by Mary Paley Marshall, she became a lecturer at Newnham College, Cambridge, and even covered some of Pigou's courses at the outbreak of war (Collard 2011, p. 58). When D. H. MacGregor left the University of Leeds for war duties, she became the Acting Head of the Economics Department through 1919. After a short time lecturing at Newnham after the war, Grier became the Principal of Lady Margaret Hall, Oxford in 1921, a position she would hold through 1945. She was well prepared to participate in an Oxford administration that was just opening itself up to women and achieved much acclaim. In 1925, she became the President of Section F of the British Association, and in 1926 she served as the first woman on Oxford's policy-setting Hebdomadal Council (Tullberg 2004).

Grier is included in the sample of economists for an article published in the September 1925 *Economic Journal* titled "The Meaning of Wages," which was also published in *Nature*. Written in light of the coal dispute of 1925, Grier considered the relationship between the "normal wage" as determined by the supply and demand for labor and the living wage that could maintain a worker. The coal industry was unable to support a living wage for its workers, causing unemployment. However, Grier believed that the workers should not be blamed for their numbers or forced to face further wage reductions: "Those more fortunately placed among the workers, as well as among other classes of the community, often gain by the cheapness of the goods made by workers whose work is worth little because their numbers are great. But the community as a whole does not gain because the workers receiving low wages are part of the community" (Grier 1925, p. 535). To Grier, those who advocated an adjustment of wages to remedy unemployment were not only assuming a degree of labor mobility and flexibility of wages that did not hold, but they were also assuming that normal wages appropriately met the expenses of workers.

Given her administrative duties during the interwar period, Grier did not publish much else in this period. In 1921, she wrote a section of *British Labour, Replacement, and Conciliation, 1914-1921* with Annie Ashley on the substitution of women for men in labor markets during the First World War (Grier, Ashley, and Kirkaldy 1921). Considering each industry separately, this scholarly work presented statistics on female employment, wages, and jobs in relation to male employment throughout the time period. Grier also published a review of J. H. Jones's *The Economics of Public Enterprise* in the *Economic Journal* in 1926, where she criticized the text for improperly defining key economic concepts (Grier 1926).

1.6 Structural change and regional and industrial perspectives

The previous section shows that some economists grappled with interwar unemployment by simply doubling down on their Marshallian explanations. However, a growing literature focused on unemployment resulting from structural change forces that disproportionately affected certain regions and industries. The special challenges faced by the export industries and those in the North of England, Scotland, and Wales — such as a loss of markets because of the war, overcapitalization, and the overvalued exchange rate — could cause unemployment that would not be remedied by market forces and flexible wages. This perspective marked a shift from the traditional Marshallian normal science. Rather than thinking of unemployment in aggregate

as a problem of labor markets finding equilibrium, these economists focused on the experiences of specific industries and regions. This disaggregated approach uncovered stubborn unemployment resulting from structural change, which could explain much of the anomaly of persistent unemployment on a national level.

In this section, the works of Henry Clay are discussed in detail. Clay was an economist at Manchester who focused on the disparate unemployment experiences of the export industries. Relying on his practical experience and interactions with industry, Clay made numerous revisions to his explanations for unemployment throughout the interwar period, trying to pinpoint the causes and prescribe policy solutions that would help the most affected industries. The works of eight other economists from the *Economic Journal* are also surveyed — four that co-authored many writings on the cotton industry, and four with close ties to the region or industry on which their research focused. All of these economists recognized interwar unemployment as an empirical anomaly that could not be explained by the Marshallian normal science.

1.6.1 Henry Clay

After achieving only a second class in Classics at Oxford, Clay's hopes of pursuing an immediate academic career were disappointed as a young man. He became a lecturer for the Workers' Educational Association for eight years before World War I and published *Economics: An Introduction for the General Reader* in 1916. From 1917 to 1919, Clay was a civil servant for the Ministry of Labour, working under H. D. Butler on issues of industrial relations. He then became a fellow of New College, Oxford, from 1919 to 1921, when left to visit the United States. Upon his return, Clay was made the Stanley Jevons Professor of Political Economy at the University of Manchester, where he remained through 1930. Clay left his chair at Manchester to work at the Bank of England and then in other government departments.

Clay recognized interwar unemployment as anomalous and of a different character than the pre-war unemployment. At first he believed the instability of relative wages was the primary disturbance in the economy, but he came to recognize the importance of the maldistribution of labor across industries owing to structural change. He ultimately supported government-sponsored rationalization programs for the hardest-hit industries. Clay's work accommodated the anomaly of unemployment by centering the experiences of particular industries and rejecting general explanations of the unemployment phenomenon.

The post-war wages problem, 1923–1926

Clay's 1916 text *Economics: An Introduction for the General Reader* intended to incorporate ethics and political economy into the analysis of economic problems. Clay described drawing on the "wide and diverse industrial experience" of the students he had taught in the Workers' Educational Association when preparing the book, and the resulting work is full of real examples and pragmatic considerations.

In this text, he defined economics as "the study of business in its social aspect" (Clay 1921, p. 1). To Clay, industrial and social experiences motivated economic study and formed the basis of all economic inquiry. Economics generalized from the facts of experience, tested generalizations by collecting more facts, and then adjusted the generalizations to more exactly fit the facts (Clay 1921, p. 9). These empirically-based theories then provided a basis for rational action (Clay 1921, p. 12).

This empiricist approach characterizes his writings from early on in his time at the University of Manchester. In September 1923, Clay read a paper to Section F of the British Association in Liverpool in September 1923, which he would publish in the March 1924 *Economic Journal* as "The Post-War Wages Problem." He described how before the war, wages in different industries continually adjusted to gradual changes in economic conditions, all while keeping relatively stable to other industries. In this period, "the problem of wage-fixing was limited to adjusting particular rates to particular economic changes, always with reference to a system of rates that was generally accepted" (Clay 1924, p. 3). The war disrupted this continuous adjustment of wages to meet war-time needs, raising the wages of some groups, like unskilled labor, relative to other groups (Clay 1924, p. 3). Then, after the war, comparisons between industries and classes led to agitation, since most workers could point to someone relatively better off than themselves (Clay 1924, p. 3). It also became more difficult for unions and employers to determine what wage rates were fair and feasible (Clay 1924, p. 4). The restoration of industrial peace in the 1920s thus required a restoration of some stable relationship of wages among industries, which would be adjusted to commercial needs and accepted by workers. To Clay, this new stable system of wage rates could not be derived from the pre-war wages adjusted for the cost of living — the needs of workers had changed, and the level of wages industries could support had also changed (Clay 1924, p. 10). Instead, he suggested that Britain use the wages that were competitive for export industries under the changed post-war conditions to guide wage setting in both import and export industries (Clay 1924, p. 15). The implications of this policy would be moving excess

labor from the export industries and reducing wages in domestic industries.

Clay also wrote on a number of topics only indirectly associated with unemployment in 1923 and 1924. He reviewed Beatrice and Sidney Webb's book *The Decay of Capitalist Civilisation*, lectured on the relationship between property ownership and inequality at the 1923 Liberal Summer School, and gave speeches on wage controls and minimum wages at the London School of Economics (Clay 1923; 1929b, pp. 260-281, 20-73, 213-235). Clay was also one of nine authors of a statistical survey of the 1921–1922 unemployment problem titled *The Third Winter of Unemployment*, though it is unclear how much he contributed to this report (Astor et al. 1923). In 1925, Clay went to South Africa with Britain's Economic and Wage Commission, writing a report that recommended increased integration of the native South African populations with the European populations in the economic sphere (Plant 1926, p. 675).

Upon his return, Clay expressed stronger support for government intervention in wage-setting and wrote a number of pieces trying to reconcile this policy with his support of *laissez-faire*. In March 1926, he commended the government policy of aiding collective bargaining without actually intervening to fix wages because "any rate fixed would have to be justified by reference to some accepted principle or standard of remuneration and no such accepted principles are available" (Clay 1929b, pp. 204-5). Instead of fixing absolute levels of wages, he argued that the government should ensure that relative wages were sensible and that similar wages were paid for the same work through legislation.

In July 1926, he expressed his support for a moderate form of *laissez-faire*, which, to him, meant that enterprise was free but regulated. Regulation "raises the plane of enterprise and competition" in a way that Clay supported, unlike protection, which "restricts the area" of competition in a way he opposed (Clay 1929b, p. 310). In "The Authoritarian Element in Distribution," published in the March 1927 *Economic Journal*, he described how progressive public policies had maintained the working-class standard of life and reduced poverty, despite war and depression. Clay noted that the government regulation of wages, unemployment insurance, public relief, and progressive taxes had combined to support the working classes since 1890, but not at the expense of the *laissez-faire* principles he supported (Clay 1927, p. 18).

Clay discussed the balance between government intervention and private industry in a 1927 speech on arbitration at the League of Nations Union conference on industrial peace. Arbitration could limit costly industrial stoppages, but a compulsory arbitration scheme would infringe on the right of workers to collectively bargain by limiting the effect of strikes and lockouts (Clay

1929b, pp. 206-208). Instead, the challenge was to "create an atmosphere in which the appeal to reason... is easy and likely to be heard" so that the parties in a trade dispute will voluntarily choose arbitration (Clay 1929b, p. 211). To this end, Clay urged that industrial accounts should be made publicly available so that the position of industry can be better understood, and that the cost of industrial disputes should be more accurately measured after the fact (Clay 1929b, pp. 211-212). Clay resumed this theme in a speech at the end of November that year, writing that wages need to be set in relation to other wages, and that "[t]he practical inference from this is that some public authority should intervene, on behalf of the community as a whole, in all important wage negotiations" (Clay 1929b, p. 181).

Professor of Social Economics, 1927

In 1927, Clay asked to step down from his professorship in political economy to become the first Professor of Social Economics at Manchester. A year earlier, Clay had described his training in economics as "scrappy" and wrote that, "I cannot suppress my interest in current political and social questions sufficiently to stick to any one part of the field of economics and so do some serious work on it" (Casson 1983, p. 19). In this new role, Clay was able to build relationships with industries in Manchester rather than focusing on economic theory, and his work throughout the rest of the interwar period reflects this new focus.

In a public lecture at the University of Manchester in 1927, Clay expanded his argument on the problem of wages, emphasizing the changing role of unions and the importance of the distribution of labor across industries. Likely influenced by the events of the 1926 General Strike, he noted a change in the temper and organization of the unions: "The war and the post-war boom raised their expectations" (Clay 1929b, p. 92). This led to new ways of making wage claims and striking, basing wage claims on the hypothetical amount an industry could pay after reorganization and using strikes to inconvenience consumers, forcing the government to intervene (Clay 1929b, p. 93). Clay still believed the pre-war system of wages could not be carried into the post-war period. Industry had had difficulty adjusting to the two deflations of 1920–1921 and 1925–1926, leading to "uncoordinated" adjustments that caused wages to fall out of proportion to the skill and quality of the work (Clay 1929b, p. 99). But, he now placed additional emphasis on the changed distribution of labor across industries after the war. He believed that the maldistribution of labor after the war was the primary cause of disordered wages, so workers would need to be relocated before wages could be adjusted (Clay 1929b, p.

102).

In November 1927, Clay suggested that some portion of the disturbances in wages and in the distribution of labor had begun before the war. In a speech given at the University of Manchester, "The Problem of Industrial Relations on the Eve of the War," Clay described two schools of thought: "a school that accepts the present economic order as essentially sound but disordered by the war, and one that regards it as fundamentally unsound and needing radical reorganisation, war or no war" (Clay 1929b, pp. 1-2). Clay aligned himself more closely with the second school, arguing that problems of industrial relations were persistent and fundamental to any productive organization (Clay 1929b, p. 2). He described how the pre-war system of collective bargaining had become dysfunctional even before the war because of destabilizing economic changes. These structural forces included a rise in prices, a shift of labor from lower-paid to higher-paid occupations, the inefficient structure and low wages of older industries like coal and railroads, changes in legislation strengthening unions, and the increased egalitarian sentiment from improved democracy and education (Clay 1929b, pp. 17-19).

An additional factor upsetting the pre-war system was a "habit of bargaining." Instead of controlled and coordinated wage changes, the unequal bargaining strength of certain groups led workers in some industries to abandon their customary bargaining positions and press for additional claims (Clay 1929b, p. 18). This complicated the problem of wage negotiations and upset the existing wage structure. Clay wrote, "The problem of industrial relations becomes almost insoluble if, every time a contract of wages and related conditions is negotiated, each party sets itself to exploit every element in the commercial situation and its own resources in order to exact the maximum that the other party can possibly concede" (Clay 1929b, p. 18). The war intensified this "habit of bargaining" as well as the other disturbances noted above. Because industries had these underlying problems, Clay now believed that simply remedying wartime disturbances to industries would not be sufficient to save them.

Defense of the export industries, 1928

In the first issue of the *Economic Journal* of 1928, Clay responded to Pigou's article "Wage Policy and Unemployment," which had asserted that high wages caused 5 percentage points of the abnormal unemployment in Britain. To Clay, this argument oversimplified the relationship between wages and unemployment and overlooked how structural changes in the distribution of labor across industries caused unemployment. Clay argued that Pigou had ignored all of

the other costs of industry that could contribute to unemployment, including increased capital charges, the increased cost of credit, restrictions of output through short-time, exploitative prices for inputs that are produced by monopolies, and taxation (Clay 1928b, pp. 2-3). These and other costs meant that, "[i]n very few industries is it clear that a reduction in wages would by itself do much to stimulate employment" (Clay 1928b, p. 3). Further, Clay was concerned that attributing unemployment to high wages might falsely suggest that the unemployment problem would remedy itself through wage adjustments. Clay believed these Marshallian adjustments were unlikely to occur if both reduced wages and unemployment were effects of some other economic cause like the disturbance of war (Clay 1928b, p. 3).

Clay also considered wage rates and unemployment on an industry level rather than in the aggregate, finding that wages were actually lowest where unemployment was the highest, and highest where unemployment was the lowest (Clay 1928b, p. 9).[11] This suggested that labor was maldistributed and that the redistribution of labor across industries could reduce unemployment. Additionally, the small adjustment of labor between industries that had taken place throughout the 1920s did correspond to reductions in unemployment in some industries (Clay 1928b, p. 9). Thus, to Clay, the maldistribution of labor was a more important cause of unemployment than the level of wages, but a variety of causes should be considered (Clay 1928b, p. 14). He wrote that it would be "a dangerous abstraction to isolate one factor and attribute to it the whole of the present abnormal unemployment," as he claimed Pigou had done (Clay 1928b, pp. 13-14).

In 1928, Clay wrote two pieces that referred to the *Liberal Industrial Report*, published earlier that year. The report pointed optimistically to the success of some expanding industries as evidence that unemployment was not general but instead concentrated only in the export industries. The implication was that expanding industries could play a larger role in the economy, replacing the export industries after their demise. In Clay's first piece, "Export Trades and Unemployment," published in the *Manchester Guardian*, he noted that the unemployment rate for males in non-export industries was still 9% (Clay 1929b, p. 123). He argued that subsidies and protection had produced the expansion in other industries, and that, without this public support, the expanding industries would not be able to compensate for the decline of the export industries (Clay 1929b, pp. 124-127).

He also suggested that the export industries actually had a better case for encouragement from the state than the industries being subsidized and protected. The export industries were

11. He also argued that the wages of the depressed export sectors were too low given the disagreeableness and difficulty of the work being done in them (Clay 1928b, pp. 5-6, 12).

struggling because they had given up their ordinary trade for war production. He wrote, "The loss of employment and reduction of wages, the loss of capital and profits that they have suffered, are a cost of the war that differs from other war costs only in being concentrated on the workpeople and employers in these industries instead of being borne by the general body of taxpayers" (Clay 1929b, p. 128). Instead of favors, however, Clay noted that the export industries had been further disadvantaged by taxation for unemployment relief and higher local rates to support the increased numbers on poor relief in their depressed areas (Clay 1929b, pp. 128-130). The recovery of the export industries was essential to general economic recovery, and he warned against viewing "the superficial improvement in employment figures as proof that the problem of post-war unemployment is being solved" without the recovery of these industries (Clay 1929b, p. 133). In his review of the *Liberal Industrial Report* in the June *Economic Journal*, Clay made the same argument that the report overlooked unemployment in non-export industries and was too optimistic about the expansion of other industries (Clay 1928a, pp. 195-197).

Clay also wrote on the cotton industry in 1928, which he viewed as a special case of an export industry that was not disturbed by wartime expansion. The industry had resorted to short time to meet a fall in demand for their products from 1925 to 1928, which Clay described as "a desperate gamble" (Clay 1929b, p. 137). To Clay, the major problem of the industry was the loss of export markets for their goods, concentrated on the heavily indebted American spinning section, and he supported the efforts of the Yarn Association to reorganize the industry (Clay 1929b, p. 139).

An argument for rationalization, 1929-1930

In the midst of the 1929 General Election, Clay published *The Post-War Unemployment Problem*, which argued for a different solution to unemployment: rationalization. Clay is clear in this text that unemployment was not because of a typical cyclical downturn — he described fluctuations in trade occurring "on top of a persistent depression represented by something like a million unemployed" (Clay 1929a, p. 24). Clay did not expect that a recovery in trade would remedy unemployment, motivating his search for another solution.

Because of the divergent and off-setting experiences of different industries, Clay believed that general explanations for unemployment in aggregate could not account for the whole problem.[12]

12. To support the idea of off-setting experiences, Clay documented how the concentration of unemployment had shifted from engineering to coal throughout the decade, with the building trades experiencing a brief recovery of employment and then recent collapse (Clay 1929a, p. 27).

He did, however, believe that deflation contributed generally to unemployment by forcing export industries to sell at lower prices without a reduction of their costs. Because inflation was impossible under the gold standard, remedies for unemployment needed to help export industries reduce their costs in other ways (Clay 1929a, p. 80). Similar to his arguments the previous year, Clay wrote that the losses of export industries were a direct cost of war but had not been recognized as such (Clay 1929a, p. 102).

Clay considered other policies to address unemployment. Though he opposed protection and uniform reductions in local rates, he supported policies to transfer workers to different industries or to reduce rates in only depressed areas to make them more attractive for new business investment (Clay 1929a, pp. 111-124). He also paid particular attention to Lloyd George's proposal for public works to address unemployment as put forth by Keynes and Henderson (Keynes 2013b, pp. 86-125). While Clay believed Lloyd George's program might encourage a general revival, he pointed out that the government expenditure in that program would do nothing to address the problems of industry directly. A public expenditure program was acceptable as an emergency measure to expand credit given the limitations of the gold standard, but it might distract from the real challenge, which was to reduce the costs of industry (Clay 1929a, p. 136). Wage reductions could not serve this purpose because wages were already low in industries with high unemployment (Clay 1929a, p. 156). He thus concluded, "We are left with the necessity not only of reducing costs on an unprecedented scale, but of finding some new way in which to effect the reduction" (Clay 1929a, p. 166). Clay argued that this new way was rationalization.

Clay defined rationalization as "industrial combination with the object of securing not monopoly prices, but certain productive economies... due mainly to... more economic division of functions" (Clay 1929a, p. 171). Economies of scale could reduce costs while also giving industries a chance to reorganize in a more efficient manner. Clay believed that either the London banks or the government should step in to help industries reorganize and re-equip, extending credit as needed (Clay 1929a, pp. 183-205). Because the country had decided that the benefits of a return to gold justified its costs, he believed that the state should intervene through rationalization projects to help the export industries that were forced to bear these costs (Clay 1929a, pp. 202-203). To Clay, industries would not be able to rationalize on their own, despite its necessity. He wrote that "industry itself has neither the will nor the power to reorganise itself," citing mining and textiles as two examples of this reluctance to reorganize (Clay 1929a, p. 176).

Clay clarified his position on interwar unemployment in the March 1930 *Economic Journal*. In this piece, he stated that he did not believe that the transfer of workers alone could alleviate unemployment, as he had said in 1928, or that wages should be reduced to their real 1924 level. Rather, he argued that there needed to be rationalization, supported by the government, as he had described in his book (Clay 1930, p. 335). In an essay prepared for the BBC, he wrote directly on the difficulties facing industries after World War I: "...the industrialist and trader [directed] industry into new channels; and every such change involves dislocation. But it would be a mistake on this account to undervalue the importance of the War's influence. Before the War, industry was able to make the necessary adjustments to meet such changes; the cumulative effect of the War and these other changes together have been to confront industry with a task of adjustment which hitherto has been too much for it" (Clay 1931, p. 32). He goes on to again express support for state interventions in industry to help these adjustments occur.

In 1930, Clay left his chair at Manchester to join the Bank of England in their Securities Management Trust. This was a subsidiary of the Bank tasked with encouraging the rationalization of the depressed export industries, exactly as Clay had advocated. He became one of the foremost economic advisers at the Bank from 1931 and was promoted to economic adviser to the Governor in 1933. He had few publications in the 1930s, focusing instead on his contributions to the Bank and to other government departments throughout the rest of his career. He also contributed to the early establishment of Nuffield College as a social science hub at the University of Oxford, serving as Warden from 1944–1949.

Clay thus believed interwar unemployment was anomalous and of a different character than pre-war unemployment. He rejected general explanations of the unemployment problem based in the Marshallian normal science, including Pigou's assertion that high real wages were at fault. Clay analyzed unemployment in a more disaggregated manner, focusing on the experiences of certain industries and regions and relying on industry-level empirical evidence. This approach led him to change his stance on interwar unemployment throughout the period — though at first he viewed the disruption of relative wages as the primary issue in the economy, he came to believe that the changing distribution of labor across industries played an important role. Ultimately, he concluded that only government action could provide the support the export industries needed in order to rationalize. His decision to leave his post at Manchester to join the Bank of England indicated a desire to put these policies into practice.

1.6.2 Cotton perspectives

The cotton industry faced immense challenges in interwar Britain and contributed to high levels of unemployment for both men and women. Cotton textile production was concentrated in Lancashire, which included Manchester. Four Manchester economists in the *Economic Journal* eschewed the Marshallian normal science and instead focused on the local cotton industry, coauthoring numerous articles, pamphlets, and books that addressed unemployment at the industry level.

George William Daniels (1878–1937), an expert on the Lancashire cotton industry, grew up in a working-class family in the area and was educated at Manchester. In 1927, he replaced Henry Clay as the Stanley Jevons Professor of Political Economy at the University of Manchester. Though Daniels was not a prolific academic, he established Britain's first degree in Public Administration in 1927 as well as the Economics Research Section for quantitative economic research in 1932, demonstrating his practical approach to economic problems (Jewkes 1938). In the *Economic Journal* he wrote an empirical study on the Lancashire cotton industry with John Jewkes, which they developed into *The Comparative Position of the Lancashire Cotton Industry and Trade* in 1927 and "The Post-War Depression in the Lancashire Cotton Industry" for the Royal Statistical Society in 1928 (Daniels and Jewkes 1927b, 1927a, 1928).

John Jewkes (1902–1988) studied at Manchester in the 1920s and became a lecturer there in 1926. He wrote primarily on the cotton industry throughout the interwar period and became an outspoken critic of government intervention in the economy after the Second World War. In the *Economic Journal* in 1928, he published an article with Harry Campion that estimated the mobility of labor in the cotton industry using the issuing county of the insurance cards at the Lancashire employment exchange (Jewkes and Campion 1928). An article with Allan Winterbottom in the *Economic Journal* in 1931 makes the argument that short-time work arrangements led to under-reporting of unemployment in the cotton industry while creating conditions that limited labor mobility (Jewkes 1930b). In the early 1930s, Jewkes also authored books on local labor markets in Lancashire and Cumberland, focusing on economic displacement and juvenile unemployment with Winterbottom (Jewkes and Winterbottom 1933a, 1933b) and on the cotton industry with Edward Mayall Gray (Jewkes and Gray 1935). His sole-authored research at the time discussed productivity and industrial organization in England and the United States (Jewkes 1930b, 1930a, 1931).

During this period Harry Campion (1905–1996) was a member of the Cotton Trade Statistical Bureau in Manchester. He eventually became the first director of the Central Statistical Office in 1941 and organized the United Nations Statistical Office in 1946.

Another associate of the Manchester economists was Allan Winterbottom (born 1907), part of the Economics Research Section at the University of Manchester. In addition to his work with Jewkes, Winterbottom wrote a history of trade unionism with Robert Yorke Hedges (Hedges and Winterbottom 1930).

While most of the work of the Manchester economists was thus focused on the cotton industry and local economic issues, in a 1935 pamphlet for the London & Cambridge Economic Service, Daniels and Campion took a broader view of the depression and recovery (Daniels and Campion 1935). Using data from the just-published 1930 *Census of Production*, they tracked how the proportion of exports in overall production declined from 1924 and was likely still declining, even as many domestic industries recovered from the depression. Grounded in this empirical analysis, they argued that the poor relative performance of the export industries drove the employment crisis and shaped regional patterns in employment. They wrote, "... [T]here is no definite evidence to show that those finding employment in expanding industries are the same as those who have lost employment in export industries. When it is further remembered that the export industries are principally situated in areas such as Lancashire, South Wales, and Tyneside, the decline in employment in export industries is seen as the main cause of the problems of the depressed areas and maybe as the most important cause of the problem of unemployment in the country as a whole" (Daniels and Campion 1935, p. 18). This argument for the centrality of the performance of export industries echoes that of Manchester economist Henry Clay.

1.6.3 Other economists focused on industry or regional perspectives

This subsection discusses the work of George Cyril Allen, who wrote on industrial diversification in the Birmingham area, as well as three more industry-specific perspectives: work by Alfred Morgan and Brinley Thomas on the coal industry, and an article by Harry Dawes on the steel industry.

George Cyril Allen

George Cyril Allen (1900–1982) grew up in Warwickshire and was educated at the University of Birmingham under William Ashley. After completing his degree, he taught in Nagoya, Japan, for two years from 1922–1924. Throughout the rest of the 1920s he worked at Birmingham as a research fellow, and in 1929 he became the first Professor of Economics and Commerce at Hull University College. He served on the Board of Trade during the Second World War and staunchly opposed monopolies in post-war reconstruction planning. He also headed the Japanese economic section in the Foreign Office in 1945. Later in life he held chairs at the University of Liverpool and University College London, and he became a fellow of St Antony's College, Oxford (Silberston 2004).

Allen's work reflects his background in Birmingham industries and in Japan. In 1923, at the request of Keynes, he published the paper "An Eighteenth-Century Combination in the Copper-Mining Industry" in the *Economic Journal* (Allen 1923). After he returned from Japan, he wrote two books and two articles on the Japanese economy in the 1920s, which was a topic he would address throughout his lifetime. He also specialized in the local economic history of Birmingham, publishing a nearly 500-page treatise on the topic in 1929, *The Industrial Development of Birmingham and the Black Country, 1860-1927* (Allen 1929).

The next year, he published a unique explanation for unemployment in the *Economic Journal* in an article titled "Labour Transference and the Unemployment Problem." To Allen, the reason some parts of Birmingham and the Black Country were doing better than other regions with old industries was because they had been able to attract expanding industries because of their greater diversification of industrial skill and technology. This permitted better absorption of the unemployed from declining industries into expanding industries. When examining areas that still faced high unemployment, Allen recognized that geographic distance of even only a few miles impeded labor mobility by changing the workers' perceived employment opportunities. He wrote, "I suggest that it is not only the cost of travelling between home and the place of employment, or the expense of moving the residence, which is responsible for this, but that a population bred in the atmosphere of one trade is less alert to seize fresh opportunities than people who find around them the stimulus of a varied industrial life" (Allen 1930, p. 246). This could be seen in the higher unemployment rates of smaller towns centered around a single industry than in cities with more varied industries. Allen did not blame the workers for not being aware of better opportunities in neighboring towns but instead suggested that the government could coordinate

the localization of expanding industries to regions where they would increase industrial diversity and offer needed employment (Allen 1930, p. 248).

Finally, in 1933 Allen published the first edition of *British Industries and their Organisation*, a detailed economic history of the older export trades and the motor vehicle industry. In this book, he again connected the geographic location of expanding industries to unemployment: "Provided new trades spring up in the neighbourhood of decaying ones, heavy unemployment may be avoided... But the localization of the new trades in the post-war periods has prevented this easy transference from taking place" (Allen 1933, p. 319). Allen published five editions of the text throughout his life.

Perspectives from the coal and steel industries

Alfred Morgan, a coal mine official from Glamorgan, Wales, published a piece in the *Economic Journal* in 1926 after the General Strike (Morgan 1926). He argued that with coal being produced and consumed more efficiently, the total number of miners in the industry must be gradually reduced.

Offering a more academic perspective on the coal mining industry, Brinley Thomas (1906–1994) was the son of a Welsh coal miner who attained his PhD from the London School of Economics in 1931 and eventually became a professor at University College, Cardiff (Foreman-Peck 2014). His research during the interwar period focused on labor mobility in the coal mining industry. In a 1930 *Economica* paper using similar methods to Jewkes and Campion (1928), he found that there was more mobility among coal miners in South Wales than among workers in the cotton industry (Thomas 1931). His other papers analyzed coal mining mobility prior to World War I (Thomas 1930) and the mobility of labor into the South East region of England from 1927 to 1931, large inflows of which were from Welsh coalfields (Thomas 1934, pp. 224-225).

Harry Dawes explored labor mobility in the steel industry by interviewing 187 former employees of the Penistone steelworks which closed in 1930, three years afterward. His article in the 1934 *Economic Journal* found that over half of the displaced workers were able to find some other employment, but temporary employment on public road-building projects played a large role in this (Dawes 1934). He also found that older workers were disadvantaged, with over two-thirds of experiencing more than two years of unemployment (Dawes 1934, p. 85).

1.7 Monetary policy and the business cycle

The Marshallian normal science focused on short-term market clearing processes rather than persistent, mass unemployment. Confronted with the anomaly of persistently high unemployment, some economists departed from this normal science to consider macroeconomic causes of unemployment in the interwar period, building on a separate long literature on the trade cycle. This section describes the work of three economists who focused on the relationship between unemployment and the business cycle. By treating unemployment as a largely cyclical phenomenon, and advocating various monetary policy interventions, these economists recognized interwar unemployment as anomalous from "normal" economic times. Their contribution was to clarify the connection between monetary policy and unemployment, becoming early proponents of monetary interventions to promote economic stability.

This section begins with an extended discussion of the work of John Rotherford Bellerby, who most explicitly linked monetary policy to unemployment. Bellerby is also of interest for his development of a utopian society, The Neighbours, in parallel with his academic research. The last subsection briefly reviews the work of Ralph George Hawtrey and MP Arthur Michael Samuel.

1.7.1 John Rotherford Bellerby

John Rotherford Bellerby (1896–1977) was born in York and was studying at the University of Leeds at the outbreak of World War I. He enlisted and became a major on the Western Front in the Eighth West York Regiment. In 1917, he was severely wounded in the Battle of Passchendaele, losing his right arm and suffering damage to his eye (J. O. Jones 1988, p. xiii). A contemporary describes the effect of Bellerby's service on his economic outlook: "Deep contemplation and prayer during convalescence led him to seek ways of improving economic and social conditions and enhancing industrial harmony... He saw the role of the economist as not only to describe and analyse, but also to prescribe; and having prescribed, to practice" (J. O. Jones 1988, p. xiii). After the war, Bellerby finished his studies at the University of Leeds and acquired a post with the International Labour Office (ILO) in Geneva to begin accomplishing these goals. His work brought him to the United States in the early 1920s. Then, he became a Research Fellow at Gonville and Caius College, Cambridge, from 1927-1930, and a Professor of Economic Science at Liverpool University throughout the 1930s.

During this time, Bellerby made two major contributions. First, he was an early proponent of monetary policy. He argued consistently throughout the 1920s that monetary policy aimed at price stabilization could remedy the mass unemployment problem, aligning his views with Keynes at the time. But, he also thought more broadly about the challenges of the day. His second contribution was a controversial text, *A Contributive Society* (1931), which laid the groundwork for a utopian society based on principles of generosity and sharing. Bellerby took this a step further by actually founding and participating in such a society, which he called The Neighbours. Of Bellerby, *The Economist* wrote, "that any social reformer should in these days seriously propose to practise the social faith that he presents is sufficiently remarkable; that an economist of recognised standing should be afraid neither to practise nor to preach is an event that his colleagues cannot afford to ignore" (*The Economist* (1931) as cited in J. O. Jones (1988, p. xii)).

Credit control and monetary stability, 1923–1926

From the ILO in Geneva, Bellerby published two works in 1923 — "The Controlling Factor of Trade Cycles," in the *Economic Journal* and *Control of Credit as a Remedy for Unemployment*. In both works, he intended to present clearly and concisely to the public what he viewed as consensus opinions on the primary remedy of unemployment: the control of credit. He described this mission in the preface to *Control of Credit as a Remedy for Unemployment*, writing "If the science of economics is discredited in the eyes of the lay reader, it is because he can discover so little apparent agreement amongst economists on the essential problems of industrial life. In the present report... an attempt is made to show that almost unanimity of agreement is to be found on certain conclusions of vital interest for the solution of unemployment" (J. R. Bellerby 1923a, Preface).

Bellerby began developing this theory in "The Controlling Factor of Trade Cycles," where he argued that the remedy for trade cycles and unemployment is to control price movements through the control of currency. Bellerby's "currency control" included restricting the note issue as well as limiting the amount of credit extended by the banks. To achieve these objectives, he suggested an international organization for regulating currency policy or an agreement to limit fluctuations of prices to some range around a fixed normal (J. R. Bellerby 1923b).

Control of Credit as a Remedy for Unemployment again argued that the stabilization of prices would lessen fluctuations in the trade cycle, reducing unemployment. Prices could be stabilized

by controlling the level of credit available through the discount rate (J. R. Bellerby 1923a, p. 69). The central banks have an imperative to take on this role of managing the currency in order to address the problem of unemployment: "Unemployment is a scourge. If the manipulation of one factor in industrial organisation may lead in any way to a diminution of this evil, the immediate duty of all concerned would seem to be to strengthen this factor where possible and determine the soundest criteria for its use. The discount rate is a weapon ready to hand" (J. R. Bellerby 1923a, p. 102). Bellerby also argued that the effectiveness of discount rate policy could be increased by countercyclical government spending and international cooperation (J. R. Bellerby 1923a, pp. 111-113, 114-120).

Bellerby's work in 1924 and 1925 presented the same argument but in greater detail. "The Monetary Policy of the Future," published in the June 1924 *Economic Journal*, argued for a fixed normal price level. Price stability could then be achieved by limiting the fluctuation of prices to some range around this normal (J. R. Bellerby 1924, p. 179). Bellerby argued that this would promote confidence, limit large swings in the trade cycle, and permit better cooperation among countries. He believed that the stabilization of prices should be the main criterion for determining the bank rate rather than the level of reserves, so he was opposed to the gold standard (J. R. Bellerby 1924, pp. 185-187).

Bellerby's 1925 book *Monetary Stability* opened, "The subject treated in the present pages is closely connected with that of unemployment. It was, in fact, the study of unemployment which first led the present writer into the field of monetary policy; for it is now recognised that the relationship between these two questions is so intimate that neither can be examined without reference to the other" (J. R. Bellerby 1925a, p. v). However, his focus was slightly broader than this, considering what form of price stabilization would be financially, socially, and economically preferred. He contrasted the "constant price-normal system" of a fixed price level with the "composite system" where an assortment of indices would be used to determine when adjustments should be made without a guiding principle. These differed in scale: "The 'constant price-normal' system eliminates the secular, long-period fluctuation of prices; the 'composite' system is concerned alone with the current trend" (J. R. Bellerby 1925a, p. 135). Because the constant price-normal system would prevent long-term changes in the value of money, it would preserve the value of property, making the system more just than a composite system (J. R. Bellerby 1925a, pp. 78-79). It would also make forecasting less risky, would keep the cost of living stable, and would base the policy of price stability on equally rigid principles to that of the

gold standard (J. R. Bellerby 1925a, pp. 138-144). Clarifying what is meant by price stability, to Bellerby, was the first and most important step in seeing policies of price stability actually enacted. Introducing a fixed normal price would accomplish this most effectively (J. R. Bellerby 1925a, p. 146).

In the mid-1920s, Bellerby was posted to the Washington arm of the ILO. In 1924, he presented a paper at the American Economic Association meeting in Chicago on the role of international cooperation in maintaining the world supply of gold (J. R. Bellerby 1925b). Then, in 1926, he published a small report, *Stabilization of Employment in the United States*, which spoke optimistically of monetary remedies for unemployment in the US. Bellerby wrote, "...the Federal Reserve System has been enabled to develop and apply a new system of credit control which, if safeguarded in future through the international regulation of gold reserves, may prove the most significant of all new developments for the stabilisation of the general employment situation" (J. R. Bellerby 1926, p. 2).

Research fellow at Cambridge, 1927–1929

In 1927, Bellerby went to Cambridge as a Research Fellow at Gonville and Caius College. At Cambridge, he was close with John Maynard Keynes and was a member of the exclusive Political Economy Club. He also met and married the poet Frances Parker.

In 1927, Bellerby published a three-part article in the *International Labour Review* on the principles and mechanisms of a system of fixed wages. He argued that wages should be fixed first with reference to what the community considers just, and then with reference to what would be feasible (J. R. Bellerby 1927a, p. 3). In many cases, the just resolution would be for industry to pay wages as high as they could without burdening other workers (J. R. Bellerby 1927b, pp. 199-200). For disputes between wage-earners in different industries, he suggested that a "Schedule of Skill" be developed to fix relations between industries according to their skill levels while preserving a living wage (J. R. Bellerby 1927b, p. 206). Bellerby believed that a central body should be established in each country to find fair compromises between the wage principles held by competing groups (J. R. Bellerby 1927c). In *Coalmining: A European Remedy* (1928), Bellerby described how coal miners had suffered wage reductions while other industries had been sheltered through protection and monopoly: "Whatever may be the gain of the sheltered group, the burden of their success tends to be partly transferred, through higher prices, to the unsheltered section" (J. R. Bellerby 1928, p. 71). The appropriate system of wage-fixing would

ensure that no group in a community bore such an unfair burden.

A 1930 article with K. S. Isles argued that a policy of wage reductions would not reduce unemployment. Again focusing on monetary factors, Bellerby attributed the rise in real wages by 5% from 1925 to 1930 to deflation from the return to the gold standard rather than to deliberate wage policy. He wrote, "Since, in the present situation, high wages are an effect rather than a cause, it would be misleading to state the problem in such a way as to imply that the remedy can be found through action taken directly within the sphere of wages" (Bellerby and Isles 1930, p. 141). Attempting to remedy unemployment through wage adjustments would not have the desired effect because wages were already low in the industries with high unemployment, so "the problem is rendered intractable" (Bellerby and Isles 1930, p. 146). Instead, Bellerby supported raising prices relative to costs through international cooperation between central banks with the aim of stabilizing prices and credit (Bellerby and Isles 1930, p. 154). If Britain wanted to act independently, Bellerby also suggested that quoting a higher Bank price for gold while lowering the exchange rate would have a similar effect (Bellerby and Isles 1930, p. 154).

Bellerby was consistent throughout the 1920s in his view that unemployment was driven by trade downturns that could be limited through a monetary policy of price stabilization. In a departure from the Marshallian normal science, he extended this prescription to wages, advocating a system of wage-fixing to aid in the general stabilization of prices. Regardless of the currency standard, Bellerby believed that international cooperation was key to ensuring this price stabilization.

The Neighbours

While at Cambridge, Bellerby founded a utopian group called The Neighbours based on the principle of maximum contribution. He described the fundamentals of this group in a 1929 paper presented at the Political Economy Club at the request of Keynes, and also published a full treatise on the group's principles, *A Contributive Society* in 1931. Both works begin by considering what the ideal state of society might be — a question which, to Bellerby, was as essential to economics as architecture is to buildings, "an indispensable part of the science of economics... peculiarly practical... the subject of most vivid interest to those outside economics" (J. R. Bellerby 1988, p. 225). The problem of "the final aim of economic effort" underlies all social issues, and to Bellerby, economists should take the lead in reasoning on it (J. R. Bellerby 1988, p. 227). He approached this question by constructing an ideal individual who attempts

to maximize his net gift to society by producing as much as possible and consuming as little as possible. Bellerby recognized that this was a radical revision of the fundamental assumptions of the economic man, writing, "The motive assumed here is seen to be the reverse of that generally imputed to the 'economic man' of the present time. Whereas this abstract representative of human kind is usually regarded as being bent on maximum acquisition, he is assumed here to have the aim of maximum contribution" (J. R. Bellerby 1988, p. 229). What would a world full of these ideal persons look like?

The Neighbours was an attempt to create this ideal world on a small scale by adhering to this principle. To achieve maximum contribution, every member was required to work to their fullest potential while limiting their consumption to the average wage in society (around £3 per week) (J. R. Bellerby 1988, pp. 229-232). The surplus earnings and gradual donation of property would be put towards enhancing the knowledge, beauty, and goodwill of society (J. R. Bellerby 1988, pp. 233-235). Importantly, members retained "stewardship" over their earnings and property, having a say in what these ends were: "In the ideal state there will be as much independence and personal initiative as now, enterprise will still be privately conducted, but for public gain, and each individual will retain stewardship over whatever wealth he personally can create. There will be as much variety then as now and, in some ways, more, since communal outlays will be more lavish" (J. R. Bellerby 1988, pp. 241-242). This utopian society was founded and led by Bellerby and his wife, who adhered to these principles personally and recruited others. In a pamphlet Frances Bellerby wrote on the group, she detailed one of their initiatives to establish home libraries in various East End neighborhoods (F. P. Bellerby 1934, pp. 9-10). She summarized the efforts of the Neighbours: "The society has one fundamental ethic: that, in the service of the things of Truth and Beauty, the only contribution which satisfies is the maximum" (F. P. Bellerby 1934, p. 11).

Founding this ascetic utopian society seems to have not interfered with Bellerby's research, as he was offered and accepted a professorship in the field at the University of Liverpool in 1930. But Bellerby was pulled in very different directions. As an economist, he had been motivated by the challenge of unemployment to discover and advocate monetary reform. However, he was unsatisfied with his work ending there — his desire to see these policies implemented in the real world remained unfulfilled. He joined the Labour party and stood unsuccessfully for election in Newark in 1931. He then resigned his chair at Liverpool in order to focus on politics, standing for Labour in Cambridgeshire in 1935 with a platform that included monetary reform to address

unemployment (J. R. Bellerby 1988, xix). Despite a passionate campaign, he was not elected, leading to a period of confusion and illness. For the rest of his life, Bellerby moved in and out of academia, working at the University of Glasgow, the Ministry of Food, and the Oxford Institute for Research in Agricultural Economics on issues of post-war food supplies, reconstruction, and employment.

Of all the economists surveyed here, Bellerby addressed economics with the strongest intent to discover and prescribe policies to improve the economic and social conditions of the real world. In the interwar period, he experimented with changing his lifestyle and profession in order to have more real-world impact, committing to donating most of his earnings to social initiatives and dropping out of economic research for a short time to run for parliament. His preferred policies of price stabilization and credit control to address unemployment represented a departure from the prevailing Marshallian normal science.

1.7.2 Other perspectives focused on the business cycle

This subsection briefly discusses the work of two other economists who abandoned the Marshallian approach and instead focused on monetary policy — Ralph George Hawtrey and MP Arthur Michael Samuel.

Ralph George Hawtrey

Ralph George Hawtrey (1879–1975), like Keynes, was educated at Eton and Cambridge, became a member of the Apostles, and formed friendships with the Bloomsbury group. However, Hawtrey entered the civil service rather than academia, working at the Treasury from 1904 until 1947 (Black 2004). During the interwar period, Hawtrey was the Director of Financial Inquiries and a trusted adviser to the highest ranks of the Treasury (Peden 2004, 16-19). Hawtrey thus occupied a space between two worlds — well-connected and well-respected in Cambridge as an economist, but working and advising in the Treasury.

Hawtrey never considered unemployment in the 1920s and early 1930s to be anything more than an effect of cyclical downturns. In a 1922 article on the Genoa Conference, Hawtrey wrote, "It is quite superfluous to seek for other causes of depression and unemployment, when there has been so tremendous a deflation as to reduce prices by half in less than two years" (Hawtrey 1922, p. 302). Similar to the views of Keynes and Bellerby in this period, Hawtrey believed

that stabilizing prices should be a central objective of monetary policy. In 1924, he wrote positive reviews of Keynes's *A Tract on Monetary Reform* and Bellerby's *Control of Credit as a Remedy for Unemployment*, commending their emphasis on international cooperation and monetary issues (Hawtrey 1924a, 1924b). In *Trade Depression and the Way Out* (1931) and *The Art of Central Banking* (1932), he again connected unemployment to credit contraction, focusing on the need for monetary policy that expands credit (Hawtrey 1931, pp. 73-74; 1932, p. 301).

However, Hawtrey was less supportive of broad programs of government expenditure on public works than Keynes or Bellerby (Hawtrey 1924b, p. 441). In a 1925 article "Public Expenditure and the Demand for Labour," published in *Economica*, Hawtrey argued that government expenditure on employment programs would divert funds from sources of private employment unless there was a simultaneous expansion of credit or "idle balances" that would not have been usually invested (Hawtrey 1925, pp. 38-43). But, because credit expansion ultimately drove the new employment, Hawtrey argued that there was no need for public expenditure at all. To Hawtrey, "[t]he public works are merely a piece of ritual, convenient to people who want to be able to say that they are doing something, but otherwise irrelevant. To stimulate an expansion of credit is usually only too easy. To resort for the purpose to the construction of expensive public works is to burn down the house for the sake of the roast pig" (Hawtrey 1925, p. 44). Thus, "the true remedy for unemployment is to be found in a direct regulation of credit on sound lines" (Hawtrey 1925, p. 47). This article was used by the Treasury in 1929 to defend their position against Lloyd George's public works program (Peden 2004, p. 59).

Hawtrey advocated a managed gold standard, where central banks made decisions about the stabilization of credit instead of just reacting to the level of gold reserves. Hawtrey disagreed with Keynes that the stabilization of the price level was more important than the stabilization of the exchanges — he wanted prices to be stabilized through the regulation of credit, but in a gold standard world (Hawtrey 1927, p. 106). In the same book, Hawtrey again stated his belief that unemployment was a problem of the trade cycle because of the contraction of credit during an economic downturn (Hawtrey 1927, p. 82). In a lecture he published in 1928, Hawtrey wrote, "[I]n my opinion the trade cycle can be eliminated, or at any rate so reduced in extent as to avoid epidemics of unemployment, without any departure from the gold standard, provided the banking authorities of the different gold standard countries co-operate for that object" (Hawtrey 1928, p. 80).

Hawtrey went so far as to argue that the trade cycle was a "purely monetary phenomenon," taking special issue with Pigou's discussions of other causes for the trade cycle in *Industrial Fluctuations* (1927). In 1928, Hawtrey published *Trade and Credit*, a collection of speeches and essays including a new 42-page critique of *Industrial Fluctuations*. In the exchange with Pigou that followed, Hawtrey maintained his position that the trade cycle was a monetary phenomenon requiring a monetary solution (Hawtrey 1928, pp. 142-184; Hawtrey and Pigou 1929).

Throughout the 1920s and early 1930s, Hawtrey thus consistently treated unemployment as a purely cyclical phenomenon. Unemployment was a consequence of the business cycle, but he was primarily interested in how business cycles were shaped by monetary policy causing credit contractions and expansions.

Arthur Michael Samuel

Arthur Michael Samuel (1872–1942), the 1st Baron Mancroft, was born in Norwich and served as an MP for Farnham from 1918 to 1937. He became Stanley Baldwin's Secretary for Overseas Trade from 1924 to 1927 and the Financial Secretary to the Treasury from 1927 to 1929. In addition to a pamphlet on the use of bills of exchange in trade (1928), he published a single article on economics in the *Economic Journal*. Written in 1930, Samuel described unemployment as "our main problem" and suggested, following Keynes, that the investment of British capital abroad rather than domestically could have contributed to the problem (Samuel 1930, p. 64). Like Keynes, he noted that a default on funds loaned abroad leaves Britain with no assets, whereas domestic investment creates something for the country even in face of a default. Samuel thus suggested the encouragement of domestic investment through monetary policy as a solution for unemployment (Samuel 1930, pp. 67-68).

1.8 John Maynard Keynes before the *General Theory*

John Maynard Keynes (1883–1946) was educated at Eton and studied mathematics at Cambridge. After a short stint as a civil servant in the India Office, his father, the economist John Neville Keynes, arranged for his return to Cambridge. In 1911 he was elected a fellow of King's College and became the editor of the *Economic Journal*.

At the outbreak of the First World War, Keynes took a position at the Treasury where he worked on acquiring currencies. He was later exempted from conscription as a conscientious

objector. Keynes served as the financial representative of the Treasury at the Versailles Peace Conference at the end of the war, but he was unsuccessful in persuading Lloyd George to advocate a lenient treatment of Germany. This led Keynes to resign his post and write *The Economic Consequences of the Peace*, which was a best-seller that criticized the peace negotiations in strong language. Throughout the interwar period, Keynes informally advised the German, British, and American governments, speculated on currencies, invested in the arts, and maintained a light teaching load at Cambridge.

Keynes wrote extensively on unemployment throughout the interwar period before the publication of the *General Theory*, with a distinct focus on possible policy remedies. In the early 1920s, he primarily argued that deflationary monetary policy and price instability caused unemployment. He opposed returning to the gold standard at its pre-war parity with the dollar and expressed concern over the disproportionate impact of this policy on the export industries. He argued for credit expansion and public works policies at the end of the 1920s, and then briefly supported tariffs in 1931. His ultimate remedy for unemployment, given in "The Means to Prosperity," was government expenditure to spark new investment in the economy (Keynes 2013b, pp. 335-366).

Keynes was convinced that the persistent, mass unemployment Britain experienced in the interwar period was not Marshallian in nature and thus could not be accommodated by the prevailing normal science. While he recognized that wage reductions could alleviate some unemployment, the level of reduction that would be required for markets to clear was so severe it might be impossible, or, he feared, cause social unrest. Instead, Keynes connected anomalous British unemployment to domestic monetary policy, international currency issues, and the global cyclical downturn, presenting not only novel policy prescriptions for unemployment, but also new ways of thinking about mass unemployment as a systemic problem that eventually led him to develop the new paradigm of the *General Theory*.

Currency reform and price stability, 1922-1923

In his November 1922 lectures to the Institute of Bankers, Keynes argued against returning to the gold standard at its pre-war parity with the dollar, instead favoring a devaluation of the pound and a 15-20% inflation of prices. Addressing unemployment was one of three arguments he gave to support his position. First, he noted that a restoration of the pre-war parity would increase Britain's internal debt, raising the tax burden and likely requiring a capital levy, whereas

a devaluation would yield a surplus in revenue, permitting tax cuts (Keynes 2013e, pp. 62-64). Second, given the uncertainties of war debts to the United States, Keynes believed that if the pound were restored to its pre-war parity rather than devalued, it would be difficult to keep its value stable (Keynes 2013e, pp. 67-73). Finally, Keynes observed that prices had risen abroad but not in Britain, while wages had doubled out of proportion with the cost of living. Because a reduction of wages "was almost hopeless, or it will take a long time," a sentiment he repeated throughout the decade, the only option to address unemployment was to permit a devaluation of the pound (Keynes 2013e, p. 66).

Throughout 1923, Keynes expanded and developed these arguments into a case for price stability. In March, he took over the weekly Liberal publication *The Nation and Athenaeum*, in which he would publish 155 articles in eight years (Skidelsky 1992, p. 136). In a July 1923 article commenting on the rise in the Bank rate from 3% to 4%, Keynes described the incompatibility between a deflationary policy to return to gold and the maintenance of the level of credit in the economy (Keynes 2013e, p. 106). This misguided government policy caused uncertainty, leading Keynes to write, "For my part I believe that confidence in the price level is the biggest practical help which the official world can give to the business world." In addition to aiding business, confidence in the price level could alleviate some unemployment; he continued, "... lack of this confidence [in the price level] is a considerable cause, and probably the only remedial one, of present unemployment" (Keynes 2013e, p. 112).

Later in 1923, Keynes delivered a talk at the Liberal Summer School, which was eventually published as "Currency Policy and Unemployment" in the *Nation*. Again Keynes argued that deflationary policy caused a lack of confidence in the price level, which could lead to unemployment (Keynes 2013e, pp. 113-118). He also raised a new concern: that instability of the price level could disrupt the social and economic order. He wrote, "Modern individualistic society, organised on lines of capitalistic industry, cannot support a violently fluctuating standard of value... Unless we can give it such a reasonably stable standard, this society will be stricken with a mortal disease and will not survive" (Keynes 2013e, p. 117). Keynes wanted currency and credit to be regulated in order to "protect society against the attacks and criticisms of Socialist and Communist innovators" (Keynes 2013e, p. 117).

In September 1923, William Beveridge stated that Keynes believed unemployment was caused by overpopulation. This was an extrapolation from *The Economic Consequences of the Peace*, which embroiled Keynes and Beveridge in a debate through the spring of 1924. Keynes did not

deny the risk to employment of overpopulation, but argued again that the primary cause of the current unemployment was a maladjustment of the economy to deflation, as well as shifts in Britain's export markets (Keynes 2013e, p. 121).

Prime Minister Stanley Baldwin declared in late October 1923 that he intended to introduce trade protection to reduce unemployment, which had been over 11% for most of the year. A General Election was called in December on the issue of tariffs. Keynes campaigned for the Liberal party and advocated free trade in the *Nation*. In these articles, he listed the four main causes of unemployment as trade cycles exacerbated by the recent policy of deflation, the uncertain state of Europe, the high cost of production in Britain, and the increase in population (Keynes 2013e, pp. 153-154). He argued that a tariff would not remedy any of these causes but would instead contract trade (Keynes 2013e, pp. 151, 154). Keynes did believe, however, that the problem of unemployment was diminishing (Keynes 2013e, p. 153).

A few days after the December 1923 election, which had returned a minority Labour government under Ramsey MacDonald, Keynes published *A Tract on Monetary Reform*, which consolidated his arguments on monetary policy from 1922 and 1923. Keynes argued that stabilizing internal prices through the control of the level of credit available to businesses should be the primary objective of monetary policy, with external exchange stability as only a secondary objective (Keynes 2013a, p. 147). He criticized a return to gold at its pre-war parity, believing that this would lead to unstable prices owing to the instability of gold as a measure of value (Keynes 2013a, pp. 132-133)

The *Tract* does not directly address unemployment, but rather treats it as a consequence of price instability. Every time Keynes discussed employment, it was grouped with trade or prices rather than considered directly (Keynes 2013a, pp. 138, 140, 145, 148-149, 152, 153, 155); for example, "I regard the stability of prices, credit, and employment as of paramount importance" (Keynes 2013a, p. 140). While Keynes may have supported price stability in order to accomplish the ultimate goal of alleviating unemployment (Patinkin 1976, p. 124, for example), he was also interested in establishing general price stability for other reasons, including to provide confidence for business owners.

Another one of these reasons was to prevent social unrest. In the first chapter of the *Tract*, "The Consequences to Society of Changes in the Value of Money," Keynes argued that the arbitrary redistributive effects of inflation and deflation pose a serious threat to the existing social fabric. For example, inflation permits businesses to make windfall profits, becoming

"profiteers" in the public light. Their unequal and unearned rewards upset the social order and threaten capitalism itself: "No man of spirit will consent to remain poor if he believes his betters have gained their goods by lucky gambling. To convert the business man into the profiteer is to strike a blow at capitalism, because it destroys the psychological equilibrium which permits the perpetuance of unequal rewards" (Keynes 2013a, p. 24). Likewise, deflation "redistributes wealth in a manner injurious, at the same time, to business and to social stability" (Keynes 2013a, p. 118), often through unemployment. In his oft-cited conclusion to the chapter, Keynes wrote that he preferred inflation to deflation "because it is worse, in an impoverished world, to provoke unemployment than to disappoint the rentier" (Keynes 2013a, p. 36). Keynes underscored the threat of price instability in the next paragraph, when he continued, "The individualistic capitalism of today... presumes a stable measuring-rod of value, and cannot be efficient — perhaps cannot survive — without one" (Keynes 2013a, p. 36).

Keynes amplified these conclusions in a December 1923 speech to the National Liberal Club. He described how changes in the value of money cause the "triple evils" of modern society: some individuals earn money that society might not think they deserve, pressuring the social order; which is further threatened by unemployment leading to social movements like strikes; and ultimately investors face the disappointment of their expectations due to this uncertainty (Keynes 2013e, p. 160). Again, his argument for price stabilization is based on ensuring the confidence of business owners and preventing disturbances to social stability.

Keynes continued advocating price stabilization through the spring of 1924. In a February article for the *Nation*, he defined two goals for currency reform: to remedy the credit cycle, unemployment, and uncertainty; and to link the monetary standard to staple goods instead of gold (Keynes 2013e, p. 167). In a separate article in February, he wrote that currency reformers "believe that the stability of the internal price level and the damping down of the credit cycle are desirable and attainable objects" (Keynes 2013b, pp. 191-192).

Though Keynes had been discussing unemployment indirectly in conjunction with price stability, he had not comprehensively described the causes of unemployment since the 1923 General Election campaign, where he had listed trade cycles, the uncertain state of Europe, high costs in Britain, and population growth. In a speech to his colleagues at a League of Nations Union conference on unemployment in April 1924, however, he listed completely different reasons: better unemployment pay, the maldistribution of labor, and wages being kept high because of unions (Keynes 2013e, pp. 182-183). Keynes attributed 4 to 5 percentage points of the present un-

employment to these reasons, with the rest caused by businesses' fear of falling prices (Keynes 2013e, p. 183). Here he clearly delineated excess unemployment due to price instability and a high baseline unemployment due to reduced wage flexibility, labor immobility, and moral hazard.

Keynes touched on unemployment again to an audience of his colleagues in April 1924 at the annual meeting of the Royal Economic Society. Keynes agreed with Ralph Hawtrey that there was "no longer any reason to doubt" the connection between the monetary system, the credit cycle, and unemployment — credit cycles "cause unemployment and other social disturbances," posing "one of the greatest and most dangerous social evils of the economic system" (Keynes 2013e, p. 208). This cyclical unemployment could be remedied through price stabilization, reducing the risk of social disturbance.

Does unemployment need a drastic remedy? 1924-1925

By late May 1924, Keynes had moved past the *Tract*, writing that "the shape of my new book begins to form in my mind" (Skidelsky 1992, p. 164). He had also shifted his approach to unemployment, joining a debate on the issue in the *Nation* with "Does Unemployment Need a Drastic Remedy." Keynes now believed that excessive unemployment was because of a slump in the shipbuilding and engineering industries (Keynes 2013e, p. 223) and that the unemployment rate in all other industries was only about 4% for reasons that were harder to address, like the immobility of labor, trade union interference in wages, and the differences in wages between the "sheltered" domestic industries and the "unsheltered" export industries (Keynes 2013e, pp. 231, 219-221). Thus, he proposed a program of "great works of construction," where the state would encourage capital projects like the mass production of houses, the updating of roads, or the deployment of electrical systems with savings that were currently being invested abroad — up to £100 million a year. Though he had no theoretical grounding for this proposal, he believed that, when paired with monetary reform, it would restore business confidence. He urged, "Let us experiment with boldness on such lines" (Keynes 2013e, p. 223).

In August 1924, Keynes expanded his argument by suggesting a licensing scheme to ration overseas borrowers (Keynes 2013e, pp. 282-283, also 327-332). He also encouraged government intervention in his Sidney Ball Lecture that November, where he argued that the solutions to the economic evils of the day, whether unemployment, the disappointment of business expectations, or the inequality of wealth, would be through the coordinated effort of the state and community (Keynes 2013e, pp. 291-292).

As Britain edged closer to restoring the gold standard, Keynes vocally opposed linking the exchange to the dollar, instead believing that Britain should manage internal prices and credit. If the pre-war parity on gold had to be achieved, Keynes thought parity should be achieved through deflation before the removal of the embargo on gold, rather than forcing parity by removing the embargo. He made these arguments consistently in his report of the speeches of the bank chairmen in February 1925, his comments to the Commercial Committee of the House of Commons in March, in two April articles in the *Nation*, and in private meetings with Treasury officials, including a March 17 dinner with the Chancellor of the Exchequer (Keynes 2013b, pp. 192-200; 2013e, pp. 337-344, 349-354, 337). Keynes described the frustration of his position: "At present, to debate monetary reform with a City editor (or an ex-City editor) is like debating Darwinism with a bishop 60 years ago" (Keynes 2013e, pp. 348-349). Despite Keynes's efforts at persuasion on this issue, however, the return to gold at its pre-war parity was officially announced on April 28, 1925.

Unemployment was only on the fringes of these arguments about the return to gold, connected again with the threat of social unrest given a deflationary policy to restore the pre-war parity. In an October 1924 letter in support of a local Liberal candidate, Keynes wrote "Our most pressing problem is to mitigate unemployment" but said that the purpose of the Liberal platform on unemployment was to prevent class conflict (Keynes 2013e, p. 324). Keynes also pointed to social unrest as a negative consequence of monetary policy a few other times in this period. In July 1924 he wrote that "the disturbance to industrial peace" of a deflationary policy and reducing money wages "can be easily imagined" (Keynes 2013e, p. 263). In March 1925 he described employment and industrial conditions as so poor in Britain that they "are not in a condition to stand shocks or storms" (Keynes 2013e, p. 342). In April he wrote that "the average industrialist, banker, or politician is not really anxious to submit us to a further course of deflation and of strikes and unemployment," connecting the cost of unemployment to the possible labor unrest (Keynes 2013e, p. 353).

Keynes was also concerned about price stability and business confidence for reasons other than unemployment in this period. In Keynes's July 1924 testimony to the Committee on the Currency and the Bank of England Note Issue (Chamberlain-Bradbury Committee), he stated explicitly: "Why I want price stability is that it will minimise disastrous losses to traders through no fault of their own, through events which were quite beyond their cognisance" (Keynes 2013e, p. 261). In his October 1924 testimony to the Committee on National Debt and Taxation (Colwyn

Committee), Keynes defended his proposal for "great works of construction" but without any reference to unemployment, instead arguing that the Treasury should facilitate investment in public utilities like transport and power because of the low incentives private enterprise had to invest in them (Keynes 2013e, pp. 321-322). Finally, when the interests of price stability and the relief of unemployment diverged in March 1925, Keynes supported a rise in the Bank rate to ensure the stability of prices, despite the risk of intensifying unemployment (Keynes 2013e, pp. 335-336).

The economic consequences of Mr. Churchill, 1925-1927

Keynes wrote that the decision to return to gold was based on a "jejune and intellectually sterile" orthodoxy (Keynes 2013e, p. 361). The pre-war parity overvalued the pound, making domestic prices too high and requiring nominal wage reductions. To Keynes, forcing down wages was still a real threat to social stability, and he wrote that these wage reductions could not be achieved "without the gravest danger to industrial profits and industrial peace" (Keynes 2013e, p. 360). He bluntly concluded that Britain should have allowed the currency to find its own level rather than "embark[ing] on a struggle with every trade union in the country to reduce money wages" (Keynes 2013e, p. 360).

Keynes developed this argument in his July 1925 testimony to the Committee on Industry and Trade (Balfour Committee) and in his pamphlet *The Economic Consequences of Mr. Churchill*. These two pieces, written at the same time, make the same argument but in a different tone for different audiences. Keynes recognized that unemployment was concentrated in the unsheltered export industries and attributed their difficulties to the return to the gold standard at its pre-war parity. The return to gold increased the value of the pound internationally, decreasing the revenues of the export industries, but wages could not adjust because the domestic cost of living had remained constant (Keynes 2013e, p. 386; 2013b, pp. 207-208). In his committee testimony, he also suggested that markets in Britain were less likely to be smoothly adjusting due to trade unions, the dole, and the immobility of labor (Keynes 2013e, p. 396).

To Keynes, the monetary policy of the Treasury and the Bank of England would eventually force wages down in the unsheltered industries through the continued restriction of credit and intensification of unemployment. This was not only a risk to social stability but also unjust (Keynes 2013e, pp. 391-393; 2013b, p. 218). Keynes suggested alternative remedies to the disequilibrium between prices and wages, such as encouraging a rise of prices abroad or leaving

gold and allowing the exchanges to fall (Keynes 2013e, pp. 397-298; 2013b, p. 226). In his committee testimony, he also supported "unsound" short-term policies to stimulate the economy in hopes that "prosperity would be cumulative" (Keynes 2013e, p. 405).

In his pamphlet for the public, Keynes suggested that a uniform reduction in wages would distribute wage pressure fairly among the sheltered and unsheltered industries (Keynes 2013b, p. 211).[13] Issues of social justice needed to be considered if these wage reductions were not uniform. Taking miners as an example, he wrote, "Like other victims of economic transition in past times, the miners are to be offered the choice between starvation and submission [to lower wages], the fruits of their submission to accrue to the benefit of other classes... On the grounds of social justice no case can be made out for reducing the wages of the miners. They are the victims of the economic juggernaut" (Keynes 2013b, p. 223).

Concerns about social unrest also motivated Keynes's comments on monetary reform in September 1925. Keynes had married Lydia Lopokova that summer and traveled to Russia to attend to some Cambridge business and to meet her family. In a speech in Moscow, he argued for a middle way between fascism and Leninism where state-led monetary reform could ensure stable prices and social stability (Keynes 2013e, pp. 439, 441).

Keynes repackaged these arguments in his last speech of 1925, which was published in the *Manchester Guardian*. Keynes described three "schools" of thought on unemployment. The "pious school" did not view monetary issues as important, pointing to high wages from the shorter working week and high taxes on business as the drivers of unemployment (Keynes 2013e, pp. 443-444). To this, Keynes wrote that he did not think wages were higher than Britain can afford, and again argued that cutting wages would be destabilizing, leading to "a social struggle of which no one could foretell the outcome" (Keynes 2013e, p. 444). The "strait-laced" school appreciated that there was a monetary disequilibrium, but would remedy this disequilibrium through a ruthless enforcement of the pre-war gold standard (Keynes 2013e, pp. 444-445). But Keynes pointed out that if there was a resistance to lowering wages due to unions and labor immobility, contractionary Bank rate policy could just cause a depression and increase unemployment without lowering wages. This "disastrous" policy could "bring us to the edge of a revolution, if revolution is ever possible in this country" (Keynes 2013e, p. 445). The final school was the "sensible school" led by Keynes, which supported policies like state-sponsored investment and the expansion of credit in the hopes that "prosperity is cumulative" (Keynes

13. He had described this as infeasible in his committee testimony (Keynes 2013e, p. 393).

2013e, p. 446).

Keynes' consistent concerns about social stability were somewhat alleviated with the General Strike in 1926. During the Strike in May, Keynes noted that it was largely non-revolutionary: neither party wanted the strike to happen and the movement had "no excitement, no passion, not a flicker of revolutionary feelings... The atmosphere is first one of depression and helplessness" (Keynes 2013e, p. 530). Afterwards, in Berlin, Keynes wrote that the strike had established the "non-revolutionary" character of the labor movement while probably strengthening its Parliamentary aspect. "The whole episode," he said, was "perhaps not of first importance in the evolution of Britain's industrial problem" (Keynes 2013e, p. 545). Keynes did not seem to worry about social unrest in Britain after this episode.

Throughout the rest of 1926, Keynes wrote on a variety of topics including the franc, the role of economic advisers in the government, and foreign loans. He participated in the organization of the Liberal Industrial Inquiry in the summer and wrote a large chunk of what would eventually be the *Treatise on Money*. In November, Keynes published an article on the cotton industry in the *Nation* which led to a fruitful collaboration with Lancashire's cotton industry (Keynes 2013e, pp. 578-585). He helped establish the Cotton Yarn Association cartel in December 1926, which set a minimum selling price and maximum level of output to ensure the financial solvency of its spinners (Keynes 2013e, pp. 598-600). Keynes stated in a speech in December 1927 that the problem of the cotton industry was "a very broad one, where there is no need of the subtleties of an economist" (Keynes 2013e, p. 615). Despite this "broadness," Keynes engaged practically with the issue from 1926 to 1927, and this active policy advocacy set the tone for his work later in the decade and in the early 1930s.

Inspired by this work on the cotton industry, in a January 1927 speech to the National Liberal Club, Keynes argued that Britain was in a new economic age where small-scale capitalists, like the Lancashire spinners, could not succeed (Keynes 2013e, pp. 641-643). He suggested a more active role for the state, believing that the government should collect and disseminate industrial knowledge, prepare interventions for economic downturns, and coordinate national savings towards domestic investments that it had a role in managing (Keynes 2013e, pp. 643-645).[14] Additionally, government intervention might be helpful in ensuring the correct distribution of labor and education across industries (Keynes 2013e, p. 646), which he also suggested in his February report on the speeches of the bank chairmen (Keynes 2013b, p. 206). He did not touch

14. For a detailed discussion of Keynes' view of the role of the state in this period, see Crotty (2019, pp. 84-94).

on unemployment throughout the rest of 1927, instead expanding his draft of the *Treatise* and writing articles on a wide range of other issues.

We can conquer unemployment, 1928-1929

In January 1928, Keynes listed unemployment as a primary economic concern in a letter for Lloyd George. As before, he attributed high unemployment to the depressed export industries and the effect of the return to gold on prices and credit (Keynes 2013e, p. 730). However, he now wrote that "we have no particular reason to expect a revival" in the export industries (Keynes 2013e, p. 730), leading to his emphasis on the expansion of credit in 1928 and 1929. His re-engagement with the issue of unemployment coincided with the publication of the Liberal Industrial Inquiry's report *Britain's Industrial Future*. Keynes had been involved in its preparation from 1926, but he was not directly responsible for the chapter on unemployment. Though he was not thrilled with the "long-winded" report (Keynes 2013e, p. 735), he defended its ideas at the University Liberal Club and in the *Nation* early in 1928 (Keynes 2013e, pp. 735-738).

After a trip to Germany and Russia that summer, Keynes began campaigning for credit expansion with "How to Organise a Wave of Prosperity" in the July 31 *Evening Standard*. He wrote there could be "no doubt about the explanation" for unemployment — the deflated prices without deflated costs owing to the return to the gold standard (Keynes 2013e, p. 762). The error of the Treasury and the Bank of England was to think that costs, such as wages, would adjust automatically, which they had not. Though money wages could be forcefully lowered, the General Strike and upcoming general election made that politically inexpedient (Keynes 2013e, pp. 762-763). Rationalization, where businesses focus on increasing efficiencies through industrial reorganization, was "overdue," but Keynes noted that in the long run the increased efficiency actually aggravated unemployment (Keynes 2013e, p. 763). Instead, Keynes suggested an increase of credit and a slight inflation of prices, which would permit the full productive capacity of both plants and labor to be used (Keynes 2013e, pp. 763-765). He encouraged the Bank to augment the credit base and the Chancellor to encourage public spending on capital projects (Keynes 2013e, p. 765).

Keynes had been advocating public spending on domestic investment projects since his 1924 piece "Does Unemployment Need A Drastic Remedy?" and credit expansion since 1922. However, he attributed the ideas of "How to Organise a Wave of Prosperity" to his 1925 response to the return to the gold standard, perhaps to mask his political motivation with an economic one

(Clarke 1988, pp. 76-77). Though the 1924 piece was ignored by the Treasury, "How to Organise a Wave of Prosperity" was picked up, and both Hawtrey and Leith-Ross submitted memoranda on the article to Churchill upon his request. This led to the formation from 1928-1929 of the "Treasury View" which opposed Keynes and Lloyd George's proposal for state-sponsored investment. Though Keynes characterized this Treasury View as dogmatic and backwards in colorful language, recent literature based on Treasury archives has argued that their approach was evidence-based and often pragmatic (Clarke 1988, ch. 3; Peden 2004, ch. 2).

In November, Keynes wrote a favorable review of Reginald McKenna's book *The Post-War Banking Policy in Britannia*, commending McKenna for distinguishing speculative inflation, which ought to be controlled by the Bank, from inflation that does not involve excess profits, which would not require a restriction of credit (Keynes 2013e, pp. 771-772). This led Keynes to write in his current draft of the *Treatise* that price stabilization might not be the only objective of monetary policy, as a central bank must also ensure the level of credit available to business is adequate, which does not follow automatically (Skidelsky 1992, p. 284).

Keynes expanded on this idea in February 1929 when the Bank rate was raised a full percentage point to 5.5% — the highest level since 1921. This rise was intended to prevent a drain on gold (Keynes 2013e, p. 796). Despite this change in the price of credit, Keynes wanted the Bank to maintain the level of credit available to domestic businesses, suggesting that the Bank should purchase securities and encourage domestic capital projects. "The problem before the Bank of England is, therefore, to make the higher rate effective in the short-loan market without curtailing the volume of credit" (Keynes 2013e, p. 798). Continuing to restrict credit could "allow unemployment to spread" which would be "at this juncture, a rather dangerous thing" (Keynes 2013e, p. 799).

In 1929, the Liberal Party published specific proposals for national development in their pamphlet *We Can Conquer Unemployment*, where Lloyd George pledged to reduce unemployment to normal levels in only one year through a program of public works. After the pledge was announced in March, Keynes spent the rest of the spring and summer defending and clarifying this policy proposal in four major articles. Though all the articles refer to the same plan for public works, Keynes developed new theory in each article to support the policy proposal.

In "Mr Lloyd George's Pledge" in the March 19 *Evening Standard*, Keynes described a "leakage" in the normal operations of the credit system. When there are few opportunities to invest domestically, savings will be lent abroad, causing an outflow of gold, a rise in the Bank

rate, and a further restriction of credit (Keynes 2013e, p. 805). Reducing foreign lending to pay for a program of domestic investment would increase the demand for labor without crowding out private employment (Keynes 2013e, p. 807).

Sir Laming Worthington-Evans responded to this article on behalf of the Treasury, leading Keynes to criticize the "Treasury dogma" in his second article, "A Cure for Unemployment." Published in the *Evening Standard* in April, it argued that state-sponsored employment would not divert investment from the private sector (Keynes 2013e, pp. 809-810). Instead, Keynes listed three sources of funding for the investment program: the Bank could increase credit because investment was lagging behind savings, the money currently used to "pay for unemployment" in the form of the dole could be reallocated, and there could be a net reduction of foreign lending through increased imports (Keynes 2013e, pp. 810-811). Keynes argued that the Treasury view started with the assumption of full employment, "assuming the non-existence of the very phenomenon which is under investigation" (Keynes 2013e, pp. 809-811). This article led to a series of letters to the Editor of *The Evening Standard* where Laming Worthington-Evans criticized Keynes for vacillating in his views on unemployment, and where Keynes defended himself as being "singularly consistent — indeed, obstinate" in his views since 1925 (Keynes 2013e, pp. 812-816, 813).

On May 10, Keynes published his major work on the issue, the pamphlet *Can Lloyd George Do It? — The Pledge Examined* written with then-candidate Hubert Henderson. This extended the arguments of his articles in order to convince the public that "what *seems* sensible *is* sensible, and what *seems* nonsense *is* nonsense" — that a state-sponsored employment program would indeed increase employment (Keynes 2013b, pp. 92, emphasis in original). They detail Lloyd George's program for unemployment, which would involve investment in roads and railways, subsidies for 200,000 new homes per year, and other small programs of development (Keynes 2013b, pp. 95-99). According to their calculations, the program would provide 5,000 new jobs for each £1 million spent due to indirect employment and to the general climate of prosperity (Keynes 2013b, pp. 103-107). This climate of prosperity would give the expansion of trade a "momentum" that would make the capital expenditure have an even larger effect on employment than predicted (Keynes 2013b, p. 107). In the section of the pamphlet on whether the program diverts employment from other enterprises — a direct response to the "Treasury dogma" — Keynes and Henderson listed the same three sources of funds that could be used for a net increase in employment but in a different order: savings on unemployment compensation, increased

savings from expanding credit, and a reduction in net foreign lending (Keynes 2013b, p. 116). But, they also slipped in a new source, "the very prosperity the new policy will foster" (Keynes 2013b, p. 120), suggesting that the policy itself would increase savings and investment (Keynes 2013b, pp. 821-823).

In response to this pamphlet, the Treasury contributed to an official white paper on Lloyd George's unemployment proposals. In his exasperated review in the *Nation*, Keynes again provided a list of sources from which unemployment could be addressed without crowding out, but the list had changed again. Though savings on the dole still topped the list, the second item was now Exchequer surpluses from the overall increase in national income. Third was the fraction of the expenditure that would be saved by businesses, and fourth was the indirect employment because of the consumption of the newly employed (Keynes 2013e, pp. 821-823).

Subtly, throughout these four pieces defending Lloyd George's proposal, Keynes had shifted the theoretical mechanism by which public spending on domestic capital projects would increase employment. The original source of funds that he suggested for these projects, a reduction in foreign lending, would require the Bank rate to be raised so that domestic lending would be competitive. While Keynes did say he supported a rise in the Bank rate for this purpose in a private meeting with Treasury officials in March 1929 (Clarke 1988, 88), this was obviously in conflict with the Liberal campaign's goal to reduce unemployment in the short-term, as well as with funding the program through expanding credit.

Pressured to develop a new theoretical foundation for the policies he publicly supported, Keynes latched onto the idea that "prosperity is cumulative," turning to the domestic effects of this one-time stimulus to investment. His last article was no longer a list of sources of funding for Lloyd George's program but instead a collection of the dynamic ways in which an investment scheme would stimulate general domestic prosperity (see Clarke 1988, pp. 101-102). Though it did not result in success for Lloyd George's Liberal party, Keynes had finally provided a theoretical justification for the measures he had been fighting for since 1924, taking an important step in the development of the multiplier and in the eventual reorientation of theory in the 1930s. By August 1929, after the election, Keynes realized the significance of this new way of thinking. He wrote to his publisher about the draft *Treatise*, "I am ashamed to say that after I had got more than 440 pages into paged revise I had come to the conclusion that certain chapters must be drastically rewritten, and the whole very considerably rearranged" (Skidelsky 1992, p. 285).

Public affairs, protectionism, and crisis, 1930-1931

From January 1930 through May 1931, Keynes' primary focus was contributing to the Macmillan Committee on Finance and Industry and the Economic Advisory Council. Despite these policy obligations, he still found time to contribute public comments on the worsening economic conditions and to finally publish the *Treatise on Money* in October 1930.

The purpose of the Macmillan Committee was to consider the connection between banking, monetary policy, and the wider economy. Keynes was heavily involved, giving five sessions of evidence in February and March of 1930 based on the *Treatise*, examining witnesses throughout the spring and summer, and preparing the framework and early drafts of the final report in November and December. The final report was signed on May 29, 1931, advocating control of domestic prices rather than the exchange rate — though by the time it was published a month later, the position of Britain had changed considerably.

Keynes' views on unemployment early in 1930 are made clear in a February interview. He attributed unemployment to "the lack of investment and enterprise at home," reiterating that he was in favor of a large public works program (Keynes 2013f, p. 323). To Keynes, rationalization could not possibly do enough to remedy unemployment, especially with the difficulty of reviving the export industries. But his greatest concern was that nothing would be done —"If we just sit tight there will be still more than a million men unemployed six months or a year hence. That is why I feel that a radical policy of some kind is worth trying, even if there are risks about it" (Keynes 2013f, p. 325).

Keynes became more concerned about the economic conditions in April, writing that "we are now in the depths of a very severe international slump, a slump which will take its place in history amongst the most acute ever experienced. It will require not merely passive movements of Bank rate to lift us out of a depression of this order, but a very active and determined policy" (Keynes 2013f, pp. 345-346).

Keynes' position on what this policy should be shifted over the summer of 1930 as he began to become open to protection. In June, Keynes provided a written response to a set of questions the Prime Minister asked on the industrial position of Britain. Keynes noted that for the situation to improve, either the balance of trade needed to become more favorable (allowing the Bank rate to be lowered) or that there needed to be more domestic outlets for savings (increasing investment). Given the limited scope for reducing the costs of production, Keynes believed that

the first objective could be achieved through protection. He wrote, "I have, therefore, become reluctantly convinced that some protectionist measures should be introduced" (Keynes 2013f, p. 376). Protectionism would improve the balance of trade while also benefitting the national budget. Although this was a departure from his previously-held beliefs, Keynes believed it was warranted by the changing economic conditions. He wrote, "Free trade is profoundly based on the assumption of equilibrium conditions and in particular that wages always fall to their strict economic level. If they do not, and if for several reasons we do not desire them to, then it is only by means of a tariff that the ideal distribution of resources between different uses, which free trade aims at, can be achieved" (Keynes 2013f, p. 379). In recognizing that classical Marshallian conditions were not met, Keynes proposed a departure from their associated *laissez-faire* policies.

In July of 1930, Keynes took a new role within the Economic Advisory Council. The Economic Advisory Council was formed in January 1930 to more directly advise the government on policy matters. Keynes became the chair of a new Committee of Economists given the task of analyzing the current economic downturn, identifying its causes, and suggesting remedies. This committee included Hubert Henderson, Arthur Cecil Pigou, Lionel Robbins, and Josiah Stamp, with Richard Kahn and A. F. Hemming acting as joint secretaries. The Committee of Economists met in September and October of 1930, with intense deliberation yielding a final report that surveyed causes and possible remedies of unemployment. The report was discussed at the Economic Advisory Council in November and December of 1930, and March and April of 1931, but had little effect and then was buried (Keynes 2013f, p. 466).

The report reflects Keynes' views on how a tariff policy could remedy unemployment in Britain. After confirming support for free trade generally, a section drafted primarily by Keynes (Howson and Winch 1977, p. 72) argues that the special conditions of Britain might require a tariff policy: "Though unemployment before the War was sometimes large in amount, there was no large intractable mass of unemployment associated with dislocations between costs and world prices such as has existed ever since the post-armistice boom" (Howson and Winch 1977, p. 222). Reducing costs, especially wage costs, could improve the balance of trade but was not feasible. They concluded, "It is therefore better to occupy our unemployed resources in making goods to take the place of goods now imported than not to occupy them at all" (Howson and Winch 1977, p. 223). The report supports a general tariff (suggesting 10%) rather than a tariff policy aimed at safeguarding certain industries from competition. It also recommends preferential trade agreements with the rest of the British Empire.

This report was only circulated within the Economic Advisory Council, so Keynes' support for tariffs was not widely known. In his public writings at the end of 1930, Keynes remained optimistic that international cooperation on monetary policy could lead to a reduction of interest rates and a revival of capital investment and enterprise (Keynes 2013b, pp. 126-134). This was a view he had first discussed with Montagu Norman, the Governor of the Bank of England, in May 1930 (Keynes 2013f, pp. 350-357) and they began to meet more frequently at the end of the year (Keynes 2013f, p. 477).

In January of 1931, Keynes gave an address titled "Saving and Spending" on the BBC radio, urging listeners to spend on British, home-produced goods rather than saving. In dramatic fashion, he claimed, "...whenever you save five shillings, you put a man out of work for a day...Therefore, O patriotic housewives, sally out tomorrow early into the streets and go to the wonderful sales which are everywhere advertised" (Keynes 2013b, pp. 137-138). Though he maintained the economic downturn was primarily an international problem, he argued that activity, boldness, and enterprise would be the best response. "The patient does not need rest. He needs exercise" (Keynes 2013b, p. 138).

As economic conditions deteriorated in early 1931, there was discussion of possibly being forced to leave the gold standard. Keynes had never been opposed to devaluation, but the prospect of such a disruption at a time when international monetary leadership was sorely needed led him to begin to popularize his view that tariffs could provide an immediate remedy for the employment downturn, restore business confidence, and support the government budget. He expressed his view in an article for the public in March 1931 in *The New Statesman and Nation* titled "Proposals for a Revenue Tariff."

In this article, Keynes clearly indicated that his position on domestic expansionary policies had shifted. He wrote, "...the objections to the expansionist remedy — the instability of our international position, the state of the budget, and the want of confidence — cannot be thus disposed of. Two years ago there was no need to be frightened. Today it is a different matter...A policy of expansion sufficiently drastic to be useful might drive us off the gold standard. Moreover, two years ago the problem was mainly a British problem; today it is mainly international. No domestic cure today can be adequate by itself. An international cure is essential; and I see the best hope of remedying the international slump in the leadership of Great Britain" (Keynes 2013b, p. 235). To Keynes, the situation had become so dire that the costs of a domestic expenditure policy on the budget and balance of trade outweighed the benefits.

The only option, if Britain were to stay on the gold standard, was tariffs.[15] Keynes proposed general tariffs of 15% on manufactured goods and 5% on food and raw materials. The tariff would provide "breathing space" and strengthen Britain's financial position enough that expansionary policies could be pursued. Though extreme, to Keynes, this was the right time. "Free traders may, consistently with their faith, regard a revenue tariff as our iron ration, which can be used once only in an emergency. The emergency has arrived" (Keynes 2013b, p. 238).

Keynes' article in *The New Statesman and Nation* supporting tariffs elicited dramatic reactions. At the editor's request, Keynes published a shorter and simpler version in the *Daily Mail* that same week. He defended his proposal for a tariff policy throughout March and April 1931 (Keynes 2013f, pp. 488-520).

The day after the final Macmillan Committee report was signed in May 1931, Keynes sailed to the US to give a series of lectures in Chicago based on the *Treatise*. These lectures are notable because he hinted for the first time that an equilibrium at less than full employment could be possible (Keynes 2013d, p. 343, Moggridge's comment), writing, "... there is eventually reached, therefore, a sufficiently low level of output which represents a kind of spurious equilibrium" (Keynes 2013d, p. 356). Keynes discussed possible methods of increasing the international volume of investment, suggesting efforts to restore the confidence of lenders and borrowers, new government construction programs, and reductions in the long-run interest rate. To this international audience, he did not discuss tariffs or express concerns about the effect of domestic expenditure programs on the budget. In a later speech in Chicago, Keynes suggested that the long-run interest rates could be decreased through an agreement between the Federal Reserve and Bank of England (Keynes 2013f, pp. 541-542).

The financial crisis of 1931 began brewing before Keynes left for America, with the Credit-Anstalt failure on May 11. In June, German banks began to feel the effects, and Hoover's moratorium on reparations payments was declared on 20 June. Keynes met both the President and Eugene Meyer, the Chairman of the Federal Reserve, before sailing back to England in early July. During his journey, sterling was exposed to pressure. Gold losses forced the Bank rate up to 3.5 percent on July 23 and then 4.5 percent a week later, despite credits from other central banks. Expenditure cuts and tax raises were discussed in Parliament so as to be able to continue to raise loans to support the sterling. Keynes criticized these measures in a number

15. Keynes wanted to stay on the gold standard. He wrote in the same article, "I, who opposed our return to the gold standard and can claim, unfortunately, that my Cassandra utterances have been partially fulfilled, believe that our exchange position should be relentlessly defended today, in order, above all, that we may resume vacant financial leadership of the world" (Keynes 2013b, p. 236).

of articles, believing that this budget would worsen unemployment without greatly improving Britain's economic position (Keynes 2013b, pp. 141-141; 2013b, pp. 145-149; 2013f, pp. 596-598). He continued to call for import restriction (Keynes 2013b, pp. 238-242), and also argued for a new international gold conference to try to save the system (Keynes 2013f, pp. 601-602). To his friend Walter Case, Keynes wrote of the situation on September 14, "I am utterly depressed, and rack my brains as I may, I find it almost impossible, even by way of day-dream, to conceive a way out now that matters have been allowed to develop as they have" (Keynes 2013f, p. 603).

Britain left the gold standard on September 21. Keynes published an essay "The Future of the World"[16] in the *Sunday Express* that opened, "There are few Englishmen who do not rejoice at the breaking of our gold fetters. We feel that we have at last a free hand to do what is sensible... the great advantages to British trade and industry of our ceasing artificial efforts to maintain our currency above its real value were quickly realised" (Keynes 2013b, p. 245). He noted that a sterling depreciation has the same effect as a tariff on imports, but without hurting exports. Keynes then dropped the tariff issue and began to focus on how the new currency system could be arranged. He ended the essay with pessimism as he reflected on the international system, "The solution to which we have been driven, though it gives immediate relief to us and transfers the strain to others, is in truth a solution unsatisfactory for everyone... Peace and confidence and a harmonious economic equilibrium for all the closely interrelated countries of the globe is the only goal worth aiming at" (Keynes 2013b, p. 249).

The means to prosperity, 1931-1935

After 1931, Keynes became less active in public life. Skidelsky writes, "Partly, and certainly at first, this was because economic policy had caught up with his prescriptions. The deflationary constraint of the gold standard had ended, the decade of cheap money was at hand. The Keynesian agenda of the 1920s, applied in the 1930s, enabled Britain to escape the worst of the world depression" (Skidelsky 1992, p. 433). Keynes also lost some political influence with the demise of the Liberal Party with the October 1931 General Election. At the end of 1931, Keynes published a selection of his writings from 1919 to 1931 titled *Essays in Persuasion.*[17] In the Preface, he describes this shift:

> I have thought it convenient to choose this date of publication, because we are

16. Published later that year in *Essays in Persuasion* as "The End of the Gold Standard."

17. Keynes wrote with humility in the Preface, "The volume might have been entitled 'Essays in Prophecy and Persuasion', for the *Prophecy*, unfortunately, has been more successful than the *Persuasion*" (Keynes 2013b, p. xvii, emphasis in original).

> standing at a point of transition. It is called a national crisis. But that is not correct — for Great Britain the main crisis is over. There is a lull in our affairs. We are, in the autumn of 1931, resting ourselves in a quiet pool between two waterfalls. The main point is that we have regained our freedom of choice. Scarcely any one in England now believes in the Treaty of Versailles or in the pre-war gold standard or in the policy of deflation. These battles have been won — mainly by the irresistible pressure of events and only secondarily by the slow undermining of old prejudices. But most of us have, as yet, only a vague idea of what we are going to do next, of how we are going to use our regained freedom of choice (Keynes 2013b, p. xix).

From this more removed position, Keynes was able to focus on his academic work. Late November 1931, he told Lydia, "I have begun again quietly in my chair writing about monetary theory," (quoted in Skidelsky (1992, p. 438)). Though the timeline is debated in the literature, his lecture series at Cambridge in the autumn of 1932, titled the "Monetary Theory of Production" contained many of the essential innovations of the *General Theory*. He spent most of 1933 and 1934 writing the text and conducted substantial revisions in 1935.

After 1931, Keynes' articles and advocacy focused again on the need for public expenditure to kickstart the economy. From as early as November 1931, Keynes maintained that leaving the gold standard could not fully resolve the unemployment issue. He wrote, "I should not be surprised at a reduction [of the numbers unemployed] of perhaps as many as 250,000, but I should doubt the probability of a greater reduction unless there is either a revival of world trade or construction enterprise at home" (Keynes 2013g, p. 7). He expanded on this idea in his Halley-Stewart lecture of February 1932 titled "The World's Economic Crisis and the Way of Escape."[18] Keynes expressed hope that leaving gold would stop the deflationary pressure and restore international equilibrium. But he was concerned that cheap money policies would not, on their own, be sufficient. If there was not enough confidence among borrowers and lenders in the financial system, the only option was for the state to intervene with a loan-financed expenditure program. He wrote, "Formerly there was no expenditure out of the proceeds of borrowing, which it was thought proper for the state to incur, except war. In the past, therefore, we have not infrequently had to wait for a war to terminate a major depression. I hope that in the future we shall not adhere to this purist financial attitude, and that we shall be ready to spend on the enterprises of peace what the financial maxims of the past would only allow us to spend on the devastations of war" (Keynes 2013g, p. 60).

In July 1932, he began to draw out the distinction between what was good for the individual,

18. These comments were also repeated in his January lecture in Hamburg titled "The Economic Prospects" (Keynes 2013g, pp. 39-48), in Cambridge for the Marshall Society, in a printed volume for the Halley-Stewart Trust, and in the May 1932 *The Atlantic Monthly* (Keynes 2013g, p. 50).

saving in times of economic distress, and what was good for the collective, spending in times of economic distress. He wrote, "It is often said by wiseacres that we cannot spend more than we earn... For the community as a whole it would be much truer to say that we cannot earn more than we spend. Prices cannot rise, output and employment cannot increase, unless the first stimulant comes from the side of increased spending" (Keynes 2013g, p. 126). In a similar vein, he signed onto an open letter arranged by Pigou in support of public spending. The letter sets out how saving would not aid investment when business confidence was low, and would actually have the effect of lowering national income. Economizing on consumption would thus lead to greater unemployment. In December 1932, Keynes wrote, "There is one, and only one, genuine remedy [for the economic conditions]; namely, to increase demand — in other words to increase expenditure" (Keynes 2013g, p. 213).

Keynes developed and deepened this position through 1933. In a January interview, Keynes urged spending regardless of whether the budget would be balanced: "...it is the burden of unemployment and the decline in the national income which are upsetting the Budget. Look after the unemployment, and the Budget will look after itself" (Keynes 2013g, p. 150). Keynes was concerned that the gains in employment from leaving the gold standard and from import protections had been canceled out by losses to employment because of restrictions on public works (Keynes 2013g, pp. 144, 155). He wrote that the first course of action must be to "increase individual incomes by setting on foot large-scale capital developments which are capable of causing the stagnant savings of the community to circulate again," such as a large public housing program (Keynes 2013g, p. 158).

In March, Keynes published "The Means to Prosperity," a series of four articles in *The Times*. This last major publication before the *General Theory* made a careful and considered case for loan-financed public expenditure programs. Keynes wrote, "The reluctance to support schemes of capital development at home as a means to restore prosperity is generally based on two grounds — the meagerness of the employment created by the expenditure of a given sum, and the strain on national and local budgets of the subsidies which such schemes usually require" (Keynes 2013b, p. 339). Taking up both of these issues in turn, Keynes argued that the amount of employment and income generated by a loan-financed public expenditure scheme would be much greater than the cost of the program.

Referencing R. F. Kahn (1931), Keynes suggested that a multiplier effect would cause large

employment gains from public expenditure.[19] With so many unemployed resources, a large expenditure program would not cause higher prices and increased inflation, but would instead increase employment by 1.5 to 2 times the cost of the program in terms of wages. Using the same estimate for the multiplier, Keynes extended this analysis to national income to argue that such a program would actually be beneficial to the budget. He concluded, "Thus new capital expenditure of £3 million, paid for by an additional loan and not by reducing consumption-expenditure or existing capital-expenditure, increases the national income by more than £3 million if we allow for repercussions" (Keynes 2013b, p. 346). This part of the analysis influenced contemporary discussions of the effects of government expenditure on the budget, with other commentators discussing the costs of such programs being mitigated by "repercussions" (Skidelsky 1992, p. 473).

Keynes thus wrote that it would be "a complete mistake" to think that programs that increase employment would have an adverse effect on the budget, because employment and income are inextricably linked. "There is no possibility of balancing the budget except by increasing the national income, which is much the same thing as increasing employment." (Keynes 2013b, p. 347).

Keynes also discussed the global challenge of causing prices to rise, an important component of recovery from the dramatic fall in prices caused by the Great Depression. While currency depreciation and tariffs had been used effectively earlier in the decade, tariffs "help no one and injure each, if they are applied all round" requiring a different solution. "We are left, therefore, with the broad conclusion that there is no effective means of raising world prices except by increasing loan-expenditure throughout the world" (Keynes 2013b, p. 352).

To do this, Keynes first suggested a commitment to making credit abundant and lowering long-term interest rates. In his estimation, Britain had succeeded at both while the United States still required the latter. But the innovation of his approach was to suggest that these methods alone would not be sufficient — that more direct stimulus was needed. He wrote, "For even when we have reached the second stage [low long-term interest rates], it is unlikely that private enterprise will, on its own initiative, undertake new loan-expenditure on a sufficient scale" (Keynes 2013b, p. 354). Loan expenditure should not just be confined to times of war when direct foreign loans or domestic loan-financed public expenditures could improve employment and income so drastically. Keynes was also hopeful that through international cooperation,

19. In the American version of "The Means to Prosperity," Keynes also uses Kahn's verbiage of primary and secondary employment. In both versions, Keynes popularizes calling this a "multiplier."

countries could simultaneously increase their expenditure, causing a general revival.[20]

What type of domestic expenditure program did Keynes have in mind? In "The Means to Prosperity," he again referred to proposals for a National Housing Board as one program that could have beneficial employment and income effects (Keynes 2013b, p. 348). In an article in September of the same year, he suggested a number of other possible programs, but without taking a strong stance: "Whether it is better to electrify the railways or to rebuild South London, or to supply country districts with water, or to build a Cunarder, or to drain the countryside, or to modernise our ports, or to recast our steel plant, or a bit of each, it is not my function to say. But unless we do one or another of these or similar things, it is utterly impossible that we can increase our national wealth or employ our population" (Keynes 2013g, p. 287).

This section has explored how Keynes' ideas on unemployment shifted in the period before the publication of the *General Theory* in 1936. In the early 1920s, Keynes was focused on unemployment arising from the return to the gold standard at its pre-war parity with the dollar. He believed that policies to stabilize prices rather than to stabilize exchange rates would have helped alleviate unemployment, especially for the export industries. He did not believe that wages could fall sufficiently for market forces to correct unemployment — at least, not without driving dangerous social unrest.

From 1924, Keynes also supported public works programs to encourage employment. It was only in 1929 that he was able to begin to develop a theoretical foundation for his idea that "prosperity is cumulative," exploring the dynamic ways that public expenditure could stimulate prosperity. The worsening economic conditions of 1930 and 1931, however, led him to briefly abandon this policy in support of a system of general tariffs which would not cause additional strain to the national budget. After Britain left the gold standard in 1931, Keynes returned to this idea, developing his argument into support for loan-financed government expenditure justified by the use of the multiplier for employment and income.

In the American version of *The Means to Prosperity*, Keynes wrote, "... all our ideas about economics, instilled into us by education and atmosphere and tradition are, whether we are conscious of it or not, soaked with theoretical presuppositions which are only properly applicable to a society which is in equilibrium, with all of its productive resources already employed. Many people are trying to solve the problem of unemployment with a theory which is based on the assumption that there is no unemployment" (Keynes 2013b, pp. 349-350). In the period

20. These hopes for the 1933 World Economic Conference were disappointed; see "Farewell to the World Conference" published in the *Daily Mail* on July 27, 1933 (Keynes 2013g, pp. 281–284).

before the *General Theory*, Keynes was already trying to see British interwar unemployment for what it was — something anomalous that required a different explanation than the simple wage reductions prescribed by the Marshallian normal science. Though his arguments changed considerably throughout the period, his attempts to connect the changing monetary conditions and the global cyclical downturn to Britain's unemployment problem represented an important broadening of the conception of unemployment in interwar Britain, which eventually led to the development of the new paradigm of the *General Theory*.

1.9 Other economic perspectives

This section summarizes the economic writings of the remaining six economists, all of whom approached unemployment from unique perspectives outside of the Marshallian normal science. The first subsection analyzes the work of three economists interested in unemployment insurance and public works, while the second subsection focuses on technological change and seasonality.

1.9.1 Unemployment insurance and public works

This subsection discusses the work of three economists who were primarily interested in the institutions surrounding unemployment, with William Henry Beveridge focusing on unemployment insurance, and Richard F. Kahn and Jens Warming writing on the multiplier and public works.

William Henry Beveridge

William Henry Beveridge (1879–1963) was born in Bengal and studied law at Oxford. In 1904, he became the sub-warden of Toynbee Hall, a settlement house in London's depressed East End. Beveridge believed that social policy should be informed by research in the social sciences. He contributed to campaigns for old age pensions, free school meals, unemployment insurance, and unemployment exchanges before the war, eventually becoming a civil servant (Harris 2004). His 1909 book *Unemployment: A Problem of Industry* was the major statistical work on unemployment in the pre-war period.

Beveridge worked for the Ministry of Munitions and the Ministry of Food during the war. After the war, he became the director of the London School of Economics, leading their expansion in size and prestige throughout the interwar period. He did not publish much during the 1920s. The one article he wrote in the 1923 *Economic Journal*, "Population and Unemployment," was

part of a larger debate with Keynes where Beveridge argued that unemployment was not caused by overpopulation. Instead, he believed it was because of the shifting of workers out of wartime industries and disturbed trading relations after the war (Beveridge 1923, p. 470). Because Britain depended on trade, the restoration of peace and international cooperation should be the foremost economic objective.

In the 1930s, Beveridge began writing on unemployment again with renewed vigor. In 1931, he released an updated version of *Unemployment: A Problem of Industry (1909 and 1930)* containing a new discussion on the role of the unemployment insurance scheme in unemployment (Beveridge 1930b). This argument was based on the Sidney Ball Lecture he delivered in February of 1930 titled *The Past and Present of Unemployment Insurance* (Beveridge 1930a). In the lecture, Beveridge gave a detailed history of the unemployment insurance program, arguing that it had shifted from a genuine insurance scheme based on employee contributions to a more discretionary, tax-financed relief grant program for workers in certain classes of insured industries. Beveridge was a strong supporter of unemployment insurance in general, but he criticized the British system for allowing unlimited benefits and for not tying the receipt of benefits to prior payments into the system.

These changes to the unemployment insurance system, according to Beveridge, created a disincentive for employment. However, unlike many contemporaries, he was not concerned about the effect of the generous unemployment scheme on individuals' efforts to find employment.[21] Rather, he was concerned that the safeguard of non-contributory unemployment insurance would make government policymakers less concerned about preventing unemployment, and could lead employers and trade unions to make decisions that increased unemployment without any real consequences. Beveridge wrote, "Those dangers, in a sentence, lie not so much in the risk of demoralizing recipients of relief, so that they do not look for work, as in the risk of demoralizing governments, employers and trade unions, so that they take less thought for the prevention of unemployment... Relief of unemployment is after all a very bad second best to its prevention" (Beveridge 1930a, p. 41).

Beveridge was not only concerned about the disincentive effects of unemployment insurance in general, but also about how these generated inequities in industries' reliance on unemployment benefits. He cited dock work as an example of an industry disincentivized to reduce its labor

21. Beveridge believed that if employment exchanges operated efficiently, it would be difficult for unemployed workers to claim benefits when vacancies were available. He also noted in the lecture that claims of abuse of the employment system have been investigated and found to be false (Beveridge 1930a, p. 41).

reserve. He wrote that rather than limiting the numbers of laborers associated with dock work, the industry had been "building up again the old under-employed unorganized reserves of labour and throwing the cost of maintaining those reserves on other industries and the taxpayer through the insurance system" (Beveridge 1930a, p. 45). He also discussed short-time work arrangements in the cotton industry that make heavy use of unemployment benefits. These industries stood in contrast to those such as commerce, banking, and finance, which paid much more into the unemployment benefit program than their workers had used.

In his testimony to the 1931 Royal Commission on Unemployment Insurance, Beveridge suggested that the key to remedying this issue was to treat different groups of unemployed workers differently in the unemployment insurance system. Workers who were cyclically unemployed were in a different position than those who had permanently lost work because of structural changes, who had loose ties to a casual industry, or who were working short time (Beveridge 1931, p. 66). In a 1935 radio address, he addressed benefits for the long-term unemployed directly, saying that "[t]he people who have been unemployed for a long time and have exhausted their right to benefit ought to be treated differently from those on benefit, not because they are responsible for their plight, but because they need something different" (Beveridge 1936, p. 46). This support could extend beyond the financial to retraining or relocation assistance.

Beveridge's 1931 publication *Causes and Cures of Unemployment* extends his analysis to a comparison of pre-World War I, 1920s, and early 1930s unemployment. Beveridge maintained, as in *Unemployment: A Problem of Industry* (1909) that the major cause of pre-war unemployment was a disorganization of industries and labor markets. His discussion on unemployment in the 1920s focuses on rigidities preventing the adjustment of wages or the reallocation of labor across industries. He wrote, "The characteristic cause of Britain's troubles in the years from 1922 to 1929 is rigidity of her economic structure — failure to adapt herself to a changing environment, a kind of hardening of her arteries" (Beveridge 1931, p. 8). Beveridge was careful to qualify his discussion of wage rigidity, emphasizing the role of other factors including the unemployment insurance scheme, as discussed above, and dramatic changes in the industrial structure. Finally, the unemployment spike of the late 1930s he attributed to a cyclical downturn, emphasizing the monetary aspects following Hawtrey.

Beveridge was thus concerned with institutional and structural challenges facing the British labor market. A failure to respond to, and efficiently adjust to, the shock of World War I caused wage and labor market rigidities that generated unemployment. Institutions that he supported,

such as employment exchanges and unemployment insurance, could be reformed to better align incentives, permitting them to not only provide relief for those unemployed but also to reduce the incidence of unemployment itself.

Richard F. Kahn

Richard Ferdinand Kahn (1905–1989) studied at Cambridge from 1924 and eventually become a fellow of King's College. He was a favorite student and colleague of Keynes and an active participant in the 'circus' which debated and critiqued Keynes' work leading up to the *General Theory* (Harcourt 2004). During his long career at Cambridge, he contributed to the development and defense of Keynes' ideas and legacy, including writing histories of Keynes' work such as *The Making of Keynes' General Theory* (1984).

In 1931, Kahn published "The Relation of Home Investment to Unemployment" in the *Economic Journal*. This seminal paper formalized and popularized the principle of the multiplier, linking government expenditure on public works to increases in employment and national income.[22] This provided a crucial step in the development of Keynes' *General Theory* by precisely relating investment expenditure to new savings. Kahn's work provides strong support for large-scale public works as a remedy for unemployment, especially in the face of a severe cyclical downturn. Kahn wrote, "[i]t is clear, then, that if there is ever any justification for expenditure on 'public works' as a means of reducing unemployment, the justification is greatest when depression is most severe; and the scale on which it is desirable that such a policy should be carried on is also then most extensive" (R. F. Kahn 1931, p. 182).

Kahn defended his formulation of the multiplier in further works in the 1930s (R. F. Kahn 1932, 1936), and also extended his analysis to the United States (R. F. Kahn 1933). Kahn's other work in the 1930s demonstrates a broad interest in questions of economic theory, with articles relating to imperfect competition, economies of scale, elasticities of substitution, and the economics of welfare.

Jens Warming

Jens Warming (1873–1939) was a Danish statistician and economist who held positions at the Danish Central Department of Statistics, the Danish Agricultural University, and the University

22. It should be noted that Kahn's article does not actually use the term "multiplier." This term was popularized by Keynes with reference to Kahn's work, e.g., in *The Means to Prosperity* (1933).

of Copenhagen (Pacheco Coelho 2016). He is best remembered for his 1911 paper "On Land-Rent of Fishing Grounds," published in Danish, which developed the concept of the tragedy of the commons with relation to fisheries over forty years before the model was re-invented in the English literature. He published another key paper on fisheries in 1931 and other papers in agricultural economics during the interwar period. Warming's work did not gain much traction or recognition in his lifetime, and he had trouble securing a permanent academic post in Denmark (Eggert 2010, p. 474).

Warming is included in the sample of *Economic Journal* economists for a 1931 article "International Difficulties Arising Out of the Financing of Public Works During Depression." This paper presents an extension to Kahn's multiplier analysis emphasizing the role of savings in financing public works (Warming 1931, pp. 214-216). However, his analysis is based on a misinterpretation of Kahn's paper, as Kahn detailed in a 1932 article (R. F. Kahn 1932). In addition to supporting public works, the Warming's *Economic Journal* article makes a strong argument for international cooperation on economic policy, expressing support for international institutions such as the International Labour Office.

1.9.2 Technological change and seasonality

This subsection summarizes the work of two authors who focused on the link between technological change and unemployment, James Southworth and Herbert Stanley Jevons. It also discusses the work of Christopher Saunders, who explored seasonality in interwar industries.

James Southworth

No biographical information for James Southworth exists, but his 1926 and 1928 articles in the *Economic Journal* present a unique explanation for the experience of unemployment. Southworth attributed cyclical unemployment to a trade cycle characterized by productivity improvements and imperfect competition. In his model, technological improvements increase the productivity of labor, but, because of imperfect competition, profits accrue rather than the price of manufactured goods falling. These profits are invested, causing an expansion of credit which maintains employment despite the productivity gains. Eventually this investment causes prices to fall, but first, credit contracts and competition increases, creating unemployment. Once prices fall, a new equilibrium in industries with increasing productivity is established at a lower level of employment and prices (Southworth 1926, pp. 299-301). In 1928, he added that as competition becomes

more imperfect and labor more immobile, prices will adjust even slower (Southworth 1928, pp. 132-133). Thus, in Southworth's model, the expansion and contraction of credit determine the timing of the unemployment that must occur because of productivity improvements. By preventing a fall in prices, the credit cycle could shift unemployment from periods of productivity improvements to periods of credit contraction.

Herbert Stanley Jevons

Herbert Stanley Jevons (1875–1955) was the son of William Stanley Jevons, the nineteenth-century economist known for his contributions to marginal utility theory. H. Stanley Jevons was a professor at the University College of South Wales and Monmouthshire. He is included in the sample of *Economic Journal* economists for a 1931 contribution, "The Second Industrial Revolution." In this article, he argued that improvements in science would reshape the structure of industries in advanced industrial countries. These scientific advancements would serve to reduce costs of production in many industries and therefore increase employment. Any technological unemployment from rationalization could be absorbed by expansions in the machine-making industries or in consumption industries that would expand with increased national income (Jevons 1931, p. 18). He proposed nationalization of the steel industry based on these technological advancements (Jevons 1932, pp. 28-29). His other major works during the interwar period included two books focused on money and monetary policy in India and a book describing how an economic system could be based on cooperation rather than competition to promote economic equality.

Christopher Saunders

Christopher Thomas Saunders (1907–2000) was educated at Oxford in the second-ever class of philosophy, politics, and economics graduates (Frowen 2004). In the 1930s, he contributed to the Merseyside Social Survey, writing an article summarizing some results on occupational mobility (Saunders 1931), and then became part of the Economic Research Section at the University of Manchester. His research during the interwar period focused on seasonality, but throughout a long career in the civil service he contributed to analyses of the cotton industry, engineering, and international economics. He eventually became the director of the National Institution of Economic and Social Research (NIESR) and the director of the economic analysis division of the United Nations Economic Commission for Europe.

In 1935, he published an article on seasonality in the *Economic Journal*, which he developed into the 1936 book *Seasonal Variations in Employment*. In this article, he argued that the aggregate unemployment numbers in Britain mask important seasonality in unemployment for industries — while seasonality looked less significant in Britain than in other European countries, this was actually due to seasonal patterns of industries coinciding in a way that canceled out in the aggregate trend. With relatively sophisticated statistical techniques, he estimated that 5 to 7 percent of the insured population was affected by seasonality and that seasonal unemployment could represent as much as 18 percent of overall unemployment. Saunders went so far as to conclude that "the effect of seasonal fluctuation on the unemployment figures for all industry is far greater than, say, the post-war loss of export markets for coal or for cotton or the consistent depression in shipbuilding" (Saunders 1935, p. 277), which is not directly supported by his statistical work but is a rather unique perspective.

His 1936 book on the topic, with an introduction from Manchester economist G. W. Daniels, extended the analysis by considering seasonality specifically in the motor industry, clothing industries, the building industry, and holiday resorts and other "wholly seasonal" industries. He concluded from this additional analysis that industries with significant seasonality because of nature and climate are becoming a smaller portion of the British economy, so seasonality should have been on the decline. However, he noted trends in the motor and clothing industries towards a sort of seasonality driven by fashion demand. To combat this seasonality of demand, he noted that trends toward larger firms, product standardization, and better organization of labor markets through exchanges could all have a stabilizing influence. (Saunders 1936, pp. 248-251). He proposed policy interventions in price setting and production to limit the effects of seasonality on workers.

1.10 Conclusion

The interwar period changed the nature of British unemployment in two ways. First, there was a collapse in Britain's labor market performance, with unprecedented, persistent mass unemployment gripping the nation through the end of the Great Depression. Second, there was a shift in how unemployment was understood by the field of economics, from a consensus normal science surrounding Marshallian theories of labor market clearing to the emergence of cyclical, monetary, structural, and ultimately macroeconomic explanations of unemployment.

This chapter explored the latter transformation, providing crucial context on what unemployment meant during this period before Keynes' *General Theory*. I identified thirty economists who wrote on unemployment using text analytic methods on the complete text corpus of the *Economic Journal* from 1921 to 1935. Then, I analyzed all of their works on unemployment from the period, with reference to the Kuhnian framework of scientific revolutions.

Some economists interpreted the persistent unemployment of interwar Britain from a largely Marshallian point of view. These economists argued that wages were being kept above their market level, so a reduction of wages could remedy most of the unemployment by permitting markets to clear. They thus attempted to accommodate persistent unemployment within the prevailing normal science. Other economists made important shifts away from this Marshallian framework, recognizing interwar unemployment as a genuine empirical anomaly and developing a broader understanding of its causes and remedies. Rather than thinking of unemployment in aggregate as a problem of labor markets finding equilibrium, economists such as Henry Clay focused on unemployment arising from structural change forces, considering the unique challenges of the export industries and those in the North of England, Scotland, and Wales. Others discussed the relationship between unemployment and the business cycle, treating unemployment as a largely cyclical phenomenon and advocating various monetary policy interventions. There was interest in how unemployment insurance and technological change cause unemployment, and what role public works could play in addressing it. Keynes, who wrote extensively on unemployment in the interwar period, touched on almost all of these different explanations on the road to the *General Theory*, advocating monetary reform, some rationalization of the export industries, large public works programs, and ultimately loan-financed government expenditure of any kind.

These extremely varied approaches to Britain's unemployment challenge shed light on how the understanding of the phenomenon developed from a short-term problem of markets clearing to something multidimensional, with many forms and possible policy responses. The Marshallian consensus was disrupted, and conceptions of unemployment that incorporated both cyclical and structural factors emerged. The works of interwar economists thus indicate that both of these dimensions need to be considered when analyzing interwar unemployment, as well as the disproportionate impacts on certain workers. Chapter 2 picks up this thread by using modern techniques to analyze interwar unemployment at a finer level of disaggregation, using econometric methods to consider the structural and cyclical dimensions of the downturn and to explore how unemployment and labor market flexibility varied by industry, region, and gender.

Chapter 2

Industrial, Regional, and Gender Divides: Re-Evaluating British Unemployment Between the Wars

2.1 Introduction

When Keynes published the *General Theory* in 1936, Britain had just experienced the longest and most intense bout of unemployment since industrialization — the unemployment rate averaged 14% from 1920, and over 3 million workers were unemployed at the peak of the Great Depression. Keynes' landmark work shifted the approach economists took to understanding this prolonged employment downturn. Chapter 1 found that some pre-Keynesian explanations of persistent interwar unemployment focused on the struggles of the export industries and their regions, suggesting that a structural transformation of the economy after World War I was driving the prolonged employment downturn. However, since the *General Theory*, most economic research on interwar unemployment has relied on macroeconomic frameworks, exploring the role of deficient aggregate demand and supply factors in the downturn. The present chapter builds on both of these approaches, using econometric methods to offer new evidence on the characteristics and causes of interwar unemployment and evaluating the role of structural change.

The analysis in this chapter is based on the first complete digitization of the Ministry of Labour's unemployment data from 1923 to 1936, which were printed each month in the *Labour Gazette*. I digitized hundreds of pages of these documents using optical character recognition (OCR) technology, cleaning and linking the monthly data to construct a comprehensive dataset on unemployment in 100 industries, disaggregated by gender, for every month in the period.

This rich, disaggregated dataset indicates that there were significant divides in interwar

British unemployment by industry, gender, and region. Unemployment varied dramatically across industries and was not just a problem of the staple industries. For the first time, the monthly unemployment rate series for Britain can be disaggregated by gender. Men and women are found to have been largely working in, and unemployed in, distinct industries, and thus had distinct experiences of interwar unemployment. Certain regions were disadvantaged by their industrial composition but also by regional effects above and beyond industry mix effects, which increased unemployment in the North and in Wales and decreased unemployment in the other regions of Britain. The striking increase in the gap in unemployment rates between the North and the South of Britain over the interwar years is found to be primarily because of these regional effects going beyond industrial composition.

These variations in interwar unemployment created the conditions for structural transformation through the reallocation of labor across industries. The extent to which this reallocation actually occurred, however, has been difficult to discern from the aggregate, macroeconomic methods favored in the existing literature. No previous research has been able to establish what role labor market rigidities played in interwar unemployment, and who benefitted. Differences in the flexibility of the labor market by gender, by region, and by sector have yet to be explored.

This chapter takes up these open questions by evaluating the extent to which the reallocation of labor across industries occurred in interwar Britain. How much adjustment was there in the interwar labor market, and how did this vary by industry, gender, and region? Which unemployed workers were able to find other employment opportunities? To answer these questions with the novel *Labour Gazette* data, I estimate labor reallocation across industries using two methods, estimating adjustment coefficients and Markov transition probabilities between industry categories.

The first method is to estimate simple adjustment coefficients that relate changes in employment in an industry to changes in unemployment in the same industry using least squares. This takes advantage of the fact that unemployed workers are associated with the industries in which they were last employed in the Ministry of Labour data. For industries that were contracting in employment, the adjustment coefficients represent whether laid-off workers joined the unemployed pool of labor in their industry or were hired in a different industry. For industries that were expanding in employment, these coefficients represent whether workers were hired from the unemployed pool associated with that industry or if they came from other industries or from outside the labor force. I estimate adjustment coefficients for six industry sectors and for ex-

panding and contracting industries, first for the whole labor force and then separately for men and women. I also explore the speed of adjustment and how the average adjustment coefficients differed across the regions of England and Wales.

The second method estimates mobility across sectors and employment states by modeling these transitions as a Markov process. There is a large literature on estimating Markov transition probabilities from aggregate data (Lee, Judge, and Zellner 1970; MacRae 1977; Van Der Plas 1983; Kalbfleisch and Lawless 1984). Transition probabilities can be estimated from the counts or proportions of individuals or other micro components in aggregate states using some form of conditional least squares. For the period 1923–1936, I use aggregate data on the proportion of the labor force in twelve employment-industry states, representing employment and unemployment in six industry categories. To estimate the Markov transition probabilities between states, I set up and solve a quadratic programming problem minimizing the sum of squared residuals subject to constraints that the estimated probabilities are valid and sum to one and that transitions between employment and unemployment states operate according to the arrangement of the unemployment insurance program from which the data derive. I bootstrap standard errors for these probabilities using residual resampling. Then, I simulate 120,000 individuals in the Markov process. Their paths shed light on the persistence of unemployment for individuals in each employment-industry state.

The results of the adjustment coefficient analysis indicate that interwar industries not only had large differences in unemployment, but they also had differences in their ability to adjust their labor supply to these employment changes. Workers in services and building benefited from high levels of adjustment across industries, while workers in textiles and mining faced rigidities to adjustment. When these results are disaggregated by gender, it is apparent that on the whole, labor markets were less flexible for women than for men, with some variation by sector. Women faced more rigidities than men in the textile industries, but fewer in the service industries and in other manufacturing industries. When adjustment is estimated by region, the South East and London regions had the most flexible labor markets, while labor markets in the North and Wales regions were the least flexible.

Adjustment coefficients were higher in industries that were expanding than in those that were contracting. This suggests that workers in industries with declining employment had few opportunities to move into other industries. During the Great Depression, the adjustment coefficients for contracting industries worsened while the coefficients for the expanding industries

improved. The Great Depression thus increased the difference in adjustment between contracting and expanding industries. This pattern holds when only men are considered, but not for women exclusively. Labor market adjustment decreased for women in both expanding and contracting industries during the Great Depression.

The Markov analysis provides some evidence on which industries workers were able to transition between. For men, unemployed mining workers were least likely to find employment, with movement primarily into building industries. Unemployed men in metal manufacturing were most likely to find alternative employment in textile manufacturing, other manufacturing, or in services. For women, employed textile workers had a high probability of becoming unemployed, but once unemployed were more likely than not to find work in another industry. In contrast, women employed in service industries were unlikely to become unemployed, but if they did, were likely to remain unemployed. Simulating the Markov chain for 120,000 individuals over thirteen time steps, men that began employed in other manufacturing or in services had the least unemployment while those who began in mining or textiles had the most unemployment. For women, employed service workers spent the fewest time steps in unemployment while employed textile workers spent the most. The heterogeneity in adjustment across industries and by gender thus led unemployment to be more persistent for some groups of workers than for others.

What explains these large differences in unemployment by industry and gender? In order to better understand these results, I also provide some evidence on the determinants of industry-level unemployment rates for men and women, focusing in particular on the role of structural change processes that affected some industries and not others. Digitizing almost 1,000 pages of the 1924 and the 1930 *Census of Production* enables a new dataset to be developed on the characteristics of 123 interwar production industries, which is then linked with unemployment data from the *Labour Gazette*. A regression model indicates that export industries and those that expanded substantially during World War I suffered higher unemployment rates. A one standard deviation increase in the percent of output exported in an industry corresponded to a 1.88 percentage point increase in that industry's unemployment rate, while a one standard deviation increase in an industry's growth during World War I corresponded to a 1.27 percentage point increase in the industry's unemployment rate in 1924. In contrast, industries that had high levels of female employment were associated with low unemployment overall, indicating a capacity of some industries to absorb new workers. The magnitude of this advantage is large, with a one standard deviation increase in the proportion of women corresponding to a 3.06 percentage

point decline in the industry's unemployment rate overall. When this analysis is disaggregated for men and women, the results are similar for men. Industry-level unemployment rates for women, however, depended critically on the composition of administrative and operative tasks in an industry. The results of this additional analysis shed some light on why certain industries had more adjustment than others during the interwar period, and why gender affected this labor market adjustment. Structural forces are thus found to have played a key role in industry-level unemployment.

Taken together, the analysis in this chapter provides new empirical evidence that structural transition significantly affected patterns and magnitudes of interwar unemployment, and that these structural forces were amplified by cyclical trends. The development of the full Ministry of Labour *Gazette* data on interwar unemployment reveals large disparities in unemployment across industries, gender, and regions. The econometric analysis of labor market rigidities through the estimation of adjustment coefficients and Markov transition probabilities finds that the interwar labor market was not sclerotic in aggregate, as has been previously assumed by some scholars, but rather that certain groups were advantaged and disadvantaged by structural rigidities. The unequal effects of interwar unemployment were amplified by the business cycle, which widened the gap in adjustment between structurally-advantaged and disadvantaged industries and regions. An analysis of the determinants of unemployment rates finds that unemployment rates at the industry and gender level were determined partially by structural change forces including the effects of World War I and changes in the composition of the labor force. Interwar unemployment was thus in many ways not an "aggregate" problem but rather something experienced much more acutely by some workers than others. The interaction of structural change and the business cycle in the interwar period in part drove these unequal effects, and may have generated persistent disadvantage.

2.1.1 Historical background

> *[T]he immediate future for me — and I view the position of those that are older than myself, or those who may have had experiences as bad as mine — appears to be as one of a crowd rushing hither and thither to find an outlet of escape which at each turn finds the channel choked as it becomes more narrow.*
>
> – an unemployed house painter in interwar London describing the search for work[1]

The inflationary boom at the end of World War I — driven by pent-up consumption, nominal

1. Beales and Lambert (1934, 173).

wage increases, and working week decreases — collapsed into a global depression from 1921 to 1922. This downturn was particularly severe in Britain, where the unemployment rate increased from an average of 3.9% in 1920 to over 20% in the spring of 1921, reaching a maximum for the decade of 23.4% in May of 1921. The war had shifted Britain's position in the world economy substantially — Britain was no longer at the nexus of global trade or the arbiter of the international gold standard. Policymaking was clouded by the uncertainty of reparations, inter-Allied war debt repayments, and labor militancy.

By the middle of the 1920s, the economy had recovered by many measures. From the end of the war, Britain had pursued an objective of returning to the gold standard at its pre-war parity with the dollar. Tight monetary policies throughout the early 1920s helped Britain avoid the high inflation experienced by other European countries. The pound was restored to the gold standard in 1925, making London once again the center of the international money market. By 1924, the issue of Britain's debts to the US was also settled, and the Dawes Plan temporarily handled questions of German reparations. Despite this seeming restoration of normality, however, unemployment remained remarkably high, averaging well over 10% in the late 1920s. The General Strike of 1926, motivated by the plight of coal miners, highlighted unemployment as an urgent social and political issue. By the 1929 General Election, remedies for unemployment were a key part of every major party's platform.

The worldwide Great Depression of the early 1930s exacerbated unemployment in Britain. The unemployment rate climbed to over 20%, where it remained for all of 1931 and 1932. The gold standard prevented credit expansion by means of lower interest rates, as the Bank rate was effectively linked to the United States' discount rate. With over three million workers unemployed, Britain finally refused to increase the Bank rate any further to protect its gold reserves in September 1931, forcing the pound off the gold standard. Under a new system of flexible exchange rates, the Bank rate was reduced from 6% to 2% through June 1932. Long-term interest rates fell, driving a sustained boom in home construction from 1933. Eventually, rearmament spending led to a full recovery before the onset of World War II. In international comparison, unemployment was higher and more persistent in Britain than in the rest of Europe during the 1920s, but Britain recovered relatively quickly from the Great Depression after leaving the gold standard.

Throughout the interwar period, Britain experienced substantial shifts in its economic structure. At the end of World War I, it faced increased international competition in markets for its

major pre-war exports. The war had interrupted the cotton trade with Asian countries, which responded by developing their own supply lines. Production of coal increased throughout Europe, displacing British firms that had built up the capacity to meet domestic and international demand in wartime. Domestic markets were shifting away from traditional products and toward alternative substitutes — relying on electricity, gas, and oil rather than coal, and preferring road transport to railways, for example. Many industries grew up closer to large consumer markets, establishing industrial hubs in the Midlands and in Greater London. Trends toward agglomerations and branched firms raised the barriers to entry in some industries. The industrial structure was also affected by tariffs, subsidies, and direct government intervention, especially in the 1930s. These underlying shifts complicate our understanding of the cyclical trends of the interwar period.

2.2 Related literature

The importance of understanding the causes and remedies of interwar unemployment has generated many studies in economic history examining the effects of real wages, aggregate demand, unemployment insurance, structural change, and other factors on employment. By developing a detailed dataset on unemployment and pursuing a novel empirical strategy, this chapter contributes new evidence on labor market adjustment and structural change to these long-running debates on interwar British unemployment.

Following the publication of the *General Theory* in 1936, interwar unemployment was typically assumed to have been Keynesian in nature (Beveridge 1944, pp. 90-109, for example). The contention of Benjamin and Kochin (1979) that interwar unemployment was voluntary, induced by generous unemployment benefits, cast doubt on this view. Though this paper was heavily criticized,[2] it generated interest in the role of supply factors in interwar unemployment. This led to a large debate in the literature on whether interwar unemployment was driven by aggregate demand fluctuations or systemic and institutional labor market rigidities such as inflexible wages, unemployment insurance, and trade unionization.

2. The *Journal of Political Economy* published a series of responses to Benjamin and Kochin (1979) in 1982 — Collins (1982) notes that their model does not control for any sort of regional or sectoral differences, Cross (1982) points out that "voluntary" unemployment was restricted by the requirements that dole-takers must be "genuinely seeking work" and other forms of means-testing, Metcalf, Nickell, and Floros (1982) demonstrate that interwar unemployment benefits were much lower than the post-World War II benefits, yet unemployment was higher in the interwar than the postwar period, and Ormerod and Worswick (1982) show that their regression is not robust to small changes in the sample window or to the inclusion of time-trends. Additionally, Hatton (1983, 1985) argues that the British economy was in a state of excess supply in product and labor markets, causing the partial equilibrium approach of Benjamin and Kochin (1979) to overstate the effects of unemployment benefits.

Much of this research focused specifically on whether high wages during the 1920s or early 1930s caused or contributed to the economic downturn. Beenstock and Warburton (1986, 1991) argue that the growth in real wages from 1929 to 1932, due in part to unemployment benefits, had the effect of reducing labor demand and increasing labor supply. Hatton (1988) finds with quarterly data that high real wages reduced employment during the Great Depression, but notes that other supply-side factors such as unemployment insurance and demographic changes could have played a role. In a general equilibrium model, Cole and Ohanian (2002) argue that the incentive effects of unemployment benefits were in fact the key explanation for elevated unemployment levels in the interwar period.[3] Hatton and Thomas (2013) emphasize that other institutional factors such as unions and centralized wage setting may have played a role in interwar unemployment. In a recent work, Luzardo-Luna (2020) finds additional evidence for interwar labor market frictions in a search-and-matching framework.

Other scholars have argued for the importance of demand-side effects. Dimsdale (1984) criticizes the focus on real wages in explaining high interwar unemployment, noting that the effects of wage increases in the 1920s were more significant than in the 1930s and that price changes need to be taken into account. With a structural macro model, Dimsdale, Nickell, and Horsewood (1989) find that the early 1930s recession was not instigated by real wage changes but rather by a large demand shock. Sticky prices and wages, and the effect of falling import prices on the wage bargain, did help translate this demand shock into unemployment. Broadberry (1986) argues that supply-side factors were more important in the 1920s than in the early 1930s, with the fall in average hours worked and consequent rise in the real wage more important than unemployment benefits or other structural forces.[4] But, the experience of the early 1930s recession and then recovery he finds to be driven primarily by demand-side factors. This contrasts with the results in Crafts (1989), which, by incorporating long-term unemployment, suggest supply-side forces did contribute to high unemployment in the 1930s.

This chapter contributes to the debate by analyzing labor market rigidities at a finer level of disaggregation using econometric methods, focusing on labor market flows across industries and incorporating gender and region. New evidence is provided on the extent to which labor

3. Hatton and Bailey (2002) reexamine the effect of the benefit-to-wage ratio on unemployment rates in interwar London using microeconometric analysis of the New Survey of London Life and Labour. They find no evidence that benefit-wage ratios affected unemployment controlling for skills, industries, age, marital status, and gender, in contrast to Eichengreen (1987) which uses a 10% sample of the same data. The econometric results in Hatton and Bailey (2002) suggest a spurious relationship between the benefit-wage ratio and unemployment can arise if skill and industry indicators are not properly included in the analysis.

4. Broadberry (1990) goes into more detail about the decrease in hours worked in the early 1920s. A fall in the price level because of deflationary government policy also contributed to an increase in the real wage in this period.

reallocation across industries occurred in interwar Britain, and who benefitted. While I find that rigidities in labor market adjustment played a significant role in interwar unemployment, the labor market was not sclerotic in aggregate. Some workers faced structural rigidities to adjustment that generated persistent unemployment, but other workers experienced flexible labor markets and many employment opportunities.

These debates on the broader causes of interwar unemployment in Britain have been criticized for obscuring or ignoring significant regional and industrial patterns in unemployment (Booth and Glynn 1975, pp. 614-615; Gazeley and Rice 1996, p. 297; see for the US case Margo 1993). The focus on differences between industries in the present chapter is related to efforts to incorporate sectoral variation into quantitative analyses of interwar unemployment. Gazeley and Rice (1992) consider four staple industries, finding that a sharp increase in real wages was associated with unemployment. Their 1996 paper on the shipbuilding industry, however, finds that in that industry, unemployment was driven by the demand side — leading them to argue for the importance of industry-disaggregated approaches (Gazeley and Rice 1996). Turner and Bowden (1997) incorporate twenty-one industries into a macroeconomic framework, finding little evidence for real wage effects in the sectors with the greatest employment loss. Bowden, Higgins, and Price (2006) present summary statistics for twenty-five industry categories and empirical results on short-time working for various subsets of ten industries, and Luzardo-Luna (2020) gives summary statistics for fifteen industry categories, incorporating four industries in his empirical analysis.

This chapter extends this research by contributing the first complete digitization of the Ministry of Labour's unemployment data from 1923 to 1936. Subsets or aggregates of these data, printed monthly in the *Labour Gazette*, form the basis of the industry-level analysis in Gazeley and Rice (1992), Turner and Bowden (1997), Bowden, Higgins, and Price (2006), and Luzardo-Luna (2020). Subsets of the *Labour Gazette* data have also been hand-collected since their publication for reference works and early empirical research (Beck 1951; Chapman and Knight 1953; Feinstein 1972, for example). I digitized hundreds of pages of the interwar *Labour Gazette* using optical character recognition (OCR) technology, cleaning and linking the monthly data to construct a comprehensive dataset on unemployment in 100 industries, disaggregated by gender, for every month in the period. This rich dataset enables four times as many industries to be analyzed in this chapter as in any previous study. Additionally, rather than having to rely on aggregate, macroeconomic methods, it also allows microeconometric methods to be used to

explore differences in the labor market experience by industry, gender, and region.

Additionally, despite the ready availability of gender-disaggregated unemployment data from the Ministry of Labour during this period, Bowden, Higgins, and Price (2006) and Heim (1984) are the only major papers that discuss unemployment separately for men and women. The present chapter disaggregates by gender throughout the analysis, more closely modeling the discriminating labor markets and distinct labor supply choices men and women workers faced during the interwar period.

This chapter is also related to previous studies that have considered the role of structural change and the differing experiences of industries and regions using historical methods. In the 1960s and 1970s, some historians argued that structural change contributed to strong economic growth and productivity gains in Britain during the interwar period (Aldcroft and Richardson 1969; Aldcroft and Fearon 1969, for example). Aldcroft (1969b) writes that rapid technological progress and structural change caused growth through labor reallocation from old to new industries, and that the decline of older export industries was actually "a positive long-term advantage" (p. 234). Richardson (1969) argues that an over-commitment to these export industries delayed structural transformation in the 1920s, leading to structural unemployment and regional disparities, but then paved the way for growth in the 1930s. The shift of resources to expanding sectors was thus a determinant of interwar economic growth (Aldcroft 1969a, p. 54), which was not slowed detrimentally by unemployment (Dowie 1969, p. 72). The link between structural change, productivity, and growth has been criticized, however, in more recent work.[5]

Other studies have focused on the link between industrial organization and structural change. The 1920s saw a large wave of mergers (Hannah 1974, p. 253), and many of the new industries grew quickly in an oligopolistic way (Buxton 1979, p. 19). However, the industrial organization of many expanding industries limited their ability to improve the economic performance of the depressed regions in Britain. Heim (1983) finds that many firms in expanding industries were not developed enough to branch out into the depressed regions, while potential new firms faced barriers to entry and controlled competition that prevented their success in the depressed regions.

5. Von Tunzelmann (1982) finds that the productivity effects from the reallocation of resources across sectors were less important than general productivity growth within all sectors, so a structural shift toward the new industries could not explain high growth and high unemployment. Buxton (1975) shows that structural change processes were actually slowed by the Great Depression, a result confirmed by the present chapter, and that the growth of the "new" industries was not essential to the recovery in the 1930s. Broadberry (1983) demonstrates that productivity growth during the interwar years was driven primarily by closures of less productive firms rather than the superiority of new industries or processes of rationalization. More recent estimates of British economic growth and productivity during the interwar years are also less sanguine (Broadberry and Crafts 1992; Broadberry 1997; Mitchell, Solomou, and Weale 2012, for example).

Expanding industries also relied on different workers than did the old — Heim (1984) finds that the labor of women and children in factories and services was often preferred, in some cases because these workers were less likely to have entrenched attitudes about industrial structures or production processes. Glucksmann (1990) also discusses how women's labor was essential to assembly-line production in many of the expanding industries during this period.

The present chapter builds on this literature on structural change by providing new quantitative evidence on the influence of some structural factors on interwar unemployment. By estimating the determinants of unemployment differentials across industries and gender, this chapter finds that export industries and those that expanded during World War I were structurally disadvantaged, while those that exploited the changing composition of the labor force benefited. Structural change is found to have played a central role in interwar unemployment and in the different labor market experiences of different workers.

Finally, this chapter is related to the literature on regional disparities in interwar unemployment. The relatively poor performance of the North of England, Wales, and Scotland during the interwar period is well known, though whether this represents a reversal of fortune from the pre-war period has been the subject of debate (see Massey 1986, p. 31; Southall 1988; Lewis and Townsend 1989, pp. 22-28; Crafts 2005). Booth and Glynn (1975) argue that interwar unemployment was primarily a regional problem, emphasizing how regional disparities in unemployment created a structural problem that was difficult to address. M. E. F. Jones (1985) estimates the regional effect of the overvalued currency, finding that "Outer" Britain, with a disproportionate share of export industries, was especially disadvantaged. It has also been asserted that regional unemployment differentials existed even once the effect of the different industrial composition of regions is removed (see Eichengreen 1989, p. 9, for example). Hatton (1986) explores this question directly, extending the earlier analysis of Champernowne (1939b, 1939a). Both of these authors use data from the Ministry of Labour on industry-level unemployment rates in "Inner Britain" and "Outer Britain" in 1929, 1932, and 1936 to conduct a shift-share analysis to determine the portion of the unemployment differential between "Inner" and "Outer" Britain due to industry mix and to other regional factors.[6] Hatton (1986) finds evidence that industrial composition accounts for less than half of the differential.

This chapter deepens our understanding of these regional unemployment differentials by providing new evidence for regional effects above and beyond industrial mix in the interwar

6. Champernowne (1939b, 1939a) uses a sample of 16 industries while Hatton (1986) uses all of the industries.

period. By linking the complete Ministry of Labour data on industry-level unemployment rates with data from the 1931 *Census*, improvements on Hatton (1986) and Champernowne (1939b) can be made. The effect of industry mix on regional unemployment rates can be analyzed for six distinct regions rather than for "Inner" and "Outer" Britain. These effects can be estimated for the 1920s period before the Great Depression. Finally, the unemployment rate differentials can be decomposed on an annual level rather than only for the three years used in the previous analyses. My findings confirm that regional effects above and beyond the effects of industry mix contributed to interwar regional unemployment differentials, but that these effects were strongest during the Great Depression.

2.3 Industrial and gender divides

In 1911, Britain established the first national unemployment benefit scheme in the world. Originally available to about 2 million workers in volatile industries such as building and engineering, it was expanded at the end of World War I to cover over 11 million workers in most industries. The benefit scheme included all contract or apprenticeship workers aged 16 or over in manual work, as well as those earning less than £250 per year in non-manual work. It excluded a few industries — agriculture, domestic service, forestry, and horticulture — because of their low risk of unemployment,[7] as well as various civil service, military, and teaching jobs (Garside 1980, 31-32).

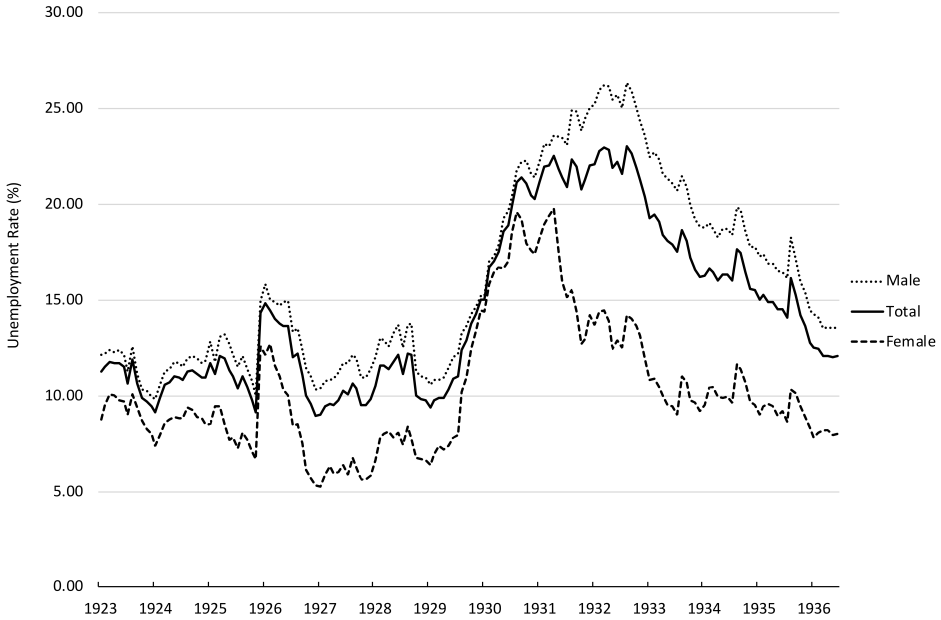
The operation and management of the National Insurance scheme led to the systematic collection and distribution of comprehensive unemployment statistics for insured workers in Britain during the interwar period. Each July, the number of people registered under the scheme was determined by the issue of Unemployment Books at local unemployment exchanges. Workers who could not find employment lodged their books at the exchange. Every month, the *Labour Gazette* unemployment rate was calculated as the total "Books Lodged" on a given day, divided by the total number of workers insured in July.[8] Data on the numbers unemployed were printed each month in the Ministry of Labour's *Gazette*, with separate figures given for men and women across 100 industries.

This chapter contributes a digitization of this Ministry of Labour employment and unem-

7. HC Deb 23 February 1921 vol 138 c1060. Mr. Thompson says, "The reason why the right hon. Gentleman excluded two classes from the insured people, namely, domestic servants and agricultural workers, was that the unemployment in those two classes was so small that they need not come into a general scheme."

8. Garside (1980, p. 55) details how this process was complicated somewhat by the Two Months file.

Figure 2.1: Monthly unemployment rate for Britain by gender, 1923–1936



Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936 for men and women.

ployment data from 1923 to 1936. For 163 original Ministry of Labour *Gazettes*, representing every month over 14 years, June 1923 – December 1936,[9] I scanned the table "Unemployment in Insured Industries," which gives the number of unemployed for the month in 100 industries, disaggregated by gender. I then used optical character recognition (OCR) software to convert the images to editable text and cleaned and verified every row and column of the data. Linking the monthly files generated a time series of unemployment for men and women in 100 industries over the 1923–1936 period.[10]

2.3.1 Gender

Figure 2.1 presents the first monthly unemployment rate series for interwar Britain with women and men's unemployment rates disaggregated. The series with men and women together indicates that unemployment was persistently high throughout the interwar period, increasing dramatically during the Great Depression in the early 1930s. This trend is then decomposed into unemployment rates for women and for men in the labor market.

9. The *Labour Gazettes* referenced are held by the Bodleian Libraries, Oxford. Prior to June 1923, unemployment statistics are only available for 63 industries.

10. The central dataset developed for this chapter includes both Great Britain and Northern Ireland. However, in keeping with the existing literature that relies on the same sources including Northern Ireland, I use "interwar Britain" throughout the chapter. Use of the shorthand term "United Kingdom" can be confusing for this period, as even after the creation of the Irish Free State in 1922, the name "United Kingdom of Great Britain and Ireland" was retained until 1927. A few cases in the chapter in which data only include England and Wales are clearly marked.

The most striking difference between the female and male series of unemployment in Figure 2.1 is their levels: the unemployment rate for men is higher than the aggregate series throughout the entire period, while the unemployment rate for women is lower. The unemployment rate for men ranged from its minimum of 9.8% in June 1924 to 26.3% in January 1933, with a mean of 16.1% for the period. In contrast, the unemployment rate for women ranged from 5.3% in June 1927 to a maximum of 19.8% in September 1931, with a mean of only 10.3% for the period.

The female and male unemployment rate series also have distinct trends. The onset of the Great Depression coincided with a steeper increase in the unemployment rate for women than for men. Female unemployment rates began decreasing in 1931, while male unemployment rates remained high through 1933.

An important qualification to these gender trends in unemployment is the different propensity for men and women to join the labor force during this period. While annual data is not available, the 1931 *Census of England and Wales* offers some insight into these differences in labor force participation. Table 2.1 gives the labor force participation rate by gender and marital status in 1931. Overall, the labor force participation of women was much lower than that of men — while over 90% of men in the population were working or unemployed at the time of the *Census*, only 34% of women were in the labor force. The participation rates by marital status indicate that both single and married men had high participation, whereas single women had much higher participation rates than married women. These patterns reflect women's looser attachment to the labor force because of the option, and expectation, of non-market home production, as well as institutional factors such as marriage bars that limited women's paid employment.

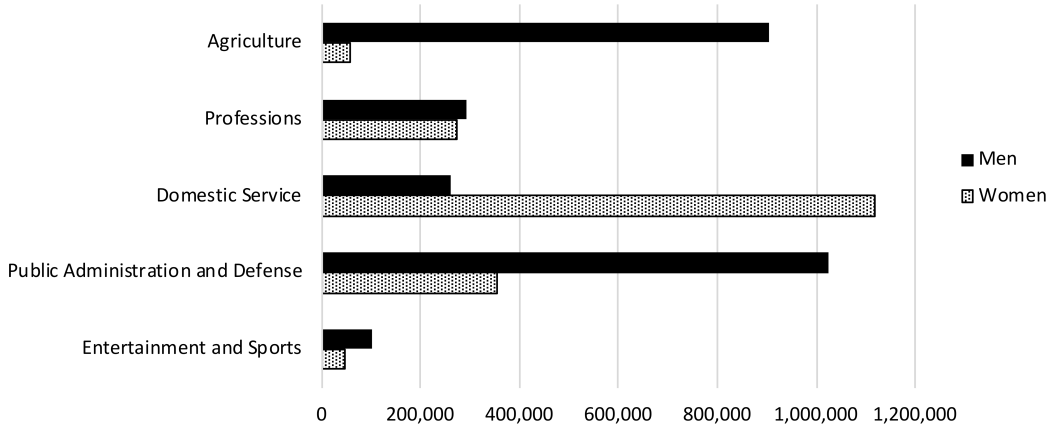
Table 2.1: Labor force participation by gender and marital status, 1931 *Census*

	Overall		*Single*		*Married*		*Widowed/Divorced*	
	Men	Women	Men	Women	Men	Women	Men	Women
Labor Force	13,247,333	5,606,043	4,848,524	4,322,259	7,921,905	896,967	476,904	386,817
Population	14,632,859	16,410,894	5,414,158	6,006,387	8,487,058	8,599,308	731,643	1,805,198
LFPR	90.53%	34.16%	89.55%	71.96%	93.34%	10.43%	65.18%	21.43%

Analysis using data from the 1931 *Census of England and Wales* Industry Report, Table XLIX. LFPR is the labor force participation rate.

Another caveat is the representativeness of the industries covered by the *Labour Gazette* data. The exclusion of workers in domestic service in particular may have influenced the relative unemployment rate for women. Figure 2.2 gives the number of workers in the 1931 *Census* who were associated with industries that were excluded from the unemployment benefit program.

Figure 2.2: Number of workers in industries excluded from unemployment insurance scheme



Analysis using data from the 1931 *Census of England and Wales* Industry Report, Table XLIX.

Over half of the women in the labor force in industries excluded from unemployment insurance were associated with domestic service. For men, about a quarter of workers in excluded industries were associated with agriculture and a quarter with public administration and defense.[11]

The unemployment rates given for these excluded industries in the *Census* can be used to reweight the unemployment rates for men and women from the 1931 *Labour Gazette*. For example, the unemployment rate for women in domestic service was 7.4%, much lower than the overall unemployment rate for women in the *Labour Gazette* in July 1931 of 19.0%.[12] Likewise, for men the unemployment rate in all of the excluded industries was lower than the *Labour Gazette* average of 23.2%.[13] Figure 2.3 gives the unemployment rates for men and for women in July 1931 when the numbers employed and unemployed in the industries excluded by the unemployment benefit program are added to the *Labour Gazette* numbers. As expected, the unemployment rates for men and for women both decrease when these industries with lower unemployment rates are included. The gap in the unemployment rate between men and women, however, increases slightly, from 4.21 percentage points to 5.26 percentage points. This suggests that the patterns in the monthly unemployment rate in Figure 2.1 are not simply because of differences in the representativeness of the *Labour Gazette* data for men and for women.[14]

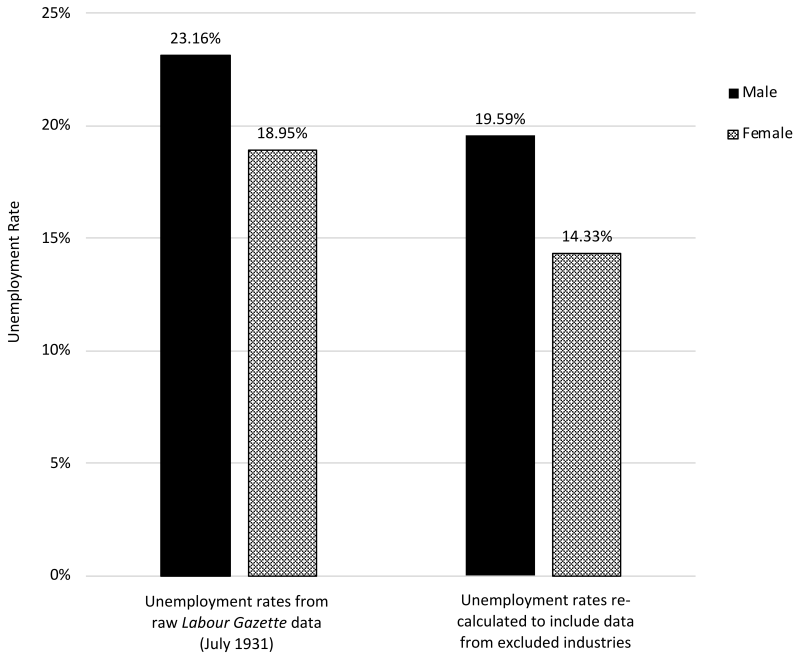
11. In addition to these workers in industries that were deliberately excluded from the insurance scheme, a further 1,918,958 men and 367,088 women were counted as employed in the 1931 *Census* but not represented in the total numbers insured in the July 1931 *Labour Gazette*.

12. Likewise, the unemployment rate for women in agriculture was 3.6%, in professions was 2.6%, in public administration and defense was 1.9% and in entertainment and sports was 2.8%.

13. The unemployment rate for men in agriculture was 6.0%, in professions was 3.4%, in domestic service was 7.8%, in public administration and defense was 9.1%, and in entertainment and sports was 21.7%.

14. The overall unemployment rate for men in the 1931 *Census* was 14.60% while the unemployment rate for women was 9.40%, further evidence of around a 5 percentage point difference in unemployment rates.

Figure 2.3: Unemployment rates by gender adjusted for excluded industries, 1931



Analysis using data from the 1931 *Census of England and Wales* Industry Report, Table XLIX, and gender-disaggregated employment and unemployment data from the July 1931 *Labour Gazette*. The numbers of employed and unemployed workers in the excluded industries are added to the total numbers employed and unemployed in the *Labour Gazette* to recalculate the unemployment rates.

Prior work on interwar unemployment has ascribed the rapid increase in female unemployment in 1930 to changes in the National Insurance scheme which made it easier to claim unemployment benefit without actually seeking work. For example, Booth and Glynn (1975) write that "...in the early 1930s, when the condition that claimants must be 'genuinely seeking work' was dropped, the female average [unemployment rate] rose to 80-90 per cent of the male rate. When the Anomalies Act of 1931 partially reversed the previous policy, female rates tended to return to pre-1929 levels" (617). The implied mechanism is that women who were unattached to the labor force falsely became insured and claimed unemployment benefits once they did not have to prove they were genuinely seeking work. However, using the full *Labour Gazette* data, Table 2.2 casts some doubt on this simple narrative. While the female unemployment rate did rise to 90% of the male unemployment rate in 1930, there was not a large relative increase in the number of women insured. This is inconsistent with the view that policy changes in the early 1930s caused women to seek employment insurance at greater rates than men, suggesting that any abuse of the insurance system would have been in equal measure by men and women. However, there is still the possibility that some portion of the increase in the relative unemployment rate for women was because of a greater propensity of newly insured women to be unemployed.

Table 2.2: Relative unemployment rates and numbers insured for men and women, 1923–1936

	Male		Female		Ratio Female:Male	
Year	Unemp. Rate	# Insured	Unemp. Rate	# Insured	Unemp. Rate	# Insured
1923	12.1	8,526,900	9.6	2,975,900	0.79	0.35
1924	11.1	8,480,600	8.7	3,033,400	0.79	0.36
1925	12.4	8,717,400	8.8	3,174,600	0.71	0.36
1926	13.5	8,843,800	9.9	3,197,200	0.73	0.36
1927	11.3	8,576,200	6.3	3,207,800	0.56	0.37
1928	12.3	8,621,900	7.1	3,259,600	0.57	0.38
1929	11.7	8,755,350	7.4	3,338,650	0.63	0.38
1930	16.7	8,931,530	15.0	3,474,170	0.90	0.39
1931	22.8	9,187,000	18.1	3,583,000	0.79	0.39
1932	25.4	9,302,300	13.6	3,505,700	0.54	0.38
1933	23.2	9,344,400	11.5	3,538,600	0.50	0.38
1934	19.3	9,435,200	10.0	3,524,800	0.52	0.37
1935	17.7	9,531,000	9.8	3,527,000	0.55	0.37
1936	15.0	9,720,700	8.8	3,618,000	0.58	0.37

Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936. Unemployment rate expressed in percentage. The final two columns give the female unemployment rate divided by the male unemployment rate, and the number of insured women divided by the number of insured men.

2.3.2 Industries

The Ministry of Labour *Gazette* data disaggregates unemployment into 100 industries forming 25 industry groups. For example, "Woolen and Worsted" is an industry in the group "Textiles." The 100-industry level of disaggregation has not been used previously in the literature, despite the significant heterogeneity across this dimension. This section contributes summary statistics on unemployment across these 100 industries and explores specifically the role of the staple industries.

Which industries had the most unemployed workers in interwar Britain? Of the 100 industries in the *Labour Gazette*, Table 2.3 lists the ten industries that accounted for the highest proportion of overall unemployment 1923–1936 for both men and women.[15]

For men, coal mining accounts for the largest proportion of total unemployment (14.55%), followed by building (9.12%), distributive trades[16] (7.53%), and iron and steel founding (6.85%). For women, 19.56% of unemployed workers were associated with the cotton industry, followed by the distributive trades (12.38%); hotel, boarding house, and club services (7.89%); and the woolen and worsted industry (5.95%).

It is striking that the industries accounting for the most unemployment among men and women were so distinct — only two industries feature on both the male and female lists. This indicates that unemployment was concentrated in largely different industries for men and women. Further, many of the industries driving unemployment among women are rarely discussed in the literature on interwar unemployment, such as hotel and club services, tailoring, and pottery.

Though often left out of narratives of interwar British unemployment, the distributive trades accounted for a large portion of overall employment and unemployment during the interwar period. The rise in retail trades was driven by rising real incomes and a trend toward multiple retailing and branched retail networks. Multiple-shop retailers more than doubled their share of total retail sales over the interwar period (Jeffreys 1954, 72-73), often employing more workers per shop. While previously the distributive trades required technical skills and even apprenticeships, during the interwar period more emphasis was placed on commercial and service skills, attracting new entrants to the industry, including women (Jeffreys 1954, 52).

It is also notable that the ten industries that accounted for the most unemployment in interwar Britain sum to only 62.20% of unemployment for men and 62.96% of unemployment for

15. Table A.3 in Appendix A.1 gives the rankings on an annual level by gender.
16. Including wholesale distribution and retail distribution.

Table 2.3: Industries accounting for the most unemployed workers, 1923–1936, by gender

Men			Women		
Industry	% of Total Unemp.	% of Total Emp.	Industry	% of Total Uemp.	% of Total Emp.
Coal Mining	14.55%	11.60%	Cotton Industry	19.56%	9.03%
Building	9.12%	9.26%	Distributive Trades	12.38%	20.73%
Distributive Trades	7.53%	12.53%	Hotel, Boarding House, Club	7.89%	6.42%
Iron and Steel Founding	6.85%	5.87%	Woolen and Worsted	5.95%	4.05%
Shipbuilding and Ship Repairing	6.17%	15.73%	Tailoring	4.06%	4.00%
Public Works Contracting, etc.	4.78%	1.88%	Linen	3.44%	1.45%
Canal, River, Dock Service	4.07%	1.58%	Pottery, Earthenware, etc.	2.50%	1.02%
Steel Melting, Rolling Mills, Forges	3.78%	1.66%	Hosiery	2.49%	2.47%
Local Government	2.77%	3.18%	Other Food Industries	2.42%	1.65%
Cotton Industry	2.58%	2.02%	Other Metal Industries	2.27%	2.15%
Total % of unemployed from 10 industries	62.20%			62.96%	

Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936 for men and women. The ten industries, out of 100, accounting for the most unemployed women and men throughout the interwar period are listed.

women. This represents only 10.0 percentage points of the average male unemployment rate for the period of 16.08%, and only 6.48 percentage points of the average female unemployment rate of 10.3%. These percentages indicate that there was widespread unemployment outside of these industries, suggesting that interwar unemployment cannot simply be attributed to one sector or one group of industries.

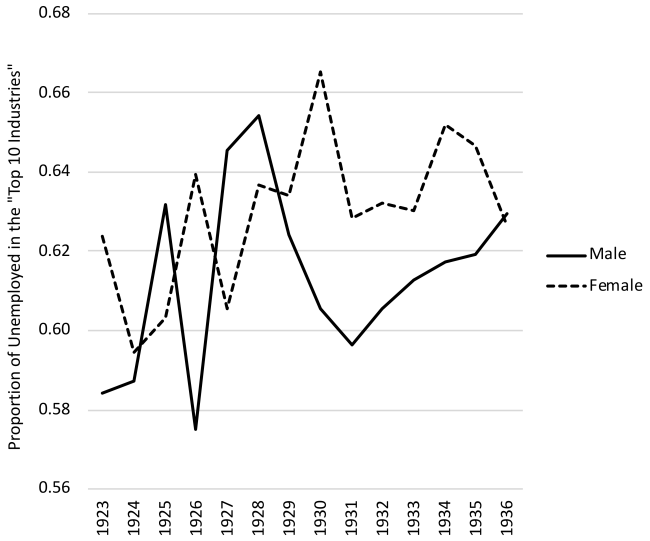
This proportion does change over time, as given in Figure 2.4. The male trend shows a clear dip in concentration from 1925 to 1926 and from 1928 to 1931. In both of these periods, national macroeconomic events might have caused unemployment to become more widespread across industries — Britain's return to the gold standard in 1925 created contractionary pressures throughout the national economy, and the worldwide collapse of demand in 1929 had far-reaching effects. The female trend, however, shows little recognizable pattern, possibly because a full 32% of female unemployment was driven by only two industries. The concentration of unemployment in only a few industries is a structural phenomenon, reflecting changes in the economy that disadvantaged certain industries. Tracing this measure over time begins to reveal the interplay between processes of structural adjustment and cyclical forces.

A related question is the role of staple industries in interwar unemployment: coal mining, cotton textiles, iron and steel,[17] engineering,[18] shipbuilding, and sometimes also woolen and

17. Includes the industries Iron and Steel Tube Making, Pig Iron Manufacture/Blast Furnaces, Steel Melting and Iron Puddling Furnaces, Wire/Wire Netting/Wire Rope Manufacture, and Stove/Grate/Pipe/General Iron-founding.

18. Industry category containing the industries General Engineering/Engineer's Iron and Steel Founding, Constructional Engineering, Electrical Engineering, and Marine Engineering.

Figure 2.4: Proportion of unemployment accounted for by top ten industries, 1923–1936



Analysis using gender-disaggregated unemployment data from the Ministry of Labour *Gazette*, 1923–1936. Data is the proportion of unemployed workers associated with the ten industries accounting for the most unemployment among men and women. The industries comprising the top ten industries vary by year as indicated in Table A.3 in Appendix A.1.

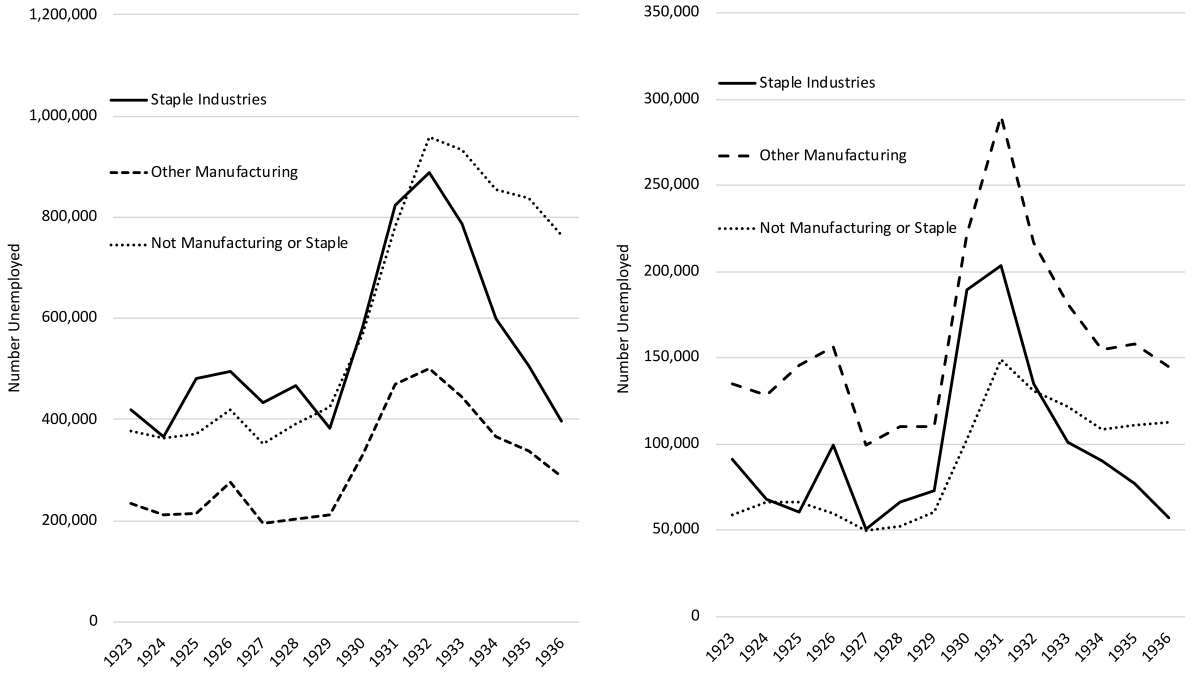
worsted textiles. These older industries drove British economic growth during the nineteenth century, and their visible decline was widely discussed during the interwar period. More recent research has also emphasized the staple industries. Gazeley and Rice (1996, p. 297), for example, use employment data from Chapman and Knight (1953) to find that 87% of employment losses from 1929 to 1932 were in the staple industries. The complete Ministry of Labour *Gazette* data allows us to complement these figures on employment changes with data on changes in the numbers unemployed.

Figure 2.5 gives the number of unemployed throughout the interwar period across three broad categories of industries: staple industries, other manufacturing industries, and non-manufacturing industries. In both the data for men in Figure 2.5a and for women in Figure 2.5b, the staple industries hold a less prominent position than might be expected. For men, we see that unemployment in the staple industries was higher than the other categories throughout the 1920s, but that unemployment in non-manufacturing matched and then outpaced unemployment in the staples throughout the 1930s.[19] For women, the highest numbers unemployed throughout the interwar period were in other manufacturing rather than the staple industries.[20] While the staple industries certainly played an important role in British interwar unemploy-

19. Led by Building, Distributive Trades, Public Works Contracting, and Canal, River, Dock, and Harbour Service.

20. Led by Linen, Tailoring, Pottery, and Hosiery.

Figure 2.5: Numbers unemployed in staple vs. non-staple industries, 1923–1936



(a) Men

(b) Women

Analysis using gender-disaggregated unemployment data from the Ministry of Labour *Gazette*, 1923–1936.

ment, these figures suggest that we cannot simply conclude that unemployment was driven by the staple industries.

2.4 Regional effects

Unemployment in interwar Britain had a distinct regional pattern, with concentrations of high unemployment in the North of England and throughout Wales and Scotland, and lower unemployment than average in the Midlands and in the South. These patterns are evident in the data on aggregate regional unemployment rates presented in Table 2.4.

What explains these large differences in regional unemployment rates during the interwar period? One leading hypothesis is that regional unemployment differentials primarily reflected the different mix of industries in the region. If a region's workforce was concentrated in a declining industry, such as coal mining in Wales, that region would have a larger unemployment rate than one with more industrial diversity or with leading industries that were expanding. In this section, the rich industry-level unemployment data from the Ministry of Labour *Gazette* is used to explore the extent to which these regional differences in unemployment rates were due to industrial mix.

Table 2.4: Regional unemployment rates in Britain, 1923–1936

Year	London	South East	South West	Midlands	North East	North West	Scotland	Wales	N. Ireland
1923	10.1	9.2	10.6	10.7	12.2	14.5	14.3	6.4	18.2
1924	9.0	7.5	9.1	9.0	10.9	12.9	12.4	8.6	16.6
1925	7.8	5.9	8.5	9.1	15.0	11.4	15.2	16.5	23.9
1926	6.9	5.4	8.4	11.0	17.2	14.7	16.4	18.0	23.2
1927	5.8	5.0	7.2	8.4	13.7	10.7	10.6	19.5	13.2
1928	5.6	5.4	8.1	9.9	15.1	12.4	11.7	23.0	17.0
1929	5.6	5.6	8.1	9.3	13.7	13.3	12.1	19.3	14.8
1930	8.1	8.0	10.4	14.7	20.2	23.8	18.5	25.9	23.8
1931	12.2	12.0	14.5	20.3	27.4	28.2	26.6	32.4	27.8
1932	13.5	14.3	17.1	20.1	28.5	25.8	27.7	36.5	27.2
1933	11.8	11.5	15.7	17.4	26.0	23.5	26.1	34.6	26.5
1934	9.2	8.7	13.1	2.9	22.1	20.8	23.1	32.3	23.4
1935	8.5	8.1	11.6	11.2	20.7	19.7	21.3	31.2	24.8
1936	7.2	7.3	9.4	9.2	16.8	17.1	18.7	29.4	22.7

Source: *Twenty-Second Abstract Of Labour Statistics* (1937, p. 59)

2.4.1 Data

There is no comprehensive data on unemployment by industry and region on an annual or monthly level for interwar Britain. To bring in data on the industrial composition of regions, I digitized Table C of the 1931 *Census of England and Wales* Industry Report.[21] This table gives the number of workers, including the employed and the unemployed, in fifty industries across twelve regions in 1921 and 1931.[22]

Table 2.5 demonstrates the varied industrial composition of regions in England and Wales using this newly-digitized *Census* data. The proportion of a region's workforce in an industry is compared to the overall proportion of workers in the industry in England and Wales. The three industries listed for each region are those that had the greatest difference between the national and regional proportion of workers in the industry in 1931. These industries thus made up a disproportionate share of the region's labor force.

Table 2.5 indicates that in Greater London, the South East, and the South West, a disproportionate share of the regional workforce was associated with commerce, retail, and service industries. The Midlands regions were dominated by manufacturing industries such as motor vehicle construction, mixed fiber textile manufacturing, and artificial silk. Regions in the North of England and in Wales had a disproportionate share of mining and traditional textile industries such as cotton and wool. These differences in the industrial composition of regions in 1931 demonstrate the importance of analyzing the role of industrial mix in regional unemployment

21. This source does not provide data on the industrial composition of Scotland and Northern Ireland, which are omitted from the analysis in this section.

22. The counties located in each region are provided in Appendix A.1.

Table 2.5: Industries with a disproportionate share of regional labor force in 1931

Region	Industries
Greater London	Commerce and Finance; Distributive Trades; Paper Making, Stationery, Printing, Bookbinding
South East	Personal Service (including Hotels and Catering), Defense and Central Government, Agriculture
South West	Agriculture; Personal Service (including Hotels and Catering); Defense and Central Government
Midlands 1	Other Metal Industries; Construction and Repair of Vehicles; Bricks, Pottery, Glass, etc.
Midlands 2	Mixed Fibers; Manufacture of Clothing (not Knitted); Silk, Natural and Artificial
East	Agriculture; Fishing; Food
North 1	Coal Mining; Ship Building and Repairing, Marine Engineering; Chemicals and Explosives
North 2	Agriculture; Iron and Steel; Water, Air, Transport and Communication
North 3	Wool, Worsted, and Shoddy; Coal Mining; Iron and Steel
North 4	Cotton; Textile Dyeing, Printing, Finishing; Water, Air, Transport and Communication
Wales 1	Coal Mining; Founding, Secondary Processes in Metal Working; Iron and Steel
Wales 2	Agriculture; Other Mining and Quarrying; Personal Service (including Hotels and Catering)

Analysis using regional industrial labor force data from Table C of the 1931 *Census of England and Wales* Industry Report. Industries listed for each region are the three with the greatest difference between the proportion of workers in the region in that industry and the proportion of workers in all of England and Wales in that industry.

rates.

2.4.2 Industrial specialization

The *Census* data on the industrial composition of regions can also be used to measure the industrial diversification or specialization of each region. To capture the industrial specialization of each region, a modified Herfindahl-Hirschman index based on industry employment shares can be calculated for each region.

Typically, the Herfindahl-Hirschman index is constructed by summing the squared market share of firms in an industry. A larger result indicates that an industry is more concentrated and less competitive. I modify this index to get a measure of the industrial specialization of a region by summing the squared industry shares of total employment in a region.

Letting H_r indicate the Herfindahl-Hirschman index for each region r, and N the total number of industries i, the Herfindahl-Hirschman index is defined as

$$H_r = \sum_{i=1}^{N} s_{r,i}^2 \tag{2.1}$$

where $s_{r,i}$ is the share of total employment in region r associated with industry i, i.e.,

$$s_{r,i} = \frac{e_{r,i}}{\sum_{i=1}^{N} e_{r,i}}$$

with $e_{r,i}$ the number employed in industry i in region r.

H_r thus takes on values between 0 and 1. A higher value of H_r indicates that a region's employment was concentrated in fewer industries, so the region was highly specialized. A lower value of H_r indicates that the region's employment was spread among many industries and thus had more industrial diversity.

This modified Herfindahl-Hirschman index, H_r, can be computed for all regions in 1921 and 1931 using the data on industrial composition from the *Census*. The results are given for all twelve regions in Table 2.6. In both 1921 and 1931, Midlands 1 — the west Midlands, including Birmingham — had the most diversified economy. Wales 1, the south of Wales, was the most specialized region. For all regions, the Herfindahl-Hirschman values were generally similar between 1921 and 1931, but the majority of regions show a slight increase in diversification from 1921 to 1931.

Table 2.6: Herfindahl-Hirschman index of regional specialization, 1921 and 1931

	1921	1931
Greater London	0.070	0.076
South East	0.104	0.091
South West	0.099	0.090
Midlands 1	0.049	0.052
Midlands 2	0.068	0.063
East	0.120	0.102
North 1	0.100	0.101
North 2	0.071	0.069
North 3	0.064	0.063
North 4	0.075	0.069
Wales 1	0.124	0.126
Wales 2	0.115	0.097

Analysis using Table C of the 1931 *Census of England and Wales* Industry Report. The Herfindahl-Hirschman index of specialization is calculated as the sum of the squared industry shares of total employment in the region following Equation 2.1.

2.4.3 Decomposition into industry mix and regional effects

The close link between industries and regions in the interwar period complicates our understanding of regional unemployment because regional unemployment rates could simply reflect the different experiences of industries located in those regions. Were these differences in regional unemployment rates because of the differing industrial composition of regions? The industry unemployment rates from the *Labour Gazette* can be used to analyze the role of industry mix

effects in regional unemployment rates.

First, I map the industries in the *Labour Gazette* to the fifty industries in the *Census of England and Wales*.[23] The industry-level unemployment rates from the *Labour Gazette* can then be used to calculate a synthetic unemployment rate for each region in every year from 1923 to 1936.[24] For each *Census* region, I assume that the distribution of workers across industries was constant throughout the interwar period at the 1931 level while allowing the industry-level unemployment rate to vary annually for fifty industries.[25] Based on the proportion of workers in each industry in a region, I compute what the unemployment rate would be if it only reflected the industrial composition of the region.

Letting $U^S_{r,t}$ represent the synthetic unemployment rate in region r in year t based on industrial mix, and N the total number of industries i, $U^S_{r,t}$ is defined as

$$U^S_{r,t} = \frac{\sum_{i=1}^{N} u_{i,t} \cdot w_{r,i}}{\sum_{i=1}^{N} w_{r,i}} \tag{2.2}$$

where $w_{r,i}$ is the number workers associated with industry i in region r in 1931 and $u_{i,t}$ is the national unemployment rate for industry i in year t. $w_{r,i}$ thus comes from the *Census of England and Wales* (1931) and $u_{i,t}$ from the *Labour Gazette* industry unemployment rates. The regional synthetic unemployment rates $U^S_{r,t}$ vary annually based on the industry unemployment rates $u_{i,t}$ while the industrial composition of regions that gives $w_{r,i}$ is assumed to be constant.

Comparing this synthetic unemployment rate with the actual unemployment rates from the *Twenty-Second Abstract of Labour Statistics* (reported in Table 2.4) gives an estimate of the size and direction of regional unemployment effects beyond the direct effect of the composition of industries in a region.

The actual regional unemployment rate and the synthetic unemployment rate based on each region's industrial mix are plotted in Figure 2.6. While the actual unemployment rates and the synthetic unemployment rates based on industrial mix follow similar trends, in all regions there are sizable differences between the two series.

In the South East, London, and South West, regional unemployment rates were not only lower than the national average, but they were lower than would be expected based on the

23. The complete crosswalk between industries is give in Table A.4 in Appendix A.1.

24. *Census* regions are compiled into six larger regions to match with the *Abstract of Labour Statistics*.

25. This assumption is because of the limited availability of *Census* data, but it is in line with other uses of *Census* statistics for the interwar period and is a frequent assumption in the regional economics literature. For example, this is how Feinstein (1972) uses *Census* data. See Gardiner et al. (2013, p. 904) for a discussion of this assumption in the regional economics literature.

industrial mix of these regions. This indicates that a regional effect above and beyond the direct effect of industrial mix served to lower unemployment rates in these regions. In contrast, the actual unemployment rates in the North and Wales were much higher than expected based on the composition of industries in these regions. This suggests that regional effects exacerbated unemployment in these areas, in addition to the direct effect of declining industries located in these regions.

The synthetic unemployment rates indicate what each region's unemployment rate would be in the absence of any factors other than industrial mix. The residual regional effect that is not captured by this synthetic unemployment rate could reflect any of these other factors including differences in the industry unemployment rate across regions; agglomeration or spillover effects associated with the industries in the region; natural geographic factors of the region such as mineral deposits, coastline, or soil quality; other location factors such as infrastructure or transport links; or differences in institutions or political economic structure across regions. This regional effect may also capture an urban effect, as not all regions in interwar Britain included a major urban area.

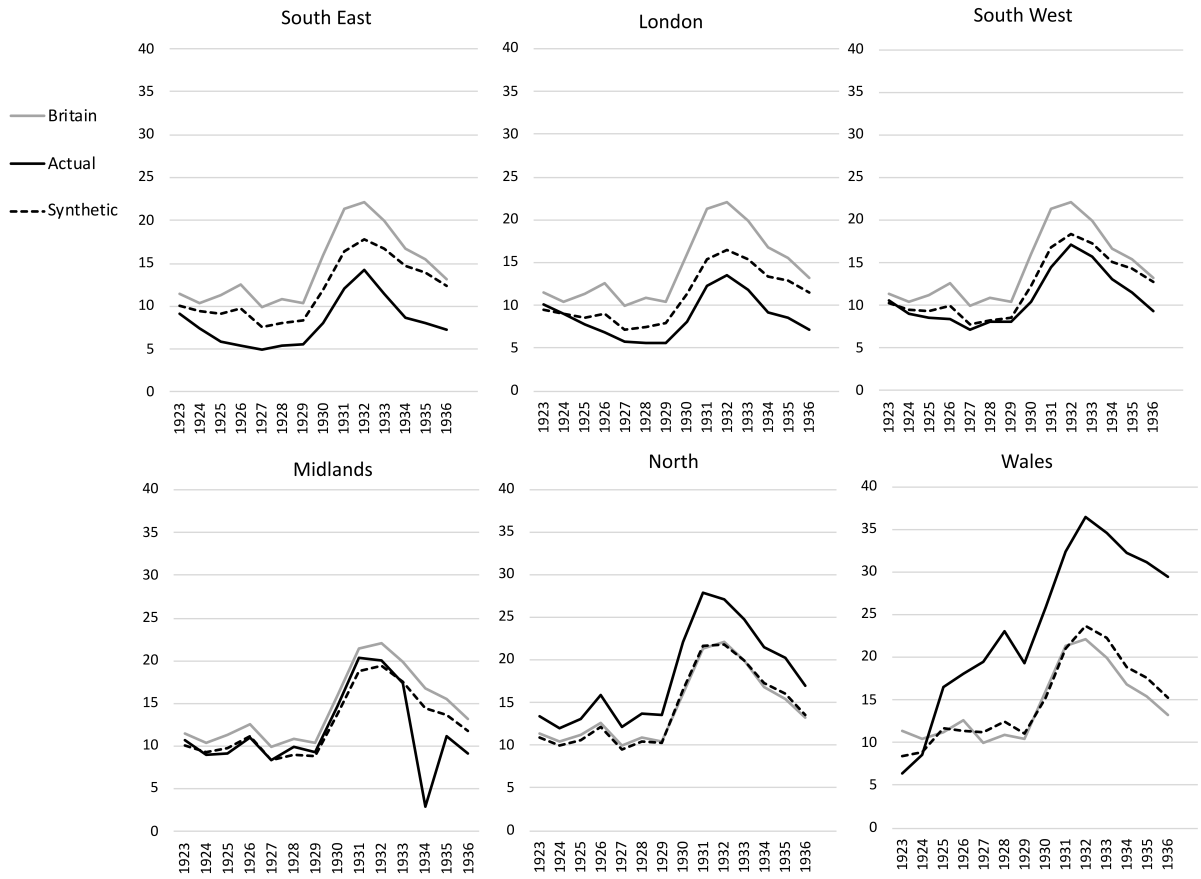
To better understand the magnitudes of these residual regional effects, I calculate the percent of the regional unemployment rate that can be attributed to a regional effect other than industrial mix. Letting $U^A_{r,t}$ be the actual unemployment rate for region r in year t, the percent of the regional unemployment rate that can be attributed to a regional effect in year t is

$$\frac{|U^A_{r,t} - U^S_{r,t}|}{U^A_{r,t}} \cdot 100.$$

The average of this percentage over the 1923–1936 period is given in the first column of Table 2.7, with the direction of the effect on the unemployment rate in the second column. 21% of the regional unemployment in the North and 37% of the regional unemployment in Wales can be attributed to a regional unemployment effect above and beyond the direct effect of declining industries in the region. An even larger percentage of the regional unemployment rate in the South East can be attributed to a regional effect beyond industrial mix, but, in that case, the regional effect served to lower the unemployment rate rather than increase it. Across all regions, between 13% and 49% of the regional unemployment rate cannot be accounted for by the composition of industries in the region.[26]

26. For 1929, 1932, and 1936, Hatton (1986) finds that more than half of the unemployment differential between "Inner" and "Outer" Britain was due to regional effects. The estimates in the present chapter, calculated annually for six regions, suggests this was not representative of the whole period. While the estimates for the North-South

Figure 2.6: Regional unemployment rates and synthetic unemployment rates based on industrial mix, 1923–1936



Y-axis is unemployment rate (%). The synthetic unemployment rate based on industry mix is derived from the *Labour Gazette* and *Census* data following Equation 2.2, the British average rate is computed from the *Labour Gazette* data, and the actual regional unemployment rates are taken from the *Twenty-Second Abstract Of Labour Statistics* (1937, p. 59).

Table 2.7: Magnitude and direction of regional effects on interwar unemployment rates

	Avg. percent of unemployment rate due to regional effect	Direction of regional effect on unemployment rate
Midlands	36%	+/−
North	21%	+
Wales	37%	+
South East	49%	−
London	30%	−
South West	13%	−

The percent of the unemployment rate due to regional effects is the absolute value of the difference between the actual unemployment rate for the region and the synthetic unemployment rate based on the region's industrial mix, divided by the actual unemployment rate for the region. The average percent of the unemployment rate due to regional effects is the average over the 1923–1936 period. The industry mix unemployment rate projection is derived from the *Labour Gazette* and *Census* data, the British average rate is computed from the *Labour Gazette* data, and the actual regional unemployment rates are taken from the *Twenty-Second Abstract Of Labour Statistics* (1937, p. 59).

Finally, the synthetic regional unemployment rate based on a region's industrial mix can also be used to decompose the "North-South" gap in unemployment rates into industrial mix and regional effects. The results are given in Figure 2.7. The black line shows the actual difference in unemployment rates between the North of England (and Wales) and the South of England, where the North includes the North and Wales regions, and the South includes the London, South East, South West, and Midlands regions. The gap between the North and South of Britain increases through 1934 to over 15 percentage points, with an especially striking jump during the Great Depression. It recovers somewhat from 1934 to 1936 with recovery and rearmament.

The dark area at the bottom of the graph shows the projected gap given the differing industrial mix of the North and South, with the residual lighter area under the line representing other regional effects. Differences in the industrial composition of the North of England and Wales and the South of England would have led to a gap in their unemployment rates of just under 5 percentage points at its maximum. Regional effects above and beyond industrial composition thus account for a large portion of the gap in unemployment rates — on average, 71% of the North-South gap is because of regional effects above and beyond industrial mix. The influence of regional effects is thus much greater when regions are grouped into the North and the South than considered individually, as in Table 2.7, and is largest during the Great Depression.

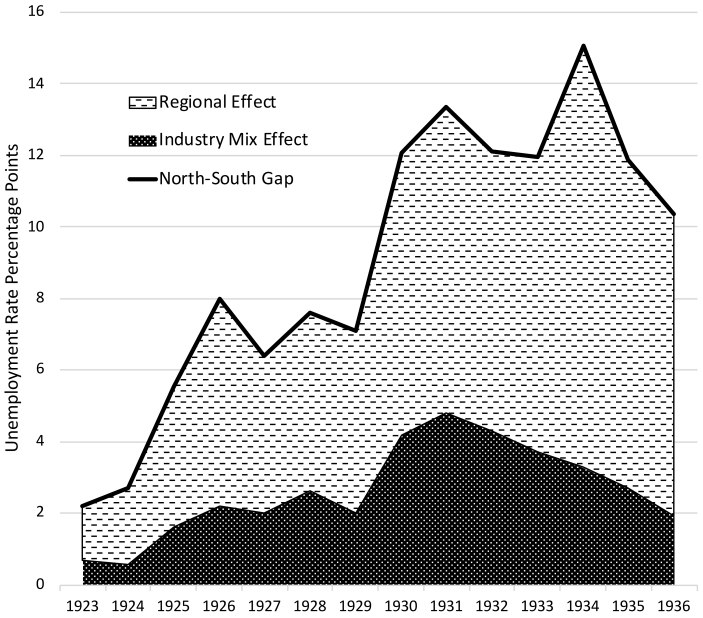
Taken together, Figure 2.6, Table 2.7, and Figure 2.7 suggest that a significant portion of regional unemployment rate differences were because of regional effects above and beyond the direct effects of differences in the industrial composition of regions. Regional effects above and beyond industrial mix increased unemployment in the North and in Wales by 20-30% and decreased unemployment in the other regions of Britain by 12% in the smallest case (South West) and by 49% in the largest case (South East). The striking increase in the gap in unemployment rates between the North and the South of Britain over the interwar years was primarily due to regional effects going beyond industrial composition. However, industrial mix effects did still play a role in regional unemployment differentials in the interwar period.

2.5 The reallocation of labor across industries

These descriptive statistics highlight the growing divide between industries and between regions during the interwar period. This divergence suggests that a significant amount of labor reallo-

gap during the early 1930s are in line with the findings in Hatton (1986), the estimates in Table 2.7 for six regions during the whole interwar period are lower.

Figure 2.7: North-South unemployment rate gap decomposed into industry mix and regional effects, 1923–1936



Industry mix unemployment rate calculated from employment and unemployment data from the Ministry of Labour *Gazette* and from the 1931 *Census of England and Wales* data. The North-South gap is calculated using actual regional unemployment rates from the *Twenty-Second Abstract Of Labour Statistics* (1937, p. 59). The residual is the regional effect.

cation across industries was needed for market forces to restore full employment.

How much reallocation of labor across industries occurred before and during the Great Depression? From which industries were unemployed workers able to find other employment opportunities? These questions motivate the two stages of the empirical analysis in this chapter. In the first section of the analysis, adjustment coefficients are estimated by industry, gender, region, and over time. For expanding industries, these adjustment coefficients represent whether new hires were drawn from an industry's unemployed pool of labor. For contracting industries, the adjustment coefficients represent whether laid-off workers joined the unemployed pool of labor in an industry or were hired in a different industry. The second section of the analysis uses a Markov framework to estimate the probability of transitioning between employment or unemployment in six broad industry categories. This offers some insight into which industries workers might have been transitioning to or from when labor reallocation across industries did occur, and more directly links slow or limited adjustment to persistent unemployment.

2.5.1 Empirical strategy

The *Labour Gazette* associated unemployed workers with industries, offering a unique view into the total labor force, employed and unemployed, of industries during the interwar period.[27] Every worker in an insured industry was issued an Unemployment Book in July of each year, where the employee and the employer's contributions to the tripartite unemployment program were recorded. When a worker became unemployed, they lodged their Unemployment Book at a local employment exchange, where it remained until they found new employment and provided the book to their new employer. The number of books lodged for each industry was counted monthly, establishing the number of unemployed workers each month in every insured industry.

The relative changes in the numbers employed (insured less unemployed) and unemployed can offer some insight into the dynamics of entry into and out of employment and unemployment in industries. If employment was declining in an industry, a large increase in unemployment in that industry suggests that many laid-off workers could not find jobs in other industries. If employment was increasing in an industry, a large decrease in unemployment in that industry suggests that hired workers came from the unemployed pool of that industry rather than from other industries.

These intuitions can be formalized by decomposing employment changes in an industry into the part represented by a change in unemployment in the industry, the part represented by net movement from other industries, and the part represented by net flows of labor force participation. An adjustment coefficient for each industry can be estimated, representing the extent to which employment increases drew workers from other industries and to which employment decreases led workers to find jobs in other industries. Though intuitive, the development and estimation of these adjustment coefficients is original to this analysis, taking advantage of the fact that the *Labour Gazette* associates unemployed workers with the last industry in which they were employed.

The change in employment in an industry i from time $t-1$ to t can be represented

$$\Delta E_i = -\Delta U_i + \sum_{\substack{1 \leq j \leq 100 \\ j \neq i}} M_{i,j} + F_i \tag{2.3}$$

27. The number insured is only a proxy for the full population working or looking for work in an industry, as unemployed workers could search for jobs in other industries. However, as soon as they found work in another industry, their association would be switched to the new industry.

where ΔE_i is the change in employment in industry i from $t-1$ to t and ΔU_i is the change in unemployment in industry i from $t-1$ to t. $M_{i,j}$ represents the net movement of workers between industry i and j between $t-1$ and t, with $M_{i,j}$ positive if there is a positive net movement from j into i. F_i represents the net flow between industry i and outside of the labor market, with F_i positive if there is a positive net flow into industry i from outside the labor market. If ΔE_i is positive, i.e. employment is expanding, then we would expect unemployment in the industry to decrease, positive flows from other industries, and possibly new workers being drawn into the industry from outside the labor force through positive flows in F_i. If ΔE_i is negative, we would expect unemployment to increase, labor flows from i to other industries, and flows from i out of the labor force.[28]

Dividing through Equation (2.3) through by ΔE_i gives the shares

$$1 = \frac{-\Delta U_i}{\Delta E_i} + \frac{\sum_{\substack{1 \le j \le 100 \\ j \neq i}} M_{i,j} + F_i}{\Delta E_i} = -\beta + \delta, \tag{2.4}$$

where

$$\delta = \frac{\sum_{\substack{1 \le j \le 100 \\ j \neq i}} M_{i,j} + F_i}{\Delta E_i}$$

and the adjustment coefficient β is defined

$$\beta = \frac{-\Delta U_i}{\Delta E_i}.$$

The adjustment coefficient represents the extent to which the change in unemployment was proportional to the change in employment, thereby estimating the amount of adjustment across industries or from outside of the labor force. $-\beta$ gives the share of the change of employment that was reflected in a change in unemployment. $1+\beta$ gives the share of the change of employment that came from flows of workers from other industries or from outside of the labor force.

For an expanding industry, an estimate near 0 indicates that only a small proportion of the increase in employment came from a decrease in unemployment in the industry, and $1+\beta$ gives the proportion who entered the industry from other industries or from outside the labor force. An estimate of β near -1 indicates that the expanding industry drew on workers from its own unemployment pool. For a contracting industry, an estimate near -1 indicates that most of the laid-off workers became unemployed in that industry, with little flow of workers to other

28. In the context of the generous and largely non-contributory unemployment benefit system, there was little incentive for unemployed workers to leave the active labor force.

industries. An estimate near 0 indicates that a large proportion of the decrease in employment was movement of workers to other industries or outside the labor force.

β can be estimated using a least squares regression for groups of industries and over time periods:

$$y_{it} = \alpha + \beta_1 x_{it} \cdot p_1 + \beta_2 x_{it} \cdot p_2 + \beta_3 x_{it} \cdot p_3 + \boldsymbol{\gamma}' \mathbf{T}_t + \epsilon \tag{2.5}$$

where y_{it} is the change in unemployment in industry i from period $t-1$ to t and x_{it} is the change in employment in industry i from period $t-1$ to t. p_1 indicates the first time period, 1925–1929; p_2 indicates the second time period, 1930–1933; and p_3 indicates the third time period, 1934–1936. The regression is a partial interaction between x_{it} and p, with no main effect for x_{it} but main effects for the time periods captured by the T_t year dummies. β_1 thus represents the adjustment coefficient for the period 1925–1929, β_2 represents the adjustment coefficient for the period 1930–1933, and β_3 represents the adjustment coefficient for the period 1934–1936.

Equation (2.5) is estimated on annual data with industry fixed effects for different subsamples of the data: for six industry categories including metal manufacturing, textile manufacturing, other manufacturing, mining, service, and building; and for expanding and contracting industries.[29] All estimates are given for the overall labor force as well as for men only and for women only.

Then, an additional analysis is conducted where the window of adjustment is expanded by one, two, or three years. In these models, the time period interaction is removed to allow for ease of analysis. The resulting model is,

$$y_{it} = \alpha + \beta x_{it} + \boldsymbol{\gamma}' \mathbf{T}_t + \epsilon, \tag{2.6}$$

again estimated for different industry groupings and for men and women separately.

Finally, to estimate differences in the level of labor market adjustment across regions, adjustment coefficients are estimated for all 100 industries for 1925–1936 according to Equation (2.6) and for the three time periods according to Equation (2.5). Then, the average adjustment coefficient for each region in England and Wales is computed using the distribution of workers across industries in each region from the 1931 *Census*. The adjustment coefficients for indus-

29. All 100 industries are associated with one of these industry categories. The industries included in each category are listed in Appendix A.1 Table A.1.

tries are weighted by their employment share for each region to generate a regional adjustment coefficient.

The adjustment coefficients thus make it possible to estimate the amount of labor reallocation across industries that occurred in interwar Britain. However, it is important to keep in mind two limitations of this empirical approach. The first limitation is that these coefficients are estimated on the industry level owing to the availability of employment and unemployment data for interwar Britain. While we can estimate the amount of labor market adjustment that occurred across industries, this empirical strategy cannot shed light on the specific rigidities that affected industrial reallocation, including geographic factors, industrial organization, and the role of industry-specific human capital. A second limitation is that we remain unable to distinguish flows across industries from flows into and out of the labor force. Though there was little incentive for insured workers to leave the labor force, expanding industries often relied on drawing new workers into the labor force. New entrants to the labor force are accounted for in the analysis, but it is impossible to tell from the adjustment coefficient their importance relative to flows across industries.

2.5.2 Results

Table 2.8 presents the adjustment coefficients for all industries and by broad industry category for three time periods: 1925–1929, 1930–1933, and 1934–1936. These correspond to the period after the return to the gold standard and up to the Great Depression, a period during the global Great Depression, and finally the period of recovery and rearmament. Model (1) includes all 100 industries. Models (2)–(7) only include industries in the listed industry category. For example, the regression for textile manufacturing industries in (3) includes only the carpet manufacturing, cotton, hemp, hosiery, jute, lace, linen, silk, woolen and worsted, and textile bleaching and dyeing industries. All 100 industries are allocated to the six industry categories according to Appendix A.1 Table A.1, and the proportion of insured, employed, and unemployed men and women in each of the industry groups is given in Appendix A.1 Table A.2. Every model includes year and industry fixed effects. These results are robust to the full interaction model specification, given in Appendix A.2 Table A.6.

The coefficients represent the amount of adjustment across industries, giving a sense of the flexibility and responsiveness of the labor market. A coefficient near -1 signifies little to no adjustment across industries. In this case, changes in the number of unemployed in an industry

were inversely proportionate to changes in that industry's employment. For an expanding industry, the entire increase in employment is thus reflected in a decrease in unemployment in that industry, suggesting workers had been hired from the unemployment pool of the industry rather than from other industries. For a contracting industry, a coefficient of −1 signifies that unemployment increased proportionate to the decrease in employment, suggesting that few laid-off workers moved to other industries.

In contrast, a coefficient near 0 signifies substantial adjustment across industries, with 0 indicating perfect labor market flexibility. For expanding industries, a coefficient near 0 signifies that they increased their employment levels by drawing new workers into the industry rather than tapping into their existing unemployment pool. For contracting industries, this indicates that workers who were laid off were able to secure jobs in other industries rather than remaining unemployed in that industry.

Table 2.8: Adjustment coefficients for all industries and by industry category

	(1) Overall	(2) Metals	(3) Textiles	(4) Other Manu.	(5) Mining	(6) Service	(7) Building
1925-1929 × Δ Employed	-0.80***	-0.94***	-1.01***	-0.66***	-0.90***	-0.11*	-0.50**
	(0.02)	(0.04)	(0.03)	(0.03)	(0.02)	(0.04)	(0.15)
1930-1933 × Δ Employed	-0.90***	-0.97***	-1.14***	-0.62***	-1.18***	0.26**	-0.53***
	(0.02)	(0.04)	(0.03)	(0.05)	(0.04)	(0.09)	(0.07)
1934-1936 × Δ Employed	-0.71***	-0.49***	-0.80***	-0.44***	-1.51***	-0.54***	-0.36*
	(0.04)	(0.06)	(0.11)	(0.04)	(0.19)	(0.11)	(0.14)
Constant	3407.65***	544.78	2406.97	1183.39***	-366.65	2576.82	5839.13
	(656.37)	(887.08)	(1396.19)	(306.14)	(1460.07)	(1836.96)	(5577.28)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num. of observations	1200	228	132	504	120	180	36
R2	0.798	0.904	0.968	0.727	0.976	0.520	0.933

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936, for both men and women.

Model (1), using all 100 industries, suggests that during the Great Depression, there was somewhat less adjustment across industries overall than in the period before or after. The adjustment coefficient decreases from −0.80 in the late 1920s to −0.90 during the Great Depression, and then rises again to −0.71 from 1934–1936. These estimates suggest that if an industry laid off 100 workers in a given year during the Great Depression, 90 of those workers would remain unemployed in that industry and 10 would find jobs in other industries. In the late 1920s, only

80 workers would remain unemployed in that industry, and during the recovery years 1934–1936, only 71 workers would remain unemployed.

These overall trends mask heterogeneity across industry categories. The industry categories with the most adjustment were service in model (6), building in model (7), and other manufacturing in model (4). In all three periods, their adjustment coefficients were much larger than those in the worst performing industry categories including textile manufacturing (3) and mining (5). For example, looking at the late 1920s period, textile manufacturing had an adjustment coefficient of -1.01, signifying almost no adjustment across industries, whereas service had an adjustment coefficient almost ten times higher, at -0.11.

The trend across time also varies by industry category. The adjustment coefficients for mining and textiles became more negative over the Great Depression years, a 0.28 decrease for mining and 0.13 decrease for textiles. Both metal manufacturing and building had only a small decrease of 0.03. In contrast, the adjustment coefficients for the other manufacturing industries and for service industries became more positive, with an increase in other manufacturing of 0.04, and in services of 0.37. The adjustment coefficient for the service industries during the Great Depression is remarkable for being greater than 0. While a coefficient near 0 indicates significant adjustment across industries, a coefficient much greater than 0 suggests some amount of over-adjustment. For contracting service industries, this positive adjustment coefficient suggests that as employment decreased, unemployment also decreased. Not only were laid-off workers not added to the unemployment pool for their industry, but previously unemployed workers were able to find employment in other industries. For the expanding industries in service, this implies that as employment increased, unemployment also increased. This could suggest new workers being drawn into the labor force as unemployed service workers.

During the recovery years, the adjustment coefficients recover for all of the manufacturing industry categories and for building. In fact, for all of these industry categories, there was more adjustment in the mid-1930s than there was in the late 1920s, especially in metal manufacturing and in building. However, it is remarkable that the adjustment coefficient for mining continues declining precipitously even during the recovery years. The adjustment coefficient for the service industries also declines, possibly a correction to the overadjustment of the Great Depression years.

Table 2.9 suggests that there was less adjustment for women than for men on the whole during the late 1920s and during the Great Depression. The top panel presents the adjustment

coefficients overall and by industry category using only men's employment and unemployment in each industry. The bottom panel uses only women's employment and unemployment. Surprisingly, for men across all industries in model (1), adjustment only slightly decreased during the Great Depression, from −0.82 in the late 1920s to −0.84. In contrast, for women in model (8), adjustment declined significantly during the Great Depression, from −0.88 to −1.12. This was driven by the exceptionally poor performance of the textile industries for women (10), whose adjustment coefficient declined five times more than the coefficient for men in those industries (3).

Table 2.9: Adjustment coefficients by gender for all industries and by industry category

Men	(1) Overall	(2) Metals	(3) Textiles	(4) Other Manu.	(5) Mining	(6) Service	(7) Building
1925-1929 × Δ Employed	-0.82***	-0.97***	-0.96***	-0.48***	-0.90***	-0.20***	-0.50**
	(0.02)	(0.03)	(0.04)	(0.04)	(0.02)	(0.05)	(0.15)
1930-1933 × Δ Employed	-0.84***	-1.00***	-1.00***	-0.66***	-1.18***	0.13	-0.53***
	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.09)	(0.08)
1934-1936 × Δ Employed	-0.68***	-0.51***	-0.75***	-0.42***	-1.51***	-0.64***	-0.35*
	(0.04)	(0.06)	(0.14)	(0.03)	(0.19)	(0.11)	(0.14)
Constant	2176.41***	-323.31	982.68	393.96	-406.27	2916.55*	5871.28
	(517.75)	(792.56)	(644.59)	(227.20)	(1447.41)	(1412.56)	(5613.99)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.814	0.917	0.937	0.698	0.977	0.547	0.932
Women	(8) Overall	(9) Metals	(10) Textiles	(11) Other Manu.	(12) Mining	(13) Service	(14) Building
1925-1929 × Δ Employed	-0.88***	-0.24**	-1.02***	-0.80***	0.02	0.04	-0.03
	(0.02)	(0.08)	(0.03)	(0.03)	(0.09)	(0.06)	(0.07)
1930-1933 × Δ Employed	-1.12***	-0.84***	-1.22***	-0.51***	-0.19	0.47***	-0.02
	(0.02)	(0.07)	(0.03)	(0.05)	(0.18)	(0.10)	(0.14)
1934-1936 × Δ Employed	-0.57***	-0.22**	-0.76***	-0.25***	-0.16	0.08	0.00
	(0.05)	(0.07)	(0.11)	(0.06)	(0.21)	(0.12)	(0.11)
Constant	1310.50***	185.78	1403.77	717.18***	36.82	-99.52	34.62
	(242.53)	(201.07)	(872.68)	(145.45)	(38.72)	(755.06)	(48.66)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.825	0.603	0.973	0.690	0.185	0.301	0.616
Num. of observations	1200	228	132	504	120	180	36

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. The top panel uses counts of employed and unemployed for men only, and the bottom panel uses counts of employed and unemployed for men only. Standard errors given in parentheses. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Another departure between men and women is in other manufacturing industries. In the late 1920s, the adjustment coefficient for women in these industries (11) was lower than for men (4).

However, during the Great Depression, adjustment decreased for men and increased for women. The adjustment coefficient continued increasing for women to a remarkable level of −0.25 during the 1934–1936 period.

Both men and women had increased adjustment in the service industries during the Great Depression, though adjustment coefficients were generally higher for women in these industries than for men.

The adjustment coefficient has a slightly different interpretation for expanding and contracting industries, representing whether workers were drawn into the industry or whether workers were able to exit the industry. Table 2.10 groups industries by whether they were expanding in employment or contracting, with models (1)–(2) representing overall employment and models (3)–(6) disaggregating by gender.[30]

In general, expanding industries had much higher adjustment coefficients than contracting industries. When both men and women are taken together, the adjustment coefficients for contracting industries (1) range from −1.06 to −0.44, whereas the adjustment coefficients for expanding industries (2) range from −0.45 to −0.24. This suggests that workers in contracting industries faced not only decreasing employment but also more rigidities in their adjustment to these employment changes. Entry into an expanding industry's pool of potential labor was thus easier than exiting from a contracting industry's labor force.

The Great Depression served to widen the gap between expanding and contracting industries, decreasing adjustment for contracting industries and increasing adjustment for expanding industries. During the Great Depression, the adjustment coefficient for contracting industries fell by 0.17, while it increased for expanding industries by 0.18. The difference in the adjustment coefficients between contracting and expanding industries in models (1) and (2) was thus largest during the Great Depression.

This widening gap is echoed in the data for men's employment and unemployment (3, 4), but not for women (5, 6). Contracting industries had extremely low levels of adjustment across industries for women in the late 1920s, and this did not change much during the Great Depression. Expanding industries had better adjustment during the early 1920s, but, contrary to the overall trend, the adjustment coefficient for expanding industries actually decreased for women during

30. In Table 2.10 Columns (3)-(6) whether industries were expanding or contracting is determined separately for men and women. The results when expanding and contracting industries are defined based on their overall employment performance are given in Appendix A.2 Table A.7. Adjustment coefficients for expanding and contracting industries within each of the six industry categories are given in Appendix A.2 Table A.8.

the Great Depression.

During the recovery, the overall estimates and the estimates for men suggest that adjustment coefficients were increasing for contracting industries and decreasing for expanding industries. Workers from contracting industries were thus better able to find jobs in other industries during the recovery, but expanding industries were relying more on their existing labor supply for their growing employment needs.

Table 2.10: Adjustment coefficients by gender for expanding or contracting industries

	Men and Women		Men Only		Women Only	
	Contracting (1)	Expanding (2)	Contracting (3)	Expanding (4)	Contracting (5)	Expanding (6)
1925-1929 × Δ Employed	-0.89***	-0.43***	-0.81***	-0.49***	-1.23***	-0.67***
	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)
1930-1933 × Δ Employed	-1.06***	-0.24***	-0.97***	-0.27***	-1.25***	-0.76***
	(0.02)	(0.05)	(0.02)	(0.05)	(0.02)	(0.06)
1934-1936 × Δ Employed	-0.44**	-0.45***	0.18	-0.42***	-0.78***	-0.63***
	(0.13)	(0.05)	(0.27)	(0.04)	(0.06)	(0.09)
Constant	-365.54	2244.58*	-442.21	1786.51*	-432.60*	1361.10***
	(658.33)	(872.86)	(524.22)	(720.83)	(216.57)	(307.83)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Num. of observations	483	717	505	695	490	710
R2	0.907	0.386	0.886	0.376	0.957	0.494

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Contracting industries are those that had a decrease of employment from $t-1$ to t, while expanding industries had an increase. For the gendered analysis, whether an industry is contracting or expanding is defined within the gender. Standard errors given in parentheses. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

The previous tables have looked at how employment changes relate to unemployment changes within the same year. Table 2.11 explores different adjustment windows, giving a sense of how the speed of adjustment varied by gender and by industry category.

Each entry in the table is the adjustment coefficient and standard error from a regression model where the dependent variable is the change in unemployment from $t-1$ to t, and the independent variable is the change in employment from $t-k$ to t, where $k \in [1, 4]$. The adjustment coefficients thus indicate how the changes in employment over the last $k-1$ years affect the change in unemployment in a year.[31]

The estimates for men and women in Table 2.11 indicate that the effects of employment

31. The speed of adjustment is estimated separately for the three time periods in Appendix A.2 Table A.9. The full regression results for each entry of Table 2.11 are given in Tables A.11 - A.18 in Appendix A.2.

shocks on the size of the unemployed pool are felt most strongly the same year and in the year afterward, with the size of the effect diminishing as the adjustment window widens. For women, the effects are sharper but less persistent than for men. By industry category, adjustment happened quickest in building and in metal manufacturing, while the effects of employment changes were most persistent for mining.

Table 2.11: Speed of adjustment by gender and industry category

Overall and by gender	(1) Contemporaneous $k = 1$	(2) One Year $k = 2$	(3) Two Years $k = 3$	(4) Three Years $k = 4$
Men and Women: Δ Employed, $t-k$ to t	-0.82***	-0.36***	-0.19***	-0.16***
	(0.01)	(0.02)	(0.02)	(0.02)
Men Only: Δ Employed, $t-k$ to t	-0.81***	-0.36***	-0.18***	-0.19***
	(0.01)	(0.02)	(0.02)	(0.02)
Women Only: Δ Employed, $t-k$ to t	-0.97***	-0.45***	-0.28***	-0.04
	(0.02)	(0.03)	(0.02)	(0.03)
By industry category				
Metals: Δ Employed, $t-k$ to t	-0.85***	-0.31***	-0.18***	-0.06
	(0.03)	(0.04)	(0.03)	(0.04)
Textiles: Δ Employed, $t-k$ to t	-1.07***	-0.52***	-0.37***	-0.15
	(0.02)	(0.09)	(0.07)	(0.11)
Other Manu.: Δ Employed, $t-k$ to t	-0.58***	-0.18***	-0.12***	-0.06**
	(0.02)	(0.03)	(0.02)	(0.02)
Mining: Δ Employed, $t-k$ to t	-0.96***	-0.46***	-0.20**	-0.35***
	(0.02)	(0.06)	(0.07)	(0.06)
Service: Δ Employed, $t-k$ to t	-0.10*	0.03	0.10	0.22***
	(0.05)	(0.07)	(0.06)	(0.06)
Building: Δ Employed, $t-k$ to t	-0.50***	-0.17*	-0.12	-0.08
	(0.06)	(0.08)	(0.07)	(0.07)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Contracting industries are those that had a decrease of employment from $t-1$ to t, while expanding industries had an increase. For the gendered analysis, whether an industry is contracting or expanding is defined within the gender. Standard errors given in parentheses. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Finally, adjustment coefficients can be estimated for all 100 industries individually for 1925–1936 and for the three time periods 1925–1929, 1930–1933, and 1934–1936 following Equation (2.6). Then, using the distribution of industries across twelve regions of England and Wales from the *Census of England and Wales* (1931), the average adjustment coefficient for each region can be calculated. The adjustment coefficients of all of the industries are weighted by the proportion of workers in that industry in each region in 1931.[32]

The results are given in Table 2.12. The South East and London regions had the highest

32. As a robustness check, the analysis is conducted with the proportion of workers in each region in 1921 as well. These results are presented in Appendix A.2 Table A.10.

Table 2.12: Estimated average adjustment coefficients by region

	Overall	By Time Period		
	1925-1936	1925-1929	1930-1933	1934-1936
South East	-0.29	-0.27	-0.08	-0.44
Greater London	-0.32	-0.29	-0.15	-0.44
South West	-0.32	-0.31	-0.12	-0.45
East	-0.34	-0.34	-0.14	-0.46
North 2	-0.39	-0.38	-0.24	-0.48
Wales 2	-0.40	-0.38	-0.22	-0.56
Midland 1	-0.47	-0.45	-0.41	-0.52
Midland 2	-0.49	-0.49	-0.43	-0.47
North 4	-0.52	-0.50	-0.43	-0.48
North 1	-0.54	-0.52	-0.47	-0.76
Wales 1	-0.56	-0.55	-0.53	-0.81
North 3	-0.59	-0.58	-0.52	-0.68

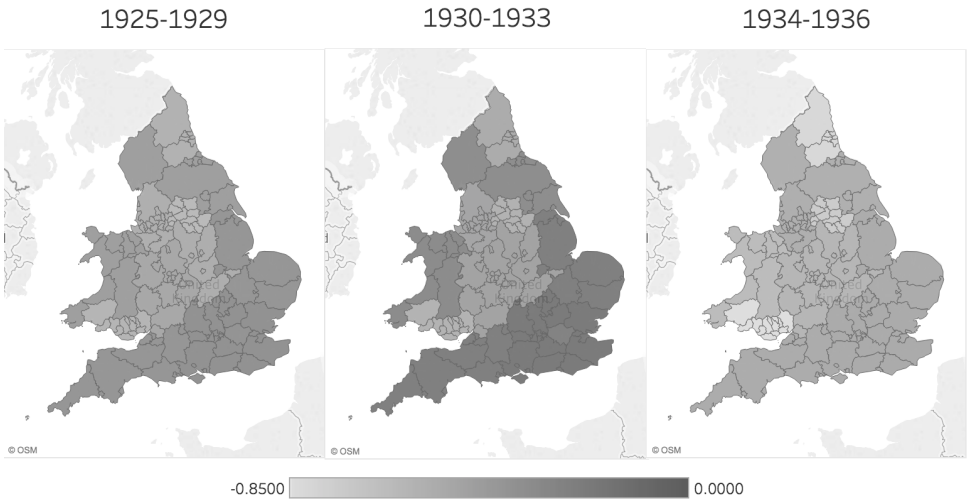
The entries are the average adjustment coefficient of industry-level estimates from the model described by Equation (2.6). For each region, the adjustment coefficient of every industry is averaged, weighted by the proportion of the labor force, employed and unemployed, in that industry according to the 1931 *Census of England and Wales* Industry Report Table C. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries.

estimated adjustment coefficients, while the North and Wales regions had the lowest adjustment coefficients. These estimates, based solely on the composition of industries in regions, likely underestimate the difference in adjustment between the South and North of England because of the size and direction of regional effects identified in subsection 2.4. Table 2.12 indicates that in all regions, estimated adjustment coefficients increased during the Great Depression, though this increase was most significant in regions that already had a high level of adjustment.

Figure 2.8 presents these adjustment coefficients over time in a heat map where a darker shade indicates a higher adjustment coefficient while a lighter shade indicates a lower adjustment coefficient. The South East and London regions had the highest estimated adjustment coefficients, with the South West and the East regions following close behind. In contrast, areas of the North and in Wales had the lowest adjustment coefficients, especially the south of Wales, Yorkshire, and Durham areas. During the Great Depression, adjustment coefficients increased dramatically for the South East, London, and the South West — the areas that already had higher levels of adjustment — widening the gap in adjustment coefficients between the North and the South of Britain.

The results of the adjustment coefficient analysis thus suggest that there was substantial heterogeneity in labor market adjustment by sector, by gender, and by region. Workers in services and other manufacturing had the most adjustment across industries, while those in textiles and

Figure 2.8: Heat map of regional adjustment coefficients over time



Regional adjustment coefficient estimates as given in Table 2.12. A darker shade indicates a higher adjustment coefficient, while a lighter shade indicates a lower adjustment coefficient.

mining had the least. When these results are disaggregated by gender, it is apparent that there was less adjustment on the whole for women than for men, but there were important variations in this pattern by industry. Adjustment coefficients were higher in industries that were expanding than in those that were contracting, and in the South East and London than in the North and Wales. The effect of the Great Depression was to widen the gap in adjustment between expanding and contracting industries and between the North and South of England. These results suggest that while some groups of workers faced significant labor market rigidities, other groups of workers benefited from flexible labor markets and relatively easy access to alternative labor market opportunities, with the business cycle amplifying these divides.

2.6 The persistence of unemployment

Using a Markov framework, this section connects these labor market rigidities to persistent unemployment while also offering some insight into which industries workers may have transitioned between when structural adjustments did occur.

2.6.1 Empirical strategy

There are no individual-level data available for the interwar period on the transitions of workers across industries or between employment and unemployment. Labor market analyses for this period have instead focused on what can be readily observed from the Ministry of Labour *Gazette*

data that is expanded for this thesis. However, even when individuals' labor market transitions are not observed, it is possible to estimate mobility across sectors and employment states by modeling these transitions as a Markov process.

There is a large literature on estimating Markov transition probabilities from aggregate macro-level data (Lee, Judge, and Zellner 1970; MacRae 1977; Van Der Plas 1983; Kalbfleisch and Lawless 1984). In this literature, transition probabilities are estimated from the counts or proportions of individuals or other micro components in aggregate states using some form of conditional least squares. Recent work on collective graphical models in machine learning, where individual observations are generated by a graph but only contingency tables are observed, is analogous to this problem (Bernstein and Sheldon 2016). The method described in MacRae (1977) has been used recently to estimate time-homogenous transition probabilities between credit classes of mortgages (Walshe 2016) and to estimate transition probabilities between credit ratings of commercial bank loans (M. T. Jones 2005).

A transition matrix based on a time-homogeneous discrete Markov chain can be used to describe labor market mobility across industries and between employment and unemployment. The Markov model has a number of states, S, representing employment status and industry pairs. At any point in time, all labor market participants can be classified into one of these employment-industry states, indicating their employment or unemployment in a specific industry. The transition matrix P describes the probability of remaining in the current state or transitioning to a different state in one time step. Each element of P, p_{ij}, gives the probability of transitioning from state i to j from $t-1$ to t. P is thus:

$$P[i,j] = \begin{bmatrix} p_{11} & p_{12} & \cdots . & p_{1S} \\ p_{21} & p_{22} & \cdots & p_{2S} \\ \vdots & \vdots & \ddots & \vdots \\ p_{S1} & p_{S2} & \cdots & p_{SS} \end{bmatrix}$$

There are two assumptions. First, the Markov process is assumed to be first-order stationary, so the individual probabilities p_{ij} do not change over time. Second, it is assumed that an individual's state at time t is exclusively affected by their state at time $t-1$. If x_t represents the state of an individual at time t, then this means $p_{ij} = Pr(x_t = j|x_{t-1} = i) = Pr(x_t = j|x_{t-1} = i, x_0, \ldots, x_{t-2})$.

With complete data on individual transitions, p_{ij} is simply the total number of people who

moved from state i to state j between time $t-1$ and time t, divided by the total number of people who were in state i at time $t-1$. Letting m_{ij} represent the number of people who moved from state i to j, then:

$$p_{ij} = \frac{m_{ij}}{\sum_{j=1}^{S} m_{ij}}$$

In the interwar case, we do not have data on individual industry or employment status transitions. Instead, we are restricted to aggregate data on the proportion of workers in each industry and employment status pair. Using the same framework as in the full information case, following MacRae (1977), the aggregate proportions data can be used to estimate p_{ij} for all j and i with some error. As Appendix A.3 describes, this amounts to setting up and solving a quadratic programming problem minimizing the sum of squared residuals subject to the constraints that each estimated $p_{ij} \in [0, 1]$ and that the rows of P sum to one.

I add two additional constraints to the quadratic programming problem that derive from the specific context of the interwar unemployment system. Recall that the numbers of unemployed in every industry were determined from a count of the number of insured workers who had lodged their Unemployment Books at local employment exchanges. The industry with which an unemployed worker was associated in the official employment figures was thus fixed until that individual secured employment in a different industry, removing their Unemployment Book from the exchange. This means that workers were nominally unable to move from unemployment in one industry to unemployment in another industry without first gaining employment. Additionally, they were unable to move from employment in one industry to unemployment in a different industry without first gaining employment in the latter industry. I add these two additional constraints to the model so that the only estimated transitions are those from unemployment in any industry to employment in any industry, from employment in one industry to employment in any industry, and from employment in one industry to unemployment in the same industry.

For the period 1923 to 1936, I estimate this model with twelve employment-industry states, representing employment and unemployment in the same broad industry categories used in the adjustment coefficient analysis. The Markov analysis is then conducted separately for men and women. Projecting the estimated probabilities forward suggests that the model fits the data well. A simulation of 120,000 individuals in the Markov process is then conducted to shed light on the persistence of unemployment throughout the process for each employment-industry state.

This empirical strategy links the labor market rigidities identified in Section 2.5 with persistent unemployment. The Markov framework makes it possible to estimate which industries workers may have transitioned between, and how this affected long-term unemployment, without the need for individual-level data on worker transitions. However, the two assumptions of the Markov process are important limitations of this analysis to keep in mind. The assumption that the process is first-order stationary is necessary because of the limited availability of interwar data, but it likely does not match the true experience of interwar labor reallocation. The Markov condition that the process is memoryless again may not model true labor markets, where the exit rate from unemployment often exhibits negative duration dependence, i.e., where employment prospects are worse for those who have been unemployed longer (see Kroft, Lange, and Notowidigdo 2013).

2.6.2 Results

Table 2.13 gives the first statistical estimates of transitions across industries and between employment and unemployment in the interwar British labor market. The employment and unemployment proportions on which this analysis is based contain both male and female participants in the labor force.[33] The entries in the table are the probabilities of moving from the employment-industry state on the row to the employment-industry state on the column. The diagonals give the probability of remaining in the same state. The italicized numbers are bootstrapped standard errors using the residual resampling method.

The results offer some insight into which industries workers could transition between during the interwar period. For example, the first row indicates that unemployed workers in metal manufacturing had a 49.7% chance of remaining unemployed, a 36.1% chance of finding employment in textile manufacturing, and a 14.2% chance of finding employment in other manufacturing industries. In contrast, unemployed workers in other manufacturing had a 62.2% chance of remaining unemployed in other manufacturing, a 5.3% chance of finding employment again in other manufacturing, and a 32.6% chance of finding employment in the service industries. As the estimates are based on movement in the aggregate proportion of workers in each employment-industry state, many transition estimates are zero. This does not indicate that no workers transitioned between these industries, but rather that the aggregate data did not capture those transitions in trends of the two industries over the time period. The bootstrapped standard

33. Separate estimates for men and women are given in Tables 2.14 and 2.15. The estimates in Table 2.13 are more difficult to interpret because the experiences of men and women were so different in the labor market.

errors reflect this uncertainty.

For employed workers, those in the service industry were least likely to transition to unemployment (3.4%), while those in the textile industry were most likely (11.1%). Employment in other manufacturing was the most secure — workers had an 85.7% chance of remaining in the industry, a 3.6% chance of finding employment in metal manufacturing, a 6.3% chance of finding employment in service, and a 4.4% chance of becoming unemployed.

Table 2.13: Markov transition probabilities across employment-industry states

	Unemployment						Employment					
	Metals	Textiles	Other Manu.	Mining	Service	Building	Metals	Textiles	Other Manu.	Mining	Service	Building
Unemp. - Metals	0.4974						0.0000	0.3610	0.1415	0.0000	0.0000	0.0000
	0.167						*0.068*	*0.165*	*0.158*	*0.056*	*0.105*	*0.162*
Unemp. - Textiles		0.5448					0.0000	0.0000	0.0000	0.0000	0.0000	0.4552
		0.149					*0.083*	*0.126*	*0.117*	*0.060*	*0.141*	*0.186*
Unemp. - Other Manu.			0.6215				0.0000	0.0000	0.0527	0.0000	0.3258	0.0000
			0.199				*0.060*	*0.077*	*0.159*	*0.016*	*0.165*	*0.191*
Unemp. - Mining				0.8057			0.0000	0.0000	0.0000	0.0000	0.0000	0.1943
				0.107			*0.068*	*0.043*	*0.078*	*0.015*	*0.094*	*0.085*
Unemp. - Service					0.7390		0.1362	0.0000	0.0000	0.0000	0.1248	0.0000
					0.159		*0.072*	*0.045*	*0.124*	*0.021*	*0.141*	*0.112*
Unemp. - Building						0.6918	0.1186	0.0000	0.1896	0.0000	0.0000	0.0000
						0.176	*0.111*	*0.081*	*0.158*	*0.052*	*0.125*	*0.116*
Emp. - Metals	0.0959						0.4850	0.0000	0.0000	0.0975	0.0000	0.3216
	0.037						*0.241*	*0.129*	*0.190*	*0.082*	*0.111*	*0.165*
Emp. - Textiles		0.1114					0.2699	0.4606	0.0598	0.0983	0.0000	0.0000
		0.042					*0.170*	*0.211*	*0.160*	*0.120*	*0.069*	*0.099*
Emp. - Other Manu.			0.0440				0.0359	0.0000	0.8566	0.0000	0.0634	0.0000
			0.024				*0.109*	*0.054*	*0.157*	*0.014*	*0.087*	*0.105*
Emp. - Mining				0.0657			0.0000	0.1867	0.0365	0.7112	0.0000	0.0000
				0.032			*0.048*	*0.097*	*0.054*	*0.097*	*0.019*	*0.038*
Emp. - Service					0.0343		0.0014	0.0000	0.0461	0.0000	0.8402	0.0780
					0.020		*0.033*	*0.011*	*0.060*	*0.004*	*0.086*	*0.070*
Emp. - Building						0.0802	0.2304	0.2517	0.0034	0.0000	0.3168	0.1175
						0.049	*0.229*	*0.161*	*0.221*	*0.061*	*0.244*	*0.267*

Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936, for both men and women. Entries are coefficient estimates from the quadratic programming model described in Appendix A.3, representing the probability of transitioning from the row employment-industry state to the column employment-industry state. Bootstrapped standard errors, using residual resampling, are presented in italics.

Tables 2.14 and 2.15 present these transition probability estimates separately for male and female workers.[34] The results for men in Table 2.14 suggest that unemployed workers in mining were most likely to remain unemployed (79.3%) while those in metal manufacturing were least likely to remain unemployed (56.6%). Unemployed metal manufacturing workers transitioned to textile and other manufacturing as well as service industries, while unemployed miners relied on transitions to the building industries.

Employment in the service industries for men was most secure. Workers had an 84.3% chance of remaining employed, a 9.0% chance of transitioning to building, a 2.4% chance of transitioning to other manufacturing, and a 4.3% chance of becoming unemployed. In contrast, metal manufacturing workers had a 9.0% chance of becoming unemployed, though the results for unemployment in metal manufacturing suggest they would not be unemployed for long.

For women, the estimates in Table 2.15 indicate that unemployed textile workers had a 49.4% chance of remaining unemployed, a 16.8% chance of regaining work in textiles, and a significant chance of finding work in every other industry category. In contrast, unemployed service workers were much more likely to remain unemployed, at 64.5%, or otherwise were likely to be rehired in the service industries (31.9%).

Women in the service industries, however, were much less likely to become unemployed in the first place (2.3%) than female textile workers (12.5%). Female workers in the service industries had an 88.0% chance of remaining employed, a 6.3% chance of transitioning to other manufacturing, and a small chance of transitioning to metal manufacturing.

34. These estimates for both women and men derive from the number of workers in each state, rather than from household-level data. We are thus unable to consider the interaction of employment patterns for men and women, or to explore the possible role of women as a reserve supply of labor for the household.

Table 2.14: Markov transition probabilities across employment-industry states, men only

	Unemployment						Employment					
	Metals	Textiles	Other Manu.	Mining	Service	Building	Metals	Textiles	Other Manu.	Mining	Service	Building
Unemp. - Metals	0.5662						0.0000	0.1707	0.1417	0.0000	0.1214	0.0000
	0.138						*0.093*	*0.090*	*0.136*	*0.059*	*0.129*	*0.144*
Unemp. - Textiles		0.6741					0.0000	0.0000	0.0000	0.0000	0.0000	0.3259
		0.268					*0.095*	*0.143*	*0.168*	*0.082*	*0.208*	*0.183*
Unemp. - Other Manu.			0.6936				0.0000	0.0000	0.0000	0.0000	0.3064	0.0000
			0.202				*0.074*	*0.049*	*0.150*	*0.020*	*0.179*	*0.150*
Unemp. - Mining				0.7931			0.0000	0.0000	0.0000	0.0000	0.0000	0.2069
				0.088			*0.052*	*0.036*	*0.071*	*0.023*	*0.093*	*0.087*
Unemp. - Service					0.7390		0.2334	0.0000	0.0000	0.0000	0.0292	0.0000
					0.152		*0.073*	*0.047*	*0.128*	*0.028*	*0.138*	*0.108*
Unemp. - Building						0.7448	0.0006	0.0000	0.2102	0.0444	0.0000	0.0000
						0.134	*0.099*	*0.061*	*0.126*	*0.044*	*0.104*	*0.091*
Emp. - Metals	0.0896						0.3513	0.2298	0.1117	0.0754	0.0389	0.1033
	0.035						*0.231*	*0.107*	*0.206*	*0.091*	*0.089*	*0.149*
Emp. - Textiles		0.0743					0.6876	0.0000	0.0009	0.2371	0.0000	0.0000
		0.070					*0.323*	*0.209*	*0.228*	*0.250*	*0.112*	*0.117*
Emp. - Other Manu.			0.0382				0.0999	0.0000	0.8239	0.0000	0.0380	0.0000
			0.027				*0.147*	*0.038*	*0.211*	*0.022*	*0.114*	*0.155*
Emp. - Mining				0.0709			0.0735	0.0820	0.0213	0.7524	0.0000	0.0000
				0.027			*0.068*	*0.070*	*0.051*	*0.084*	*0.021*	*0.041*
Emp. - Service					0.0429		0.0000	0.0000	0.0244	0.0000	0.8428	0.0899
					0.023		*0.031*	*0.012*	*0.077*	*0.005*	*0.111*	*0.102*
Emp. - Building						0.0685	0.1264	0.0143	0.0007	0.0000	0.2075	0.5826
						0.038	*0.178*	*0.093*	*0.203*	*0.056*	*0.244*	*0.285*

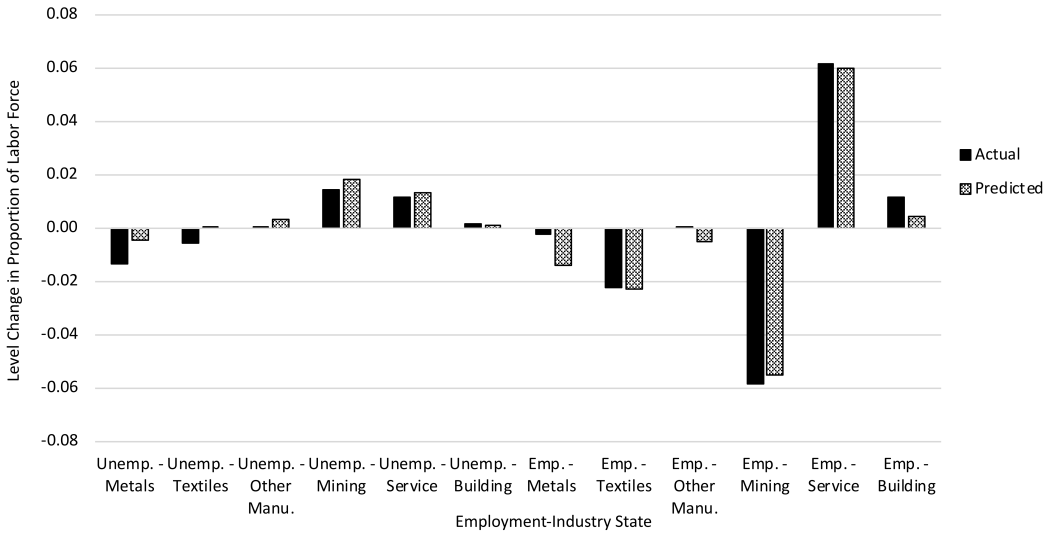
Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936, for men only. Entries are coefficient estimates from the quadratic programming model described in Appendix A.3, representing the probability of transitioning from the row employment-industry state to the column employment-industry state. Bootstrapped standard errors, using residual resampling, are presented in italics.

Table 2.15: Markov transition probabilities across employment-industry states, women only

	Unemployment						Employment					
	Metals	Textiles	Other Manu.	Mining	Service	Building	Metals	Textiles	Other Manu.	Mining	Service	Building
Unemp. - Metals	0.5856						0.0000	0.0000	0.0000	0.0000	0.4144	0.0000
	0.330						*0.110*	*0.290*	*0.237*	*0.106*	*0.264*	*0.107*
Unemp. - Textiles		0.4939					0.0000	0.1680	0.1833	0.0157	0.0335	0.1056
		0.091					*0.060*	*0.131*	*0.116*	*0.029*	*0.093*	*0.072*
Unemp. - Other Manu.			0.3301				0.0000	0.6230	0.0469	0.0000	0.0000	0.0000
			0.222				*0.106*	*0.262*	*0.198*	*0.026*	*0.223*	*0.065*
Unemp. - Mining				0.8057			0.0000	0.0000	0.0000	0.1034	0.0000	0.0909
				0.435			*0.267*	*0.373*	*0.382*	*0.231*	*0.397*	*0.100*
Unemp. - Service					0.6449		0.0362	0.0000	0.0000	0.0000	0.3188	0.0000
					0.248		*0.110*	*0.124*	*0.145*	*0.041*	*0.224*	*0.084*
Unemp. - Building						0.0000	0.0000	0.0000	0.9999	0.0000	0.0000	0.0000
						0.381	*0.275*	*0.420*	*0.340*	*0.250*	*0.434*	*0.125*
Emp. - Metals	0.0416						0.8274	0.0000	0.0000	0.0000	0.1310	0.0000
	0.046						*0.332*	*0.114*	*0.284*	*0.014*	*0.291*	*0.023*
Emp. - Textiles		0.1252					0.0001	0.8261	0.0397	0.0089	0.0000	0.0000
		0.025					*0.044*	*0.081*	*0.075*	*0.008*	*0.043*	*0.013*
Emp. - Other Manu.			0.0671				0.0001	0.0000	0.8359	0.0000	0.0969	0.0000
			0.024				*0.051*	*0.066*	*0.113*	*0.001*	*0.076*	*0.005*
Emp. - Mining				0.0000			0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
				0.355			*0.201*	*0.435*	*0.296*	*0.246*	*0.175*	*0.130*
Emp. - Service					0.0230		0.0340	0.0000	0.0625	0.0000	0.8805	0.0000
					0.017		*0.059*	*0.019*	*0.058*	*0.003*	*0.078*	*0.006*
Emp. - Building						0.0022	0.0001	0.0000	0.9976	0.0000	0.0000	0.0000
						0.301	*0.333*	*0.343*	*0.403*	*0.058*	*0.378*	*0.077*

Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936, for women only. Entries are coefficient estimates from the quadratic programming model described in Appendix A.3, representing the probability of transitioning from the row employment-industry state to the column employment-industry state. Bootstrapped standard errors, using residual resampling, are presented in italics.

Figure 2.9: Predicted vs. actual change in proportion of the labor force in each industry category, 1923–1936



Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936, for both men and women. The figures for men and women separately are given in Appendix A.4 Figures A.1 and A.2. The actual figures give the level change in the proportion of the labor force in each employment-industry state in the raw data over the period. The predicted figures give the level change predicted by the Markov process estimates in Table 2.13 when the probabilities are projected forward by 13 steps.

Using these estimated transition probabilities, the Markov chain can be multiplied forward 13 steps from the 1923 distribution of labor force participants across states. The predicted change in the proportion of the labor force in each state over these years, 1923 to 1936, is then the difference between the simulated 1936 proportion and the initial 1923 proportion. Figure 2.9 compares the predicted change in the overall proportion of the labor force in each state to the actual change. The similarities between the two series suggest that the estimated probabilities are fairly consistent with the observed data. The results for the models for men and women separately are given in Appendix A.4.

The estimated transition probabilities highlight two major processes occurring in the Markov chain. First, how likely is it for an individual in an industry to become unemployed? Then, how likely are they to find a job again if they become unemployed? Because six of the states of the Markov process correspond to unemployment and six correspond to employment, the estimated transition probabilities can be used to weight a random walk that captures some of these dynamics.

For a single person, simulating the Markov model represented by the transition probabilities in Table 2.13 thirteen time steps gives a prediction for the state the individual visited on each step. For example, if we start an individual in unemployment in service, there is a 73.9% chance they stay in that state, a 13.6% chance they move to metal manufacturing, and a 12.5% chance

Table 2.16: Average proportion of time steps spent in unemployment by initial state

	Total (1)	Men (2)	Women (3)
Employment			
Metals	0.138	0.134	0.066
Textiles	0.140	0.144	0.140
Other Manu.	0.098	0.111	0.085
Mining	0.161	0.166	0.131
Service	0.104	0.120	0.060
Building	0.134	0.134	0.080
Unemployment			
Metals	0.248	0.266	0.221
Textiles	0.264	0.321	0.227
Other Manu.	0.267	0.317	0.228
Mining	0.430	0.416	0.587
Service	0.356	0.359	0.249
Building	0.315	0.350	0.150

Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936. 120,000 individuals were simulated over 14 steps in the Markov processes represented by the transition probabilities in Table 2.13 in column (1), Table 2.14 in column (2), and Table 2.15 in column (3), with 10,000 individuals starting the process in each of the possible employment-industry states for each Markov chain. In each simulation, the proportion of time steps in which an unemployment state was visited, in any industry, was calculated. The entries in this table give the mean proportion of time steps spent in unemployment, based on the initial state in which the individual began the simulation.

they regain employment in service. Rolling a weighted die, say they move to employment in metal manufacturing in step 1. Then, they have a 48.5% chance of staying in employment, a 9.6% chance of becoming unemployed, and a 41.9% chance of finding employment in another industry. Rolling another weighted die, they might move to unemployment in metal manufacturing. Continuing in this fashion, the transitions for thirteen steps are simulated based on the estimated transition probabilities in Table 2.13, producing a random walk. Then, the number of steps in which they ended up in any of the unemployment states can be counted.

Table 2.16 gives the results of simulating 120,000 people in the Markov chain for everyone, for only men, and for only women. 10,000 individuals are started in each initial state. Using the paths that are generated, the proportion of time spent in unemployment states can be estimated. This gives an estimate of the persistence of unemployment for individuals in each initial state, taking into account the risk of becoming unemployed and the duration of that unemployment if it occurs. However, this cannot account for any variation between individuals that is not captured by their employment-industry state.

The results indicate that workers who began the simulation employed in mining and textiles experienced the most unemployment, while those who began employed in other manufacturing and service experienced the least. This was especially true for male workers. An employed male miner is estimated to have spent 16.6% of time steps in unemployment, while an employed male in other manufacturing is only estimated to have spent 11.1% of steps in unemployment. For women, employed textile workers spent the most amount of time in unemployment (14.0%), while employed service workers spent the least amount of time (6.0%).

Taken together, the results from the estimation of this Markov model suggest that long-term unemployment was closely associated with the rigidities identified in the adjustment coefficient analysis. There was significant heterogeneity by industry and gender in the likelihood of becoming unemployed and then in finding employment in another industry. The results of the simulation combining these two processes indicate that workers in mining for men and in textiles for women experienced the most persistent unemployment, while men and women in service and in other manufacturing experienced the least. Long-term unemployment caused by rigidities to adjustment was thus more acute for some groups of workers than others.

2.6.3 Comparison of adjustment coefficient and Markov analyses

The two methods of measuring the amount of labor market adjustment by industry and gender give broadly consistent results. For men, the results of the adjustment coefficient analysis indicate that the least amount of adjustment occurred in textiles and in mining. The Markov transition probabilities concur that employed workers in these industries were likely to become unemployed with few opportunities to move to other industries. In the simulation, men who began employed in textiles and in mining experienced the most persistent unemployment.

Additionally, both the adjustment coefficient analysis and the Markov simulation suggest that male workers in service and in other manufacturing experienced high levels of adjustment. However, the transition probabilities suggest that if a worker did become unemployed in these industries and failed to immediately secure other employment, he could have difficulty finding other employment opportunities.

According to the adjustment coefficient analysis, women experienced the least amount of adjustment in textiles, a moderate amount of adjustment in other manufacturing, and the most adjustment in service. These correspond closely with the Markov transition probability results. The simulation further suggests that women in textiles experienced the most persistent unemployment, women in other manufacturing experienced moderately persistent unemployment, and women in services experienced the least persistent unemployment.

Comparing men and women in the same industries, the adjustment coefficient results suggest that women in the textile industry faced more rigidities to adjustment than men, but that women in other manufacturing faced fewer rigidities. The results from the Markov simulation confirm that unemployment was less persistent for women in other manufacturing than for men, but the results are in the opposite direction for the textile industry. The estimated transition probabilities indicate that female textile workers had a higher chance of becoming unemployed than male textile workers, but once unemployed had a better chance of finding work in other industries.

2.7 The determinants of interwar unemployment

The results of the previous sections have demonstrated that there was significant heterogeneity in unemployment and in the amount of labor market adjustment by industry, gender, and region in

interwar Britain. What explains these large differences? While it is possible that the reasons for unemployment in industries were the same as for unemployment in aggregate, a more expansive range of industry characteristics might account for the differences. In particular, we are interested in variables that capture underlying structural transformation affecting some industries and not others.

This section explores the role of structural change in interwar unemployment by providing evidence on the determinants of industry-level unemployment rates for men and women in production industries. Linking the *Labour Gazette* unemployment data with industry-level data from the *Census of Production* and other sources offers some insight into the key differences between industries. A regression model for unemployment in 1924 and 1931 suggests that export industries were structurally disadvantaged in this period. Additionally, industries that were able to tap into the female labor supply performed better. Unemployment rates for women depended critically on whether the industry had a high proportion of administrative, technical, and clerical occupations. The results of this additional analysis give us some sense of why certain industries had more adjustment than others during the interwar period, and why gender affected this labor market adjustment. Structural forces are thus found to have played a key role in industry-level unemployment.

2.7.1 Empirical strategy

This analysis explores traditional economic explanations for industry-level unemployment and explanations linked to structural change that have not been analyzed econometrically.

Traditional explanations for interwar unemployment, in aggregate and by industry, emphasize the role of wages and trade unions. Under the classical model of unemployment, if wages are rigid at a level above market rates, unemployment will occur. As Chapter 1 demonstrates, this view was espoused most strongly during the interwar period by Arthur Cecil Pigou, who famously claimed that unemployment was caused by "uneconomically high wage-rates... against the interest of the community as a whole" (Pigou 1927c, p. 366). Trade unions, common during this period, often achieved wage increases or resisted wage reductions (Cannan 1927, p. 411; Hatton and Thomas 2013, for example). In addition to the direct effect on wages, trade unions also had an indirect effect on employment during the interwar years by increasing other costs of employing labor and by bargaining for short-time working arrangements that best took advantage of the unemployment insurance system (Whiteside and Gillespie 1991, p. 677).

As discussed above, however, the interwar period was also one of dramatic structural changes in the economy. One of the major forces behind structural change was the shock of World War I, which had a differential effect on British industries. Henry Clay wrote in 1929 that the export industries' losses during the interwar period were "as directly and certainly a cost of the war as the losses which are represented by the War Debt or War Pensions" (Clay 1929a, 102). World War I severely disturbed markets, leading to the emergence of new competitors and substitute goods that disproportionately affected industries involved in world trade. The export exposure of industries captures the shock of World War I as well as the differential challenges posed by deflation, the restoration of the gold standard, and trade policy during the interwar years. The war also caused some industries to expand to meet munitions and supply needs, leading to long-term problems of overcapacity and overcapitalization. The growth of the iron and steel industry (Burnham and Hoskins 1943, p. 49–50) and the shipbuilding industry (Geary 1997), for example, was driven by new investment in equipment and plants to meet the needs of war. This investment, which was not motivated by the long-term prospects of the industries, led to overcapacity in the interwar period. The costs of interest and depreciation on this excess capital presented a challenge in the early part of the interwar period to industries such as these which had expanded because of World War I.

There were also significant changes in the composition of the workforce in some industries during the interwar period that also could have affected unemployment rates. Women and younger workers were increasingly drawn into expanding light manufacturing industries. These demographic changes may have reduced costs of production, as these workers could be paid less and could adapt more flexibly to new industrial production and organization methods (Heim 1984, pp. 586–587). The trend toward agglomeration and branching in many industries also shifted the types of jobs that were available, increasing the number of administrative and clerical jobs.

These different factors related to traditional and structural explanations of unemployment can be put together in a least-squares regression model. The regression takes the form,

$$y_{it} = \alpha_0 + \boldsymbol{\beta}'\mathbf{x}_{it}^{C} + \boldsymbol{\gamma}'\mathbf{x}_{it}^{S} + \boldsymbol{\delta}'x_{it,2}^{S} \cdot \mathbf{T}_t + \boldsymbol{\zeta}'\mathbf{d}_{it} + \boldsymbol{\eta}'\mathbf{T}_t + \epsilon \tag{2.7}$$

where y_{it} is the unemployment rate for industry i at time t, $\mathbf{x}_{it}^{C}$ is a vector of characteristics of industry i relating to classical explanations of unemployment, $\mathbf{x}_{it}^{S}$ is a vector of characteristics

of industry i relating to longer-term structural changes, $\mathbf{d}_{it}$ is a vector of controls, $\mathbf{T}_t$ are time dummies, and $(x^S_{it,2} \cdot \mathbf{T}_t)$ is an interaction term between the time dummy and output growth during World War I to allow this effect to diminish further on from the shock.

Vector $\mathbf{x}^C_{it}$ contains the industry's real wage level, the total wage bill as a percent of net output, and the density of trade unions. $\mathbf{x}^S_{it}$ contains the percent of output exported, output growth during World War I, the proportion of women in an industry, the proportion of young workers in an industry, and the proportion of administrative, technical, and clerical workers in an industry. $\mathbf{d}_{it}$ contains controls including the intensity of short-time work, the number insured, and lagged output. Use of the *Labour Gazette* unemployment rates without taking into account short-time can lead to biased results because workers on short-time were counted as unemployed in the data.

2.7.2 Expanded data

As described in Section 2.3, the basis of this analysis is the newly digitized Ministry of Labour data on unemployment for 100 industries, disaggregated by gender, from June 1923 to December 1936. This data was reliably collected by the British government throughout the period but only covers the portion of the population under the national unemployment benefit scheme. For the regression analysis, I also incorporate data from the *Labour Gazette* on the incidence and intensity of short-time working for 124 industries in October 1924 and October 1931.[35]

The primary data source on the characteristics of industries is the *Census of Production* for 1924 and 1930. For all 123 industries in the *Census of Production*, I digitized 9 tables in 1924 and in 1930, totaling close to 1,000 pages of the *Census of Production* for these years. 87 of the 100 *Labour Gazette* industries map to those in the *Census of Production.*[36] The covariates from the *Census of Production* include wages as a proportion of net output, the percent of production exported, the proportion of workers under age eighteen, and the proportion of workers in administrative roles rather than operative roles.

The trade union data comes from the *Twenty-Second Abstract of Labour Statistics* (1935, pp. 140–141), which gives the number of members of trade unions, male and female, for 34 industry categories annually from 1923 to 1935. I link the trade union density to each industry

35. Short-time working data by industry and gender is only available for October 1924, October 1928, and October 1931. The 1924 and 1928 data is available in the October – December 1929 *Labour Gazette*, and the 1931 data is available in the January – March 1933 *Labour Gazette*.

36. The complete mapping of *Labour Gazette* and *Census of Production* industries is given in Table A.5 in Appendix A.1.

in a category and impute zero for the six industries in which no trade unions were reported.[37]

Annual output data for 28 industry groups are taken from Lomax (1959, pp. 192-193). I use this annual output data to control for output in the previous year and to construct a measure of the growth of industries during World War I. Sixteen industries, primarily in services, are not covered by any of the output categories in the Lomax data.

The resulting data for the analysis includes 79 industries representing almost all industries in manufacturing, mining, and building.[38] Service industries are not included in the *Census of Production* and so are omitted.

2.7.3 Results

Table 2.17 gives the results of the regression in Equation 2.7 for men and women together in model (1), for men only in (2), and for women only in (3). Models (2) and (3) use gender-disaggregated data for the covariates when available. In all of the models, the data is on the industry-year level for two years, 1924, and 1931. All models control for time trends, for the number insured in each category, and for output in the previous year, with standard errors clustered at the industry level.

Table 2.17 shows that industry-level unemployment rates were partially determined by structural factors, though there is variation between genders. Of the five covariates associated with structural change, in the overall model (1), the industry's export exposure, growth during World War I, and proportion of employees who are female all have a significant effect on industry-level unemployment rates. The composition of tasks in an industry also affected the unemployment rate for women.

Industries that exported a larger share of their output faced significantly higher unemployment rates in the overall model and in the model for men only. The coefficients of 0.122 ($p < 0.05$) and 0.119 ($p < 0.05$), respectively, indicate that a one standard deviation increase in the percentage of output exported (15.48 percentage points) corresponds to a 1.88 and 1.84 percentage point increase in the industry unemployment rate. In the model for women only, export exposure has no significant effect on industry unemployment rates.

37. Fishing; Gas, Water and Electricity Supply Industry; Hotel, Boarding House, Club Services; Industries and Services Not Separately Specified; Laundries, Dyeing and Dry Cleaning; and Professional Services.

38. In these industry categories, the excluded industries are Fishing, Gas and Water Supply; Sawmilling; Stationery and Typewriting Requisites; Heating and Ventilating; Steel Melting and Iron Puddling Furnaces; and Stove and General Ironfounding.

The expansion of an industry during World War I is also positively associated with the industry's unemployment rate. The main effects of 0.074 ($p < 0.01$) and 0.081 ($p < 0.01$) in the overall model and the model with men only, respectively, suggest that in 1924, a one standard deviation increase in the growth of the industry during World War 1 (17.18 percentage points) would lead to a 1.27 percentage point increase in the industry's overall unemployment rate and a 1.39 percentage point increase in the unemployment rate for men only. However, the interaction term indicates that this effect is reversed in 1931, reflecting the diminished effect of the shock of World War I at this later date. There is no significant effect of an industry's growth during the war on the unemployment rate for women.

With a coefficient of -0.123 ($p < 0.001$) in the overall model and a coefficient of -0.0944 ($p < 0.01$) in the male-only model, the proportion of women in an industry is negatively associated with unemployment rates in that industry. The effect is dramatic, with a one standard deviation increase in the percent of women employed in the industry (24.84 percentage points) associated with a 3.06 percentage point decline in the industry unemployment rate overall and a 2.33 percentage point decline in the industry unemployment rate for men. This offers some corroboration of the narrative that expanding industries were able to tap into previously underutilized labor supply to achieve cost reductions. There is no corresponding effect on female unemployment rates.

The wage effects are also large. A one standard deviation increase in the total wage bill as a percentage of net output (14.39 percentage points), reflecting higher bargained wages, corresponds to a 2.79 percentage point increase in industry unemployment rates in the overall model and to a 3.13 percentage point increase in the male-only model. However, the coefficient on the real wage level is negative in both models, suggests that increasing real wages actually decreases unemployment across industries. While this seems contrary to theory, this coefficient could be picking up higher wages in expanding industries with low employment. The real wage level is inversely related to the unemployment rate for women, but the total wage bill has no effect. This is broadly consistent with the results in Bean (2015), who finds that in interwar London, the female labor supply on the extensive margin was not closely associated with wage rates.

One of the strongest determinants of the industry-level unemployment rate for women is whether the industry employed many administrative, technical, and clerical staff. Patterns of agglomeration and branching led to an increase in these roles in many manufacturing industries,

which were likely more accessible to women than the traditional roles of operatives or laborers. The coefficient of -0.422 ($p < 0.01$) suggests that a one standard deviation increase in this percentage (5.51 percentage points) corresponded to a 2.33 percentage point decrease in the unemployment rate for women in the industry.

There is no statistically significant effect for trade unions above and beyond the variation captured by the wage measures. The proportion of employees under eighteen years of age is also not significant. The intensity of short-time working has a significant, positive effect on the unemployment rate in the overall and the male models because workers on short-time were counted as unemployed by the Ministry of Labour, which increases the unemployment rate for some industries.

These results are robust to the inclusion of industry category fixed effects and to clustering at the industry group level rather than the industry level (Table A.19 in Appendix A.5). They are also robust to the exclusion of lagged output as a control and to the use of an alternative dependent variable, the difference between the industry unemployment rate and the aggregate unemployment rate in the year (Table A.20 in Appendix A.5).

The results of this regression analysis help us understand why there were such significant differences between industries during the interwar period, and how gender affected these differences. While some industries were able to take advantage of the changing composition of the labor supply and to manage wage pressures, other industries were disadvantaged by poor trade conditions and persistent effects from World War I. This econometric analysis thus suggests that structural factors played a significant role in interwar unemployment, shaping the differential employment performance of industries.

2.8 Conclusion

This chapter evaluates the extent to which reallocation of labor across industries occurred in interwar Britain in order to understand how slow or limited labor market adjustment contributed to persistent unemployment. I digitize hundreds of British government records to construct a comprehensive dataset on unemployment by gender for 100 industries, covering each month from 1923–1936. After a series of descriptive statistics on the differences in interwar unemployment rates across industries, gender, and regions, two methods are used to measure the labor market adjustment on the industry level. First, adjustment coefficients representing whether laid-off

Table 2.17: Determinants of industry-level unemployment rates in 1924 and 1931, service industries excluded

	(1) Total	(2) Men	(3) Women
Percent of output exported	0.122*	0.119*	-0.005
	(0.052)	(0.056)	(0.030)
Output growth during WW1	0.074**	0.081**	0.063
	(0.028)	(0.030)	(0.033)
Year: 1931 × Output growth during WW1	-0.113*	-0.125*	0.047
	(0.047)	(0.048)	(0.047)
Real wage level	-0.031**	-0.025*	-0.034**
	(0.010)	(0.012)	(0.011)
Total wage bill as a percent of net output	0.194***	0.218***	0.040
	(0.054)	(0.052)	(0.060)
Trade union density	1.835	0.646	4.492
	(3.247)	(2.851)	(3.928)
Percent of all employees that are female	-0.123***	-0.094**	0.020
	(0.034)	(0.029)	(0.035)
Percent of all employees in administrative, technical, and clerical roles	-0.148	-0.091	-0.422**
	(0.150)	(0.156)	(0.125)
Percent of all employees under 18 years old	-0.100	-0.074	-0.136
	(0.123)	(0.122)	(0.132)
Short-time hours per employee	1.256**	1.432**	0.542
	(0.455)	(0.463)	(0.467)
Year: 1931	16.033***	15.467***	12.456***
	(1.748)	(1.746)	(1.492)
Constant	27.485**	22.472*	27.857***
	(9.074)	(9.985)	(7.114)
Controls	Yes	Yes	Yes
Num. of observations	156	156	156
Num. of industries	79	79	79
Adj. R^2	0.659	0.660	0.538

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, clustered at the industry level, given in parentheses. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the industry-level unemployment rate. Controls include number insured in the industry and lagged output. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

workers were able to find employment in other industries are estimated for groups of industries, disaggregated for men and women. Then, a Markov model for transitions between industries and employment states is used to estimate the probability of workers moving between employment and unemployment across six industries.

The results of the adjustment coefficient analysis suggest that interwar industries not only had large differences in unemployment, but that they also had differences in their ability to adjust their labor supply to these employment changes. Adjustment coefficients were higher in industries that were expanding than in those that were contracting, suggesting that workers in declining industries faced the additional challenge of rigidities to movement into other industries. The Great Depression widened this gap by increasing levels of adjustment for expanding industries and decreasing adjustment for contracting industries. Industries in services and in building had particularly high levels of adjustment, while textile manufacturing and mining industries had the lowest levels of adjustment. There were fewer rigidities for men in the labor market

than for women, though this varied by industry, and the labor market was more flexible in the South East and London regions than in the North and in Wales.

The estimated transition probabilities from the Markov analysis suggest that for men, unemployed mining workers were least likely to find employment while unemployed metal workers were most likely to find other employment. For women, employed textile workers had a high probability of becoming unemployed but had other opportunities once unemployed, while service workers were less likely to become unemployed but had fewer opportunities if it did occur. Simulating the employment and unemployment paths of men and women in different industries, persistent unemployment was most likely for textile and mining workers and least likely for service and other manufacturing workers.

Taken together, these analyses suggest that while labor market rigidities did play a role in interwar unemployment, the labor market was not sclerotic in aggregate. For workers in certain declining industries and for women, there were significant barriers preventing movement into other industries. However, for some of the leading industries and regions, there was more adjustment than has been assumed to have occurred during this period by some scholars. This heterogeneity in adjustment suggests that long-term unemployment was experienced much more acutely by some groups of workers than others in interwar Britain.

Additionally, this chapter estimates the determinants of interwar unemployment on the industry and gender level for 79 production industries. I find that variables associated with structural transformation explain a portion of industry unemployment differentials. Unemployment rates were higher for industries that expanded during World War I and that exported a significant amount of their output. The proportion of women in an industry, however, was associated with lower unemployment rates, reflecting the ability of some industries to take advantage of the changing composition of the labor force. High wage levels were also associated with unemployment, in line with the existing literature, though these effects did not hold for women. Women's unemployment rates were primarily determined by the prevalence of administrative and clerical roles in an industry.

When taken with the descriptive statistics presented in Section 2.3, these results demonstrate that structural transition significantly affected patterns and magnitudes of interwar unemployment, and that these structural movements were amplified by cyclical trends. Interwar unemployment varied by gender, by industry, and by region, and unemployment rates along these lines were determined partially by structural factors. The ability of workers to adjust

to these changes in employment was affected not only by sectoral and regional frictions, but also by changes in the business cycle which affected the movement of labor between industries. The complexity of interwar unemployment thus requires a complex answer, bringing together the rigor of econometric methods and the specificity of regional and industrial accounts. This chapter offers a step in that direction.

Chapter 3

The Jobless Recovery After the 1980–1981 Recession

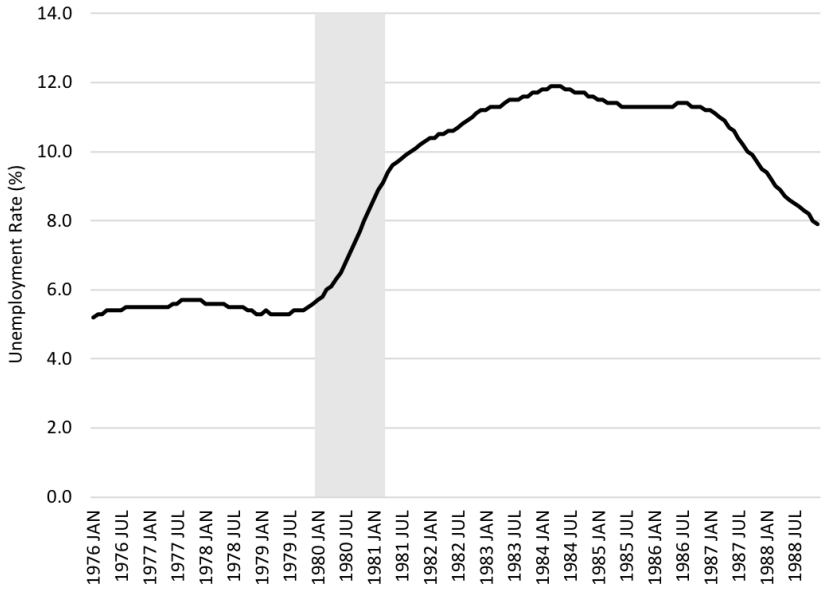
3.1 Introduction

"Sign on, sign on, with no hope in your heart, and you'll never get a job, you'll never get a job!"

Still sung at Liverpool football games by opposing teams, the "Sign On" chant is a living reminder of the severe and persistent unemployment that gripped Britain in the early 1980s. A parody of the Liverpool FC song "You'll Never Walk Alone," the chant was introduced in the 1980s when over three million people became unemployed after the brief recession of 1980–1981. "Sign On" highlighted the regional differences in unemployment that grew increasingly stark during the period — by singing "you'll never get a job" to the Liverpool supporters, football fans from the South of England emphasized their economic superiority over the troubled Northern regions. The chant also exemplified the changing attitudes toward unemployment and welfare that characterized the Thatcher era by scorning and deriding "signing on" to the dole. Today, the chant serves as a reminder of the devastation the prolonged employment downturn brought to some British industries and regions during the early 1980s, as well as of the long-lasting effects of this unemployment on policy and culture.

Though the early 1980s recession was a global economic downturn, its effect on employment in Britain was particularly severe and prolonged. Figure 3.1 shows that the unemployment rate climbed from 5.5% at the end of 1979 to a new peak of 11.9% in the spring of 1984, well after the end of the recession in 1981. From there, the unemployment rate decreased so slowly that it was still over 10% through the third quarter of 1987. This almost eight-year employment downturn was Britain's worst in terms of persistence and severity since the interwar years and

Figure 3.1: Unemployment rate in Britain, 1976–1988



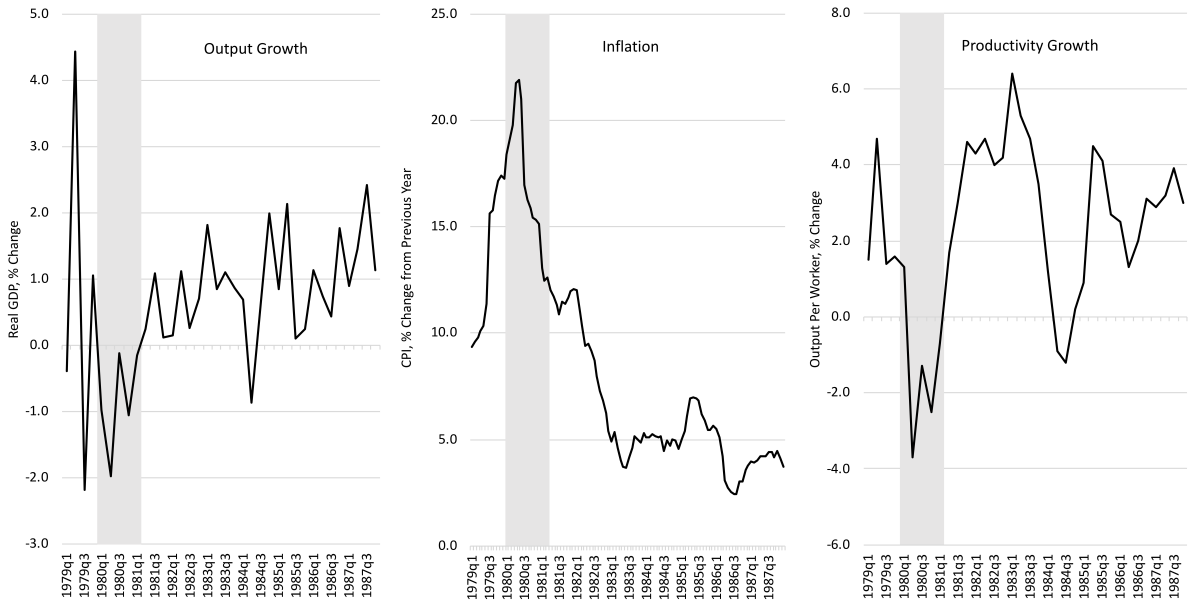
Source: ONS, Unemployment rate (aged 16 and over, seasonally adjusted) [MGSX], https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/unemployment/timeseries/mgsx/lms. Note that this is the standard series based on the Labour Force Survey (LFS) and not the claimant count that was widely cited in the early 1980s.

Great Depression.

This unemployment episode is especially puzzling when other dimensions of the British economy are taken into account. By many measures, Britain had a strong economic recovery from the 1980–1981 recession. Figure 3.2 gives three key economic indicators for Britain during the five-quarter recession from 1980 to 1981 and after. The left panel shows the negative real GDP growth over the recession dates but then a good recovery afterward. The center panel tracks CPI over the same period. There was a dramatic increase in inflation in 1979, but the growth rate of the price level slowed during the recession dates and stabilized afterward. Finally, the right panel shows that productivity growth in terms of output per worker also trended upward during the recession recovery beginning in 1981. In the context of these indications of a strong economic performance after the recession, the employment recovery seems particularly poor.

Britain's employment recovery also appears slow when compared to other countries. Table 3.1 gives the growth in employment after the end of the early 1980s recession for eighteen countries. The table is standardized for the different recession end dates for each country and gives the cumulative employment growth one and two years after the trough of the recession. While a handful of countries had meager employment growth during this period, two years after the end of the recession Britain had the third worst employment performance of the eighteen countries listed. Only Spain and Belgium had slower employment growth two years after the trough, and

Figure 3.2: Economic performance in Britain, 1979–1987



Output source: FRED, Real Gross Domestic Product for United Kingdom, Percent Change, Quarterly, Seasonally Adjusted [CLVMNACSCAB1GQU_PCH], https://fred.stlouisfed.org/series/CLVMNACSCAB1GQUK. Inflation source: FRED, Consumer Price Index of All Items in the United Kingdom, Percent Change from Year Ago, Monthly, Not Seasonally Adjusted [GBRCPIALLMINMEI_PC1], https://fred.stlouisfed.org/series/GBRCPIALLMINMEI. Productivity source: ONS, Output per Worker: Whole Economy: Percent Change per Annum SA: UK [A4YN PRDY], https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/timeseries/a4yn/prdy.

neither country had real GDP growth that was as strong as in Britain. Many countries had much better employment growth two years after the end of the recession, including the US, Canada, Australia, Switzerland, and Denmark.

This chapter thus seeks to understand why the recovery of employment after the early 1980s recession in Britain was so slow. After a brief historical background, the concept of jobless recoveries is introduced, and it is argued that the recovery from the 1980–1981 recession in Britain can be considered as an early example of a jobless recovery. Then, after a comprehensive review of the jobless recovery literature, three possible drivers of the jobless recovery are considered in depth: the reallocation of labor across industries, regional effects, and job polarization. A comparison with the US, which did not have a jobless recovery, suggests that the dominant cause of Britain's jobless recovery was dramatic and rapid structural change. Structural change is thus found to have played a significant role in the 1980–1981 recession, slowing the employment recovery.

Table 3.1: Growth in employment after early 1980s recession, international comparison

		Years Since Trough	
	Trough Year	One	Two
Spain	1981	-1.3	-2.39
Belgium	1981	-1.3	-2.29
United Kingdom	1981	-1.9	-2.10
Netherlands	1982	-1.9	-2.00
Norway	1982	-1.9	-2.00
Austria	1981	-0.9	-1.89
Germany	1982	-1.2	-1.79
France*	1983	-1.0	-1.30
Luxembourg	1981	-0.3	-0.60
Portugal	1984	-0.5	-0.30
Sweden	1981	-0.1	0.00
Italy*	1982	0.3	0.60
Denmark	1981	0.4	0.70
Switzerland	1982	0.0	1.00
Australia	1982	-1.8	1.15
Canada	1982	0.5	2.91
Iceland	1983	1.5	5.15
United States	1982	1.3	5.45

Analysis using data from *OECD Economic Outlook*, Volume 1990 Issue 2, Tables R 1. "Growth of real GNP/GDP in the OECD area" and Table R 17. "Growth of employment in the OECD area." Recession trough dates are taken as the last year in which real GNP/GDP growth was negative for the country, except for the cases with an (*). In these cases, real GNP/GDP growth was never negative, so the trough date is the last year in which it was less than 1%.

3.1.1 Historical background

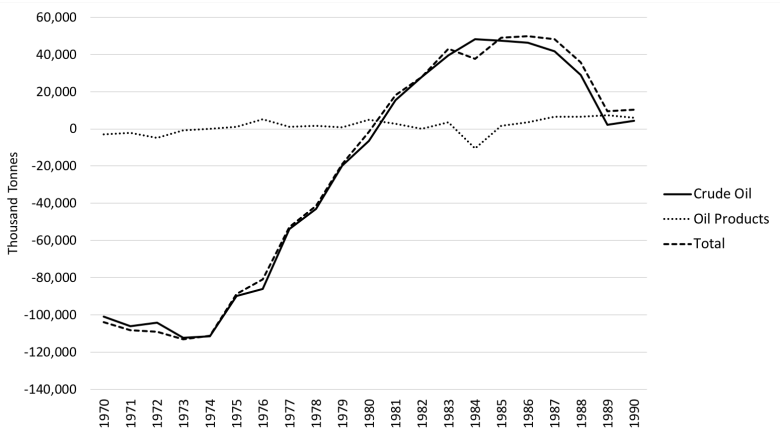
The early 1980s recession in Britain is associated with two interconnecting storylines: oil production in the context of the Second Oil Crisis and the Thatcher government's efforts to control inflation. These forces not only helped bring about the early 1980s recession, but they also shaped the monetary and fiscal policy response to the economic downturn.

The 1979 Second Oil Crisis was due primarily to decreased oil output in the Middle East because of the Iranian Revolution. In late 1978, oil workers in Iran went on strike in protest against the Shah, Mohammed Reza Pahlavi. The Shah was forced to flee the country in January 1979, and oil production in Iran plummeted from over 5 million barrels a day to less than 500,000 barrels a day (Verleger 1979). Some of this decrease in production was compensated for by increased production in other nations, especially Saudi Arabia, early in 1979. Still, this 4% decrease in the global oil supply presented a serious global energy crisis. Panic conditions over the summer amplified the price shock, leading the price of oil to double to $39.50 per barrel from the spring of 1979 to the spring of 1980. The global oil supply fell an additional 10% after Iraq invaded post-revolutionary Iran, but this decrease in supply was met by increased output from oil fields in Siberia, the Gulf of Mexico, Alaska, and the North Sea.

Britain was in a unique position during this oil price shock. Oil production had increased in Britain after the 1973 oil crisis made developing oil fields in the North Sea more profitable. This increase in production in the late 1970s led to Britain becoming a net exporter of oil in 1980, right in the middle of the recession and the Second Oil Crisis. Figure 3.3 shows net exports of crude oil in Britain from 1975 to 1990. Net exports became less negative in the late 1970s, with exports first outpacing imports in 1980. Domestic oil production thus partially shielded Britain from the effects of the 1979 oil price shock. Industries relying on oil as an energy input for production were still disadvantaged by the price shock. However, national income benefited from the increased value of oil production.

The pressure on the price level from the oil crisis exacerbated the inflationary challenges that Britain had been facing throughout the 1970s. Wage and price controls had been unsuccessfully used from late 1972 to try to stem inflation. In the mid-1970s, the climate of inflation led investors to believe the pound was severely overvalued, causing it to depreciate against the dollar. In 1976, fears of sterling depreciation led the Labour government, headed by James Callaghan, to borrow $5.3 billion from the US, in US dollars, to stabilize the pound (Burk 1989). Though

Figure 3.3: Net exports of crude oil and oil products from Britain, 1975–1990



Source: UK Department for Business, Energy, and Industrial Strategy, "Crude oil and petroleum products: production, imports, and exports 1890 to 2018."

the Bretton Woods era was over, policymakers believed that sterling's depreciation would cause economic instability and worsen inflation. Faced with continued devaluation, this costly attempt at managing the exchange rate forced the Labour government to request a $3.9 billion loan from the IMF later that year to pay back the US. The IMF imposed strict conditions on this loan, including cuts in government spending and the deficit. Importantly, though not required by the IMF, the external pressures arising from securing the loan led the Callaghan government to also commit to setting money supply targets — Britain's first steps toward monetarism (Goodhart 1989). Monetarist policies had been coming into vogue, but the government had hesitated to announce official targets over the summer of 1976. The exchange rate crisis pushed the government to concede to monetarist pressures by suggesting money supply targets, which were then taken as formal targets by the financial sector (Davies 2012).

The loose money supply targeting, reduced government expenditure, and wage controls brought inflation down a little but did not solve the problem by the late 1970s. The Callaghan government set new guidance in 1978 limiting public-sector pay rises to 5% in a further attempt to control inflation. This limit was taken as a general guideline by private-sector industries and was met by intense trade union opposition. Over the "Winter of Discontent" from 1978 to 1979, strikes and walkouts were held in many industries to negotiate pay rises well above 5%. The lorry drivers' strike in January 1979 led to a 20% pay rise, which then became the standard request. The success of this early industrial action led to widespread strikes among private-sector workers as well as among public-sector workers such as gravediggers and waste collectors, who also secured pay increases. As a result of these strikes, 20 million more working days were lost to industrial disputes in 1979 than in 1978.

The Conservative party led by Margaret Thatcher came to power in May of 1979. The Thatcher government was committed to reducing inflation and had no hesitation about pursuing monetarist policies to achieve that goal. Inflation had increased from 8.4% to 17.2% from December 1978 to October 1979. In order to achieve the monetary targets set by the new government, the Minimum Lending Rate was increased to 17% in November. This sharp increase in interest rates contributed to the start of the recession early in 1980. It also impacted the exchange rate by attracting foreign capital inflows — by the end of 1980, the real exchange rate had appreciated 30% over its level at the end of 1978 (Maynard 1988, p. 60). Though these policies had consequences for unemployment, throughout 1980 and 1981 the Thatcher government attributed unemployment to high wage demands and a correction of "overmanning" in unproductive industries (Rieger 2018, pp. 649-650).

The Thatcher government's Medium Term Financial Strategy (MTFS) was introduced in the 1980 budget with the explicit aim of reducing inflation. By linking fiscal and monetary policy, the MTFS presented a serious commitment to long-term monetarism and inflation control. Targets for the money supply were given for the 1980–1981 year as well as for the three years following. These monetary targets were paired with fiscal targets to reduce the amount of public-sector borrowing by about 1 percentage point as a proportion of GDP. However, as the scale of the recession became clear in the second half of 1980, the monetary targets were temporarily abandoned in order to lower interest rates.

The 1981 budget aimed to bring the monetary and fiscal targets of the MTFS back on track. The tightening of fiscal policy was especially severe, with the government targeting an almost 1.5 percentage point decrease in public sector borrowing as a percent of GDP through increased taxes and cuts in government spending. Many economists were outraged by the continued monetarist stance of the government, made worse by cutting fiscal expenditure during a recession. 364 economists signed a public statement expressing their discontent, published in *The Times* on March 30, 1981.[1]

The worst fears of these economists were not realized, as the economy turned around sharply in the second half of 1981. Interest rates were lowered, inflation fell dramatically, and output growth brought the recessionary episode to a close. The Thatcher government continued to focus on fiscal restraint, but monetary targeting was no longer the central aim of the government's policy. A senior policy adviser in the Thatcher government, reflecting on the 1979–1981 period,

1. Statement printed in David Blake, "Monetarism attacked by top economists." *Times* [London, England] 30 Mar. 1981: 1. *The Times Digital Archive.*

Table 3.2: The early 1980s recession in Britain and the United States

	Length (mo.)	Length (qtr.)	Unemp. Rate Peak - During Recession	Unemp. Rate Peak - Overall	GDP Decline (PtT)
Britain					
Jan 1980-Mar 1981	15	5	9.1% (Mar 1981)	11.9% (Mar-May 1984)	-4.23
United States					
Jan 1980-Jul 1980	6	2	7.8% (July 1980)	7.8% (July 1980)	-2.18
July 1981-Nov 1982	16	5	10.8% (Nov 1982)	10.8% (Nov 1982)	-2.52

Unemployment rate peak during the recession is the highest unemployment rate within the recession dates. Unemployment rate peak overall is the highest unemployment rate during the recession-recovery cycle, including after the trough of the recession. GDP decline is from the peak to the trough (PtT) of the recession. British output source: FRED, Real Gross Domestic Product for United Kingdom, Percent Change, Quarterly, Seasonally Adjusted [CLVMNACSCAB1GQU_PCH], https://fred.stlouisfed.org/series/CLVMNACSCAB1GQUK. British unemployment rate source: ONS, Unemployment rate (aged 16 and over, seasonally adjusted) [MGSX], https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/unemployment/timeseries/mgsx/lms. US output source: FRED, Real Gross Domestic Product, Percent Change, Quarterly, Seasonally Adjusted Annual Rate [GDPC1_PCH], https://fred.stlouisfed.org/series/GDPC1. US unemployment rate source: FRED, Civilian Unemployment Rate, Percent, Monthly, Seasonally Adjusted [UNRATE], https://fred.stlouisfed.org/series/UNRATE.

wrote that they had "accidentally engineered" the recession through their monetarist policies and thus had "done the economy a great deal of damage by mistake" (Hoskyns 2000, pp. 263, 269; cited in Needham 2015).

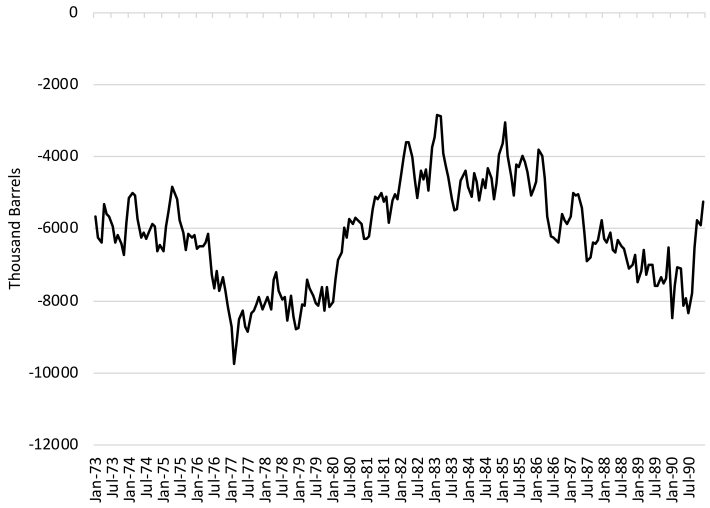
3.1.2 Comparison with the United States

In many ways, the US experience was similar to that of Britain leading up to and during the early 1980s recession, making it a good comparison case. Specifically, there are important similarities between Britain and the US in the scale of the recession, in their position as domestic oil producers, and in their decisions to combat inflation with monetarist policies.

Table 3.2 gives the headline statistics for the recession in Britain and the US. One of the major differences is that the recession in the US was a "double-dip" recession, meaning that there were two output troughs with a short period of growth between them. The NBER classifies these as two separate, brief recessions. Each dip of the double-dip recession in the US represented about half of the peak-to-trough decline in the annualized GDP growth rate for Britain, making the recession in the US and Britain broadly comparable. The unemployment rate reached during the recession is also similar, given in the fourth column, of about 10%. However, while employment recovered almost immediately in the US, unemployment continued increasing after the end of the recession to almost 12% in Britain. It is also worth noting the slightly different dates of the recessions in Britain and the US. Though they start at the same time, the second dip of the US recession occurs after the recession concluded in Britain.

The US was also shielded somewhat from the effects of the Second Oil Crisis price shock by domestic oil production. As in Britain, domestic oil production in the US was made more

Figure 3.4: Net exports of crude oil from the United States, 1973–1990



Source: US Energy Information Administration, "U.S. Net Imports of Crude Oil and Petroleum Products"

profitable by the 1973 oil crisis. Oil production increased in the US in the late 1970s as the Trans-Alaskan pipeline was operationalized and the Prudhoe Bay oil field was developed. Domestic oil production was further encouraged by the deregulation of domestic oil prices under the Carter and Reagan administrations. Figure 3.4 shows that, while the US did not become a net exporter of oil, net exports became less negative leading up to the 1979 oil crisis, putting them in a similar (though less advantageous) position than Britain.

Like Britain, the US also faced a significant challenge in combating inflation. Under the Nixon administration, wage and price controls were put in place from 1971 to 1974, but these were largely ineffective, especially in the 1973 oil crisis conditions. Ford's "Whip Inflation Now" program, which encouraged voluntary actions such as carpooling and starting vegetable gardens, also failed. Targets for monetary aggregates were set from 1975 and initially extended one quarter at a time. The Humphrey-Hawkins Act, signed into law by the Carter administration in 1978, required the Federal Reserve to set annual targets for monetary aggregates and report on their progress to Congress. This foray into monetarism was gentle at first, similar to Britain, as the Fed continued to prioritize full employment.

After inflation increased dramatically in 1979, averaging 10.75% from January to September, the Fed held a secret meeting on October 6 to change policy. Under Chairman Volcker, the Fed determined that it was essential to limit inflationary expectations by taking a credible anti-inflationary stance. To do this, they changed their "tolerance ranges" for money supply growth into actual quarterly targets, allowing the federal funds rate to increase to find the level needed to meet the targets (Walsh 2004). The federal funds rate increased dramatically through the

end of 1979, peaking in April 1980 at 17.6%. This monetarist policy was very similar to that pursued by the Thatcher administration at the same time. In both countries, the high interest rates contributed to the start of the recession in 1980.

The US did not have as strong an emphasis on fiscal measures to control inflation as Britain. However, the Carter administration did introduce the Special Credit Restraint Program (SCRP) in March of 1980, which depressed the money supply and thus caused a dramatic fall in interest rates. This program restricted bank lending to limit credit creation, increased the reserve requirements for large banks, and instituted a surcharge on the discount rate for large banks. The SCRP so effectively limited money supply growth that the federal funds rate, at that time left to adjust to meet the new money supply targets, fell to a level allowing the economy to once again expand. The Fed then had to override its money supply targeting system to keep monetary policy tight (Hetzel 1986). Their correction ended up overshooting the target, leading the federal funds rate to reach 19.04% in July 1981. This started the second dip of the US's double-dip recession. Monetary policy was loosened, and eventually monetary targeting was abandoned with the end of the recession in 1982.

Thus, after facing difficulties controlling inflation in the 1970s, the US and Britain both experimented with monetarism over the 1979–1981 period. Though their flavors of monetarism differed slightly, this was a broadly similar monetary policy response to the challenges of inflation and recession. Taken with their domestic oil production and the similar dates and scale of the recession, the US makes an interesting comparison case for Britain during this period.

3.2 Jobless recovery from the early 1980s recession in Britain

To understand the persistent unemployment in Britain following the early 1980s recession, it is helpful to introduce the analytical framework of "jobless recoveries." A recession is said to have a jobless recovery if output recovers but zero or negative employment growth persists for an extended period of time afterward. Jobless recoveries are typically associated with the United States in the 1990–1991, 2001, and 2007–2009 recessions. However, it can be argued that the early 1980s recession in Britain was followed by a jobless recovery, even once issues of recession dating and compositional effects are taken into account.

3.2.1 Jobless recoveries in the United States

The term "jobless recovery" was coined to describe the lackluster economic recovery of the United States following the early 1990s recession (Nasar 1991). Despite output beginning to expand in March 1991, unemployment continued rising for more than a year. The recovery was deemed jobless because of this GDP growth without commensurate employment growth.

Jobless recoveries were popularized as an analytical framework after the early 2000s recession in the United States, which was also followed by a slow employment recovery. In 2003, Governor Ben Bernanke gave a speech summarizing some of this early research (Bernanke 2003). He noted that the best policy response to a jobless recovery depended critically on the cause of the jobless recovery. This led to a wave of academic publications on jobless recoveries, seeking to identify possible causes of the phenomenon.

The employment recovery following the 2009 Great Recession in the United States was especially slow. It took over a year after the end of the output recession for employment to stop contracting, and then another four years for employment to reach its pre-Recession level. Figure 3.5 summarizes the experience of the United States in the five recessions from 1971 to 2019. The recessions ending in 1975 and in 1982 saw strong employment recoveries from about two months after the recession trough. In stark contrast, the recessions ending in 1991, 2001, and 2009 all had a significantly delayed employment recovery after the end of the recession.

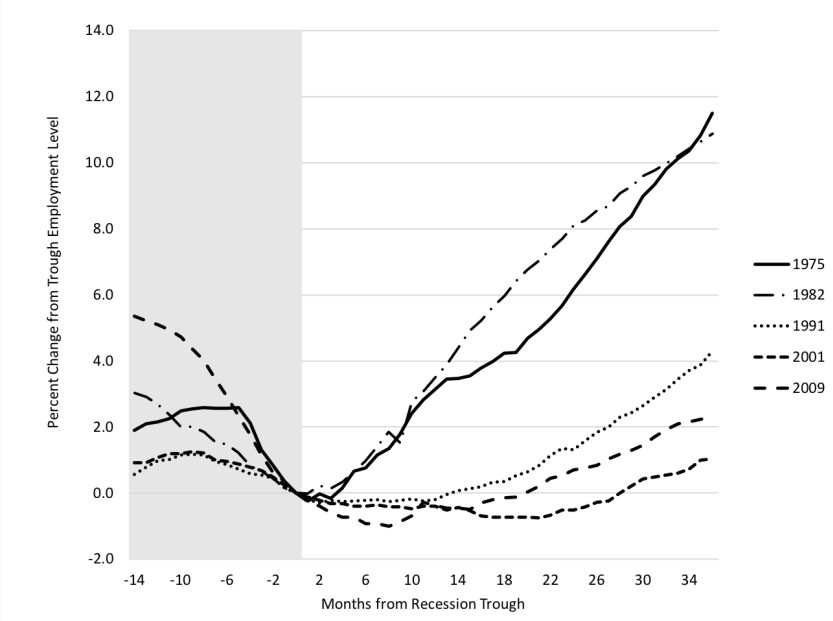
Recent research on jobless recoveries thus seeks to explain not only why output can rebound without employment, but also why recent recession recoveries in the US have been more jobless than earlier recoveries. Jobless recoveries have been most closely associated with the US in academic research and in popular media, and little is known about jobless recoveries in other developed countries.

3.2.2 Jobless recovery from the early 1980s recession in Britain

Most research on jobless recoveries has focused on the United States because their early 1990s, early 2000s, and 2009 recession recoveries were all jobless. However, a close examination of employment data for Britain over the same period reveals that the early 1980s recession was just as jobless as these later US recessions.

One way to observe jobless recoveries is to count the number of months it took for employment to rebound after the output trough of the recession was reached. Jaimovich and Siu (2020, p.

Figure 3.5: Employment growth after recent recessions in the United States



Analysis using U.S. Bureau of Labor Statistics, All Employees, Total Nonfarm [PAYEMS], retrieved from FRED, Federal Reserve Bank of St. Louis.

Table 3.3: Employment recovery after recessions, United States and Britain

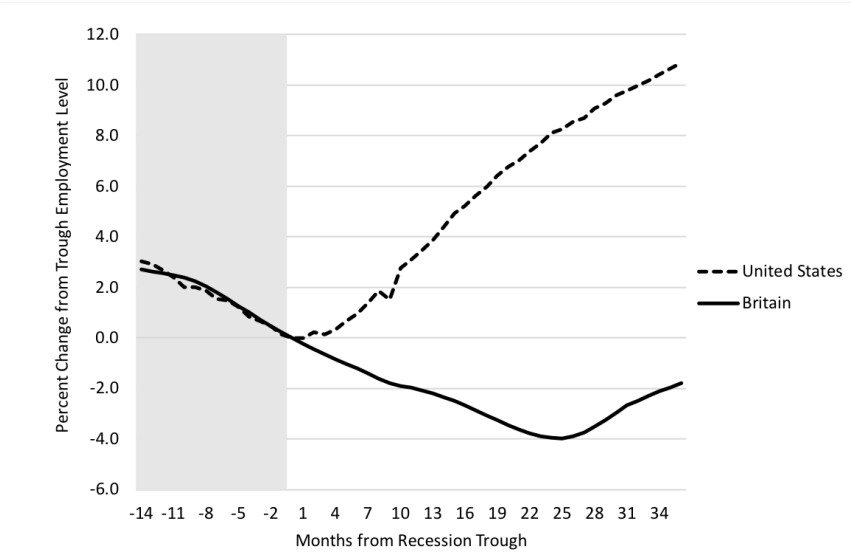
	1974–1975	1981–1982	1991	2009
United States				
months to turnaround	4	2	17	23
months to trough level	10	4	31	76
Britain				
months to turnaround	11	25	29	11
months to trough level	32	52	73	15

US entries from Jaimovich and Siu (2020). Data from 2001 US recession omitted because of lack of British comparison. Entries for Britain are author's calculations on data from the Office of National Statistics, Number of People in Employment [MGRZ] series.

132) find that before 1990, it took 4 months on average for employment to expand after a recession in the US, while after 1990 it took 21 months on average. They also count the number of months it took for employment to recover to the level it was at when the recessions ended, finding that before 1990, it took 10 months on average, while after 1990 it took 54 months on average. Their calculations for the US recessions ending in 1975, 1982, 1991, and 2009 are given in the first two rows of Table 3.3.

The final two rows of Table 3.3 give the same calculations for Britain. These figures do not show a stark divide between pre-1990 and post-1990 recessions. Rather, the early 1980s recession in Britain stands out as an early example of a jobless recovery. It took 25 months for employment to stop contracting after the end of the recession in Britain, and it took 52 months

Figure 3.6: Employment growth after the early 1980s recession, Britain and United States



Analysis using U.S. Bureau of Labor Statistics, All Employees, Total Nonfarm [PAYEMS], retrieved from FRED, Federal Reserve Bank of St. Louis for the US, and Office of National Statistics, Number of People in Employment [MGRZ] series for Britain. The trough date for the US is November 1982 and the trough date for Britain is March 1981.

for employment to recover to its level at the trough. Jobless recoveries thus seem to have begun earlier in Britain than in the US.[2]

The employment recovery following the early 1980s recession in Britain appears especially slow when compared to the employment recovery in the US from that recession. Figure 3.6 gives the change in employment from the level at the end of the recession in the US and Britain. Employment rebounded rapidly in the US after the end of the recession, but it continued to decline for many months in Britain. Thus, the early 1980s recessions saw a jobless recovery in Britain but not in the US.

Further evidence for the early 1980s jobless recovery in Britain

To designate a recession recovery as jobless, it is important to consider two possible complications — recession dating and compositional effects.

A jobless recovery requires output to be expanding while employment is stagnant or contracting for many months. If the recession trough actually occurred at a later date than used in the analysis, one could falsely believe the economy was in a jobless recovery when in fact it was just in an extended recession. This makes it important to clearly establish the dating of the

2. It is also notable that the Great Recession ending in 2009 did not have a jobless recovery in Britain, while it had a prolonged jobless recovery in the US.

output recession.

The early 1980s recession in Britain is typically considered to have been five quarters long, from the first quarter of 1980 through the first quarter of 1981. As shown above, employment did not stop contracting until the second quarter of 1983, indicating a prolonged jobless recovery. However, there is reason to be concerned that production had not actually begun expanding in a meaningful way after the first quarter of 1981. The national GDP estimates on which the traditional recession dates are based include oil output from Britain's Continental Shelf. It is possible that North Sea oil production artificially inflated output growth during this time, and that on-shore production remained in an extended recession.

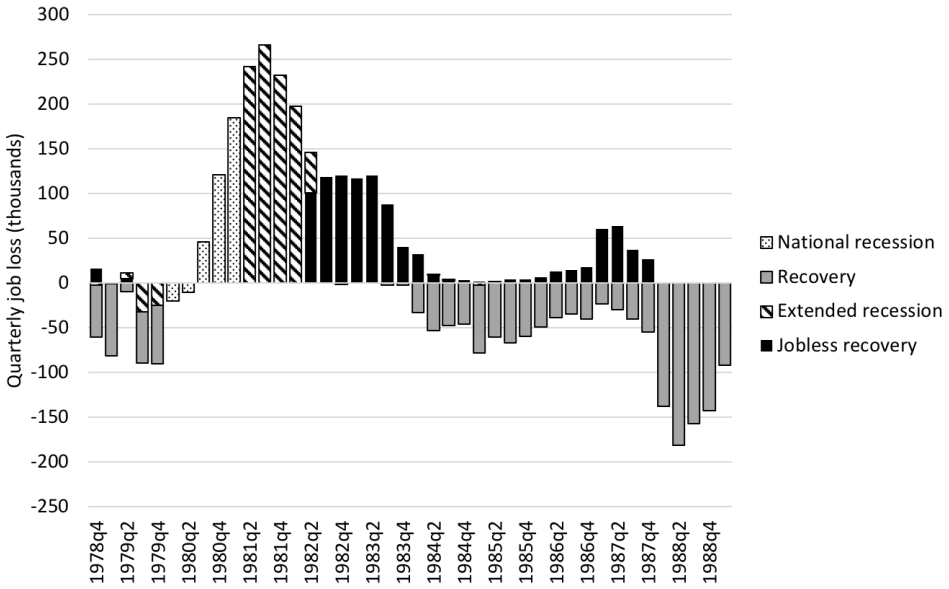
Koop et al. (2018) reconstruct quarterly GVA estimates by region back into the 1970s, excluding production from the Continental Shelf. Their estimates suggest that the national recession was only two quarters longer than traditionally thought, through the third quarter of 1981. Additionally, their estimates by region show that all regions experienced output expansion by early 1982. Thus, even with more generous recession dates excluding North Sea oil production, the recovery from the early 1980s recession was jobless for at least a year.

A second concern is compositional effects. National output measures are composed of the output from different regions of a country. It is possible for national output to show that a recession is over because of a strong recovery in some regions, even though other regions still face recession conditions. Burger and Schwartz (2018) find that these compositional effects played a role in the early 1990s and early 2000s recession recoveries in the US. Many states had extended recessions after the national output trough, rather than jobless recoveries. The national jobless recovery phenomenon could thus be partially attributed to output figures improving in some regions while employment recovery dragged in other regions.

Using the regional GVA data from Koop et al. (2018), it is possible to explore whether compositional effects played a role in the early 1980s jobless recovery in Britain. Figure 3.7 demonstrates that compositional effects did not drive this jobless recovery. Total job losses in each quarter are disaggregated by whether they occurred in a region experiencing an extended recession, a jobless recovery, or employment growth. Regions were in an extended recession if they had both output and employment contraction even after the national recession trough, in a jobless recovery if they had output growth but employment contraction, and in a traditional recession recovery if both output and employment were expanding.

Figure 3.7 shows that all regions had extended recessions through the second quarter of 1982

Figure 3.7: Quarterly job loss in Britain decomposed by recovery status of region, 1978–1988



Analysis using quarterly GVA data from Koop et al. (2018) and quarterly regional employment data from the 1987 and 1989 *Employment Gazette* Historical Supplements

based on the Koop et al. (2018) GVA data. Subsequently, a jobless recovery occurred uniformly in regions through the third quarter of 1983. While a jobless recovery continued in some regions through 1987, other regions began seeing employment recovery during those years. Thus, while compositional effects are important to consider when classifying a recession recovery as jobless, it is clear that the recovery from the early 1980s recession in Britain was uniformly jobless for almost two years.

3.3 Possible causes of jobless recoveries

Since 1990, every recession recovery in the US has been jobless, with unemployment remaining at a high level for months or years into the recovery despite output rebounding. In recent years, the academic literature on jobless recoveries in the US has flourished. There are three main strands of research on the causes of jobless recoveries: industrial reallocation and structural change, job polarization and technological change, and employment overhang and reorganization.[3] This section summarizes the state of the literature surrounding each explanation before they are considered for the British case in the rest of the chapter.

3. There are other proposed explanations for jobless recoveries not discussed here including liquidity traps (Schmitt-Grohé and Uribe 2017), wage rigidities (Shimer 2012), declining business dynamism (Pugsley and Sahin 2019), on-the-job search (Eeckhout and Lindenlaub 2019), and unemployment benefits (Mitman and Rabinovich 2014).

The connection between the reallocation of labor across industries and jobless recoveries was first put forth in Groshen and Potter (2003). They argue that permanent reallocation of jobs across sectors has increased since the 1980s in the US, and because labor reallocation is costly and takes time, the early 1990s and early 2000s recessions were consequently more jobless. Their measure of reallocation compares industries' job growth during a recession with their job growth one year after a recession to classify industries as experiencing structural losses, structural gains, procyclical flows, or countercyclical flows. Then, using a variety of descriptive statistics, they show that there was a shift toward permanent job losses rather than temporary layoffs in the 2001 recession and that industries undergoing structural change accounted for a larger share of employment than during earlier recessions. They conclude that structural change played a larger role in the early 1990s and early 2000s recession recoveries than in previous US recessions.

The coarse measure of reallocation used in Groshen and Potter (2003) has been the subject of critique based on an older literature on the relationship between industrial reallocation and business cycle unemployment. Lilien (1982) constructed a basic measure of structural shifts to argue that industry labor reallocation played a significant role in the cyclical unemployment of the 1970s. Abraham and Katz (1986) argued that Lilien's measure confounded cyclical and structural effects: because industries have different cyclical sensitivities, reallocation can occur during business cycles without sectoral reallocation in a long-term structural sense. Based on this older debate, Aaronson, Rissman, and Sullivan (2004) criticize Groshen and Potter's measure of reallocation for failing to take into account the differing cyclical sensitivities of industries. By constructing their own measure of reallocation, Aaronson et al. find that industry labor reallocation actually decreased in recent recessions. A recent paper by Chodorow-Reich and Wieland (2020), discussed below, also finds that reallocation has trended downward in the US since the early 1980s.

When considering the role of structural change in business cycles, however, the absolute trend in reallocation might not be as important as the relative volatility of reallocative and aggregate shocks. Garin, Pries, and Sims (2018) find that from 1984 to 2014, the moderation of business cycle volatility has increased the importance of reallocative (sector-specific) shocks relative to aggregate shocks in the US, even though the absolute volatility of reallocative shocks has remained constant. Using an islands model with two sectors of production, they show that the increased relative importance of reallocative shocks slows employment adjustment and also explains the declining procyclicality of productivity. When calibrated, their model explains

salient features of the recent jobless recoveries in the US.

Two other papers provide support for the role of industry labor reallocation in jobless recoveries. Olney and Pacitti (2017) use state-level panel data to estimate the effect of deindustrialization on the length of employment recovery after a recession. They find that deindustrialized economies have slower recession recoveries and that the shift toward service industries in the US has lengthened recession recoveries by 40%. Chodorow-Reich and Wieland (2020) find that during a recession and recovery period, a one standard deviation increase in reallocation increases local unemployment rates by 0.5 percentage points by the employment trough. Though their work does not directly address disparities between output and employment recovery, it demonstrates that reallocation associated with structural change intensifies unemployment during recessions — confirming somewhat Lilien's original hypothesis.

A related literature links jobless recoveries to the emergence of job polarization in recent decades in the United States. Job polarization, or the disappearance of routine occupations, has been accelerating in the United States since the late 1980s. Jaimovich and Siu (2020) connect the phenomenon of job polarization with jobless recoveries in a two-pronged argument. First, they find that job polarization is sparked by business cycle downturns, calculating that 88% of jobs lost in routine occupations occurred within a year of a recession. Second, they argue that jobless recoveries are due to jobless recoveries in routine occupations, rather than across all occupational classes. They find that in the pre-1990 recessions, employment in routine occupations rebounded within 12-16 months of the output trough. But, in the three most recent recessions, employment in routine occupations did not recover. Because employment in non-routine occupations was relatively constant during these recessions, they conclude that jobless recoveries in routine occupations caused the aggregate jobless recovery phenomenon.

The link between job polarization and jobless recoveries in the United States is bolstered by research using alternative empirical strategies. Gaggl and Kaufmann (2020) use statistical methods to classify occupations into routine and non-routine clusters, and then identify a structural break around 1990 in these clusters' cyclical dynamics, corresponding with the emergence of jobless recoveries. Burger and Schwartz (2018) find that the decline in a state's routine employment share is a significant predictor of state-level jobless recoveries in a probit regression. Graetz and Michaels (2017) analyze a panel of 17 developed countries to conclude that technological change has caused recent jobless recoveries through job polarization in the United States but not elsewhere. Finally, Waddle (2019) constructs a modified growth model where managerial

resources are offshored during recessions that is consistent with jobless recovery outcomes.

These explanations for jobless recoveries link the phenomenon to long-run trends in the US labor market. In contrast, some research finds that jobless recoveries emerge from firm or labor market dynamics over the business cycle. Particularly, if firms delay labor restructuring to recessionary periods, employment overhang could cause the jobless recovery phenomenon.

In an early contribution, Koenders and Rogerson (2005) note that the jobless recoveries of the early 1990s and early 2000s recessions in the US followed long expansionary periods. They propose a model in which firms accumulate staffing inefficiencies throughout long expansionary periods, putting off firm-level labor reorganization until recessions. The extended restructuring period of firing or non-hiring during business cycle downturns then delays employment growth following a recession.

Bachmann (2012) builds on this work by developing a quantitative model for the 1991 and 2001 recession recoveries. Like in Koenders and Rogerson (2005), in Bachmann's model, the jobless recovery outcome is driven by employment overhang. Firms have excess employment in recessionary periods because of the costs of hiring and firing, so as the economy recovers, they do not need to hire right away. In some cases, they may increase employment on the intensive margin rather than the extensive margin during a weak recovery, deepening jobless recovery effects. This employment overhang is closely associated with labor hoarding, which may arise if new workers in a firm are less productive than the old because of firm- or industry-specific human capital (see Penrose 2009, pp. 44-49).

Similarly, Berger (2018) argues that firms "trim fat" by cutting costs during recessions, but his model links this restructuring to the trend of countercyclical productivity in recent US recessions. During expansionary periods, unproductive workers remain on firm payrolls because hiring and firing are costly, and because workers' productivity might be initially unknown. During recessions, the least productive workers are laid off, which increases average labor productivity. This permits firms to meet the increasing demand during recovery periods without hiring, leading to a jobless recovery.

A central challenge of these models of labor overhang is distinguishing the three most recent US recessions from earlier recessions. If cyclical restructuring is a common feature of business cycles, why did earlier recessions not have jobless recoveries? Berger (2018) points to the reduction of unionization after the 1980s as the key change permitting average labor productivity to increase during recessions. Bachmann (2012) notes that the early 1990s and early 2000s

recessions were shallow relative to pre-1990 recessions, allowing for jobless recoveries owing to restructuring. Lastly, Koenders and Rogerson (2005) circumvent the problem altogether by arguing that the 1970 US recession, which followed a long period of expansion, did in fact have a jobless recovery.

3.3.1 Contribution to the literature

Despite the significant progress that has been made, jobless recoveries in developed economies have primarily been studied from a United States perspective.[4] It is unclear whether other developed countries have experienced jobless recoveries, and if so, whether their jobless recoveries had similar drivers. The level and type of industry labor reallocation, job polarization, and cyclic firm restructuring all could vary across institutional settings, as well as the date at which jobless recoveries first emerged.

The present chapter aims to address this limitation by identifying an early example of a jobless recovery in Britain. This pushes back the date at which jobless recoveries were thought to have begun (from the early 1990s to the early 1980s) and offers a cross-national comparison. Industry labor reallocation and job polarization, two of the possible causes of jobless recoveries identified in the literature on the US, are tested for the early 1980s British case. The analysis of industry labor reallocation is enhanced by considering the interaction of reallocation across regions and industries. Cyclic firm restructuring and employment overhang, however, are not considered in the rest of the chapter. This is because these mechanisms are most significant in recessions that follow long expansionary periods, which was not the case for the early 1980s recession in Britain.

3.4 Labor reallocation across industries and the jobless recovery

Employment recovery will take more time after a recession if significant labor reallocation across industries is occurring. This is because reallocation takes longer than simply recalling workers from temporary layoffs or rehiring workings in the same industries. In many cases, reallocation requires new jobs to be created in different sectors. It often involves costly search, retraining, or mobility for workers that are moving between industries. As the composition of industries changes in the economy, entirely new groups of workers might also be brought into the labor

4. Graetz and Michaels (2017) is a notable exception. There is also a growing literature on jobless recoveries in developing economies.

supply. These adjustments can all slow the responsiveness of employment to economic growth following a recession.

A large amount of industrial reallocation in Britain in the early 1980s could thus help explain the slow employment recovery, especially if similar levels of reallocation did not occur in countries with fast employment recoveries like the US. By evaluating how the industrial structure of both countries changed during this period, this section argues that reallocation was more dramatic and persistent in Britain than in the US during the early 1980s. This suggests that industry labor reallocation played an important role in the jobless recovery in Britain.

3.4.1 Data

Comparing the changes in industrial structure in Britain and the US requires similar data on employment by industry and geographic areas in both countries.

In Britain, the workforce jobs series offered by the Office of National Statistics (ONS) gives detailed industry and region employment data. The workforce jobs estimates are establishment-based, relying primarily on surveys sent to businesses and employers in the private and public sector. While workforce jobs data has been collected since 1959, workforce jobs by industry and region are only available to download from the ONS going back through 1981. This limits the usefulness of the ONS workforce jobs data for evaluating industry labor reallocation during the early 1980s recession.

The precursor to this series, however, was published in the *Employment Gazette* during the 1970s and early 1980s, covering the entire period of interest. Printed tables in the Historical Supplement to the *Employment Gazette* conveniently summarize these monthly publications. Digitizing Table 1.5 of the 1987 and 1989 Historical Supplements thus gives data on employment by industry and region for the entire recession and recovery period. The data are quarterly from June 1978, covering England's eight Standard Statistical Regions, Scotland, and Wales.

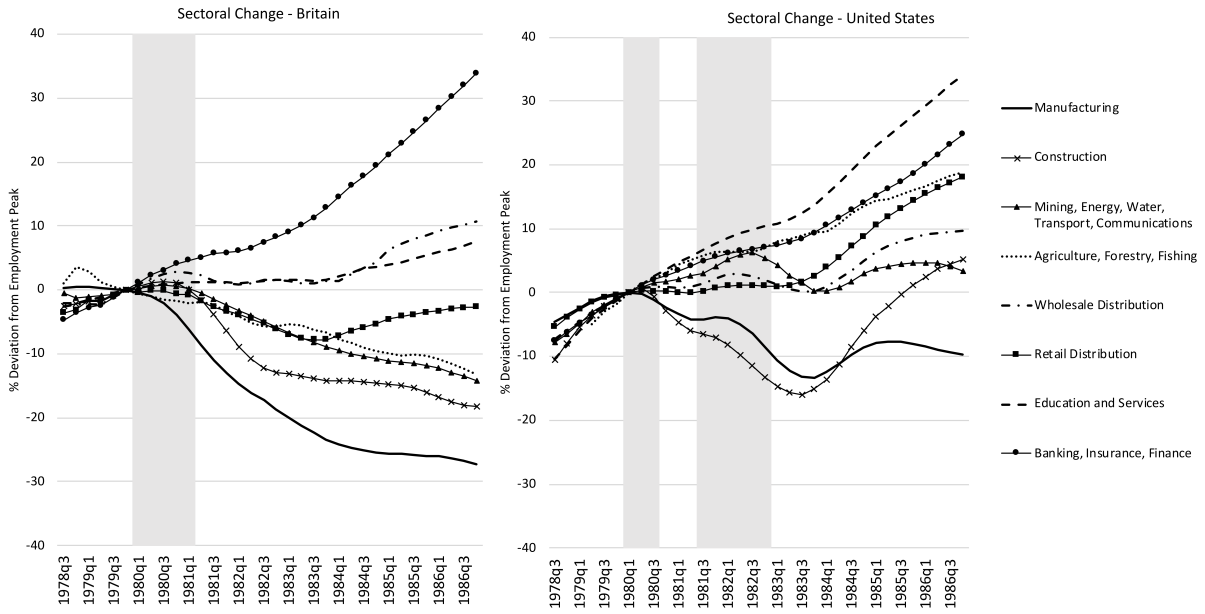
Industrial employment data is available for the US in the Quarterly Census of Employment and Wages (QCEW). Like Britain's workforce jobs data, the QCEW is establishment-based, constructed from unemployment insurance records and business surveys. Quarterly employment data is available on the state and county level from 1975 for detailed industry categories, thus spanning the entire recession-recovery period. Though the QCEW provides the best estimate of short-term changes in the industrial composition of employment, at very refined geographic areas

and industry categories, some employment estimates are "non-disclosed" for privacy reasons. More details on how disclosure restrictions affected this analysis can be found in Appendix B.1. The US data is limited to the private sector throughout in order to minimize the effect of disclosure restrictions.[5]

3.4.2 Sectoral change in the early 1980s

Figure 3.8 shows the changing composition of industries in Britain and the US in the early 1980s.[6] The highlighted areas indicate the recessionary periods for each country. After the recession, industries in Britain had extremely varied and persistent changes in employment. In contrast, industries in the US fared more similarly, with employment declining in many industries during the recession but then rebounding shortly after.

Figure 3.8: Sectoral change in Britain and the United States, 1978–1986



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW

Comparing the experiences of specific industries, there are three additional conclusions. First, the contraction in manufacturing and in construction is more dramatic and persistent in Britain than in the US. While manufacturing and construction rebounded in the US after the end of the recession, contraction continued for many years following the recession in Britain. Second,

5. The public administration and defense sector is excluded for both the US and Britain in this section. Nationalized British industries in other sectors are included, as this represented a large share of British employment and unemployment in the 1980s. Nationalized industries were uncommon in the US, so all public sector employment is excluded.

6. Sectors were standardized between the US and Britain. Public administration and defense excluded. Data for the US is private sector only.

the mining and utilities sector declined steadily in Britain, whereas in the US employment only contracted in this sector with the second recession. Finally, both countries saw remarkable increases in employment in finance and in services. British employment growth was dominated by banking and finance, while the US was buoyed by strong growth in education and other services.

While Figure 3.8 demonstrates significant differences in employment across industries during the recession and recovery, there are some outstanding questions. Should the changes in employment by industry in Britain be interpreted as permanent, structural changes, or were they temporary changes because of the different sensitivities of industries to the business cycle? How is the comparison complicated by the different recession dates for Britain and the US? Table 3.4 sheds light on these questions by presenting figures for complete recession-recovery periods in terms of employment. The time period analyzed for each country is the quarter just before the employment downturn through the quarter when national employment recovered to its pre-recession level. For Britain, this means that the table shows the changes in employment shares from the last quarter of 1979 through the third quarter of 1987, which is when the total number employed reached its level from the end of 1979. For the US, the corresponding dates are the first quarter of 1980 through the fourth quarter of 1983.

By analyzing the complete cycle of employment downturn and recovery, Table 3.4 nets out temporary changes in employment owing to the business cycle. With nearly the same number of people employed, the second and third columns of the table show how the industrial structure of each country changed over the recession and recovery period. In general, it is remarkable how similar the industrial structures of Britain and the US were during this period. This is further evidence that the comparison between the two countries is a helpful one. However, it is also notable that the industrial structure changed more significantly in Britain than in the US over the recession-recovery cycle.

The decline in the employment share of manufacturing for Britain is particularly dramatic. As a share of private-sector employment, manufacturing fell from 34.6% of employment to 26.6% of employment at the end of the cycle. This decline of 8 percentage points is much more than the decline of about 4 percentage points in the US, bringing the share of manufacturing to a similar level in both countries.

The share of employment in education and services increased in both Britain and the US to around 24% of all employment. However, banking and finance saw a much more dramatic

Table 3.4: Change in industry share of employment over 1980s recession-recovery

	Share of Emp. Pre-Recession	Share of Emp. Post-Recovery	Level Change in Emp. Share
United Kingdom (1979q4–1987q3)			
Agriculture, Forestry, Fishing	1.78%	1.68%	-0.09
Mining, Energy, Transport, Comm.	10.48%	9.31%	-1.17
Manufacturing	34.55%	26.55%	-8.00
Construction	5.77%	5.12%	-0.65
Wholesale Distribution	9.70%	11.26%	1.56
Retail Distribution	10.36%	10.87%	0.51
Banking, Insurance, and Finances	7.85%	11.52%	3.67
Education and Services	19.50%	23.67%	4.17
Unclassified	0.00%	0.00%	0.00
Total Establishment Employment	*20,641,750*	*19,426,000*	
United States (1980q1 - 1983q4)			
Agriculture, Forestry, Fishing	1.39%	1.53%	0.14
Mining, Energy, Transport, Comm.	7.56%	7.61%	0.05
Manufacturing	28.76%	25.03%	-3.73
Construction	6.20%	5.28%	-0.92
Wholesale Distribution	7.16%	7.20%	0.04
Retail Distribution	20.53%	21.14%	0.61
Banking, Insurance, and Finances	6.65%	7.30%	0.65
Education and Services	21.60%	24.67%	3.06
Unclassified	0.15%	0.24%	0.09
Total Establishment Employment	*73,196,104*	*72,936,272*	

Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW. Public administration and defense excluded. Data for the US is private sector only.

increase over the recession-recovery period in Britain than in the US. The employment share of banking and finance increased from 7.9% before the recession to 11.5% after the employment recovery — reaching a larger employment share than the US (7.3%).

Finally, there was a decrease in the share of employment in the mining, energy, water, transport, and communications sector in Britain but not in the US. However, the share of employment in this large category remained higher in Britain than in the US at the end of the cycle.

Taken together, Figure 3.8 and Table 3.4 demonstrate that the early 1980s recession and recovery coincided with more significant structural change in Britain than in the US. On a sectoral level, declining industries in Britain did not recover after the recession. In contrast, there was some rebound in employment for declining industries in the US during the recovery. This led the industrial composition of employment in Britain to change more dramatically over the recession and recovery period than in the US. There was an especially large decline in the share of manufacturing and increase in the share of banking and finance in Britain relative to the US.

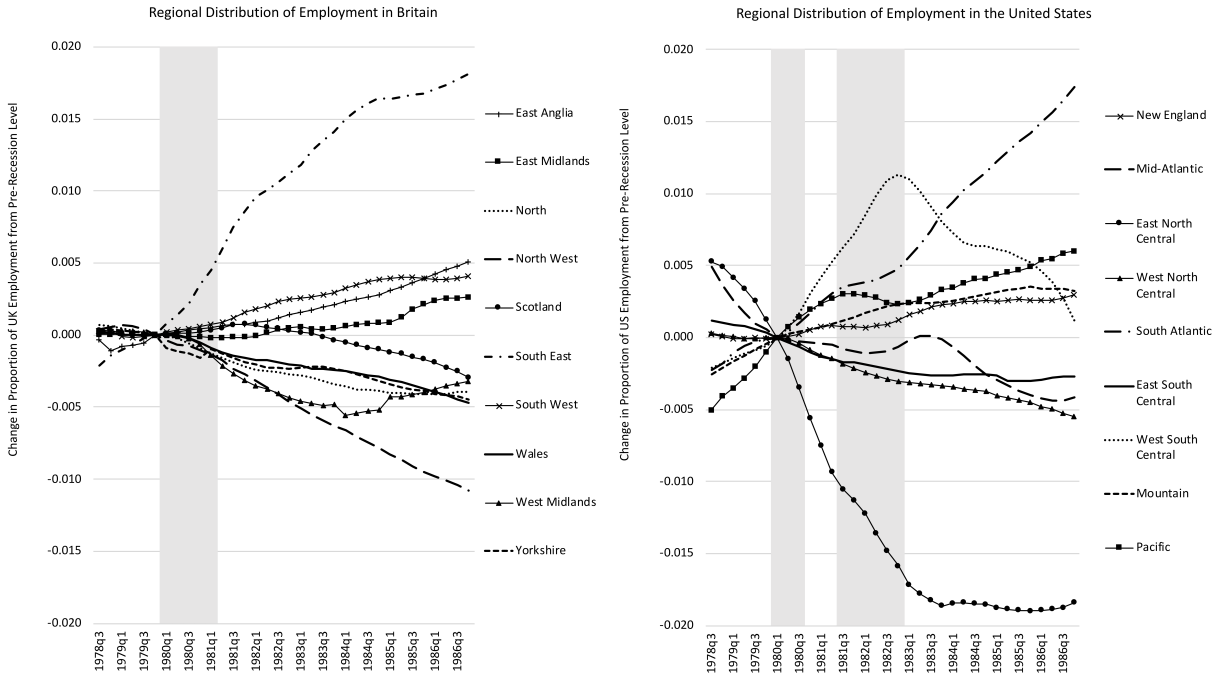
3.5 Regional disparities and industry labor reallocation

One of the major narratives to emerge from the early 1980s recession and recovery was the growing divide between the economic performance of the South of England, led by London and the surrounding areas, and the North of England, Scotland, and Wales. This section explores these trends in regional employment, analyzing how these regional effects interacted with reallocation across industries and might have contributed to the jobless recovery. While significant differences in regional employment are identified for both Britain and the US, unlike in the US, the divergent performance of regions in Britain is found to be primarily because of the differing composition of industries in each region.

3.5.1 Regional shifts in employment

Figure 3.9 shows the level change in the proportion of employment in each region in Britain and the US over the early 1980s recession and recovery. In both countries, the regional composition of employment changed significantly over the period, but regional adjustment seems more sensitive to the recession in the US than in Britain.

Figure 3.9: Regional change in Britain and the United States, 1978–1986



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW

In Britain, there was exceptionally rapid growth in the share of employment in the South East region including London. East Anglia and the South West also expanded their share of employment, and there was a slight increase in share for the East Midlands as well. In contrast, there was a consistent, dramatic decline in the share of employment in the North West over the period. The West Midlands, North, Yorkshire, and Wales regions all also had steadily contracting employment shares. While the regional changes in employment across Britain were likely affected by the business cycle downturn, there is little change in the pattern of adjustment once the recovery begins.

In the US, there was a steep decline in the employment share of the East North Central region (Illinois, Indiana, Michigan, Ohio, and Wisconsin) during the recession, tapering off during the recovery. In the opposite direction, the employment share increased for the West South Central region (Texas, Louisiana, Oklahoma, and Arkansas) during the recession and then decreased during the recovery. The South Atlantic region (Maryland, DC, Virginia, Florida, Georgia, North Carolina, South Carolina, West Virginia, Delaware) had consistent employment share growth, which picked up slightly during the recovery. Finally, the Pacific states, Mountain states, and New England states expanded their share somewhat over the period, while the West North Central, East South Central, and Mid-Atlantic states decreased their employment share.

Table 3.5: Change in regional share of employment over 1980s recession-recovery

	Share of Emp. Pre-Recession	Share of Emp. Post-Recovery	Level Change in Emp. Share
United Kingdom (1979q4–1987q3)			
South East and London	33.04%	34.75%	1.72
North West	11.86%	10.98%	-0.88
West Midlands	9.93%	9.47%	-0.46
Scotland	9.25%	8.90%	-0.34
Yorkshire	8.88%	8.40%	-0.48
South West	7.00%	7.58%	0.58
East Midlands	6.89%	7.09%	0.21
North	5.51%	5.08%	-0.43
Wales	4.55%	4.23%	-0.32
East Anglia	3.09%	3.51%	0.41
Total Establishment Employment	*20,641,750*	*19,426,000*	
United States (1980q1–1983q4)			
East North Central	19.20%	17.33%	-1.87
Mid-Atlantic	16.78%	16.77%	-0.01
South Atlantic	15.37%	16.23%	0.86
Pacific	14.67%	15.00%	0.33
West South Central	9.86%	10.67%	0.81
West North Central	7.61%	7.28%	-0.33
New England	6.19%	6.42%	0.23
East South Central	5.58%	5.32%	-0.26
Mountain	4.73%	4.98%	0.25
Total Establishment Employment	*73,196,104*	*72,936,272*	

Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW. Public administration and defense excluded. Data for the US is private sector only.

Table 3.5 shows the change in the regional distribution of employment for Britain and the US over the same recession-recovery periods as in Table 3.4. Comparing the regions with a growing employment share over the cycle, the South East region in Britain stands out for attracting significant employment growth, more than the top regions of the US. In contrast, there was a dramatic flight away from the East North Central region in the US that was larger than that from declining regions in Britain. This indicates that the dominant regional trend in Britain was the growth of employment in London and the South East, providing employment opportunities for workers when other regions were struggling. In contrast, the key story in the US was the deterioration of employment opportunities in the East North Central region, possibly dispersing workers to other regions of the country.

To better understand how these regional employment changes interacted with industry labor reallocation, an index of industrial reallocation can be constructed for each region. Adapted from Chodorow-Reich and Wieland (2020), this index for the amount of labor reallocation across industries relates the relative employment growth or decline in an industry in a region to the overall employment growth or decline in the region. The index is weighted by the employment share of the industry in the region.

The quarterly index of industrial reallocation is calculated as

$$R_{a,t,t+1} = 4 \cdot \frac{1}{2} \sum_{i}^{I} s_{a,i,t} \left| \frac{1 + g_{a,i,t,t+1}}{1 + g_{a,t,t+1}} - 1 \right|$$

where

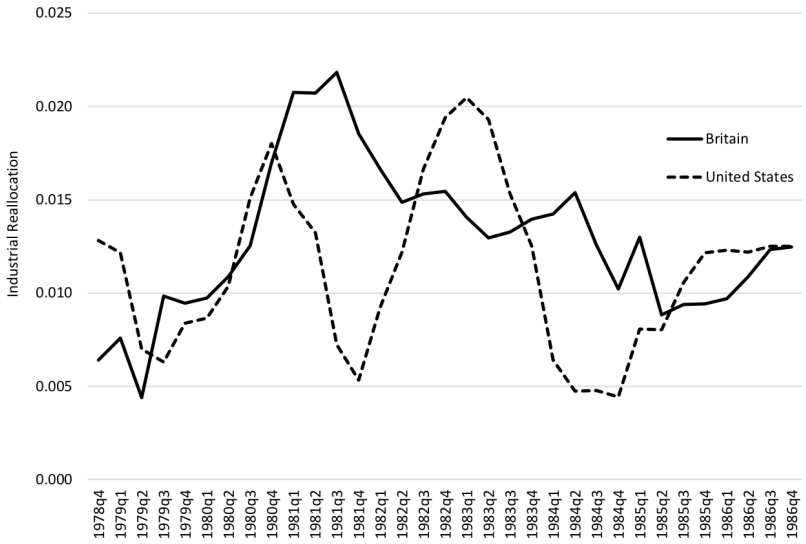
- $s_{a,i,t}$ is the employment share of industry i in area a at time t
- $g_{a,i,t,t+1}$ is the growth of employment in industry i in area a from time t to $t+1$
- $g_{a,t,t+1}$ is the total growth of employment in area a from time t to $t+1$.

The percent difference in the growth of employment in an industry and area from the overall growth in employment in the area is calculated for all industries. Intuitively, in regions with a changing composition of industries, some industries will have higher employment growth than the average for the area, while others will have lower growth. In regions where the industrial composition is stable, all industries will have employment growth near the average. These differences (in absolute value) are summed, weighted by the share of employment in the area that is associated with each industry. The sum is then scaled by $\frac{1}{2}$ to create an index that

takes on values between 0 and 1. Multiplying by 4 translates the quarterly reallocation into an annualized quarterly flow.

This index makes it easy to compare reallocation across geographic areas and across countries. A higher value of R, closer to 1, indicates that there was more change in the industrial composition of a region over the time period. A lower value of R, closer to 0, indicates little change in the industrial composition in a region.

Figure 3.10: National industrial reallocation in Britain and the United States, 1978–1986



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW

When computed for the whole of Britain and the whole of the US, rather than for a single region, this reallocation index reinforces the conclusions from Section 3.4. Figure 3.10 gives the quarterly movement of the index over the early 1980s period. Industrial reallocation peaked in the US during the two recessionary periods, recovering quickly between and afterwards. In contrast, industrial reallocation increased for Britain during the recession, but then persisted at an elevated level even after the recession through 1985. Additionally, a slightly higher level of reallocation was reached in Britain than in the US. These results offer further support that industry labor reallocation was more significant and persistent in Britain than in the US during this period.

These national trends mask heterogeneous experiences across regions. Across all regions in Britain, reallocation was highest in East Anglia, Yorkshire, and Wales, and lowest in the South East and London, the South West, and Scotland. In the US, New York had the lowest average

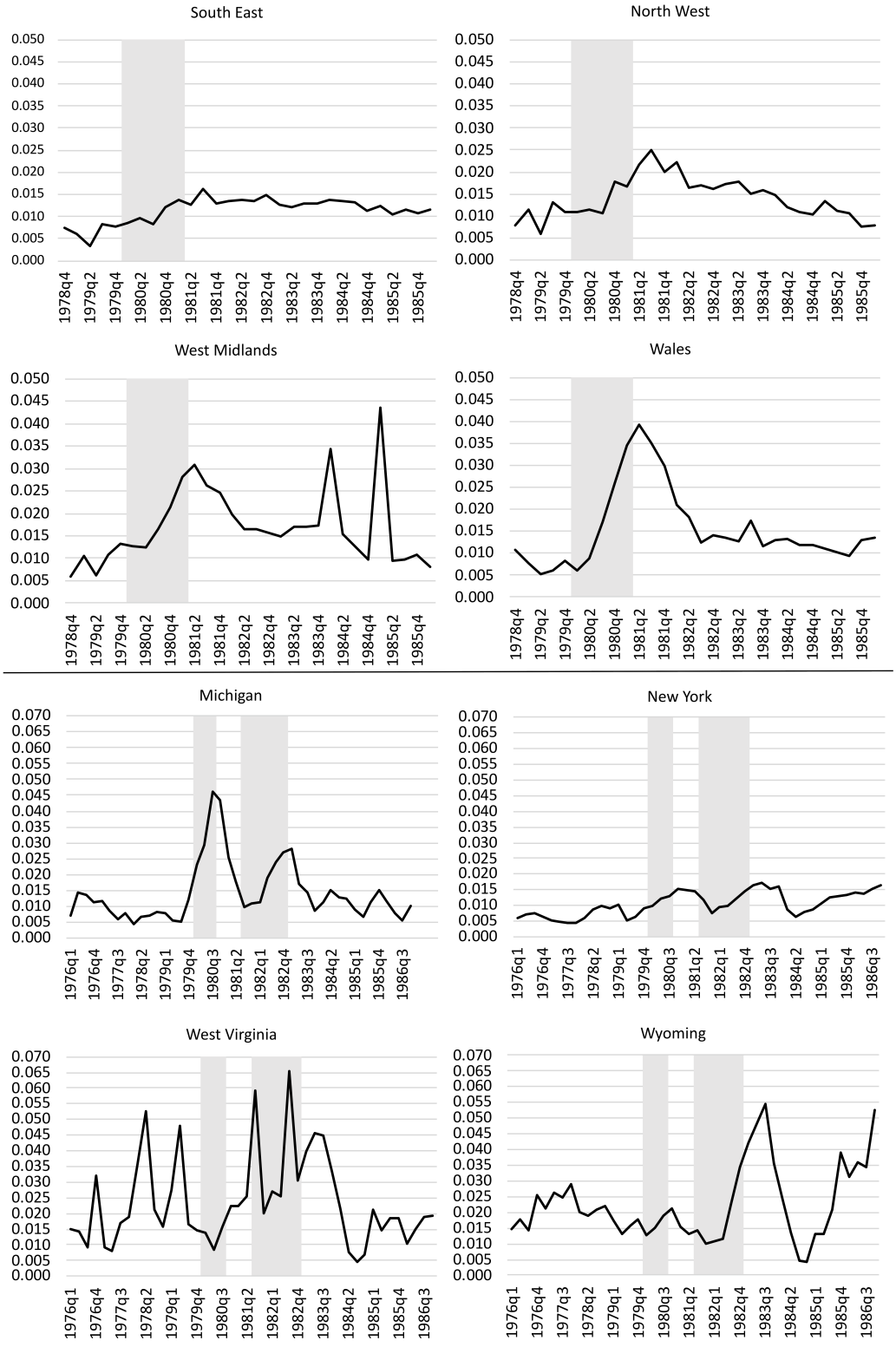
reallocation over the period, followed by Massachusetts, Alabama, and Georgia. Alaska had the most reallocation on average, followed by West Virginia, Wyoming, and North Dakota. Figure 3.11 gives the quarterly industrial reallocation for selected parts of Britain and the US, in the first and second panels respectively. In both sets of graphs, it is evident that reallocation had different levels and different trends by geographic area.

Figure 3.12 compares industrial reallocation across aggregated regions of both Britain and the US. The high levels of industrial reallocation in Wales just after the recession and in the Midwest during the first stage of the US recession are remarkable. The experiences of Britain and the US were otherwise fairly similar during the recession. In Britain, the Midlands, North and North West, and Scotland reached a reallocation index of about 0.025 during the recession, which is similar to the level reached by the Midwest, South, and Northeast in the US during the second recession. The other regions in both countries were grouped around the 0.015 level. However, as in the national trends, reallocation fell more slowly after the recession in Britain than in the US.

The level of labor reallocation across industries thus varied by region in both the US and Britain. Does this mean that regional disparities in employment were because of the different performance of industries concentrated in those regions? To begin to explore this question, Figure 3.13 compares the employment growth in tradeable and non-tradeable industries in both the best and the worst performing aggregate regions of Britain and the US. The distinction between non-tradeable and tradeable industries separates largely domestic or service industries from exporting industries that may have been more affected by the exchange rate spike and other aspects of the recession. If regional effects above and beyond differences in the composition of industries in the region were important, we would expect to see poor employment growth of both tradeable and non-tradeable industries in the worst performing regions relative to the best performing regions. If the effect of the composition of industries in a region is more important, we would expect to see tradeables performing relatively poorly in both the worst and the best performing regions, with non-tradeables performing relatively well in both.

Figure 3.13 presents the results for Britain and the US. In Britain, the worst performing regions were the North, North West, and Yorkshire regions, while the best performing regions included London, the South East, and East Anglia. In both the best performing and worst performing regions of Britain, employment in tradeable industries contracted significantly while employment in non-tradeable industries showed moderate growth. This pattern is not seen

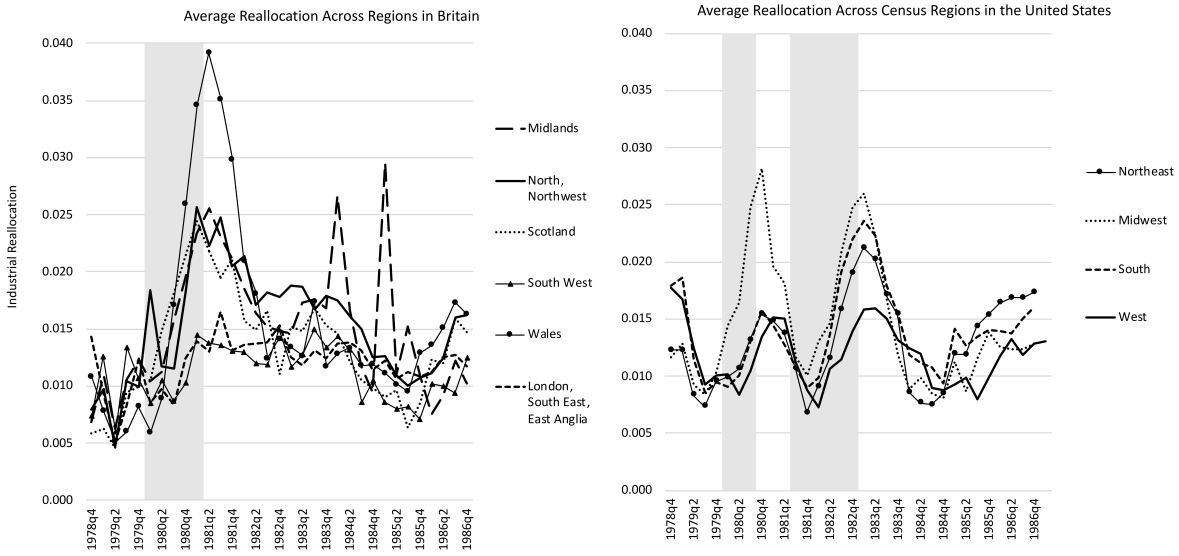
Figure 3.11: Industrial reallocation in selected regions of Britain and the United States



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW. Industrial reallocation on the vertical axis.

in the US, where employment in tradeables was relatively fine in the best performing South Atlantic division but still showed significant contraction in the worst performing East North Central division. Thus, non-tradeable industries in Britain were struggling in similar ways in

Figure 3.12: Industrial reallocation by region of Britain and the United States, 1978–1986



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW

both groups of regions, while in the US, all industries in high-performing regions fared well. These comparisons suggest that the industry labor reallocation effect in Britain might be more significant than any regional effects, and that the opposite might be true for the US.

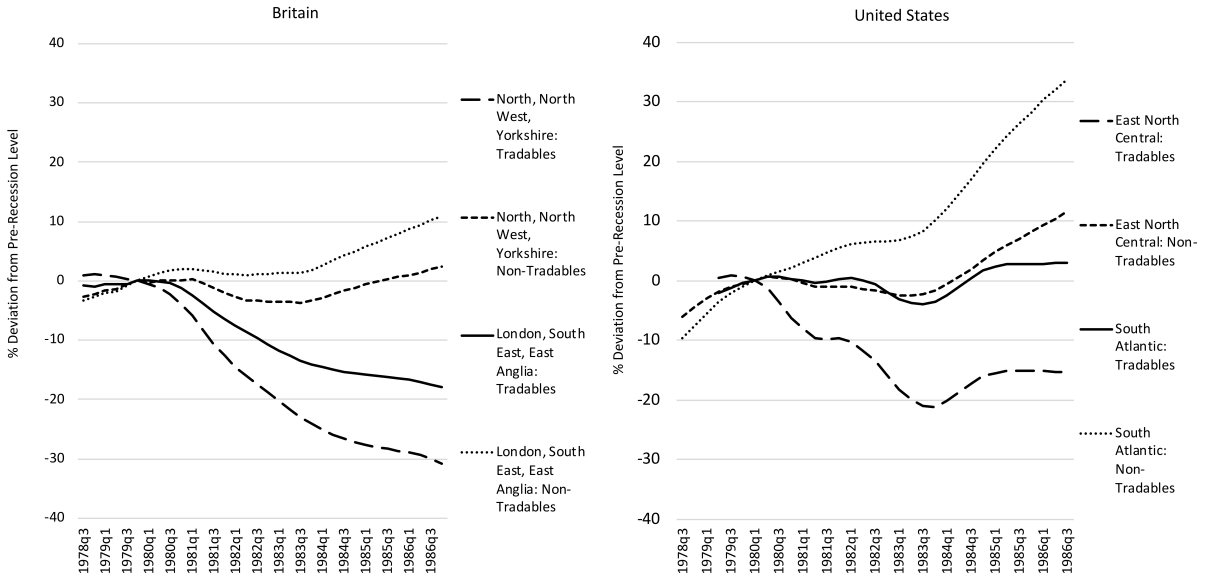
3.5.2 Regional shift-share analysis

To further probe the findings of Figure 3.13, a dynamic shift-share model is used to decompose regional employment changes over the recession-recovery period in Britain and the US into industrial and regional effects.

A traditional shift-share analysis decomposes the changes in employment in a region or local area into three effects: a national growth effect, an industry mix effect, and a regional share effect. The national growth effect captures how the region would change if it followed the path of the national economy. The industry mix effect takes into account the national performance of the industries in the region. Finally, the regional share effect is the residual, which is the change in employment in the region owing to regional factors other than the national trend or effects of the region's industrial composition. A shift-share decomposition can thus shed light on the relative importance of industrial composition and pure regional effects in the regional employment trends seen for Britain and the US.

The traditional shift-share model is a comparative static model that considers only the starting and ending date of the analysis period, keeping the industrial composition of each region

Figure 3.13: Employment growth in tradeables and non-tradeables, selected regions



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW

fixed. This can introduce bias in regions undergoing significant structural change, causing the industrial structure of the initial period to have outsize influence. The traditional shift-share model also holds the employment share of regions relative to the national economy constant, which can introduce bias when regional disparities are increasing over the period of analysis.

The dynamic model is a standard way to correct for both of these potential biases by allowing growth rates and the industrial structure to change in every year between the start and end dates of the analysis. The shift-share effects for each time increment, typically a year, are then added to give the total shift-share over the entire period.

The dynamic shift share decomposition of the change in employment e in industry i and region j from time t to $t+n$ is thus given by the formula:

$$e_{ij}^{t+n} - e_{ij}^{t} = \sum_{k=t+1}^{t+n} (NS)_{ij}^{k} + \sum_{k=t+1}^{t+n} (IM)_{ij}^{k} + \sum_{k=t+1}^{t+n} (RS)_{ij}^{k}$$

where:

- $(NS)_{ij}^{k}$ is the national share effect of the decomposition of the employment change from year $k-1$ to k, defined as:

$$(NS)_{ij}^{k} = e_{ij}^{k-1} * g_{n}^{k}$$

- $(IM)_{ij}^{k}$ is the industry mix effect of the decomposition of the employment change from year $k-1$ to k, defined as:

$$(IM)_{ij}^{k} = e_{ij}^{k-1} * (g_{in}^{k} - g_{n}^{k})$$

- $(RS)_{ij}^{k}$ is the regional shift effect of the decomposition of the employment change from year $k-1$ to k, defined as:

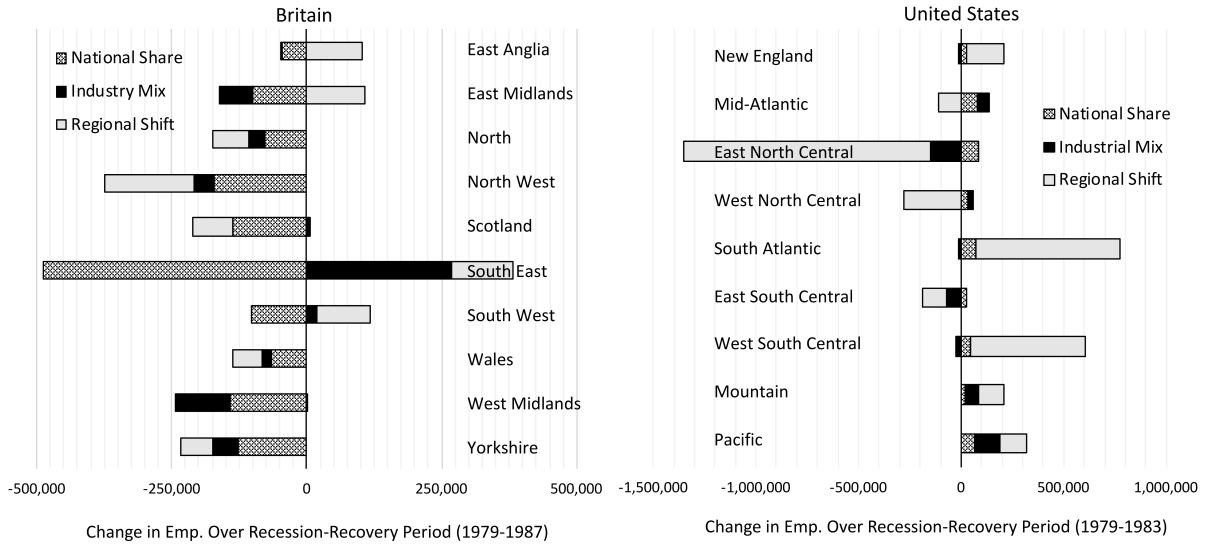
$$(RS)_{ij}^{k} = e_{ij}^{k-1} * (g_{ij}^{k} - g_{in}^{k})$$

- g_{n}^{k} is the national growth rate of employment from $k-1$ to k
- g_{in}^{k} is the national growth rate of employment in industry i from $k-1$ to k
- g_{ij}^{k} is the growth rate of employment in industry i in region j from $k-1$ to k

The dynamic shift-share decomposition is applied to the change in regional employment over the recession-recovery period for all industries in Britain and the US. The recession-recovery dates for Britain and the US are the same as those used in Tables 3.4 and 3.5. States in the US are aggregated into Census divisions for the analysis.

The results of the dynamic shift-share analysis are shown in Figure 3.14, which suggests that industrial mix effects were more important in Britain than in the US during the early 1980s recession and recovery. The change in employment in each region of Britain and the US is decomposed into the national share, industry mix, and regional shift effects, computed dynamically. In general, the decompositions for Britain indicate larger industrial mix effects and national effects, while the decompositions for the US indicate larger regional effects. These trends are even more apparent when comparing the regions with the most change over the period. In Britain, the South East (including London) attracted new employment over the period. Most of this additional employment is due to the industry mix effect rather than a pure regional effect. In contrast, the region of the US with the worst employment growth, the East North Central division, is dominated by a regional effect above and beyond industry mix effects. These results suggest that the regional disparities in employment observed in Britain during the early 1980s recession and recovery were in large part because of the differing experiences of industries in this period, unlike the US.

Figure 3.14: Dynamic shift-share analysis of regional employment change over the early 1980s recession-recovery, Britain and United States



Analysis using British data from 1987 and 1989 *Employment Gazette* Historical Supplements and US data from the QCEW

This section has found that in some ways the regional employment effects of the early 1980s recession in Britain and the US were quite similar. The distribution of employment across regions in both countries changed significantly during the early 1980s period, with poor performing regions in Britain losing employment share to growth in the South East, and the Midwestern US losing employment share to regions like the South Atlantic and the West. Additionally, both countries had more significant industry labor reallocation in some regions than in others during the recession. However, as Figure 3.13 shows, tradeable industries did poorly in high and low performing regions of Britain in contrast to the US. A dynamic shift-share analysis confirms that industrial mix effects played a larger role in regional employment changes in Britain than in the US. The regional disparities in employment observed in this period in Britain were thus more significantly shaped by industry labor reallocation than those in the US, suggesting that structural change in terms of industrial reallocation was the key difference.

3.6 Job polarization and the jobless recovery

Job polarization is the trend for routine, "middle-skill" occupations to disappear in the labor market.[7] The center of a skill or wage distribution of jobs hollows out as the employment share of non-routine manual or service jobs increases at the low end of the distribution (such

7. ONS Disclaimer: *This work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.*

as jobs in home health care or child care), while the share of jobs using abstract non-routine skills increases at the high end of the distribution (such as jobs in computer programming and data analysis). This creates an "hourglass" labor market with fewer opportunities for middle-skill workers concentrated in occupations involving routine tasks. These occupations involving routine tasks can be primarily manual, such as factory work or machine operation, or cognitive, such as secretarial work, bank telling, or data entry.

Job polarization in the US is typically understood to have begun in the late 1980s or early 1990s. Acemoglu and Autor (2011) write "During the 1980s (1979–1989), employment growth by occupation was nearly monotone in occupational skill; occupations below the median skill level declined as a share of employment and occupations above the median increased. In the subsequent decade, this monotone relationship gave way to a distinct pattern of polarization" (p. 1071). The emergence of job polarization in the US thus coincided with the emergence of jobless recoveries in the early 1990s, leading Jaimovich and Siu (2020) to draw a connection between the two phenomena. Because of this prior literature, US job polarization is only briefly discussed in this section.

There is also a large literature on job polarization in Britain and Europe, some of which suggests that job polarization was occurring during the early 1980s. Goos and Manning (2007) in an early work find evidence of job polarization from 1975 to 1990 in Britain, arguing that this polarization was due to the decline of routine tasks (following Autor, Levy, and Murnane 2003) rather than skill-biased technology change. Goos, Manning, and Salomons (2009) find evidence of polarization in Britain and Europe over the more recent period 1993 to 2006. Goos, Manning, and Salomons (2014) expand on that panel, identifying job polarization in 16 Western European countries and incorporating job polarization and industrial reallocation into a model driven by routine-biased technology change and offshoring. Salvatori (2018) emphasizes how changes in the skill composition of the labor supply contributed to job polarization in Britain over the long period 1979–2011. Finally, Cristini, Geraci, and Muellbauer (2018) give a detailed analysis of job polarization in Britain by gender and age for 1975–2015.

This section differs from these thorough treatments of longer-term job polarization by exploring job polarization specifically during the early 1980s recession and recovery period. Given that job polarization is known to have been more significant in Britain than in the US during these years, the aim of this section is to understand whether job polarization contributed to the early 1980s jobless recovery in Britain, and if so, to what extent. The findings of this section indicate

that job polarization did occur over the 1979–1987 period, but in many cases job polarization patterns were because of the changing composition of industries in the economy rather than changing tasks or occupations within industries. This suggests that the reallocation of labor across industries was a larger factor than occupational polarization over these eight years.

3.6.1 Data and methods

Following the literature, the data for the analysis in this section comes from the Annual Survey of Hours and Earnings (ASHE), previously called the New Earnings Survey (NES). The longitudinal ASHE data is available as a confidential dataset from the ONS Secure Research Service. This dataset contains about 300,000 observations per year, taken as a 1% sample from HM Revenue and Customs records of employee payrolls. The data contain information on wages and hours worked that are linked to employees' occupations, industries, and demographic characteristics. This allows for a detailed analysis of job polarization.

Using the ASHE, job polarization over the early 1980s is identified in this section in two ways. The first method captures the changing occupational structure by tracing the prevalence of abstract, service, and routine tasks. This method is common in the US job polarization literature, and a similar method has been applied to the post-1990 Labour Force Survey data for Britain in Dabla-Norries, Pizzinelli, and Rappaport (2019). The second method ranks occupations based on their average hourly earnings and then tracks how the employment share of each decile changes over time. This is the method used in Goos and Manning (2007) and Cristini, Geraci, and Muellbauer (2018), among others, which also rely on the NES-ASHE data. Both of the methods used to capture job polarization are discussed in detail before their results below.

For comparison, data for the United States is taken from the Current Population Survey (CPS), which is the monthly labor force survey used to generate national labor statistics in the United States. Data from the May Supplement Files gives occupations, hours worked, and earnings for the years 1979–1987.[8] The occupation codes are standardized using the data files from Autor and Dorn (2013).

3.6.2 Abstract, service, and routine scores

The first method of tracking job polarization computes the amount of routine, abstract, and service tasks in the economy each year based on the occupational composition. Using the ASHE

8. The NBER Extracts of the May Supplement Files are available at https://data.nber.org/data/cps_may.html.

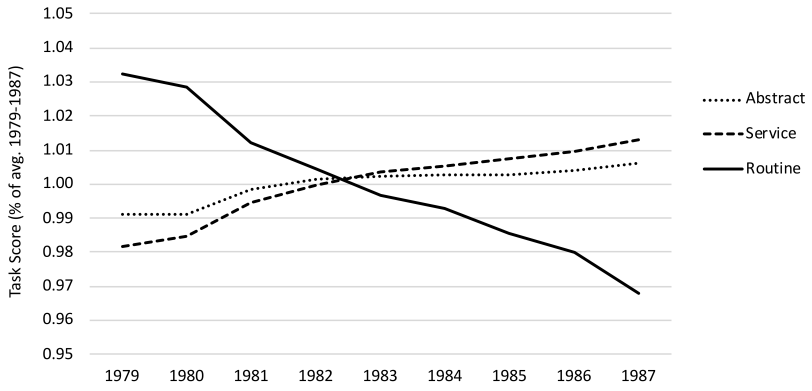
longitudinal data, the occupational codes from 1975 are first mapped into occupational codes from 2010. These 2010 occupational codes are then linked to O*NET SOC classifications which specify the amount of abstract, service, and routine tasks within each occupational category. As the composition of occupations changes in the economy, so does the prevalence of abstract, service, and routine tasks. Thus, for each year, the average abstract, service, and routine tasks across the population indicate how occupational change has shifted the tasks undergone in the economy.[9]

A strength of this method is that it captures the changing task composition of the economy. This aligns closely with the interpretation of job polarization as the decline of jobs with primarily routine tasks. Task-classified occupations thus offer a less noisy signal of job polarization than other methods that might capture routine jobs less directly. However, in the present historical application, this method has a major limitation because it depends critically on the classification of tasks in each occupation in 2010. While the O*NET task classifications are widely used in the literature, it is likely that occupations used different tasks in the late 1970s and early 1980s than they did in 2010. For example, in the 1980s the tasks of a travel agent might involve referencing paper fare sheets, calculating cost-effective travel routes, and issuing handwritten tickets. Travel agents today can largely automate the tasks of finding economical travel routes and arranging bookings, so instead have specialized in other areas of travel management, relying on more abstract skills to operate travel management technology or to handle the bespoke travel needs of various businesses. This limitation is more significant if the tasks of an occupation changed considerably between the early 1980s and 2010. Job polarization that caused the decline in the prevalence of some occupations, such as bank tellers, would still be captured accurately by this method.

Figure 3.15 shows the changing task composition on average in Britain from 1979 to 1987. The occupation of each respondent in the ASHE is assigned a score for the amount of abstract, routine, and service tasks involved in the occupation, and the average of each of these scores is then taken for the entire sample in each year. The occupational change over the time period then drives the shift in task composition. The solid line shows that routine tasks became less frequent over the period, indicating a decrease in the proportion of employment in occupations with significant routine tasks. In contrast, abstract and service tasks increased. This suggests that

9. Frey and Osborne (2017) use a similar task-classification method to identify the jobs at risk for elimination by computerization. In a departure from the traditional job polarization literature, this includes some jobs that entail non-routine cognitive tasks. These jobs are at risk of computerization because of advances in AI and big data that allow for pattern recognition. The present chapter focuses on traditional job polarization, the decline of routine jobs, because these developments in AI and big data had not yet occurred in the 1980s.

Figure 3.15: Change in task composition in Britain, 1979–1987

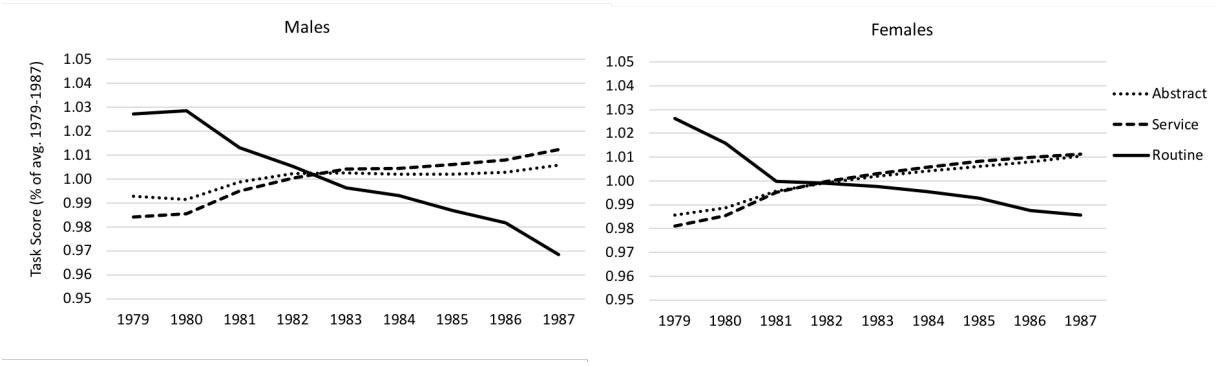


Source: ONS confidential ASHE data

occupations with more routine tasks were declining in Britain while abstract- and service-based occupations became increasingly important.

The trends in abstract, routine, and service tasks in occupations were extremely similar across the Standard Statistical Regions of England, Scotland, and Wales, as shown in Appendix B.2. Figure 3.16 shows the change in task composition by gender, which also demonstrates little difference. Finally, Figure 3.17 disaggregates between full-time workers and part-time workers. While the overall trend was the same, the decline of routine tasks in the part-time economy was not as steep as in the full-time economy.

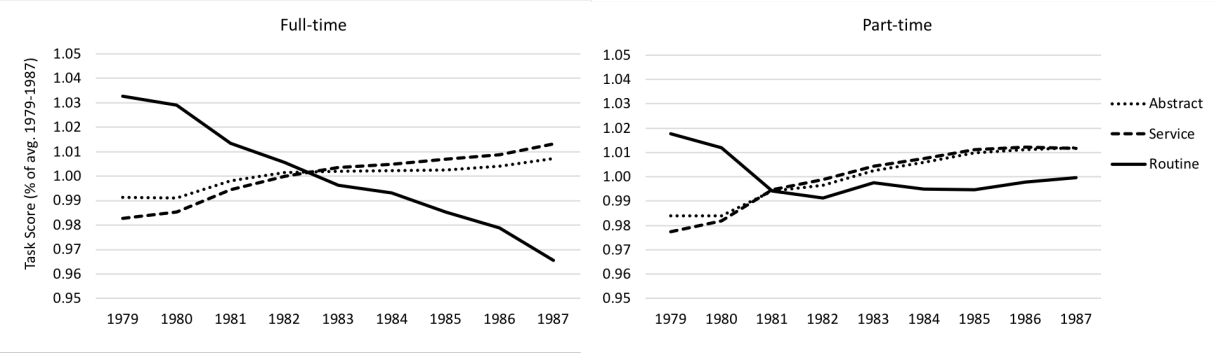
Figure 3.16: Change in task composition in Britain by gender, 1979–1987



Source: ONS confidential ASHE data

The US did not have the same pattern of polarization over this period. Autor, Levy, and Murnane (2003, Figure I) show on a decadal level that the sharpest decline in the share of routine tasks occurs after 1990, later than in the British case. They also find that the share of non-routine manual tasks, which are similar to services in the analysis for Britain, declines over the

Figure 3.17: Change in task composition in Britain by full-time status, 1979–1987

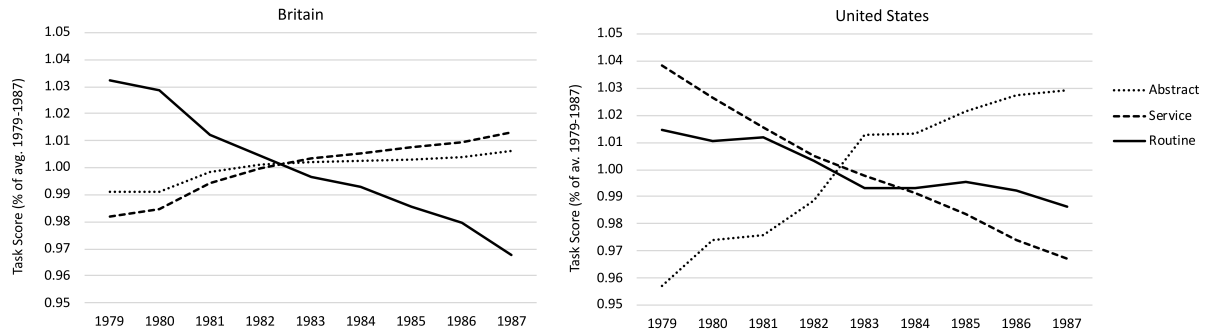


Source: ONS confidential ASHE data

1980s. However, as in Britain, the share of abstract (non-routine cognitive) tasks dramatically increases in importance from 1980 to 1990.

Using the CPS May Supplement data, these results can be replicated on an annual level for the period of interest. Occupational tasks can be classified as abstract, routine, or manual using the replication files from Autor and Dorn (2013) based on the Dictionary of Occupational Titles 1977. In this case, "manual" encompasses the same tasks as "service" in the analysis for Britain, including physical dexterity, spatial awareness, and interpersonal skills (Autor and Dorn 2013, p. 1559). After classifying all of the tasks of the CPS occupations, the average level of abstract, service, and routine tasks across the population can be computed as above. The change in the average score over time indicates how the occupational composition of the population changed from 1979 to 1987.

Figure 3.18: Change in task composition in Britain and the United States, 1979–1987



Source for Britain: ONS confidential ASHE data. Figure for Britain is replicated from Figure 3.15 for ease of comparison. US Analysis using the CPS May Supplement data.

Figure 3.18 confirms the results of Autor, Levy, and Murnane (2003) that the US did not experience significant polarization from 1979 to 1987. The results are compared to those for

Britain from Figure 3.15. The decrease in the solid line for both Britain and the US indicates that there was a decrease in the proportion of employment in occupations with routine tasks in both countries. However, the proportion of service tasks also fell in the US, disrupting the traditional polarization pattern concentrated on the loss of jobs with routine tasks. Abstract tasks are found to have become much more frequent in the US over this period, in line with the British experience.

3.6.3 Shifts in occupational deciles

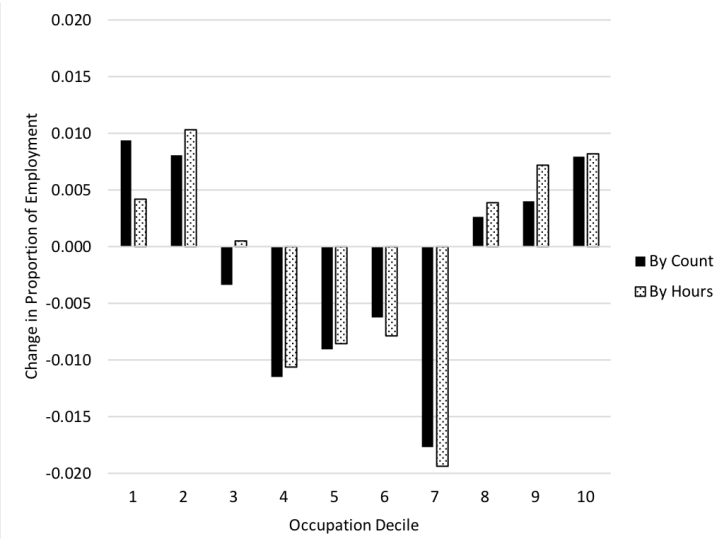
The second method of quantifying job polarization ranks the occupations in the ASHE by their average hourly earnings. Using this ranking, occupations are sorted into deciles, with lower-paid occupations in the lower deciles, and higher-paid occupations in the higher deciles. This allows the middle-skill, middle-wage occupations to be identified. Then, keeping the ranking of occupations constant over time, the share of employment represented by each decile changes as the occupational structure shifts, capturing job polarization.

A strength of this method is that it captures job polarization in an intuitive way by sorting occupations into high, middle, and low skill categories that can be tracked over time. This method also avoids the mapping issues that arise when occupational codes from 1975 are translated into more recent occupational classifications. However, a drawback of this method is that it makes the assumption that the distribution of wages corresponds closely with the definition of skill that relates to job polarization. While this assumption is common in the literature, wages are only an imperfect proxy for the skill level of an occupation. It is also not necessarily true that the skill level of occupations as proxied by wages completely captures the notion of job polarization in terms of routine tasks within an occupation.

Figure 3.19 shows how the employment share of each occupational decile in Britain changed from 1979 to 1987. The occupational deciles were determined based on average hourly earnings in 1979, with the occupations with the lowest average hourly earnings in decile 1 and the occupations with the highest average hourly earnings in decile 10. The bars give the change in the proportion of total employment classified into that occupational decile. The black bars calculate the raw share of employment based on the number of workers in each occupational decile as a proportion of total employment. The white patterned bars calculate the share of employment based on hours worked, capturing changes on both the extensive and intensive margin.

The U-shaped change in employment share by occupation deciles indicates that job polar-

Figure 3.19: Change in the proportion of employment by occupation decile in Britain, 1979–1987



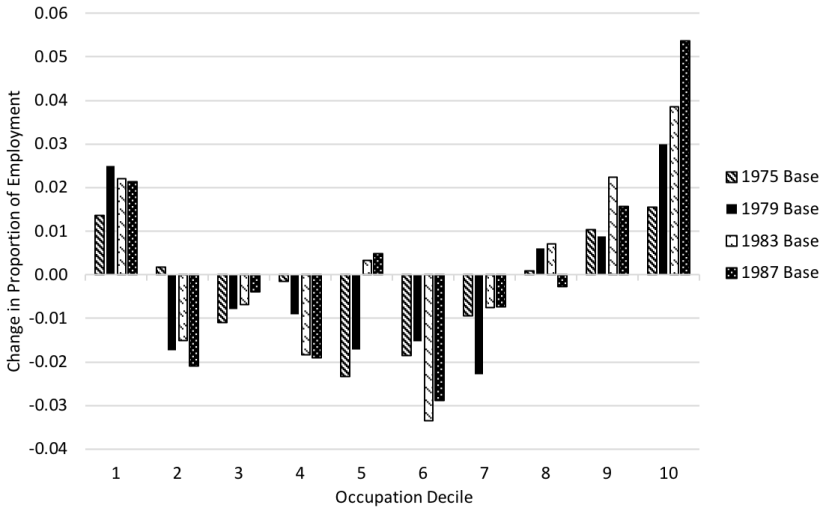
Source: ONS confidential ASHE data. Occupation decile calculated for 1979.

ization was occurring from 1979 to 1987. The employment share of the lowest two deciles and the highest three deciles increased over the period, while the employment share of the middle five deciles decreased. This indicates that the occupational composition of the economy was shifting away from the middle-skill occupations towards the upper and lower ends of the distribution. The scale of this change is modest. In terms of employment share by count, the lowest two deciles increased their share by about 0.9 percentage points each. Similarly, the topmost decile increased employment share by about 0.9 percentage points. There was variation in the decrease in the employment share of the middle deciles, ranging from 0.3 percentage points to 1.8 percentage points.

Do these results depend on the year in which the occupations are classified by their average hourly earnings? As a robustness check, the occupational rankings are calculated for four different base years — 1975, 1979, 1983, and 1987. Figure 3.20 gives the change in employment share by decile from 1975 to 1990 for each of these base years. All of the base years yield a similar U-shaped pattern of employment share change over the period, indicating that the general trend of job polarization is robust to different specifications of the base year. However, it is interesting to note that over this extended period, the second decile shows a decrease in employment rather than an increase in employment as in the 1979–1987 case in Figure 3.19. This suggests that job growth at the bottom end of the occupational ranking was weaker than job growth at the top end. It is also worth noting that over this extended period, the shifts in employment share were larger in both directions. For the topmost decile, the employment share increased by 3.0

percentage points according to the 1979 occupational ranking, and the middle five deciles had employment share decreases of 0.6 to 2.3 percentage points.

Figure 3.20: Change in the proportion of employment by occupation decile in 1975, 1979, 1983, and 1987 in Britain 1975–1990



Source: ONS confidential ASHE data. Employment share is by count. Occupation deciles are calculated for four different base years — 1975, 1979, 1983, and 1987

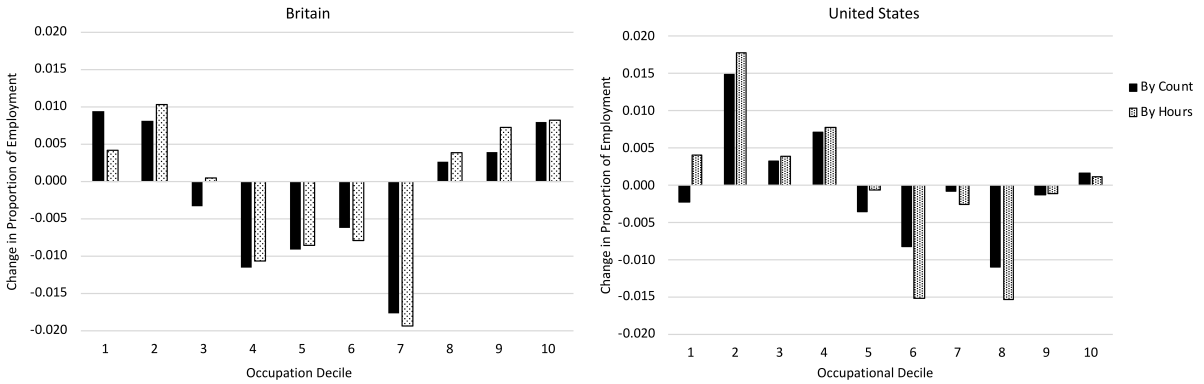
A similar analysis for the US of occupational deciles fails to show the distinctive U-shaped pattern of job polarization. Using CPS data and computing occupational deciles in the same way as for Britain, Figure 3.21 gives the change in the share of employment from 1979 to 1987 for occupational deciles based on average hourly earnings in 1979 for the US.[10] The decile changes for Britain from Figure 3.19 are also given for comparison. In the US, there was a large increase in the share of employment in the second decile, as well as in the third and fourth deciles. The share of employment declined in the sixth and eighth deciles, but there was no increase in employment for the top end of the distribution. Compared to Britain, the US did not have the U-shaped pattern of polarization during this period. This confirms that the modest job polarization experienced in Britain was distinct from the American experience from 1979 to 1987.

Between-industry and within-industry job polarization

Both methods of identifying job polarization indicate that job polarization was occurring in Britain during the early 1980s. However, it is still necessary to distinguish whether this job

10. Appendix B.3 shows the change in the share of employment from 1979 to 1984, the end of the recession-recovery period in the United States. The pattern is even less prevalent.

Figure 3.21: Change in the proportion of employment in the United States and Britain by occupation decile, 1979–1987



Source for Britain: ONS confidential ASHE data. Figure for Britain is replicated from Figure 3.19 for ease of comparison. US Analysis using the CPS May Supplement data.

polarization was mainly "within industry" or "between industries." Within-industry job polarization refers to routine or middle-skill occupations disappearing within a certain industry as technological innovations or offshoring changes the task composition of that industry. For example, bank tellers were an important component of the banking and finance industry in the past, conducting routine financial transactions. As banking transactions became more automated and accessible online, there are fewer routine tasks in the banking industry, and the occupation of "bank teller" is less important to the industry. In contrast, between-industry job polarization picks up on the effects of structural change and industrial reallocation. For example, as the industry of Steel Works, Blast Furnaces, and Rolling and Finishing Mills declined, so did the employment share of all of the occupations associated with that industry, including rolling machine operators; furnace, kiln, and oven operators; and grinding, abrading, buffing, and polishing machine operators. These occupations were not displaced because of technological change or other improvements or routinization of the production process, but rather because of the decline of the Steel Works, Blast Furnaces, and Rolling and Finishing Mills industry in general. Because the driving force behind between-industry effects is actually the larger processes of industry labor reallocation and structural change, the within-industry component is what is typically thought of as job polarization.

The overall trend of job polarization can be broken down into the between-industry and within-industry components by decomposing the change in the share of employment for each occupation decile. The between-industry component is the change in the share of overall employment in an industry, weighted by the share of the industry that is in an occupation in the relevant decile. The within-industry component is the change of the share of an industry that

is in an occupation in the relevant decile, weighted by the share of that industry in overall employment. These components are captured by the shift-share formula:

$$\Delta S_{d,t} = \sum_{i}^{I} \Delta s_{i,t} \omega_{d,i,t} + \sum_{i}^{I} \Delta \omega_{d,i,t} s_{i,t}$$

where the first term represents the between-industry component and the second term represents the within-industry component. More specifically,

- $\Delta S_{d,t}$ is the change in the employment share of the occupational decile d from t to $t+1$
- $\omega_{d,i,t}$ is the average share of industry i employed in the decile d at time t
- $s_{i,t}$ is the average employment share of industry i at time t.

Table 3.6 gives the results of this decomposition for all ten occupational deciles in Britain over the 1979 to 1987 period. Occupations are ranked by average hourly earnings as in the previous section, with 1979 as the base year. The employment share of each decile is given for 1979 and 1987, where the employment share is calculated by the proportion of workers.[11] The final two columns show how the percentage point change is decomposed into within-industry and between-industry components.

While there is some variation across the deciles, in some of the key deciles it is clear that a between-industry effect makes up most of the polarization result. In the first decile, the entire 1.17 percentage point increase in employment share is attributable to the between-industry component. Similarly, the between-industry component accounts for the increased employment share of the tenth decile. In the fifth decile, which shows a significant decrease in employment share, over 85% of the effect is because of shifts between industries. Without the between-industry component, there would be little or no evidence of polarization in these deciles and thus no U-shaped pattern when the changes in employment share are considered for all deciles.

The importance of the between-industry effect indicates that the driving force behind the job polarization results for Britain in this period was actually the shifting industrial composition of the economy. While there is evidence for job polarization measured in terms of abstract, service, and routine tasks and by occupational deciles, much of this polarization is an empirical artifact of the changing industrial structure of Britain. Thus, these results offer additional evidence that industrial reallocation was the central driver of the early 1980s jobless recovery in Britain.

11. The results are similar when employment share by hours is used.

Table 3.6: Decomposition of decile employment share change in Britain, 1979–1987

Decile	Emp. Share in 1979	Emp. Share in 1987	Percentage Point Change	Within Industries	Between Industries
1	15.84%	17.01%	1.17%	-0.02%	1.17%
2	14.82%	16.07%	1.25%	0.79%	0.44%
3	16.48%	16.37%	-0.12%	0.12%	-0.20%
4	9.23%	8.19%	-1.04%	-0.71%	-0.33%
5	7.71%	6.89%	-0.82%	-0.08%	-0.71%
6	6.50%	5.95%	-0.54%	-0.09%	-0.44%
7	5.83%	4.11%	-1.71%	-0.97%	-0.74%
8	6.45%	6.80%	0.36%	0.26%	0.09%
9	6.00%	6.49%	0.49%	0.88%	-0.40%
10	11.14%	12.10%	0.96%	-0.18%	1.11%

Source: ONS confidential ASHE data. Employment share by count. The final two columns may not add up to the total percentage point change because of rounding.

3.7 Conclusion

This chapter has argued that the recovery from the 1980–1981 recession in Britain can be considered an early example of a jobless recovery. Taking the US as a comparison case, the interacting forces of labor reallocation across industries, regional change, and job polarization were analyzed for both countries in the early 1980s. While Britain and the US were similar in many ways, Britain faced rapid, permanent industry labor reallocation at a level unseen in the US. The decline in the employment share of manufacturing and the increase in the employment share of banking and finance in Britain were especially large relative to the US.

Both Britain and the US saw significant changes in their regional distribution of employment during the early 1980s period, but in Britain these changes were in large part because of the differing experiences of industries. Industrial mix effects were more significant in Britain than in the US, and tradeable industries suffered in both high and low performing regions. The regional disparities in employment that emerged in Britain thus reinforce industrial reallocation as the central difference between Britain and the US.

Finally, while job polarization was more significant in Britain than in the US over the recession and recovery period, a large portion of this polarization was between industries rather than within industries. These results thus offer additional evidence that labor reallocation across industries was the key factor behind the early 1980s jobless recovery in Britain.

This chapter has taken the first step toward analyzing the employment recovery from the 1980–1981 recession in Britain as a jobless recovery. The interaction of structural change and

the business cycle downturn led employment to recover much slower than output after the early 1980s recession. The effect of structural change was thus to contribute to, and amplify, this cyclical downturn.

The importance of labor reallocation across industries in this period directs future research toward theoretical and empirical questions about why structural change was so rapid and persistent during these years of recession and recovery, and what the consequences were. In the interwar period, Chapter 2 found that the interaction of structural change and the business cycle caused the 1920s and early 1930s employment downturn to have unequal impacts across regions, industries, and gender. Chapter 4 explores whether similar inequalities were generated by the early 1980s recession and recovery.

Chapter 4

The Unequal Effects of the Early 1980s Recession and Rapid Structural Change

4.1 Introduction

The recovery from the 1980–1981 recession in Britain is an early example of a jobless recovery, where output recovered before employment. In Chapter 3, it was argued that this jobless recovery was due in large part to substantial, rapid reallocation of labor across industries. Because reallocating labor across industries takes longer than simply recalling workers from temporary layoffs or rehiring workers in the same industries, this structural change amplified the cyclical downturn, leading to a longer period of mass unemployment. The coincidence of this structural change with the business cycle downturn thus drove the jobless recovery following the recession.

In the interwar period, Chapter 2 demonstrated that particular groups of workers were disproportionately affected by the prolonged employment downturn in the 1920s and through the Great Depression. This chapter explores whether a similar phenomenon occurred during the early 1980s recession and recovery. How did the impact of the recession and recovery vary by industry, region, and gender?

Though asking a similar question as in Chapter 2, we can go deeper into the uneven effects of the early 1980s recession and recovery in two ways. Because of better data, it is possible to analyze the late 1970s and early 1980s labor force at the individual level. This makes it easier to directly investigate how individuals were impacted by the recession and recovery. Standard econometric techniques permit the incidence of employment for workers with different characteristics to be estimated, while allowing a wide variety of factors such as education to be taken

into account.

A second advantage of this better data is that other dimensions of inequality can also be analyzed. In addition to differences across gender, industry, and region — variables for which disaggregated data were available in the interwar period — this chapter is also able to explore the labor market experiences of nonwhite and first-generation immigrant workers. This offers a richer picture of how unemployment was experienced more acutely by some workers than others in the recession and jobless recovery of the early 1980s.

The analysis in this chapter is based on a new dataset I constructed from the single-year files of the General Household Survey (GHS). This annual, nationally-representative household dataset contains information on employment and worker demographics before, during, and after the early 1980s recession. By reconstructing the dataset from the original files, I am able to capture information such as the most recent industry in which a worker was employed. This makes it possible to compare the employment outcomes of similar workers using econometric techniques.

This chapter estimates a series of linear probability models where the dependent variable indicates if an individual is employed or unemployed.[1] Controlling for a variety of factors, the effect of a worker's race, immigration status, gender, region, and industry on their probability of employment is explored. A set of interaction terms estimated for each year in the period 1976 to 1987 reveals how this impact shifted over the recession and recovery period.

These analyses yield three general findings. First, certain groups of workers were disproportionately affected by the 1980–1981 recession. Specifically, the relative likelihood of employment fell during the recession for nonwhite workers, first-generation immigrants, men, those in the North of England, those in Wales and Scotland, and those in most production and extraction industries. This differential in employment probability occurs even when observable characteristics such as age, education, industry, and occupational class are taken into account.

The second finding is that, in general, the most uneven impacts were actually felt during the early years of the jobless recovery rather than during the recession. From 1982 to 1984, the probability of employment for nonwhite workers was about 7.6 percentage points lower than for white workers and the probability of employment for immigrant workers was 5.2 percentage points lower than for native-born workers, all else equal. The probability of employment for

1. In some models for the full working-age population, the dependent variable indicates whether the worker is employed or either unemployed or inactive.

men was about 4.3 percentage points lower than for women. Workers in the North of England were about 3.0 percentage points less likely to be working than those in the South of England and the Midlands, and those in Wales and Scotland were about 2.7 percentage points less likely. Workers in mineral extraction; metalworking, engineering, and vehicle manufacturing; other manufacturing; and construction were all relatively disadvantaged. Though the gaps in the labor market experiences of workers opened with the early 1980s recession, the effect of the jobless recovery was to widen them considerably. Thus, in most cases, the greatest difference in the likelihood of employment was not during the recession but during the early years of the jobless recovery.

Chapter 3 detailed how, by 1987, the level of employment had recovered to its pre-recession level, closing the recession-recovery cycle. However, by tracing the differential in employment outcomes over time, we find in this chapter that the gaps in labor market performance that emerged with the recession and expanded during the recovery did not always close by the end of the cycle in 1987. This suggests a third finding, that at least some of these uneven impacts of the recession and recovery were persistent, not just a temporary cyclical disadvantage.

Using the General Household Survey, this chapter analyzes the relative labor market performance of workers based on their gender, industry, region, race, and immigration status. I find significant differences in the relative incidence of employment across all of these dimensions. The effect of the 1980–1981 recession was to create these gaps, as some workers were disproportionately affected by the employment shock. During the jobless recovery, as more jobs were lost and some jobs were gained, the position of these disadvantaged workers worsened. Though there was some recovery later in the 1980s, a portion of these differences in employment outcomes persisted after the end of the recession-recovery cycle. These results indicate that the consequence of the early 1980s business cycle downturn and rapid structural change was a disproportionate, and sometimes persistent, decline in the employment prospects for certain workers.

4.2 Related literature

In addition to deepening the analysis on industries and regions from Chapter 3, this chapter contributes to the literature on the labor market experiences of women and nonwhite workers during the early 1980s recession and recovery period.

4.2.1 Gender

Chapter 2 demonstrated that in the interwar period, the unemployment rate for women in insured industries was lower than for men, but that issues of labor force participation and the propensity to seek employment are important to take into account. I found that women who did participate in the interwar labor force faced more rigidities to moving between industries than men, suggesting that labor markets were segmented in a way that restricted women's work to certain industries, sectors, and tasks.

Fifty years later, these factors still played an important role in the labor market during the early 1980s recession and recovery. The individual-level approach of the present chapter allows for the analysis of the likelihood of employment for women relative to men with otherwise similar characteristics, in the labor force and in the population. It is important that both aspects are considered as this was a period of time in which the labor force participation and educational attainment of women dramatically increased.

During the 1980s, there was active interest in whether women were disproportionately affected by business cycle downturns. Many analyses used data from the early 1980s recession to explore the issue. Humphries (1988) summarizes three hypotheses about the effect of recessions on women's employment. If women face segmented labor markets and are concentrated in sectors, industries, or occupations that are less cyclically sensitive, they could outperform male workers during recessions (Milkman 1976). Alternatively, the marginalization of women in labor markets could cause their employment to be more precarious during recessions. Under this hypothesis, women provide a flexible reserve or buffer of labor during business cycle upturns, often as recent hires or in part-time positions, but then are more likely to be let go during recessions (Bruegel 1979). A third hypothesis predicts that this marginalization, which often results in lower wages, hours, or employment protections, serves to benefit women during recessions, as poor economic conditions encourage employers to substitute female employment for male employment (Gardiner 1976).

Rubery and Tarling (1988) considered these hypotheses for Britain during the late 1970s and early 1980s. They note that women's share of employment increased during this period, and that during the recession, the unemployment rate for men increased faster than for women. They find little evidence of the buffer hypothesis outside of a few areas of manufacturing,[2] but that both the segmentation and the substitution mechanisms contributed to the trends in female employment

2. Also in Rubery and Tarling (1982) through 1980.

over this period. Sectors with a high share of female employment outperformed those with a low share of female employment during the recession, though this was somewhat offset by the poor performance of manufacturing, which still involved many women. More importantly, the share of women increased by a small amount in all sectors, suggesting that women had an advantage relative to men in finding employment. The strong labor market performance of women during this period is also supported by Owen and Joshi (1987), who find that the 1980–1981 recession and employment contraction did not cause women to become discouraged workers, which would have adversely affected their labor force participation gains. The results of the present chapter confirm and advance on these earlier findings, demonstrating that women in the labor force were advantaged by either segmentation or substitution relative to men, all else equal, and that gains in participation increased women's relative employment rate throughout the period. However, the interaction of male and female employment in the household, including the possibility of women increasing their labor supply to sustain household income when their husbands become unemployed, is not analyzed in this chapter.

4.2.2 Race and immigration status

A large literature has explored the differing experiences of ethnic minorities and immigrants in Britain during the second half of the twentieth century. The earlier literature is largely descriptive, but, as econometric techniques were developed, a group of papers emerged focusing on racial wage differentials throughout the 1980s. Data and computational limitations caused these papers to primarily analyze single-year periods. This literature was then extended in two ways: first, to consider employment differences as well as wage differences, and second, to incorporate dynamic effects and longer time series.

Our understanding of racial discrimination and structural inequities in this period is shaped by the landmark contributions of the Policy Studies Institute (PSI), previously Political and Economic Planning (PEP). The first PEP survey was conducted in 1966, just after the first Race Relations Act prohibited segregation in public places such as restaurants. The survey intended to explore discrimination in housing, employment, insurance, and financial services, which was still permissible by law.

Their results show that when a white man and a nonwhite immigrant with the same qualifications inquired about the same jobs, the white man was invited to apply to 15 times more jobs than the nonwhite immigrant (Daniel 1968, p. 77). They also find that the nonwhite immigrant

was discriminated against 75% of the time when attempting to rent from a private landlord (Daniel 1968, p. 155). This statistical evidence of discrimination led directly to the extension of the Race Relations Act in 1968 to prohibit discrimination in housing, employment, and public services (Policy Studies Institute 2006, p. 5).

The PEP/PSI survey was repeated in 1972 with a national sample, revealing systemic challenges causing "racial disadvantage" (Smith 1976). The Race Relations act was then replaced in 1976, distinguishing direct and indirect discrimination and outlawing organizational practices that disadvantaged certain racial groups (Brown 1984, p. 2).

The 1982 PSI survey offers insight into the changing position of nonwhite citizens from 1972 to 1982. The results indicate that in 1982, nonwhite workers were less likely to be employed than white workers,[3] and, of those employed, they earned less and had jobs with lower status. While the 1972 survey found very little difference in unemployment rates among white and non-white workers (both around 4%), the 1982 survey found that the unemployment rate for nonwhite men in the sample was 7-12 percentage points higher than for white men, and that the unemployment rate for nonwhite women was 6-10 percentage points higher than for white women (Brown 1984, pp. 174, 189). While their employment incidence had decreased relative to white workers, the position of nonwhite workers in the occupational distribution was stable, with no convergence to the higher-status, better-paid jobs held primarily by white workers (Brown 1984, pp. 226-227). Brown (1984) attributes some of these differences in labor market performance to differences in qualifications, and also suggests that nonwhite workers may have been disproportionately affected by the recession because of their industry and occupation: "...it has been the lower-level jobs that have been lost in greatest numbers during the recession, and so the impact on black people has been even greater than would otherwise be expected" (Brown 1984, p. 298). They conclude that "the British job market has changed little in its hostility to black workers, except that it now excludes more of them from work altogether" (Brown 1984, p. 299). This survey thus provides contemporary evidence that unemployment was more severe for nonwhite workers than white workers and suggests that dynamics over the business cycle need to be considered.

As econometric techniques developed, social scientists began exploring the gap in labor market performance between white and nonwhite workers using national datasets. Early papers were cross-sectional, looking at data for a single year, and primarily focused on earnings rather than employment differences. Chiswick (1980) uses the 1972 General Household Survey to explore

3. The sample included respondents with family origins from the Caribbean and the Indian sub-continent, classifying both as "black." Black workers with family origins from Africa were excluded.

whether there was a difference in earnings between white and nonwhite male workers, distinguishing by whether they were born in Britain or abroad. He finds no difference in earnings between white immigrants and white nationals, but that nonwhite immigrants earned 25% less than both groups, all else equal. McNabb and Psacharopoulos (1981) explore the mechanisms of this effect, finding that nonwhite male workers had flatter experience-earnings profiles, with few wage benefits awarded to experienced nonwhite workers. Blackaby (1986) confirms this result using the 1975 General Household Survey, finding decreased returns to education and experience for nonwhite male workers.

Stewart (1983) argues that these earnings differentials were largely because of differences in occupational attainment between white and nonwhite workers. Using data for 1975 from the Manpower Services Commission's National Training Survey, he finds that nonwhite workers had limited access to higher-level occupations and experienced less occupational mobility. Jain and Young (1978) review how discrimination could manifest through occupational attainment with reference to the late 1970s.

This early research, conducted in the 1980s, focused primarily on the different labor market experiences of white and nonwhite workers in the 1970s. In the 1990s, shifts in the data and methods available to social scientists caused two important changes in the literature. First, there was a shift toward analyzing employment (or unemployment) incidence rather than earnings. This reflects both a change in interest and a methodological change — the development of probabilistic models such as logistic regressions made it easier to analyze binary outcomes (employment/unemployment) while considering other factors (Nickell 1980, for example). A second trend was to rely on the Labour Force Survey (LFS) or Census microdata rather than the General Household Survey. This data was readily available for more recent years, so researchers who chose to use the latest data for their analyses focused on employment gaps in the 1990s rather than 1980s.[4]

For example, in a largely descriptive comparative study, T. Jones (1993) updates the 1982 PSI results (Brown 1984) with data from the LFS covering 1988 to 1990. Leslie, Drinkwater, and O'Leary (1998) use the LFS and 1991 Census microdata to explore differences in earnings and unemployment among nonwhite workers born in Britain and born abroad. Their logistic model for unemployment incidence suggests that more focus be given to closing the gap in employment opportunities between nonwhite and white workers. Blackaby et al. (2002) use LFS data for

4. The Labour Force Survey (LFS) was only conducted biannually through 1983 and then annually through 1991.

1993 to 1996 to show econometrically that nonwhite workers faced disadvantaged earnings and employment prospects, all else equal. They do not find evidence that UK-born nonwhite workers fared better than their parents. In a more recent comprehensive report, Clark and Drinkwater (2007) use Census data to analyze the incidence of employment for various ethnic groups from 1991 to 2001, again using probit models to control for other factors.

The result of these innovations in data and methods is that very few papers on racial employment gaps analyzed data from the early 1980s. One notable exception is Blackaby et al. (1994), which uses pooled General Household Survey data to compare the experiences of nonwhite workers from 1973-1979 to 1983-1989. Using a probit model, they find that the difference in the probability of employment between white and nonwhite workers increased from 2.6 percentage points in the 1970s to 10.9 percentage points in the 1980s, controlling for many factors. While this analysis is similar to the one conducted in the present text, the choice of years in Blackaby et al. (1994) makes it difficult to understand the effects of the early 1980s recession. The authors state that they intended to compare two periods at a similar position in the business cycle, yet the 1970s period contains two smaller recessions and expansions, and the 1980s period a jobless recovery (see Chapter 3) and short expansion. With these considerations in mind, their work still suggests that employment became more precarious for nonwhite workers relative to white workers in the 1980s period. This offers strong motivation for the present study, which advances on Blackaby et al. (1994) by analyzing differences in the probability of employment for nonwhite and white workers on an annual basis, allowing trends over the recession and recovery period to be distinguished.

This chapter is also related to a literature exploring the dynamics of racial gaps in labor market performance over the business cycle in this period. Some sense of the importance of these dynamics is given in Brown (1984), as discussed above. Leslie, Lindley, and Thomas (2001) estimate an unemployment rate series for nonwhite workers from 1970 to 1999 using some *Employment Gazette* data, data from the GHS, and the early biannual LFS data. They find that the unemployment rate for nonwhite workers increased relative to white workers from the mid-1970s. Using this estimated series, Leslie, Lindley, and Thomas (2002) compare the gap in unemployment rates between white and nonwhite workers in Britain and the US. They conclude that nonwhite workers were more disadvantaged in Britain because of the dynamics of the business cycle — nonwhite unemployment rates in Britain were "partially hypercyclical" from 1970 to 1999, with unemployment rates increasing faster for nonwhite workers than white

workers during recessions, but not falling relatively faster during recoveries. Their findings accord with the analysis in the present chapter, which, on the individual level, shows that differences in the probability of employment between nonwhite and white workers increased during the early 1980s recession but did not decrease as quickly during the recovery.

4.3 *General Household Survey* data

The primary data source for this chapter is the General Household Survey (GHS), which is an annual survey that was conducted by the Office of National Statistics continuously from 1971 to 2012. The survey focuses on health, housing, education, and employment, with individuals grouped into households. Two major time series files have been constructed covering our period of interest — the Surrey Files time series for 1973-1982, and the ONS time series for 1972-2006. Over this long time period, there were numerous changes in the questions asked and in the possible answers allowed. Because of these changes, the time series files omit many variables that are in the single-year files owing to the difficulty of standardization.

For this chapter, I constructed a new time series dataset for the GHS from 1976 through 1987 using the individual-year Surrey and ONS files. These early surveys were extremely rich, and the extensive data and code documentation permits linkage of many more variables across the years. For example, neither of the existing GHS time series datasets contain information on the industry in which individuals were employed, but I am able to capture this variable by building from the single-year files.

Employment status is captured in the GHS by asking whether an individual had done any paid work in the previous week, either as an employee or self-employed. For those who had indicated that they worked in the last week, the occupational class, industry category, and job title of their main job were recorded.[5] For those that did not work in the last week, respondents were able to indicate if they had a job they were away from in the previous week (e.g., on holiday), and if so, they were classified as employed.

Individuals were also asked if they were looking for work, or intending to look for work but temporarily prevented from searching due to short-term illness or injury. These individuals were classified as unemployed. Unemployed individuals were also asked to provide the occupational class, industry category, and job title of their most recent job.

5. The job titles were collected but do not appear to be available in the datasets.

The GHS data thus classified respondents as employed or unemployed in the standard fashion, meeting the widely-accepted definitions set by the International Labour Organisation (ILO).[6] Another advantage of the GHS is that unemployment was measured consistently from 1976 through 1987 (and beyond). The GHS was thus not impacted by the 1982 shift in the definition of unemployment in the UK national statistics from those claiming benefit (registered at a local employment office) to those seeking work, which affected the estimation of unemployment for women in particular.[7]

The individual's age, gender, and marital status are also available in the GHS. Respondents' households are associated with one of eleven regions in England, Scotland, or Wales. The highest level of educational achievement attained by the individual is recorded as one of fifteen levels, with foreign qualifications treated separately. The individual's country of birth is also listed, making it possible to identify first-generation immigrants.

The official ONS guidance on the availability of data on ethnicity in the GHS states that, "The information about ethnicity is not rich enough in early years and appeared for the first time in the 1983 GHS datasets. Country of birth is available in the GHS from 1971 onwards and time of arrival can be found only from 1974."[8] These cryptic sentences avoid mentioning a problematic piece of history regarding the GHS data and other government data on race during the late 1970s and 1980s. While it is accurate that ethnicity data, as reported by the respondent, was not collected until 1983, both before and after that date respondents were categorized by the interviewer as white, non-white, or "interviewer undecided"/"not sure," possibly indicating mixed race. The respondent was not made aware that this information was being collected, and the practice was continued through the early 1990s (Leslie, Lindley, and Thomas 2001, p. 377). The indicator for race in this dataset is thus distinct from more modern data collection efforts, which ensure that respondents can self-identify as part of various ethnic groups. The interviewer-assessed race in the GHS data instead indicates whether the respondent was perceived by the interviewer as white or nonwhite.[9] Though not the current standard practice, this variable is still appropriate (and, in a sense, best suited) for analyzing discrimination.

6. See 'A guide to labour market statistics' by the ONS for more details (ONS 2021). The only departure from this standard is that respondents who stated they had secured employment but were waiting to start the position were classified as employed, affecting less than 1% of the sample.

7. The majority of married women were not insured and had no claim to benefit. There was thus little incentive for them to register at an employment office, so these women were often left out of the official statistics. See Gardiner (1976) for more details.

8. https://beta.ukdataservice.ac.uk/datacatalogue/series/series?id=200019.

9. This variable can be compared to the variable on self-identified ethnic origin introduced in 1983. In 1983 and 1984, 97% of Indian, 98% of Pakistani, 100% of Bangladeshi, 95% of West Indian/Guyanese, 100% of African, 92% of Chinese, 65% of Arab respondents, and 56% of mixed respondents were classified as "coloured" by the interviewer, i.e. nonwhite.

Summary statistics for key variables are given in Table 4.1.

Table 4.1: Summary statistics for GHS Data, 1976–1987

	Labor Force		Population	
	Count	*Percentage*	*Count*	*Percentage*
N	152539		204264	
Employed	141152	92.52	141152	69.10
Female	64693	42.41	106662	52.22
Married	105314	69.04	142035	69.54
Nonwhite	5234	3.43	7337	3.59
First-Generation Immigrant	10398	6.82	14449	7.07
Region: North	9072	5.95	12657	6.20
Region: Yorkshire and Humberside	13640	8.94	18724	9.17
Region: North West	18171	11.91	24256	11.87
Region: East Midlands	11042	7.24	14629	7.16
Region: West Midlands	15266	10.01	20329	9.95
Region: East Anglia	5546	3.64	7334	3.59
Region: Greater London	18784	12.31	24275	11.88
Region: South East, Excl. London	27690	18.15	36227	17.74
Region: South West	11369	7.45	15235	7.46
Region: Wales	7079	4.64	10352	5.07
Region: Scotland	14880	9.75	20246	9.91
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*
Age	37.87	13.33	39.24	14.37

Analysis using the General Household Survey, 1976–1987. The first and second columns are for the labor force only, including those employed and those unemployed and seeking work. The third and fourth columns are for the full working-age (16-64) population.

4.4 Method

Did the early 1980s recession impact workers from different demographic groups, regions, and industries in different ways? Were these disproportionate impacts cyclical, recovering with the business cycle, or did they persist even after the output and employment recovery?

To answer these questions, I estimate linear probability models for an individual's probability of employment using the GHS. The binary dependent variable indicates if the individual was employed. This is the standard approach in the literature, though often a logistic or probit model is estimated (Clark and Drinkwater 2007; Blackaby et al. 2002; Leslie, Drinkwater, and O'Leary 1998; L. B. Kahn 2010; Rinz 2019, for example). The results in Section 4.5 are robust to a probit specification, given in Appendix C.1, but I present the estimates from the linear probability model for ease of interpretation.

The linear probability model is

$$y_i = \beta_0 + \boldsymbol{\beta}_1' \boldsymbol{x}_{1i} \cdot \mathbf{T} + \boldsymbol{\beta}_2' \mathbf{T} + \beta_3 a_i + \beta_4 a_i^2 + \boldsymbol{\beta}_5' \boldsymbol{x}_{2i} + \boldsymbol{\beta}_6' \boldsymbol{E}_i + \boldsymbol{\beta}_7' \boldsymbol{R}_i + \boldsymbol{\beta}_8' \boldsymbol{I}_i + \boldsymbol{\beta}_9' \boldsymbol{O}_i + \varepsilon \quad (4.1)$$

where y_i indicates whether individual i is employed, taking on 0 if unemployed[10] and 1 if employed. $\boldsymbol{x}_{1i}$ are the variables of interest, indicating if the individual is nonwhite; a first-generation immigrant; a female; in the North of England, or Scotland or Wales; or in various industry categories — all of which are explored in subsections 4.5.1 - 4.5.5, respectively. The regression is a partial interaction model where year indicators $\mathbf{T}$ are interacted with the variable of interest. Main effects are included for each year, capturing the time trend in coefficients $\boldsymbol{\beta}_2$. The interpretation of the coefficients on the interaction term for each year, $\boldsymbol{\beta}_1$, is the simple difference in the probability of employment between the variable of interest and the base case in each year.

a_i is the respondent's age, entered as a quadratic. $\boldsymbol{x}_{2i}$ are other control variables, including gender, marital status, race, and immigration status, when these are not the variable of interest.[11] $\boldsymbol{E}_i$ are dummies for the individual's highest level of education achieved across fifteen categories. $\boldsymbol{R}_i$ represent eleven regions in Britain and are included except when regions are the variable of interest in subsection 4.5.4. $\boldsymbol{I}_i$ are industry dummies and $\boldsymbol{O}_i$ are occupational class dummies, included in some models.

The linear probability model is estimated for all of the variables of interest with robust standard errors clustered at the household level.

4.5 Results

4.5.1 Interviewer-assessed race

Table 4.2 gives the results of the analysis for interviewer-assessed race. In the first model, the probability of employment is estimated among those in the labor force, without controls for industry and occupational class. The second model adds these controls. The third model considers employment incidence in the working-age population and does not control for industry and occupational class.[12] The coefficients on the interaction terms give the simple difference in

10. Or, for the models estimated for the full working-age population, if the individual is unemployed or not in the active labor market.

11. Separate models are estimated for each of the variables of interest for ease of interpretation. The results are robust to including a time interaction for all of the variables of interest in a single model; see Appendix C.2.

12. This information is not generally available for respondents who are not in the labor force.

the probability of employment for those identified as nonwhite and white in each year.

Table 4.2: Model for differences in the probability of employment by interviewer-assessed race

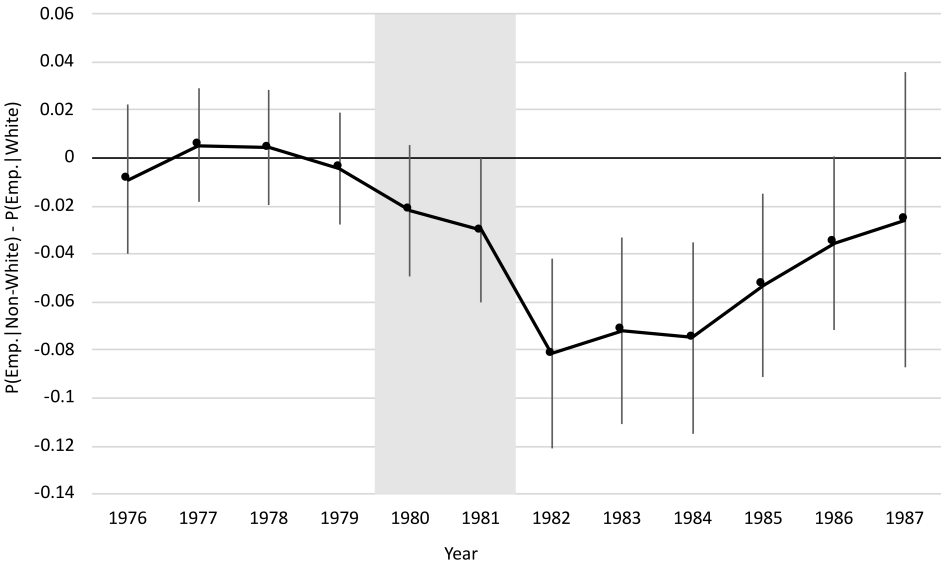
	(1) Labor Force	(2) Labor Force	(3) Population
Non-White × 1976	-0.020	-0.009	-0.054*
	(0.016)	(0.016)	(0.021)
Non-White × 1977	0.003	0.005	-0.040
	(0.013)	(0.012)	(0.021)
Non-White × 1978	-0.006	0.004	-0.059**
	(0.013)	(0.012)	(0.019)
Non-White × 1979	-0.023	-0.004	-0.102***
	(0.014)	(0.012)	(0.018)
Non-White × 1980	-0.025	-0.022	-0.071***
	(0.014)	(0.014)	(0.019)
Non-White × 1981	-0.046**	-0.030	-0.089***
	(0.017)	(0.015)	(0.019)
Non-White × 1982	-0.104***	-0.082***	-0.142***
	(0.021)	(0.020)	(0.019)
Non-White × 1983	-0.107***	-0.072***	-0.133***
	(0.021)	(0.020)	(0.021)
Non-White × 1984	-0.095***	-0.075***	-0.127***
	(0.021)	(0.020)	(0.022)
Non-White × 1985	-0.079***	-0.053**	-0.109***
	(0.022)	(0.020)	(0.022)
Non-White × 1986	-0.066***	-0.035	-0.096***
	(0.020)	(0.018)	(0.022)
Non-White × 1987	-0.028	-0.026	-0.079***
	(0.016)	(0.031)	(0.020)
Age	0.010***	0.004***	0.045***
	(0.000)	(0.000)	(0.000)
Age^2	-0.000***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)
Female	0.029***	0.028***	-0.248***
	(0.001)	(0.002)	(0.002)
Married	0.056***	0.041***	-0.003
	(0.003)	(0.003)	(0.004)
First-Gen Immigrant	-0.018***	-0.017***	-0.034***
	(0.004)	(0.004)	(0.005)
Constant	0.657***	0.870***	0.005
	(0.009)	(0.009)	(0.011)
Education	Yes	Yes	Yes
Region	Yes	Yes	Yes
Year Main Effects	Yes	Yes	Yes
Industries	No	Yes	No
Occupations	No	Yes	No
Number of observations	152539	141012	204264
Number of households	89347	83457	104112
Adjusted R2	0.055	0.051	0.167

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, are presented in parentheses. The omitted categories are white, male, non-married, and non-first-generation immigrant. Models (1) and (2) include the active labor force only, while model (3) includes the full working-age population.

The results indicate that nonwhite workers were increasingly less likely to be employed than

white workers in the early 1980s. Model (1) indicates that while there was no significant gap in the late 1970s, by 1983 nonwhite workers were 10.7 percentage points less likely to be employed than white workers ($p < 0.001$), controlling for age, gender, marital status, immigration status, education, and region. This effect diminishes somewhat when controls for the industry and occupational class of the individual's current or most recent job are added in model (2). In this model, the greatest disadvantage is in 1982, where the gap in the probability of employment was 8.2 percentage points ($p < 0.001$). This is still a large and significant difference, suggesting that industry and occupational class segregation did not account for most of the gap in employment between nonwhite and white workers.

FIGURE 4.1: DIFFERENCE IN THE PROBABILITY OF EMPLOYMENT FOR NON-WHITE AND WHITE WORKERS, 1976–1987



Analysis using the General Household Survey, 1976–1987. Plotted coefficients are from Table 4.2 model (2).

Figure 4.1 plots the key coefficients from model (2), giving the difference in the probability of employment between nonwhite and white workers over the entire time period. The gap in employment between nonwhite and white workers expanded with the 1980–1981 recession, suggesting that employment was more precarious in this period for ethnic minorities. During the jobless recovery period, the gap continued expanding and then remained stagnant, indicating that any gains in employment disproportionately benefited white workers. By the end of the recovery period in 1987, the gap in the probability of employment between nonwhite and white workers decreased but did not fully disappear.

These estimates can be compared to the existing literature, though no papers provide direct

estimates for the early 1980s recession or on an annual basis. Pooling all of the GHS data from 1983–1989, Blackaby et al. (1994) find that nonwhite workers were 10.9 percentage points less likely to be employed than white workers in that period.[13] They do not compare nonwhite and white workers within the same industry and occupational class, so their estimate is most comparable to the estimates in Table 4.2 model (1). Model (1) indicates that in 1983, the gap in employment probability was 10.7 percentage points, in line with their estimate. However, my estimates also indicate this was the largest at any time from 1976 to 1987 and that the gap decreased significantly later in the 1980s. My estimate for 1982 of a difference in the probability of employment of 10.4 percentage points is also in line with the data from the 1982 PSI survey (Brown 1984).

Model (3) in Table 4.2 gives the incidence of employment among the entire working-age population, including individuals that are inactive in the labor force. This incorporates the margin of labor force participation into the analysis. The coefficient estimates in model (3) indicate that the probability of employment of any working-age nonwhite individual was much lower than that of a white individual, with a larger gap than when just the labor force is considered. This lower employment incidence suggests that, in addition to the employment penalty, nonwhite workers were less likely to participate in the labor force, all else equal.

4.5.2 First-generation immigrants

Table 4.3 gives the results for first-generation immigrants. As above, models (1) and (2) refer to the labor force only, differing in whether they control for industries and occupational classes. Models (3) and (4), also for the labor force only, additionally control for whether the respondent is classified by the interviewer as nonwhite. Models (5) and (6) give the estimates for the working-age population, with model (6) including whether the respondent was nonwhite.

Model (1) indicates that first-generation immigrants were significantly less likely to be employed than non-first-generation immigrants. For example, in 1984 the probability of employment for first-generation immigrants was 7.5 percentage points less than for non-first-generation immigrants ($p < 0.001$), controlling for education, age, gender, marital status, and region. Model (2) compares the probability of employment for native-born and immigrant individuals within the same industry and occupational class in addition to the usual factors. The gap in employment probability decreases very slightly, remaining 7.3 percentage points in 1984 ($p < 0.001$).

13. They include several potentially endogenous variables in their analysis such as housing and car ownership.

Table 4.3: Model for differences in the probability of employment by immigration status

	(1) Labor Force	(2) Labor Force	(3) Labor Force	(4) Labor Force	(5) Population	(6) Population
First-Gen Immigrant × 1976	-0.028**	-0.018*	-0.010	-0.007	-0.044***	-0.011
	(0.009)	(0.009)	(0.009)	(0.009)	(0.013)	(0.014)
First-Gen Immigrant × 1977	-0.008	-0.003	0.009	0.009	-0.048***	-0.016
	(0.007)	(0.007)	(0.008)	(0.007)	(0.013)	(0.013)
First-Gen Immigrant × 1978	-0.017*	-0.009	0.001	0.003	-0.057***	-0.022
	(0.008)	(0.007)	(0.008)	(0.008)	(0.013)	(0.013)
First-Gen Immigrant × 1979	-0.025**	-0.016*	-0.006	-0.003	-0.069***	-0.032*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.013)
First-Gen Immigrant × 1980	-0.031***	-0.023*	-0.010	-0.009	-0.072***	-0.031*
	(0.009)	(0.009)	(0.010)	(0.009)	(0.013)	(0.014)
First-Gen Immigrant × 1981	-0.043***	-0.036***	-0.023*	-0.022*	-0.061***	-0.022
	(0.011)	(0.010)	(0.011)	(0.011)	(0.013)	(0.013)
First-Gen Immigrant × 1982	-0.067***	-0.062***	-0.044**	-0.048***	-0.104***	-0.061***
	(0.014)	(0.013)	(0.014)	(0.013)	(0.014)	(0.014)
First-Gen Immigrant × 1983	-0.074***	-0.062***	-0.052***	-0.048***	-0.096***	-0.055***
	(0.014)	(0.013)	(0.014)	(0.014)	(0.016)	(0.016)
First-Gen Immigrant × 1984	-0.075***	-0.073***	-0.054***	-0.060***	-0.102***	-0.063***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)
First-Gen Immigrant × 1985	-0.046***	-0.036**	-0.028*	-0.024*	-0.076***	-0.041**
	(0.013)	(0.012)	(0.013)	(0.012)	(0.015)	(0.015)
First-Gen Immigrant × 1986	-0.022*	-0.011	-0.003	0.002	-0.064***	-0.028
	(0.011)	(0.011)	(0.011)	(0.011)	(0.014)	(0.014)
First-Gen Immigrant × 1987	-0.039***	-0.039	-0.019	-0.025	-0.072***	-0.034*
	(0.011)	(0.023)	(0.012)	(0.023)	(0.015)	(0.015)
Age	0.010***	0.004***	0.010***	0.004***	0.045***	0.045***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.029***	0.028***	0.029***	0.028***	-0.248***	-0.249***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Married	0.056***	0.041***	0.056***	0.042***	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Non-White			-0.048***	-0.032***		-0.092***
			(0.006)	(0.006)		(0.007)
Constant	0.656***	0.870***	0.657***	0.870***	0.001	0.005
	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)
Education	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes
Year Main Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industries	No	Yes	No	Yes	No	No
Occupations	No	Yes	No	Yes	No	No
Number of observations	152539	141012	152539	141012	204264	204264
Number of households	89347	83457	89347	83457	104112	104112
Adjusted R2	0.054	0.051	0.055	0.051	0.166	0.167

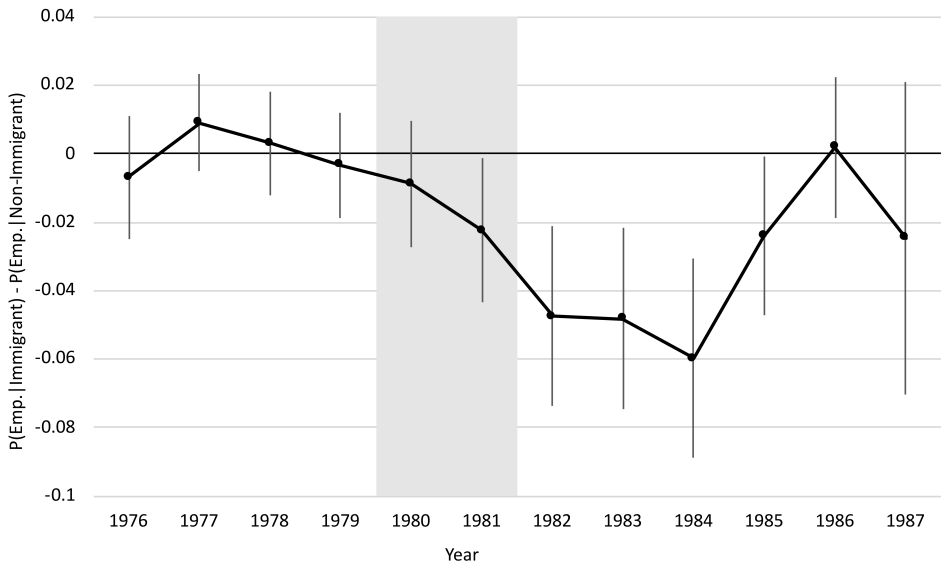
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, are presented in parentheses. The omitted categories are non-first-generation immigrant, male, and non-married. Models (3), (4), and (6) also have the omitted category of white. The first four models include the active labor force only, while the final two models include the full working-age population.

This large and significant difference again suggests that this gap in employment probability was not driven by the concentration of immigrant and native-born workers in distinct industries or occupational classes.

Many immigrants to Britain in this period were Black or South Asian, coming from the Caribbean or the Indian subcontinent. From 1976 through 1987, the GHS indicates that 49% of first-generation immigrants were also classified as nonwhite, while less than 1% of native-born individuals were classified as nonwhite. Could this difference explain the gap in the employment probability between first-generation immigrant and native-born British workers?

To explore this question, models (3) and (4) control for whether the individual was nonwhite, again focusing only on those in the labor force. The average effect of being nonwhite is significant, as suggested by Table 4.2, and the effect of being a first-generation immigrant decreases. However, there is still a large difference in the probability of employment for first-generation and native-born workers of 5.4 percentage points at its most in 1984 ($p < 0.001$). Controlling for industry and occupational class, the gap actually increases to 6.0 percentage points that same year ($p < 0.001$).

Figure 4.2: Difference in the probability of employment for immigrants and non-immigrants, 1976–1987



Analysis using the General Household Survey, 1976–1987. Plotted coefficients are from Table 4.3 model (4).

Figure 4.2 plots the coefficient estimates for the difference in probability of employment between first-generation immigrants and native-born workers over time, as estimated in model (4) which controls for whether the individual was nonwhite and for the industry and occupational

class of their most recent job. The gap in employment probability expands during the early 1980s recession and continues expanding during the jobless recovery period through 1984. This suggests that first-generation immigrants were more likely to be affected by the employment shock of the recession than native-born workers and less likely to benefit from increased employment opportunities immediately afterward. The difference in employment probability does shrink rapidly, however, in 1985 and 1986.

Models (5) and (6) present estimates for the full working-age population rather than just the labor force. With this wider population, the estimates in model (5) suggest that the gap in employment probability increases, reaching over 10 percentage points in 1982 ($p < 0.001$). However, when interviewer-assessed race is controlled for, most of this additional effect goes away. This suggests that on the margin of labor supply, the race of an individual has a more significant impact on their labor force participation than whether they are a first-generation immigrant, all else equal.

4.5.3 Gender

Table 4.4 gives the result of the models for gender, with models (1) and (2) considering those in the labor force only, and model (3) considering the total working-age population. As above, model (2) differs from model (1) by controlling for the industry and occupational class of the individual's most recent job.

Models (1) and (2) indicate that women in the labor force were more likely to be employed than men during the early 1980s recession and recovery, all else equal. The size of this effect is smaller than in the regressions for race and immigration status. In model (1), the greatest difference between the probability of employment for women and men is 4.9 percentage points, which occurred in 1984 ($p < 0.001$). When the additional controls for industry and occupational class in model (2) are added, this decreases slightly to 4.3 percentage points ($p < 0.001$).

Figure 4.3 gives the estimated coefficients for each year based on model (2). In all years, women were more likely to be employed than men when only those individuals in the labor force are considered. This gap in employment outcomes begins increasing with the onset of the early 1980s recession and then continues climbing throughout the jobless recovery. It does not decrease significantly through the end of the period of interest in 1987.

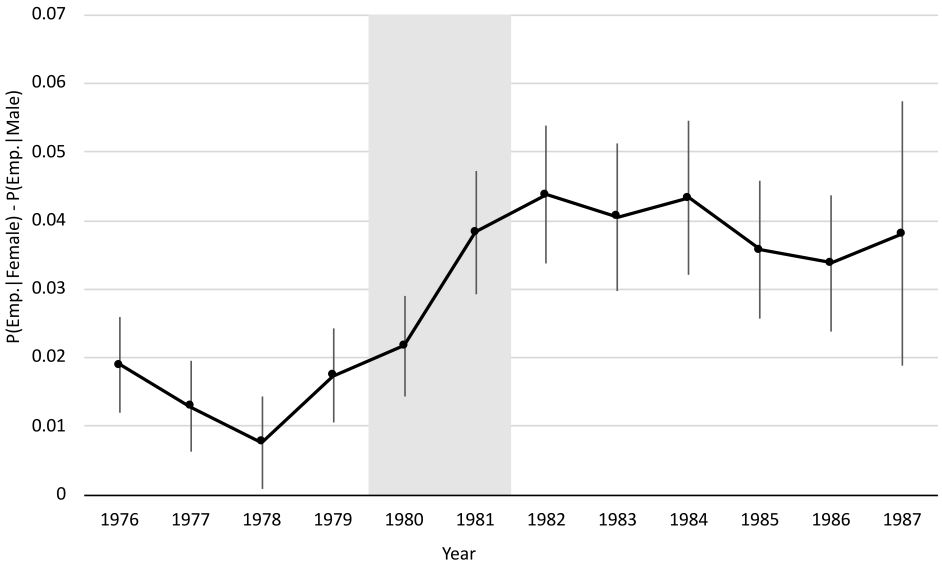
Women have a different propensity to join the labor force than men, making it especially

Table 4.4: Model for differences in the probability of employment by gender

	(1) Labor Force	(2) Labor Force	(3) Population
Female × 1976	0.020***	0.019***	-0.304***
	(0.003)	(0.004)	(0.006)
Female × 1977	0.012***	0.013***	-0.297***
	(0.003)	(0.003)	(0.006)
Female × 1978	0.006	0.008*	-0.289***
	(0.003)	(0.003)	(0.006)
Female × 1979	0.015***	0.017***	-0.277***
	(0.003)	(0.003)	(0.006)
Female × 1980	0.021***	0.022***	-0.250***
	(0.004)	(0.004)	(0.006)
Female × 1981	0.034***	0.038***	-0.243***
	(0.005)	(0.005)	(0.006)
Female × 1982	0.045***	0.044***	-0.224***
	(0.005)	(0.005)	(0.007)
Female × 1983	0.047***	0.041***	-0.231***
	(0.006)	(0.005)	(0.007)
Female × 1984	0.049***	0.043***	-0.216***
	(0.006)	(0.006)	(0.007)
Female × 1985	0.039***	0.036***	-0.216***
	(0.005)	(0.005)	(0.007)
Female × 1986	0.042***	0.034***	-0.200***
	(0.005)	(0.005)	(0.006)
Female × 1987	0.037***	0.038***	-0.195***
	(0.005)	(0.010)	(0.006)
Age	0.010***	0.005***	0.045***
	(0.000)	(0.000)	(0.000)
Age^2	-0.000***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)
Married	0.057***	0.042***	-0.003
	(0.003)	(0.003)	(0.004)
Non-White	-0.049***	-0.033***	-0.093***
	(0.006)	(0.006)	(0.007)
First-Gen Immigrant	-0.018***	-0.017***	-0.033***
	(0.004)	(0.004)	(0.005)
Constant	0.662***	0.873***	0.036***
	(0.009)	(0.009)	(0.011)
Education	Yes	Yes	Yes
Region	Yes	Yes	Yes
Year Main Effects	Yes	Yes	Yes
Industries	No	Yes	No
Occupations	No	Yes	No
Number of observations	152539	141012	204264
Number of households	89347	83457	104112
Adjusted R2	0.055	0.051	0.168

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, are presented in parentheses. The omitted categories are male, non-married, white, and non-first-generation immigrant. Models (1) and (2) include the active labor force only, while model (3) includes the full working-age population.

Figure 4.3: Difference in the probability of employment for men and women, 1976–1987



Analysis using the General Household Survey, 1976–1987. Plotted coefficients are from Table 4.4 model (2).

important to consider the margin of labor force participation. Model (3) in Table 4.4 takes this margin into account by estimating the employment incidence over the complete working-age population. All else equal, among the population women were significantly less likely to be employed than men. In addition to being in the opposite direction as the estimates from models (1) and (2), the size of this effect is very large. In 1976, the probability of a woman being employed was 30.4 percentage points lower than a man with the same observable characteristics ($p < 0.001$). From there, unlike most of the other models in this chapter, there appears to be no effect of the recession and recovery. Instead, trends toward increasing labor force participation caused the gap in employment between men and women to shrink almost monotonically throughout the period. By 1987, women were only 19.5 percentage points less likely than men to be employed, all else equal ($p < 0.001$). While this is still a large gap, the decrease in the size of the difference by over a third in about ten years is remarkable.[14]

It is important to keep in mind, however, that this analysis does not model labor force participation on a household level. For example, women might also be more likely to take on work in the event of their husband's unemployment in order to sustain their family income. These decisions in relation to the family economy are complex and path-dependent, influenced not only by the family's need for income and caring tasks, but also by social norms, the institutions surrounding work and family, and public policy (Rubery 2014, pp. 20-22). These household

14. Relative labor force participation rates for men and women may also have been affected by unemployed men dropping out of the labor force and relying on disability benefits, which is not captured in this analysis.

participation factors are not considered in this analysis.

Thus, the regressions in Table 4.4 show two stories. First, men in the labor force were relatively worse off than women in terms of their employment outcomes during the early 1980s recession and throughout the recovery period. This result is unsurprising given trends in recent recessions and provides some additional evidence for the segmentation hypothesis, which suggests that women fare better than men in recessions because of their concentration in less cyclically-sensitive industries. However, it is interesting that this trend persists even when industry and occupational class are controlled for, providing some evidence for the substitution hypothesis — that women were more likely to be employed than men more broadly, possible because of to their lower cost of employment.

On the margin of labor force participation, we also see that the relative probability of any woman in the population being employed increases dramatically during this period. This second fact colors our understanding of the first. One possibility is that the decreasing gap between men and women observed in model (3) represents a demographic shift, with more women entering the labor force after finishing their education. This would not affect the interpretation of the estimates in models (1) and (2). However, if some women were drawn into the labor force who had previously been inactive, they might be more likely to enter the labor force as employed rather than unemployed. This could inflate the employment rate among women in the labor force, accounting for some of the benefit attributed to women in models (1) and (2). This effect, though, may be offset if these newer hires were also more vulnerable to unemployment during the business cycle downturn.

4.5.4 Region

Table 4.5 compares the employment outcomes of workers in the best performing regions, the South of England and the Midlands,[15] with those in the North of England[16] and in Wales and Scotland. Models (1) and (2) are estimated for the active labor force only, while model (3) is estimated for the entire working-age population.

Model (1) indicates that workers in the North of England and in Wales and Scotland were less likely to be employed than those in the South of England, all else equal. At the point of greatest difference, workers in the North of England were 4.5 percentage points less likely to

15. South East, Greater London, South West, East Anglia, East Midlands, West Midlands.
16. North, North West, Yorkshire and the Humber.

Table 4.5: Model for differences in the probability of employment by region

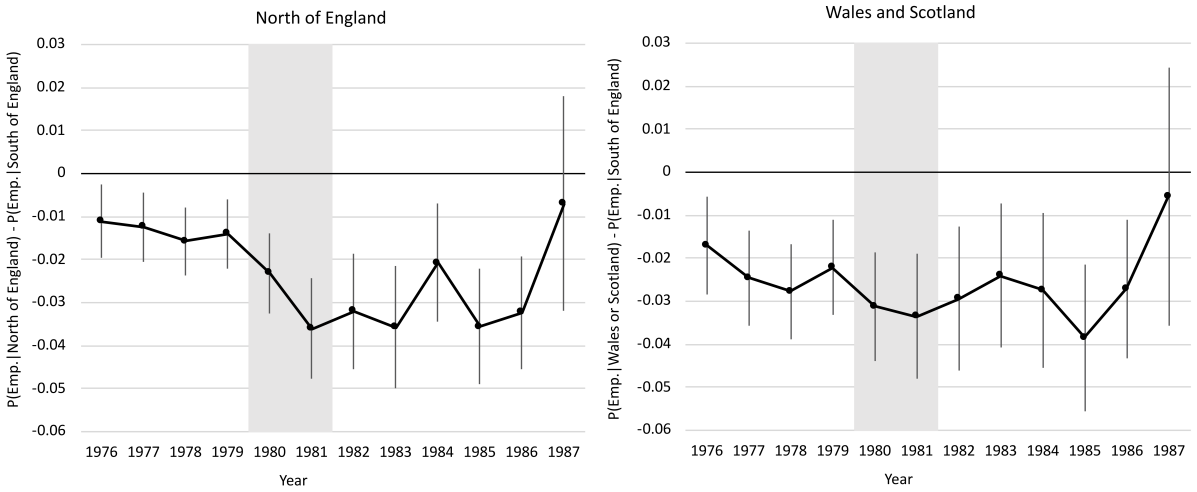
	(1) Labor Force	(2) Labor Force	(3) Population
North of England × 1976	-0.018***	-0.011*	-0.045***
	(0.005)	(0.004)	(0.007)
North of England × 1977	-0.018***	-0.012**	-0.040***
	(0.004)	(0.004)	(0.007)
North of England × 1978	-0.021***	-0.016***	-0.028***
	(0.004)	(0.004)	(0.007)
North of England × 1979	-0.021***	-0.014***	-0.042***
	(0.004)	(0.004)	(0.008)
North of England × 1980	-0.029***	-0.023***	-0.041***
	(0.005)	(0.005)	(0.008)
North of England × 1981	-0.044***	-0.036***	-0.055***
	(0.006)	(0.006)	(0.008)
North of England × 1982	-0.045***	-0.032***	-0.046***
	(0.007)	(0.007)	(0.009)
North of England × 1983	-0.041***	-0.036***	-0.040***
	(0.008)	(0.007)	(0.009)
North of England × 1984	-0.028***	-0.021**	-0.024*
	(0.007)	(0.007)	(0.010)
North of England × 1985	-0.045***	-0.036***	-0.047***
	(0.007)	(0.007)	(0.009)
North of England × 1986	-0.040***	-0.032***	-0.058***
	(0.007)	(0.007)	(0.009)
North of England × 1987	-0.032***	-0.007	-0.052***
	(0.006)	(0.013)	(0.009)
Wales and Scotland × 1976	-0.018**	-0.017**	-0.057***
	(0.006)	(0.006)	(0.010)
Wales and Scotland × 1977	-0.028***	-0.025***	-0.048***
	(0.006)	(0.006)	(0.010)
Wales and Scotland × 1978	-0.032***	-0.028***	-0.058***
	(0.006)	(0.006)	(0.010)
Wales and Scotland × 1979	-0.027***	-0.022***	-0.046***
	(0.006)	(0.006)	(0.010)
Wales and Scotland × 1980	-0.039***	-0.031***	-0.060***
	(0.007)	(0.006)	(0.010)
Wales and Scotland × 1981	-0.041***	-0.034***	-0.060***
	(0.008)	(0.007)	(0.010)
Wales and Scotland × 1982	-0.037***	-0.029***	-0.059***
	(0.009)	(0.009)	(0.011)
Wales and Scotland × 1983	-0.030**	-0.024**	-0.048***
	(0.009)	(0.009)	(0.011)
Wales and Scotland × 1984	-0.036***	-0.027**	-0.057***
	(0.010)	(0.009)	(0.012)
Wales and Scotland × 1985	-0.049***	-0.038***	-0.057***
	(0.009)	(0.009)	(0.011)
Wales and Scotland × 1986	-0.032***	-0.027***	-0.058***
	(0.009)	(0.008)	(0.011)
Wales and Scotland × 1987	-0.049***	-0.006	-0.083***
	(0.009)	(0.015)	(0.011)
Age	0.010***	0.005***	0.045***
	(0.000)	(0.000)	(0.000)
Age^2	-0.000***	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)
Female	0.029***	0.028***	-0.248***
	(0.001)	(0.002)	(0.002)
Married	0.056***	0.041***	-0.004
	(0.003)	(0.003)	(0.004)
Non-White	-0.051***	-0.035***	-0.090***
	(0.006)	(0.006)	(0.007)
First-Gen Immigrant	-0.016***	-0.016***	-0.027***
	(0.004)	(0.004)	(0.005)
Constant	0.695***	0.900***	0.074***
	(0.008)	(0.009)	(0.010)
Education	Yes	Yes	Yes
Year Main Effects	Yes	Yes	No
Industries	No	Yes	No
Occupations	No	Yes	No
Number of observations	152539	141012	204264
Number of households	89347	83457	104112
Adjusted R2	0.053	0.050	0.166

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, in parentheses. The omitted categories are South and Midlands, male, non-married, white, and non-first-generation immigrant. Models (1) and (2) are for the active labor force only; model (3) is for the working-age population.

be employed than those in the South of England in 1982 ($p < 0.001$). This effect drops to 3.2 percentage points, however, when industry and occupational class controls are added in model (2) ($p < 0.001$). The disadvantage of Scotland and Wales relative to the South of England was slightly smaller in the same year: workers in these areas were only 3.7 percentage points less likely to be employed in 1982 in model (1), and only 2.9 percentage points less likely in model (2) ($p < 0.001$).

Figure 4.4 shows the estimated coefficients from model (2) for the entire period 1976 to 1987. The chart on the left gives the difference in the probability of employment for workers in the North of England and workers in the South of England, while the figure on the right gives the difference in the probability of employment for workers in Scotland and Wales and workers in the South of England.

Figure 4.4: Difference in the probability of employment for outer regions and the South of England and Midlands, 1976–1987



Analysis using the General Household Survey, 1976–1987. Plotted coefficients are from Table 4.5 model (2).

During the 1980–1981 recession, the probability of employment for workers in the North of England fell relative to those in the South. From there, it remained stagnant throughout the jobless recovery before recovering to its pre-recession level. For workers in Scotland and Wales, the probability of employment also fell during the recession but by a smaller amount. The greatest difference in the probability of employment was actually in 1985, well after the end of the recession. This was a difference of 3.8 percentage points ($p < 0.001$).

Model (3) in Table 4.5 gives the results for the working-age population. For both the North of England and Scotland and Wales, the disadvantage in employment relative to the South of

England is greater when estimated for the working-age population. This suggests that in addition to being less likely to be employed, workers in the North of England and in Scotland and Wales were less likely to participate in the labor force.

4.5.5 Industries

The final dimension of comparison is industry. Table 4.6 presents the coefficient estimates from a single model with a full set of interaction terms estimated for each year in our time period and for ten industry categories. In this model, the omitted industry is other services, so all of the coefficient estimates represent a difference in the probability of employment from other services. The model is estimated for those in the active labor force only, as information on the industry of an individual's most recent job is not typically available for those out of the labor force.

The greatest difference in the probability of employment is found for workers in the construction industry. Workers in this highly cyclical industry were 10.0 percentage points less likely to be employed than those in other services in 1982 ($p < 0.001$). This difference in the probability of employment began in the late 1970s but widened dramatically with the early 1980s recession, without fully recovering by 1987.

Workers associated with metalworking, engineering, and vehicle manufacturing were also less likely to be employed than those in other services, all else equal. The difference in the probability of employment reached 6.9 percentage points in 1982 ($p < 0.001$). Workers in other manufacturing also had a lower probability of employment than those in other services by 7.3 percentage points ($p < 0.001$). In both of these industries, there was no gap in the probability of employment before the early 1980s recession, but a gap emerged during the 1980–1981 recession and persisted throughout the recovery.

Workers in mineral extraction were not disadvantaged relative to those in other services before the early 1980s recession, but by 1982 they were 8.8 percentage points less likely to be employed ($p < 0.001$). This gap in the probability of employment shrunk as recovery ensued, and there was no significant difference in their probability of employment relative to those in other services by 1985.

Finally, it is interesting that workers in energy and water supply were actually more likely to be employed than those in other services during the recession years of 1980 to 1981. This could reflect the effect of the high oil prices in these years or the general inelasticity of demand

Table 4.6: Model for differences in the probability of employment by industry

	Agr, forest, fish	Energy & water	Mineral extract.	Metal, engineer, vehic	Other manu.	Const-ruction	Dist, hotel, catering	Transport, communic.	Bank, insurce
Industry × 1976	0.028**	0.023*	0.010	0.008	-0.018**	-0.034***	0.008	0.021**	0.003
	(0.010)	(0.010)	(0.014)	(0.005)	(0.006)	(0.009)	(0.006)	(0.006)	(0.007)
Industry × 1977	0.037***	0.003	0.022	0.006	0.007	-0.024**	0.015**	0.019**	0.002
	(0.008)	(0.013)	(0.013)	(0.005)	(0.006)	(0.008)	(0.005)	(0.006)	(0.007)
Industry × 1978	0.012	0.007	0.026*	0.021***	0.006	-0.025**	0.001	0.009	-0.016*
	(0.012)	(0.012)	(0.012)	(0.004)	(0.005)	(0.008)	(0.006)	(0.007)	(0.008)
Industry × 1979	0.003	0.006	0.017	0.004	0.009	-0.028**	0.004	0.015*	-0.002
	(0.013)	(0.012)	(0.014)	(0.005)	(0.005)	(0.009)	(0.005)	(0.006)	(0.007)
Industry × 1980	0.040***	0.024*	0.036***	-0.020**	-0.022**	-0.048***	0.003	0.003	0.006
	(0.007)	(0.009)	(0.011)	(0.006)	(0.007)	(0.009)	(0.006)	(0.008)	(0.006)
Industry × 1981	0.024*	0.025**	-0.056***	-0.050***	-0.048***	-0.086***	-0.031***	-0.001	0.003
	(0.012)	(0.010)	(0.014)	(0.008)	(0.009)	(0.011)	(0.007)	(0.009)	(0.007)
Industry × 1982	0.011	-0.005	-0.088***	-0.069***	-0.073***	-0.100***	-0.044***	-0.025*	0.003
	(0.015)	(0.013)	(0.019)	(0.009)	(0.010)	(0.013)	(0.008)	(0.011)	(0.007)
Industry × 1983	0.002	0.018	-0.046**	-0.062***	-0.065***	-0.077***	-0.035***	-0.011	0.014
	(0.017)	(0.013)	(0.018)	(0.010)	(0.011)	(0.013)	(0.008)	(0.012)	(0.008)
Industry × 1984	0.035*	0.000	-0.039*	-0.046***	-0.048***	-0.071***	-0.014	-0.009	0.013
	(0.014)	(0.016)	(0.020)	(0.011)	(0.012)	(0.014)	(0.008)	(0.013)	(0.009)
Industry × 1985	0.027	0.010	-0.016	-0.040***	-0.043***	-0.095***	-0.037***	-0.024*	0.001
	(0.015)	(0.013)	(0.014)	(0.010)	(0.010)	(0.014)	(0.008)	(0.012)	(0.008)
Industry × 1986	0.010	-0.001	-0.021	-0.027**	-0.020*	-0.079***	-0.015*	0.013	0.008
	(0.019)	(0.015)	(0.017)	(0.009)	(0.010)	(0.013)	(0.007)	(0.010)	(0.008)
Industry × 1987	-0.005	0.003	-0.030	-0.050*	-0.060**	-0.071**	-0.022	-0.011	0.003
	(0.031)	(0.026)	(0.029)	(0.020)	(0.022)	(0.025)	(0.014)	(0.021)	(0.015)
Age					0.006***				
					(0.000)				
Age^2					-0.000***				
					(0.000)				
Female					0.023***				
					(0.002)				
Married					0.047***				
					(0.003)				
Non-White					-0.036***				
					(0.006)				
First-Gen Imm.					-0.019***				
					(0.004)				
Constant					0.765***				
					(0.009)				
Education					Yes				
Region					Yes				
Year Main Effects					Yes				
Occupation					No				
Number of Observations					141655				
Number of households					83817				
Adjusted R2					0.047				

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, are presented in parentheses. The omitted categories are other services, male, non-married, white, and non-first-generation immigrant. All estimates from a single model with the active labor force only.

for energy and water.

4.6 Conclusion

This chapter has investigated whether the early 1980s recession and recovery impacted workers from different demographic groups, regions, and industries in different ways. Did the 1980–1981 recession disproportionately affect certain workers? Were these effects simply cyclical, recovering with the business cycle, or were they more persistent?

By constructing a new dataset from the General Household Survey for 1976 to 1987, I am able to explore how the probability of employment changed over the recession and recovery period for different workers. Using linear probability models that control for many factors such as age and education, I find disparities in the probability of employment across racial, immigration, gender, regional, and industrial dimensions. A set of interaction terms estimated for each year reveals how these differences shifted from 1976 to 1987.

The results indicate that some workers were disproportionately affected by the 1980–1981 recession. For example, in 1982, nonwhite workers were 8.2 percentage points less likely to be employed than white workers, immigrants were 2.2 percentage points less likely to be employed than native-born workers (controlling for race), and men were 4.4 percentage points less likely to be employed than women, all else equal.[17] Workers in the North of England, Wales, and Scotland, and those in many productive industries, were also relatively disadvantaged. In all cases, most of these effects were not because of differences in the industry and occupational class composition of these groups.

By tracing differences in employment outcomes over time, we see that in many cases, these gaps expanded or remained large during the early years of the jobless recovery. The greatest difference in the likelihood of employment was thus often from 1982 to 1984 rather than during the recession itself. As jobs were lost and gained in this period, the position of disadvantaged workers in the labor market worsened.

Many of the differences in labor market performance that emerged with the recession and expanded during the recovery persisted through the end of the recession-recovery cycle in 1987. Some of the employment disadvantages suffered by these groups were thus persistent and structural, not just reflecting cyclical trends. This suggests that the interaction of structural change

17. All estimates significant at the 0.001 level. Estimates are taken from the model for the labor force with industry and occupation controls.

and recessions can generate inequality in labor market outcomes that will not naturally resolve with the upturn of the business cycle.

Relying on richer data and controlling for many factors, the analysis in this chapter confirms that nonwhite workers experienced a large and persistent employment penalty relative to white workers during the early 1980s. These results also provide some additional evidence that both the segmentation and substitution mechanisms contributed to women's relative employment advantage during the 1980–1981 recession and after. However, their employment advantage might be inflated by the effects of changes in the labor force participation rate during this period. Finally, the significant differences in the probability of employment for workers across various regions and industries, with otherwise similar characteristics, confirm the findings of Chapter 3.

The consequence of the early 1980s business cycle downturn and rapid structural change was thus a disproportionate decline in the employment prospects for disadvantaged workers. The jobless recovery intensified these differences, creating inequalities in employment outcomes that did not fully resolve with the employment recovery.

Conclusion

The most significant unemployment episodes in twentieth-century Britain occurred during the interwar years and again during the early 1980s, when the unemployment rate climbed to over 10% in aggregate and persisted for many years. Both episodes coincided with periods of dramatic structural change in the economy. In the 1920s and early 1930s, export-oriented heavy industries which had grown during World War I were overtaken by expanding light manufacturing industries. During the early 1980s recession, the decline of manufacturing accelerated as the British economy pivoted toward service industries and finance.

Our understanding of these employment downturns has been framed by aggregate macroeconomic explanations focusing on the role of demand shocks and supply-side wage pressures. Little was known about how structural change interacts with business cycles and industry shocks, in general and in these historical episodes. This thesis has explored these complex interactions during the interwar and early 1980s employment downturns and considered their consequences on labor market inequality.

Chapters 1 and 2 focused on the interwar unemployment episode. Chapter 1 asked how interwar economists understood this persistent unemployment, which presented an empirical anomaly that could not be accommodated by the dominant Marshallian economic tradition. Text analytic methods were used to identify economists who wrote on unemployment in interwar Britain, and then a comprehensive review of their work on the topic was given. In this period before the publication of Keynes' *General Theory*, economists were found to have expounded a wide variety of causes and remedies for persistent unemployment. Though some economists did focus on the role of high real wages in line with the Marshallian framework, the interwar period also saw major developments in our understanding of how monetary policy, business cycles, and institutions such as unemployment insurance affect unemployment. Important for this work, Chapter 1 also highlighted how many interwar economists focused on explanations of unemployment based in structural change. In particular, the competitive disadvantage of

the export industries after World War I, and their concentration in certain regions, preoccupied some interwar economists.

Chapter 2 explored the role of structural change in interwar unemployment using econometric methods. By digitizing the complete Ministry of Labour *Gazette* data, this chapter contributed a comprehensive dataset on interwar unemployment at the industry- and gender-level. These rich data were first used to provide new descriptive statistics on interwar unemployment, including the first monthly unemployment rate series for men and women, the identification of the industries with which most unemployed workers were associated, and a new analysis of the role of industry mix in regional unemployment rate differentials. Then, the extent of labor reallocation across industries was estimated, and variations in this reallocation over time, across sector, by gender, and by region were considered. A Markov model was used to link these adjustment rigidities to persistent unemployment. Large differences in the flexibility of the labor market for different groups of workers were identified, which led certain workers to have a higher risk of persistent unemployment. Finally, the determinants of industry-level unemployment differentials were estimated with a regression which highlighted the importance of structural factors in interwar unemployment.

Chapters 3 and 4 analyzed the early 1980s period. In Chapter 3, the slow employment recovery from the recession in Britain was linked to structural change through a comparison with the United States. While both countries experienced a severe recession in the early 1980s, in Britain that recession led to high unemployment rates for eight years while in the US, the labor market had a strong recovery. The concept of jobless recoveries was used to explain the coincidence of output growth and employment contraction in Britain following the 1980–1981 recession. Britain and the US were compared to identify differences that might have contributed to Britain's jobless recovery. Three possible drivers of jobless recoveries were considered in detail: the reallocation of labor across industries, regional disparities, and job polarization. In Britain, labor reallocation across industries was more rapid and persistent than that in the US. A shift-share analysis revealed that a larger portion of regional disparities was due to the differing industrial composition of regions in Britain than in the US. Finally, job polarization was found to have been more significant in Britain than in the US, but this was again because of the changing composition of industries in the economy. Structural change thus emerged as the key factor driving the jobless recovery experience in Britain in the early 1980s period.

Chapter 4 then considered how this recession and jobless recovery affected workers from

different industries, regions, and demographic groups. Using individual-level data from the General Household Survey from 1976 to 1987, this chapter estimated how the probability of employment varied for workers from these different groups throughout the recession and recovery period. The estimation of linear probability models allowed the likelihood of employment to be compared for workers with otherwise similar characteristics. Large differences in employment probabilities were identified, with nonwhite workers, men, workers in the North of England, and workers in production industries all disadvantaged. These employment penalties emerged during the 1980–1981 recession but often intensified during the jobless recovery period from 1982. In some cases, the differences in the likelihood of employment persisted through the end of the recession-recovery cycle in 1987. The consequences of structural change and the jobless recovery in the early 1980s period were thus borne disproportionately by workers from certain groups, many of whom experienced persistent disadvantage.

This thesis was motivated by two larger questions about the relationship between recessions, structural change, and inequality. The first question was how secular structural change affects recessions. Most macroeconomic approaches to the business cycle abstract away from structural change, focusing on short-run fluctuations rather than long-run changes. This has limited our understanding of how structural change and the business cycle interact in real-world economic downturns.

What have we learned about the role that structural change played in the interwar and early 1980s downturns? By using newly digitized industry microdata and econometric methods, this thesis was able to quantitatively analyze the importance of structural change in interwar Britain. Unemployment was found to have varied significantly by industry, gender, and region, and these unemployment patterns were partially determined by structural factors. The export industries and those that overexpanded during World War I were disadvantaged, while industries that could take advantage of new entrants to the labor force had lower unemployment rates. Regions in the North of England and in Wales were relatively disadvantaged above and beyond the effects of having a disproportionate share of declining industries. Finally, rigidities to structural adjustments, which were experienced more acutely by some workers than others, were found to be directly associated with persistent unemployment. These results provide new econometric evidence that structural forces deepened interwar unemployment and contributed to its persistence, playing an essential role in British unemployment between the wars.

After the early 1980s recession, Britain experienced a jobless recovery with several years of

contracting or stagnant employment growth. This contrasts with the experience of the United States, which had a similarly-sized recession but faster employment recovery. The central difference between these two countries was the speed and scope of structural change, which was more rapid and persistent in Britain than in the US. The recession accelerated the decline in the employment share of manufacturing industries in Britain, which did not reverse during the recovery. The banking and finance industries experienced a comparable increase in employment share. The effect of this rapid structural change in the early 1980s was thus to slow the employment recovery from the 1980–1981 recession, contributing to a jobless recovery that harmed British workers for several years after the end of the recession.

The second motivational question of this work was how recessions contributed to inequality. Modern recessions have had unequal impacts throughout the labor force; for example, during the Great Recession men, nonwhite workers, and those in the North of England were hardest hit by the recession, as well as workers in certain cyclically-sensitive industries. Recent research has found that these unequal impacts are a serious concern, as recessions can have persistent, negative consequences for workers who experience employment and wage shocks (Yagan 2019; Rinz 2019; Oreopoulos, Wachter, and Heisz 2012, for example).

Did the interwar and early 1980s recessions also have disproportionate impacts on certain groups of workers? A disaggregated empirical approach contributes new evidence on the uneven impacts of both the interwar and the early 1980s recessions. For interwar Britain, the rich *Labour Gazette* data on monthly unemployment confirmed that the downturn had heterogeneous effects across industries, gender, and regions. Yet the disproportionate impact on certain workers was found to be even greater than these raw unemployment differences. Estimating the flexibility of the labor market for workers of different industries, regions, and gender revealed that some workers faced more rigid labor markets than others. Workers from industries that were contracting in employment faced not only a higher risk of unemployment, but also more rigidities to moving into different industries than other workers. Those in textiles and mining, those located in the North of England and Wales, and women also had relatively fewer labor market opportunities and faced a higher risk of long-term unemployment. The downturn during the interwar period thus created a shock with diverse effects across industries, gender, and regions, and there was also heterogeneity in the ability of these workers to adjust to the shock. The rigidities to these structural adjustments that certain groups of workers faced make it likely that the downturn generated persistent labor market inequalities.

For the early 1980s period, this question could be addressed more directly using individual-level data. With econometric methods, differences in the probability of employment across the dimensions of race, immigration status, gender, industry, and region were estimated annually before, during, and after the 1980–1981 recession. Controlling for many factors, rapid structural change in this period disadvantaged workers in the North of England, Scotland, and Wales, and those in production industries. Nonwhite workers, first-generation immigrants, and men were also less likely to be employed, even once differences in industry and occupational class were taken into account. In many cases, these differences in the likelihood of employment did not disappear at the end of the recession and recovery period, even once employment recovered in aggregate. This indicates that not only did the early 1980s recession have uneven impacts along all of these dimensions, but that these inequalities often became entrenched or permanent.

The aim of this study was thus to begin to disentangle the many components of the interwar and early 1980s recessions. By producing better datasets, it was possible to analyze these downturns at a finer level of disaggregation using microeconometric methods. This has highlighted the central importance of structural change in both the interwar and the early 1980s recessions. In both episodes, structural change contributed to, and amplified, the cyclical downturn. The coincidence of structural change and cyclical downturn led these major recessions to disproportionately affect certain groups of workers, often with persistent impacts.

This reshapes our understanding of interwar unemployment significantly. Previously, there was a chasm between the macroeconomic research on interwar unemployment focused on demand- or supply-side explanations for the downturn (Beenstock and Warburton 1991; Hatton 1988; Dimsdale, Nickell, and Horsewood 1989; Broadberry 1986, for example) and the historical research focused on structural change (Aldcroft and Richardson 1969; Aldcroft and Fearon 1969; Heim 1984, for example; see also Clay 1929a). This work brings these two approaches together. For the macroeconomic strand, this thesis has provided evidence that labor market rigidities did prevent structural adjustments in interwar Britain, contributing to unemployment from the supply-side. However, these rigidities only affected certain groups, as some workers experienced flexible labor markets and many opportunities to move between industries. This indicates that the labor market was not sclerotic in aggregate, and that future research must consider interwar unemployment at a disaggregated level.

To the historical approach, this work has contributed econometric evidence for the importance of secular structural change processes. The data-driven, econometric approach of this thesis has

deepened our understanding of the role of structural change in this downturn by allowing the importance of structural factors to be quantified and by identifying the particular forces that drove this effect. We have also established that interwar economists were in no way bound to supply-side explanations of interwar unemployment before Keynes' *General Theory*, as suggested in Benjamin and Kochin (1979), Dimsdale (1984), Eichengreen (1989), and in other work. Many interwar economists believed that secular structural change generated persistent unemployment, which this thesis was able to corroborate and amplify.

This thesis has also provided a new analytic framework for the early 1980s recession. By arguing that this recession had an early example of a jobless recovery, this work connects early 1980s Britain to a literature on slow employment recoveries after recessions. It pushes back the date at which jobless recoveries were thought to have begun by a decade and offers a cross-national comparison in a literature that has been focused on the United States. The importance of structural change to Britain's jobless recovery supports the perspectives in Groshen and Potter (2003), Olney and Pacitti (2017), and Chodorow-Reich and Wieland (2020), among others, which argue for its importance in jobless recoveries in the US.

The focus of the Thatcher government on market solutions to unemployment has obscured the disproportionate impact of that unemployment on ethnic minorities, immigrants, and workers in the North of England, Wales, and Scotland. By estimating differences in the probability of employment for these groups on an annual level, this thesis has presented evidence that the early 1980s recession and recovery further disadvantaged these marginalized workers. Building on the work in Blackaby et al. (1994) and Leslie, Lindley, and Thomas (2002), these annual results suggest that the jobless recovery, driven by rapid structural change, contributed to labor market inequalities that in many cases became entrenched. The implication of these findings is that growing inequalities along these lines were central to the early 1980s unemployment episode, and that this period should be a focus for future research on the historic roots of present-day inequalities.

Finally, taken together, these findings have important policy implications. Policymakers continue to look to the interwar and early 1980s downturns for lessons that can be applied to new economic crises. This thesis demonstrates that in both of these downturns, structural change deepened persistent unemployment and contributed to inequalities in the effect of the downturn by industry, region, and demographic group. Mass unemployment in these periods was thus, in many ways, a "meso" problem that was disproportionately borne by certain groups of workers.

This suggests that policies that target stimulus or relief to workers that are experiencing the greatest disadvantage can actually work for the benefit of the national economy. For example, in both periods, direct fiscal support for export industries during the downturn could have bolstered the economy as much or more than a national fiscal stimulus, while also slowing structural change processes that left many out of work. Policymakers can thus look beyond aggregate monetary and fiscal measures to more narrowly-targeted approaches, recognizing the distributional impacts of structural change and recessions and utilizing these differences for effective interventions.

This analysis also suggests possibilities for new research. In interwar Britain, labor market rigidities were found to have affected certain groups of workers more than others, with structural factors playing a role. More research is required, however, on the exact nature of the rigidities that these workers faced. Analyzing changes to unemployment insurance, tariff, and government subsidization policies, as well as barriers to regional, industrial, or occupational mobility, could shed light on why frictions in the interwar labor market affected some workers more than others and how they might have been addressed. Many of these effects may have been the result of policy decisions, and the political economy of the period could be revisited with these findings in mind.

The variation in unemployment and labor market flexibility across industries and regions also lays the groundwork for future research on the role of industries and regions in the interwar downturn. This could explore industrial and regional clusters with economic geography or spatial econometric methods, modeling the location decisions of new branches, plants, and firms associated with old and new industries. Research in this vein could provide insights into the roots of the persistent North-South divide in Britain.

The development of the *Labour Gazette* data also allowed the labor market experiences of men and women to be considered separately in detail. Male unemployment was found to be driven by many of the same factors that affected industry-level unemployment overall, such as wage levels and structural shocks from World War I, while female unemployment was not much affected by wages or other factors beyond the task composition of the industry. Future research could aim to capture a richer picture of women's economic involvement by incorporating household-level analyses or more closely examining the margin of labor force participation, home production, and the substitution of female for male labor.

The findings for the interwar period derive from a major data digitization effort of the *Labour Gazette*. My hope is that, by demonstrating the effectiveness of using OCR technology

to create new datasets, more researchers will be inspired to take advantage of this technology to digitize other interwar data sources. The complete digitization of sources such as the Local Unemployment Index could provide insights into interwar unemployment in the future.

The early 1980s recession will also be the focus of much economic history research to come. This thesis highlights a number of open questions that can be addressed. The early 1980s recession was found to have had a jobless recovery, due in large part to the reallocation of labor across industries. Rapid, permanent structural change thus slowed the recovery of employment and had disproportionate impacts on certain groups of workers. A key question for future research is why structural change was so dramatic and persistent during these years of recession and recovery. Theoretical and empirical research using Dutch Disease models or structural change models adapted for open economies may offer some insight into the economic mechanisms for this structural change. There are also many government policies to be explored that may have had implications for structural change, including privatization, changes to unemployment benefits, and exchange rate management.

Many questions remain regarding the position of women in the early 1980s recession. By focusing on those in the labor force, the results of this thesis indicate that women were actually more likely than men to be employed throughout the early 1980s recession and recovery period. This position, however, was not necessarily advantageous — much of this effect derived from women being segmented into industries and occupations that were less cyclically sensitive, and the residual effect might be due in part to the substitution of women for men at lower wage rates with weaker employment protections. Future research can build on the work of this thesis by using similar methods to explore gender wage penalties, labor force participation, and the intensive margin of employment to capture more of these nuances. The distributive effects of whatever advantages women may have had in the labor force need to continue to be explored, including along education, class, and racial lines.

The striking disadvantage of nonwhite and immigrant workers in the early 1980s labor market also opens up areas for more research. This disadvantage should be explored from other angles by considering participation, part-time working, informal employment, and intersectional effects. Future work can also investigate what role the early 1980s period played in generating and entrenching present-day systemic inequalities.

This thesis thus represents one small step toward deepening our understanding of the causes and consequences of these two major employment downturns. Structural change processes and

the business cycle are inextricably linked, and their interaction has important implications for inequality. Continued exploration of this complex relationship is essential to understanding both the economy of the past and of the present.

Appendices

Appendix A

Appendices to Chapter 2

A.1 Data appendix

Counties in each of the 1931 *Census of England and Wales* regions

South East[1]

Bedfordshire, Berkshire, Buckinghamshire, Essex, Hertfordshire, Kent, London*, Middlesex, Oxfordshire, Southampton, Surrey, Sussex (East), Sussex (West), Isle of Wight

Greater London

Including the City of London and Metropolitan Police Districts

North 1

Durham, Northumberland

North 2

Cumberland, Westmorland, Yorkshire (East Riding), Yorkshire (North Riding)

North 3

Yorkshire (West Riding), Yorkshire C.B.

North 4

Cheshire, Lancashire

Midland 1

Gloucestershire, Herefordshire, Shropshire, Staffordshire, Warwickshire, Worcestershire

1. Source: *Census of England and Wales* Industry Report, Appendix B, p. 195.

Midland 2

Derbyshire, Leicestershire, Northamptonshire, Nottinghamshire, Soke of Peterborough

East

Cambridgeshire, Isle of Ely, Huntingdonshire, Lincolnshire (Parts of Holland, Kesteven, and Lindsey), Norfolk, Rutlandshire, Suffolk (East), Suffolk (West)

South West

Cornwall, Devonshire, Dorsetshire, Somersetshire, Wiltshire

Wales 1

Brecknockshire, Carmarthenshire, Glamorganshire, Monmouthshire

Wales 2

Anglesey, Caernarvonshire, Cardiganshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire, Pembrokeshire, Radnorshire

Table A.1: Industry categories, groups, and industries in the Ministry of Labour *Gazette*

Industry Group	Industries
Metal Manufacturing, Metal Trades, and Engineering	
Engineering, etc.	Constructional Engineering
Engineering, etc.	Electrical Engineering
Engineering, etc.	General Engineering; Engineers' Iron and Steel Founding
Engineering, etc.	Marine Engineering, etc.
Metal Manufacture	Iron and Steel Tube Making
Metal Manufacture	Manufacture of Brass, Cotton, Zinc, Tin, Lead, etc.
Metal Manufacture	Manufacture of Tin Plates
Metal Manufacture	Pig Iron Manufacture (Blast Furnaces)
Metal Manufacture	Steel Melting and Iron Puddling Furnaces, Rolling Mills and Forges
Metal Manufacture	Wire, Wire Netting, Wire Rope Manufacture
Metal Trades	Bolts, Nuts, Screws, Rivets, Nails, Etc., Manufacture
Metal Trades	Brass and Allied Metal Wares Manufacture
Metal Trades	Electrical Cable, Wire, and Electric Lamp Manufacture
Metal Trades	Electrical Wiring and Contracting
Metal Trades	Hand Tool, Cutlery, Saw, File Making
Metal Trades	Heating and Ventilating Apparatus
Metal Trades	Metal Industries Not Separately Specified
Metal Trades	Stove, Grate, Pipe, etc., and General Iron Founding
Metal Trades	Watches, Clocks, Plate, Jewellery, etc., Manufacture
Textile Manufacturing	
Textile Trades	Carpet Manufacture
Textile Trades	Cotton Industry
Textile Trades	Hemp Spinning and Weaving, Rope, Cord, Twine, etc., Making
Textile Trades	Hosiery
Textile Trades	Jute
Textile Trades	Lace
Textile Trades	Linen
Textile Trades	Silk Industry
Textile Trades	Textile Bleaching, Printing, Dyeing, etc.
Textile Trades	Textile Industries Not Separately Specified
Textile Trades	Woolen and Worsted
Other Manufacturing and Production Industries	
Brick, Tile, etc., Making	Brick, Tile, etc., Making
Chemicals, etc.	Chemicals Manufacture
Chemicals, etc.	Explosives Manufacture
Chemicals, etc.	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Chemicals, etc.	Paint, Varnish, Japan, Red and White Lead Manufacture
Clothing Trades	Blouses, Shirts, Collars, Underclothing, etc., Making
Clothing Trades	Boot, Shoe, Slipper and Clog Trades
Clothing Trades	Dress Industries Not Separately Specified
Clothing Trades	Dress and Mantle Making and Millinery
Clothing Trades	Hat and Cap (Including Straw Plait) Manufacture
Clothing Trades	Tailoring
Construction and Repair of Vehicles	Construction and Repair of Carriages, Carts, etc.
Construction and Repair of Vehicles	Construction and Repair of Motor Vehicles, Cycles and Aircraft
Construction and Repair of Vehicles	Railway Carriage, Wagon, and Tram-Car Building
Fishing	Fishing
Food, Drink, and Tobacco	Bread, Biscuit, Cake, etc., Making
Food, Drink, and Tobacco	Cocoa, Chocolate and Sugar Confectionery
Food, Drink, and Tobacco	Drink Industries
Food, Drink, and Tobacco	Food Industries Not Separately Specified
Food, Drink, and Tobacco	Grain Milling
Food, Drink, and Tobacco	Tobacco, Cigar, Cigarette and Snuff Manufacture
Gas, Water and Electricity Supply Indus	Gas, Water and Electricity Supply Indus
Glass Trades	Glass (excluding Bottles and Scientific Glass) Manufacture
Glass Trades	Glass Bottle Making
Leather and Leather Goods	Saddlery, Harness and Other Leather Goods Manufacture
Leather and Leather Goods	Tanning, Currying and Dressing
Other Manufacturing Industries	Brush and Broom Making
Other Manufacturing Industries	Musical Instrument Making
Other Manufacturing Industries	Oilcloth, Linoleum, etc., Manufacture
Other Manufacturing Industries	Rubber Manufacture
Other Manufacturing Industries	Scientific and Photographic Instrument and Apparatus Manufacture
Other Manufacturing Industries	Toys, Games and Sports Requisites Manufacture
Pottery, Earthenware, etc.	Pottery, Earthenware, etc.
Printing and Paper Trades	Cardboard Boxes, Paper Bags, and Stationery
Printing and Paper Trades	Paper and Paper Board Making
Printing and Paper Trades	Printing, Publishing, and Bookbinding
Printing and Paper Trades	Stationery and Typewriting Requisites (Not Paper)
Printing and Paper Trades	Wall Paper Making and Paper Staining

Sawmilling, Furniture and Woodwork	Furniture Making, Upholstering, etc.
Sawmilling, Furniture and Woodwork	Sawmilling and Machined Woodwork
Sawmilling, Furniture and Woodwork	Wood Box and Packing Case Making
Sawmilling, Furniture and Woodwork	Woodworking Not Separately Specified
Mining	
Mining	Clay, Sand, Gravel, and Chalk Pit Digging
Mining	Coal Mining
Mining	Iron Ore and Ironstone Mining and Quarrying
Mining	Lead, Tin, and Copper Mining
Mining	Mining and Quarrying Not Separately Specified
Mining	Slate Quarrying and Mining
Mining	Stone Quarrying and Mining
Non-Metalliferous Mining Products	Artificial Stone and Concrete Manufacture
Non-Metalliferous Mining Products	Cement, Limekilns and Whiting Works
Non-Metalliferous Mining Products	Coke Ovens and By-Product Works
Services	
Commerce, Banking, Insurance and Finance	Commerce, Banking, Insurance and Finance
Distributive Trades	Distributive Trades
Miscellaneous Trades and Services	Entertainment and Sports
Miscellaneous Trades and Services	Hotel, Boarding House, Club Services
Miscellaneous Trades and Services	Industries and Services Not Separately Specified
Miscellaneous Trades and Services	Laundries, Dyeing and Dry Cleaning
Miscellaneous Trades and Services	Local Government
Miscellaneous Trades and Services	National Government
Miscellaneous Trades and Services	Professional Services
Transport and Communication	Canal, River, Dock and Harbour Service
Transport and Communication	Railway Service
Transport and Communication	Road Transport Not Separately Specified
Transport and Communication	Shipping Service
Transport and Communication	Tramway and Omnibus Service
Transport and Communication	Transport, Communication, and Storage Not Separately Specified
Building and Shipbuilding	
Building and Construction of Works	Building
Building and Construction of Works	Public Works Contracting, etc.
Shipbuilding and Ship Repairing	Shipbuilding and Ship Repairing

Industry categories given in bold sub-headings. Industry groupings taken from the Ministry of Labour *Gazette*.

Table A.2: Proportion insured, employed, and unemployed by gender in each industry category

	Total			Men			Women		
	Insured	Emp.	Unemp.	Insured	Emp.	Unemp.	Insured	Emp.	Unemp.
Metal Manu.	0.132	0.129	0.152	0.153	0.149	0.173	0.077	0.077	0.071
Textile Manu.	0.104	0.097	0.144	0.056	0.053	0.068	0.234	0.208	0.452
Other Manu.	0.234	0.246	0.167	0.208	0.220	0.143	0.305	0.310	0.264
Mining	0.101	0.092	0.154	0.138	0.127	0.191	0.003	0.003	0.004
Service	0.327	0.342	0.239	0.308	0.320	0.247	0.377	0.397	0.207
Building	0.102	0.094	0.143	0.138	0.130	0.178	0.004	0.004	0.002
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entries are the total proportion of each group in each of the six industry categories over the period 1923–1936. "Insured" are proportions of those covered by the unemployment insurance scheme, both employed and unemployed. "Emp." covers those in employment and "Unemp." covers those out of employment. Data from the Ministry of Labour *Gazette*.

Table A.3: Ranking of industries by the proportion of total unemployment they accounted for, by year and gender

Men	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
Iron and Steel Founding	1	1	3	2	3	4	4	4	3	4	4	5	7	8
Shipbuilding and Ship Repairing	2	2	2	3	5	5	6	6	5	5	6	6	6	6
Building	3	3	4	4	2	2	2	2	2	2	2	3	3	3
Distributive Trades	4	5	5	6	4	3	3	3	4	3	3	2	2	2
Canal, River, Dock Service	5	6	6	7	6	6	5	8	9	9	9	8	8	7
Steel Melting, Rolling Mills, Forges	6	7	7	5	7	7	8	7	6	7	8	X	X	X
Cotton Industry	7	9	X	8	X	X	X	5	8	10	X	X	X	X
Coal Mining	8	4	1	1	1	1	1	1	1	1	1	1	1	1
Other Misc. Industries	9	8	8	X	9	9	X	X	X	X	X	10	9	10
Other Road Transport Industries	10	X	X	X	X	X	X	X	X	X	X	X	X	X
Local Government	X	X	X	X	X	X	9	X	X	8	7	7	5	5
Public Works Contracting, etc.	X	10	10	9	8	8	7	9	7	6	5	4	4	4
Shipping Service	X	X	9	10	10	10	10	10	10	X	10	9	10	9

Women	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
Cotton Industry	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Distributive Trades	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Hotel, Boarding House, Club	3	3	4	4	3	4	4	4	3	3	3	3	3	3
Woolen and Worsted	4	5	3	3	4	3	3	3	4	4	5	4	5	5
Tailoring	5	4	6	6	5	6	5	6	5	5	4	5	4	4
Linen	6	X	5	5	X	5	6	5	8	7	9	9	6	6
Dress Making and Millinery	7	8	X	X	X	X	X	X	X	X	X	X	X	X
Other Metal Industries	8	6	8	9	6	8	8	8	6	X	X	X	X	X
Other Food Industries	9	7	7	X	9	10	9	X	X	X	7	7	9	8
Hosiery	10	X	10	8	10	X	10	7	7	9	8	6	7	10
Laundries, Dyeing and Dry Cleaning	X	9	X	X	X	X	X	X	X	X	10	10	10	9
Pottery, Earthenware, etc.	X	10	9	7	7	7	7	9	9	6	6	X	X	X
Cocoa, Chocolate and Sugar	X	X	X	X	8	X	X	X	X	X	X	X	X	X
Silk Industry	X	X	X	X	X	X	X	10	X	X	X	X	X	X
Jute	X	X	X	10	X	X	X	X	10	8	X	X	X	X
Blouses, Shirts, etc., Making	X	X	X	X	X	X	X	X	X	10	X	8	8	7
Boot, Shoe, Slipper and Clog Trades	X	X	X	X	X	9	X	X	X	X	X	X	X	X

Each entry indicates the ranking of the industry, out of all 100 industries, by the greatest proportion of total unemployment. 1 indicates that the greatest proportion of unemployed workers were associated with that industry in that year. X indicates that the industry was not in the top ten industries in terms of proportion of total unemployment in a given year. The overall ranking for the entire period 1923–1936 is given in Table 2.3.

Table A.4: Crosswalk between Labour Gazette (1923–1936) and Census of England and Wales (1931) industries

Labour Gazette Industry	*Census of England and Wales* Industry Category
Brick, Tile, etc., Making	Manufacture of Bricks, Pottery, Glass, etc.
Building and Construction of Works	
Building	Building, Decorating, Stone and Slate Cutting, and Contracting
Public Works Contracting, etc.	Building, Decorating, Stone and Slate Cutting, and Contracting
Chemicals, etc.	
Chemicals Manufacture	Chemicals and Explosives
Explosives Manufacture	Chemicals and Explosives
Oil, Grease, Glue, Soap, Ink, Match, etc.	Greases, Glue, etc.
Paint, Varnish, Japan, Red and White Lead	White Lead, Paints, and Varnish
Clothing Trades	
Blouses, Shirts, Collars, Underclothing	Manufacture of Clothing (not Knitted)
Boot, Shoe, Slipper and Clog Trades	Manufacture of Clothing (not Knitted)
Dress Industries Not Separately Specified	Manufacture of Clothing (not Knitted)
Dress and Mantle Making and Millinery	Manufacture of Clothing (not Knitted)
Hat and Cap (Including Straw Plait) Man	Manufacture of Clothing (not Knitted)
Tailoring	Manufacture of Clothing (not Knitted)
Commerce, Banking, Insurance and Finance	Other Commerce and Finance
Construction and Repair of Vehicles	
Construction and Repair of Carriages, Carts, etc.	Construction and Repair of Vehicles
Construction and Repair of Motor Vehicles, Cycles, Aircraft	Construction and Repair of Vehicles
Railway Carriage, Wagon, and Tram-Car Building	Construction and Repair of Vehicles
Distributive Trades	Distributive Trades
Engineering, etc.	
Constructional Engineering	Engineering (not Marine or Electrical)
Electrical Engineering	Electrical Installations, Cables, and Apparatus
General Engineering; Engineers' Iron and Steel Founding	Engineering (not Marine or Electrical)
Marine Engineering, etc.	Ship Building and Repairing; Marine Engineering
Fishing	Fishing
Food, Drink, and Tobacco	
Bread, Biscuit, Cake, etc., Making	Food
Cocoa, Chocolate and Sugar Confectionery	Food
Drink Industries	Drink
Food Industries Not Separately Specified	Food
Grain Milling	Food
Tobacco, Cigar, Cigarette and Snuff Man	Tobacco, Cigars, Cigarettes, Snuff
Gas, Water and Electricity Supply Industries	Gas, Water, Electricity
Glass Trades	
Glass (excluding Bottles and Scientific	Manufacture of Bricks, Pottery, Glass, etc.
Glass Bottle Making	Manufacture of Bricks, Pottery, Glass, etc.
Leather and Leather Goods	
Saddlery, Harness and Other Leather Goods	Saddlery, Harness, Bags, Trunks, and Other Goods of Leather
Tanning, Currying and Dressing	Furs, Skins, Leather
Metal Manufacture	
Iron and Steel Tube Making	Founding and Other Secondary Processes in Metal Working
Manufacture of Brass, Cotton, Zinc, Tin	Extracting and Refining of Other Metals and Alloys
Manufacture of Tin Plates	Founding and Other Secondary Processes in Metal Working
Pig Iron Manufacture (Blast Furnaces)	Smelting, Converting, Refining, and Rolling of Iron and Steel
Steel Melting and Iron Puddling Furnaces, Rolling Mills, Forges	Smelting, Converting, Refining, and Rolling of Iron and Steel
Wire, Wire Netting, Wire Rope Manufacture	Other Metal Industries (not Precious Metals, Jewelry, or Plate)
Metal Trades	
Bolts, Nuts, Screws, Rivets, Nails, Etc	Other Metal Industries (not Precious Metals, Jewelry, or Plate)
Brass and Allied Metal Wares Manufacture	Other Metal Industries (not Precious Metals, Jewelry, or Plate)
Electrical Cable, Wire, and Electric Lamp Manufacture	Electrical Installations, Cables, and Apparatus
Electrical Wiring and Contracting	Electrical Installations, Cables, and Apparatus
Hand Tool, Cutlery, Saw, File Making	Cutlery and Small Tools (not Machine Tools)
Heating and Ventilating Apparatus	Founding and Other Secondary Processes in Metl Working
Metal Industries Not Separately Specified	Other Metal Industries (not Precious Metals, Jewelry, or Plate)
Stove, Grate, Pipe, etc., and General I	Founding and Other Secondary Processes in Metl Working
Watches, Clocks, Plate, Jewelry, etc.	Precious Metals, Jewelry, Plate
Mining	
Clay, Sand, Gravel, and Chalk Pit Digging	Other Mining and Quarrying
Coal Mining	Coal Mining
Iron Ore and Ironstone Mining and Quarrying	Other Mining and Quarrying
Lead, Tin, and Copper Mining	Other Mining and Quarrying
Mining and Quarrying Not Separately Specified	Other Mining and Quarrying
Slate Quarrying and Mining	Other Mining and Quarrying
Stone Quarrying and Mining	Other Mining and Quarrying
Miscellaneous Trades and Services	
Entertainment and Sports	Entertainment and Sport
Hotel, Boarding House, Club Services	Personal Service (including Hotels and Catering)
Industries and Services Not Separately	Other Industries, or Industry not stated
Laundries, Dyeing and Dry Cleaning	Personal Service (including Hotels and Catering)

Local Government	Local Government
National Government	Defense and Central Civil Government (British and Imperial)
Professional Services	Professions
Non-Metalliferous Mining Products	
Artificial Stone and Concrete Manufacture	Building, Decorating, Stone and Slate Cutting, and Contracting
Cement, Limekilns and Whiting Works	Treatment of Non-Metalliferous Mine and Quarry Products
Coke Ovens and By-Product Works	Treatment of Non-Metalliferous Mine and Quarry Products
Other Manufacturing Industries	
Brush and Broom Making	Other Manufacturing Industries
Musical Instrument Making	Musical Instruments
Oilcloth, Linoleum, etc., Manufacture	Other Manufacturing Industries
Rubber Manufacture	Rubber
Scientific and Photographic Instrument	Other Manufacturing Industries
Toys, Games and Sports Requisites Manufacture	Other Manufacturing Industries
Pottery, Earthenware, etc.	Manufacture of Bricks, Pottery, Glass, etc.
Printing and Paper Trades	
Cardboard Boxes, Paper Bags, and Stationery	Paper Making; Manu. of Stationery; Printing, Bookbinding
Paper and Paper Board Making	Paper Making; Manu. of Stationery; Printing, Bookbinding
Printing, Publishing, and Bookbinding	Paper Making; Manu. of Stationery; Printing, Bookbinding
Stationery and Typewriting Requisites	Paper Making; Manu. of Stationery; Printing, Bookbinding
Wall Paper Making and Paper Staining	Paper Making; Manu. of Stationery; Printing, Bookbinding
Sawmilling, Furniture and Woodwork	
Furniture Making, Upholstering, etc.	Furniture (not Metal or Basket); Fittings
Sawmilling and Machined Woodwork	Wood Working and Basket Ware
Wood Box and Packing Case Making	Wood Working and Basket Ware
Woodworking Not Separately Specified	Wood Working and Basket Ware
Shipbuilding and Ship Repairing	
Shipbuilding and Ship Repairing	Ship Building and Repairing; Marine Engineering
Textile Trades	
Carpet Manufacture	Mixed Fibers and Miscellaneous Products
Cotton Industry	Cotton
Hemp Spinning and Weaving, Rope, Cord,	Flax, Hemp, Jute
Hosiery	Mixed Fibers and Miscellaneous Products
Jute	Flax, Hemp, Jute
Lace	Mixed Fibers and Miscellaneous Products
Linen	Mixed Fibers and Miscellaneous Products
Silk Industry	Silk, Natural and Artificial
Textile Bleaching, Printing, Dyeing, etc.	Textile Dyeing, Printing, Bleaching, Calendering, Finishing
Textile Industries Not Separately Specified	Mixed Fibers and Miscellaneous Products
Woolen and Worsted	Wool, Worsted, and Shoddy
Transport and Communication	
Canal, River, Dock and Harbor Service	Water, Air, and Other Transport and Communication
Railway Service	Railways
Road Transport Not Separately Specified	Road
Shipping Service	Water, Air, and Other Transport and Communication
Tramway and Omnibus Service	Water, Air, and Other Transport and Communication
Transport, Communication, and Storage Not Separately Specified	Water, Air, and Other Transport and Communication

Mapping of 100 *Labour Gazette* industries to 49 *1931 Census of England and Wales* industries. The only un-matched industry in the *Census* is Agriculture.

TABLE A.5: MAPPING OF *Census of Production* INDUSTRIES TO THE *Labour Gazette*

1924 *Census of Production* Industries	1930 *Census of Production* Industries	*Labour Gazette* Industries
Textile Trades (vol. 1)		
Cotton	Cotton (Spinning); Cotton (Weaving)	Cotton Industry
Woolen and Worsted	Woolen and Worsted	Woolen and Worsted
Silk and Artificial Silk	Silk and Artificial Silk	Silk Industry
Jute	Jute	Jute
Hemp and Linen	Linen and Hemp	Linen; Hemp Spinning and Weaving, Rope, Cord
Hosiery	Hosiery	Hosiery
Textile Finishing	Textile Finishing	Textile Bleaching, Printing, Dyeing, etc
Lace	Lace	Lace
Rope, Twine, Net	Rope, Twine, and Net	Textile Industries Not Separately Specified
Elastic Webbing	Elastic Webbing	Textile Industries Not Separately Specified
Coconut Fiber, Ramie Fiber, Horsehair, Feather	Coir Fiber, Horsehair and Feather	Textile Industries Not Separately Specified
Flock and Rag	Flock and Rag	Textile Industries Not Separately Specified
Packing	Packing	Textile Industries Not Separately Specified
Food, Drink, and Tobacco Trades (vol. 2)		
Grain Milling	Grain Milling	Grain Milling
Bread and Biscuit	Bread and Biscuit	Bread, Biscuit, Cake, etc., Making
Cocoa and Sugar Confectionery	Cocoa and Sugar Confectionery	Cocoa, Chocolate and Sugar Confectionery
Bacon Curing and Sausage	Bacon Curing and Sausage	Food Industries Not Separately Specified
Preserved Meat, Fish, Fruit and Vegetables, etc	Preserved Foods	Food Industries Not Separately Specified
Butter, Cheese, Condensed Milk, Margarine	Butter, Cheese, Condensed Milk, and Margarine	Food Industries Not Separately Specified
Fish Curing	Fish Curing	Food Industries Not Separately Specified
Cattle, Dog, and Poultry Foods	Cattle, Dog and Poultry Foods	Food Industries Not Separately Specified
Ice	Ice	Food Industries Not Separately Specified
Sugar and Glucose	Sugar and Glucose	Food Industries Not Separately Specified
Brewing and Malting	Brewing and Malting	Drink Industries
Spirit Rectifying	Spirit Rectifying, Compounding and Methylating	Drink Industries
Wholesale Bottling	Wholesale Bottling	Drink Industries
Aerate Waters, Ciders, Vinegar, Wine, etc.	Aerate Waters, Cider, Vinegar and British Wine	Drink Industries
Spirit Distilling	Spirit Distilling	Drink Industries
Tobacco	Tobacco	Tobacco, Cigar, Cigarette and Snuff Man
Clothing Trades (vol. 2)		
Tailoring, Dressmaking, Millinery, etc.	Tailoring, Dressmaking, Millinery, etc.	Dress and Mantle Making and Millinery; Blouses, Shirts, etc.; Tailoring
Boot and Shoe	Boot and Shoe	Boot, Shoe, Slipper and Clog Trades
Hat, Bonnet, and Cap Making	Hat and Cap	Hat and Cap (Including Straw Plait) Manufacture
Glove Trade	Glove	Dress Industries Not Separately Specified
Umbrella and Walking Stick Trade	Umbrella and Walking Stick	Dress Industries Not Separately Specified
Fur Trade	Fur	Dress Industries Not Separately Specified
Artificial Flower and Ornamental Feather Trade	.	Dress Industries Not Separately Specified
Laundry, Cleaning, and Dyeing Trade	.	Laundries, Dyeing and Dry Cleaning
Iron and Steel Trades (vol. 3)		
Blast Furnaces, Smelting Works, and Rolling Mills	Blast Furnaces	Pig Iron Manufacture (Blast Furnaces)

Smelting , Rolling, Founding	Smelting and Rolling; Iron and Steel Foundries	Steel Melting, Iron Puddling Furnaces; Stove, Grate, Pipe, General Ironfounding
Tinplate Trade	Tinplate	Manufacture of Tin Plates
Light Castings Trade	.	Heating and Ventilating Apparatus
Wrought Iron and Steel Tube Trade	Wrought Iron and Steel Tubes	Iron and Steel Tube Making
Wire Drawing Trade	Wire	Wire, Wire Netting, Wire Rope Manufacture
Anchor, Chain, Nail, Screw, and Rivet Trades	Chain, Nail, Screw, and Miscellaneous Forgings	Bolts, Nuts, Screws, Rivets, Nails, Etc
Hardware, Hollow-ware, and Bedstead Trades	Hardware, Hollow-ware, Metallic Furniture, and Sheet Metal	Metal Industries Not Separately Specified
Cutlery Trade	Cutlery	Hand Tool, Cutlery, Saw, File Making
Tool and Implements Trade	Tool and Implement	Hand Tool, Cutlery, Saw, File Making
Blacksmithing Trade	.	Metal Industries Not Separately Specified
Needle, Pin, Fish-hook and Button Trade	Needle, Pin, Fish-hook, and Metal Smallwares	Metal Industries Not Separately Specified
Small Arms Trade	Small Arms	Metal Industries Not Separately Specified
Engineering Trades (vol. 3)		
Mechanical Engineering	Mechanical Engineering	General Engineering; Marine Engineering; Constructional Engineering
Electrical Engineering	Electrical Engineering	Electrical Engineering; Wiring ; Cable, Wire, and Lamp Manu.
Shipbuilding Trade (Private Firms)	Shipbuilding	Shipbuilding and Ship Repairing
Motor, Cycle, and Aircraft Trades	Motor and Cycle; Aircraft	Construction and Repair of Motor Vehicles, Cycles, and Aircraft
Railway Carriage and Wagon Building Trades	Railway, Carriage, and Wagon	Railway Carriage, Wagon, and Tram-Car Building
Non-Ferrous Metal Trades (vol. 3)		
Copper and Brass (Smelting, Rolling, and Casting)	Copper and Brass (Smelting, Rolling, etc)	Manufacture of Brass, Cotton, Zinc, Tin
Lead, Tin, Zinc and other Metals	Lead, Tin, Aluminum, and Other Non-Ferrous Metals	Manufacture of Brass, Cotton, Zinc, Tin
Gold and Silver Refining	Gold and Silver Refining	
Finish Brass Trade	Finished Brass	Brass and Allied Metal Wares Manufacture
Jewelry, Gold, Silver, and Electro-Plate Trade	Plate and Jewelry	Watches, Clocks, Plate, Jewelry, etc.
Watch and Clock Trade	Watch and Clock	Watches, Clocks, Plate, Jewelry, etc.
Chemical and Allied Trades (vol. 4)		
Chemicals, Dyestuffs and Drugs Trade	Chemicals, Dyestuffs and Drugs	Chemicals Manufacture
Coke and By-Products Trade	Coke and By-Products and Manufactured Fuel	Coke Ovens and By-Product Works
Seed Crushing Trade	Seed Crushing	Oil, Grease, Glue, Soap, Ink, Match, etc
Oil and Tallow Trades	Oil and Tallow	Oil, Grease, Glue, Soap, Ink, Match, etc
Fertilizer, Glue, Sheep Dip, and Disinfectant Trades	Fertilizer, Disinfectant, Glue, and Allied Trades	Oil, Grease, Glue, Soap, Ink, Match, etc
Soap, Candle, and Perfumery Trades	Soap, Candle, and Perfumery	Oil, Grease, Glue, Soap, Ink, Match, etc
Match Trades	Match	Oil, Grease, Glue, Soap, Ink, Match, etc
Ink, Gum, and Sealing Wax Trades	Ink, Gum, and Sealing Wax	Oil, Grease, Glue, Soap, Ink, Match, etc
Starch, Blue and Polishes Trades	Starch and Polishes	Oil, Grease, Glue, Soap, Ink, Match, etc
Paints, Colors, and Varnish Trades	Paint, Color, and Varnish	Paint, Varnish, Japan, Red and White Lead
Explosives and Fireworks Trades	Explosives and Fireworks	Explosives Manufacture
Leather, Rubber and Canvas Goods Trades (vol. 4)		
Fellmongery Trade	Fellmongery	Tanning, Currying and Dressing
Leather Trade	Leather (Tanning and Dressing)	Tanning, Currying and Dressing
Saddlery, Harness, Traveling Bags and Leather Goods	Saddlery, Harness and Leather Goods	Saddlery, Harness and Other Leather Goods
Rubber	Rubber	Rubber Manufacture
Canvas Goods and Sack Trades	Canvas Goods and Sack	Textile Industries Not Separately Specified
Paper, Printing, and Allied Trades (vol. 4)		
Paper Trade	Paper	Paper and Paper Board Making
Manufactured Stationary Trade	Manufactured Stationery	Cardboard Boxes, Paper Bags, and Stationery
Wallpaper Trade	Wallpaper	Wall Paper Making and Paper Staining
Printing and Bookbinding Trade	Printing, Bookbinding, Stereotyping, Engraving	Printing, Publishing, and Bookbinding

Printing and Publishing of Newspapers and Periodicals	Printing and Publication of Newspapers and Periodicals	Printing, Publishing, and Bookbinding
Typefounding, Electrotyping, Stereotyping, etc.	.	Stationery and Typewriting Requisites
Cardboard Box Trade	Cardboard Box	Cardboard Boxes, Paper Bags, and Stationery
Miscellaneous Trades (vol. 4)		
Pens, Pencils, and Artists' Materials Trade	Pens, Pencils, and Artists' Materials	Stationery and Typewriting Requisites
Linoleum and Oilcloth Trade	Linoleum and Oilcloth	Oilcloth, Linoleum, etc., Manufacture
Musical Instruments Trade	Musical Instruments	Musical Instrument Making
Games and Toys Trade	Games and Toys	Toys, Games and Sports Requisites Manufacture
Billiard Table and Sports Requisites Trades	Sports Requisites	Toys, Games and Sports Requisites Manufacture
Scientific Instruments, Appliances, and Apparatus Trades	Scientific Instruments, Appliances, and Apparatus	Scientific and Photographic Instrument
Film Printing Trade	Cinematograph Film Printing	Scientific and Photographic Instrument
Ivory, Horn, Picture Frame, and Fancy Articles Trade	Fancy Articles	.
Mines and Quarries (vol. 5)		
Coal Mines	Coal Mines	Coal Mining
Manufactured Fuel	Petroleum Refining	Mining and Quarrying Not Separately Specified
Salt Mines, Brine Pits, and Salt Works	Salt Mines, Brine Pits and Salt Works	Mining and Quarrying Not Separately Specified
Metalliferous Mines and Quarries (including Oil Shale Mines)	Metalliferous Mines and Quarries	Lead, Tin, and Copper Mining; Iron Ore Mining and Quarrying
Slate Mines and Quarries	Slate Mines and Quarries	Slate Quarrying and Mining
Non-Metalliferous (Other than Slate) Quarries	Non-Metalliferous (Except Slate) Mines and Quarries	Stone Quarrying; Clay, Sand, Gravel, and Chalk Pit Digging
Timber Trades (vol. 5)		
Timber Trade (e.g. Sawmilling, etc.)	Timber (Sawmilling, Etc)	Sawmilling and Machined Woodwork
Furniture, Cabinet-Making, and Upholstery Trade	Furniture and Upholstery	Furniture Making, Upholstering, etc.
Wooden Crates, Cases, Boxes, and Trunks Trades	Wooden Crates, Cases, Boxes, and Trunks	Wood Box and Packing Case Making
Carriage, Cart and Wagon Trades	Carriage, Cart, and Wagon	Construction and Repair of Carriages, Carts, etc.
Brush Trades	Brush	Brush and Broom Making
Coopering Trade	Coopering	Woodworking Not Separately Specified
Basket and Wicker Work Trade	Cane and Wicker Furniture and Basketware	Woodworking Not Separately Specified
Manufactures of Clay, Stone, etc., and the Building and Contracting Trades (vol. 5)		
Brick and Fireclay Trades	Brick and Fireclay	Brick, Tile, etc., Making
China and Earthenware Trades	China and Earthenware	Pottery, Earthenware, etc.
Cement Trade	Cement	Cement, Limekilns and Whiting Works
Glass Trade	Glass	Glass (excluding Bottles); Glass Bottle Making
Building Materials and Monumental Masonry Trades	Building Materials	Artificial Stone and Concrete Manufacture
Roofing Felts Trades	Roofing Felts	Textile Industries Not Separately Specified
Engine and Boiler Packing and Asbestos Trades	Asbestos Goods and Engine and Boiler Packing	Textile Industries Not Separately Specified
Manufactured Abrasives Trades	Manufactured Abrasives	.
Building and Contracting Trades	Building and Contracting	Building; Public Works Contracting, etc.
Public Utility Services and Government Departments (vol. 5)		
Gas Undertakings	Gas Undertakings	Gas, Water and Electricity Supply Industry
Electricity Undertakings	Electricity Undertakings	Gas, Water and Electricity Supply Industry
Waterworks Undertakings	Water Undertakings	Gas, Water and Electricity Supply Industry
Railway Companies	Railway Companies	Railway Service
Tramway and Light Railway Companies	Tramway and Light Railway Companies	Tramway and Omnibus Service
Canal, Dock, and Harbor Companies	Canal, Dock and Harbor Companies	Canal, River, Dock and Harbor Service
Local Authorities	Local Authorities	Local Government
Government Departments	Government Departments	National Government

First column contains industries and categories from the 1924 *Census of Production*. The second column contains industries from the 1930 *Census of Production*. The final column contains industries from the Ministry of Labour *Gazette*.

A.2 Adjustment coefficient analysis appendix

Table A.6: Robustness to full interaction model specification

	(1) Overall	(2) Metals	(3) Textiles	(4) Other Manu.	(5) Mining	(6) Service	(7) Building
Δ Employed	-0.80***	-0.94***	-1.01***	-0.66***	-0.90***	-0.11*	-0.50**
	(0.02)	(0.04)	(0.03)	(0.03)	(0.02)	(0.04)	(0.15)
1930-1933	-3164.31***	-1751.04	-3325.67	-896.57	-1658.60	-5144.94*	-15485.19
	(933.66)	(1269.50)	(1988.18)	(456.77)	(2056.66)	(2491.15)	(7886.43)
1934-1936	-2368.10*	249.45	-4654.58*	-918.80*	-2445.88	-549.85	-8806.43
	(962.12)	(1344.09)	(2024.85)	(445.22)	(2101.03)	(2666.39)	(8903.73)
1930-1933 × Δ Employed	-0.10***	-0.03	-0.13**	0.04	-0.28***	0.37***	-0.03
	(0.03)	(0.06)	(0.04)	(0.06)	(0.04)	(0.08)	(0.17)
1934-1936 × Δ Employed	0.09*	0.44***	0.21	0.22***	-0.61**	-0.43***	0.15
	(0.04)	(0.07)	(0.12)	(0.05)	(0.20)	(0.11)	(0.18)
Constant	3407.65***	544.78	2406.97	1183.39***	-366.65	2576.82	5839.13
	(656.37)	(887.08)	(1396.19)	(306.14)	(1460.07)	(1836.96)	(5577.28)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num. of observations	1200	228	132	504	120	180	36
R2	0.798	0.904	0.968	0.727	0.976	0.520	0.933

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. This model includes the main effect for the change in employment and for each time period in addition to the interaction effects. The dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936, for both men and women.

Table A.7: Robustness to grouping of industries as expanding or contracting based on overall employment change

	Men Only		Women Only	
	Contracting	Expanding	Contracting	Expanding
	(1)	(2)	(3)	(4)
1925-1929 × Δ Employed	-0.82***	-0.50***	-1.22***	-0.54***
	(0.02)	(0.03)	(0.02)	(0.03)
1930-1933 × Δ Employed	-0.98***	-0.27***	-1.25***	-0.49***
	(0.02)	(0.05)	(0.01)	(0.07)
1934-1936 × Δ Employed	0.08	-0.43***	-0.82***	-0.23**
	(0.26)	(0.04)	(0.06)	(0.08)
Constant	-331.07	1711.94*	-195.54	1200.27***
	(547.29)	(693.50)	(190.35)	(348.74)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	483	717	483	717
R2	0.884	0.383	0.963	0.405

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Contracting industries are those that had a decrease of employment overall, from $t-1$ to t, while expanding industries had an increase. Standard errors given in parentheses. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

TABLE A.8: ADJUSTMENT COEFFICIENTS FOR EXPANDING OR CONTRACTING INDUSTRIES, BY INDUSTRY CATEGORY

	Metals		Textiles		Other Manu.		Mining		Service		Building	
	Contr. (1)	Expan. (2)	Contr. (3)	Expan. (4)	Contr. (5)	Expan. (6)	Contr. (7)	Expan. (8)	Contr. (9)	Expan. (10)	Contr. (11)	Expan. (12)
1925-1929 × Δ Employed	-0.95***	-1.00***	-1.28***	-0.96***	-0.64***	-0.75***	-0.64***	-0.05	-0.76***	-0.05	-3.88	-0.77
	(0.06)	(0.08)	(0.04)	(0.07)	(0.06)	(0.05)	(0.07)	(0.05)	(0.14)	(0.05)	(1.54)	(0.36)
1930-1933 × Δ Employed	-0.98***	-1.03***	-1.20***	-1.35***	-0.70***	-0.59***	-0.80***	0.47***	-0.86**	0.47***	-0.77*	-0.76***
	(0.06)	(0.25)	(0.02)	(0.17)	(0.11)	(0.07)	(0.08)	(0.11)	(0.27)	(0.11)	(0.13)	(0.14)
1934-1936 × Δ Employed	-0.80	-0.49***	-1.06***	-1.38***	-0.38*	-0.47***	9.95***	-0.48***		-0.48***		-0.44*
	(3.35)	(0.08)	(0.13)	(0.35)	(0.16)	(0.04)	(1.91)	(0.12)		(0.12)		(0.16)
Constant	-1670.11	2967.25	-3855.62**	8533.87**	5.27	2014.54***	4824.15	1346.51	-1249.27	1346.51	-73428.48	12752.26
	(1178.14)	(1533.86)	(1135.81)	(3072.47)	(525.35)	(358.64)	(2415.52)	(2365.85)	(1825.98)	(2365.85)	(38442.90)	(11541.58)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Num. of observations	97	131	62	70	210	294	56	136	44	136	14	22
R2	0.896	0.710	0.989	0.869	0.598	0.665	0.977	0.572	0.743	0.572	0.974	0.936

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Contracting industries are those that had a decrease of employment from $t-1$ to t, while expanding industries had an increase. Standard errors given in parentheses. Analysis using employment and unemployment data for both men and women from the Ministry of Labour *Gazette*, 1924–1936.

Table A.9: Speed of adjustment by time period

	(1) Contemporaneous	(2) One Year	(3) Two Years	(4) Three Years
1925-1929 × Δ Employed	-0.80***	-0.33***	-0.05	0.09*
	(0.02)	(0.03)	(0.03)	(0.05)
1930-1933 × Δ Employed	-0.90***	-0.41***	-0.25***	-0.18***
	(0.02)	(0.03)	(0.02)	(0.02)
1934-1936 × Δ Employed	-0.71***	-0.31***	-0.21***	-0.14***
	(0.04)	(0.05)	(0.03)	(0.03)
Constant	3407.65***	-5886.41***	2600.34*	-2313.74
	(656.37)	(1187.62)	(1156.74)	(1231.05)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	1200	1000	900	800
R2	0.798	0.353	0.268	0.245

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.5), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-1$ to t in industry i. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. This model includes both men and women. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.10: Robustness of estimated average regional adjustment coefficients to 1921 industrial composition

	Overall	By Time Period		
	1925-1936	1925-1929	1930-1933	1934-1936
South East	-0.32	-0.30	-0.11	-0.43
Greater London	-0.32	-0.29	-0.18	-0.42
East	-0.35	-0.35	-0.19	-0.42
South West	-0.35	-0.34	-0.17	-0.44
Wales 2	-0.42	-0.40	-0.26	-0.54
North 2	-0.43	-0.41	-0.33	-0.45
Midland 1	-0.49	-0.47	-0.47	-0.49
Midland 2	-0.57	-0.57	-0.57	-0.57
North 4	-0.57	-0.56	-0.51	-0.46
Wales 1	-0.57	-0.56	-0.57	-0.79
North 1	-0.58	-0.57	-0.55	-0.73
North 3	-0.64	-0.64	-0.61	-0.69

The entries are the average adjustment coefficient of industry-level estimates from the model described by Equation (2.6). For each region, the adjustment coefficient of every industry is averaged, weighted by the proportion of the labor force, employed and unemployed, in that industry in 1921 according to the 1931 *Census of England and Wales* Industry Report Table C. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries.

Table A.11: Speed of adjustment, men only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed	-0.81***	-0.36***	-0.18***	-0.19***
	(0.01)	(0.02)	(0.02)	(0.02)
Constant	2169.55***	-4200.02***	1626.80	-1535.91
	(520.60)	(973.09)	(967.72)	(983.45)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	1200	1000	900	800
R2	0.812	0.359	0.229	0.252

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only uses data on employment and unemployment for men. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.12: Speed of adjustment, women only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed	-0.97***	-0.45***	-0.28***	-0.04
	(0.02)	(0.03)	(0.02)	(0.03)
Constant	1387.56***	-1525.33**	1025.66*	-149.54
	(256.72)	(494.72)	(487.82)	(557.82)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	1200	1000	900	800
R2	0.804	0.284	0.210	0.075

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only uses data on employment and unemployment for women. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.13: Speed of adjustment, metals only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed, -kto	-0.85***	-0.31***	-0.18***	-0.06
	(0.03)	(0.04)	(0.03)	(0.04)
Constant	528.29	-11180.20***	221.15	-1134.08
	(980.82)	(2099.90)	(1866.39)	(2164.51)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	228	190	171	152
R2	0.881	0.439	0.404	0.293

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only includes metal industries. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.14: Speed of adjustment, textiles only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed, -kto	-1.07***	-0.52***	-0.37***	-0.15
	(0.02)	(0.09)	(0.07)	(0.11)
Constant	2249.69	-17684.49**	5938.80	-979.32
	(1475.14)	(5596.22)	(5472.30)	(6537.37)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	132	110	99	88
R2	0.964	0.476	0.423	0.257

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only includes textile industries. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.15: Speed of adjustment, other manufacturing only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed, -kto	-0.58***	-0.18***	-0.12***	-0.06**
	(0.02)	(0.03)	(0.02)	(0.02)
Constant	1089.78***	-3258.62***	926.13*	-495.88
	(311.27)	(424.64)	(377.55)	(409.44)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	504	420	378	336
R2	0.713	0.432	0.431	0.393

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only includes other manufacturing industries. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.16: Speed of adjustment, mining only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed, -kto	-0.96***	-0.46***	-0.20**	-0.35***
	(0.02)	(0.06)	(0.07)	(0.06)
Constant	-1061.60	5826.77	1580.39	-18602.16**
	(1914.04)	(7016.70)	(7654.07)	(6463.16)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	120	100	90	80
R2	0.959	0.448	0.205	0.422

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only includes mining industries. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.17: Speed of adjustment, service only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed, -kto	-0.10*	0.03	0.10	0.22***
	(0.05)	(0.07)	(0.06)	(0.06)
Constant	2417.51	-7927.29***	1601.16	-4095.55
	(2094.42)	(2170.27)	(2080.60)	(2323.45)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	180	150	135	120
R2	0.365	0.362	0.355	0.426

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only includes service industries. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.18: Speed of adjustment, building only

	(1) Contemporaneous b/se	(2) One Year b/se	(3) Two Years b/se	(4) Three Years b/se
Δ Employed, -kto	-0.50***	-0.17*	-0.12	-0.08
	(0.06)	(0.08)	(0.07)	(0.07)
Constant	5766.90	-18321.18	13892.47	-5504.06
	(5297.99)	(10283.63)	(10846.62)	(11903.93)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Num. of observations	36	30	27	24
R2	0.928	0.776	0.748	0.734

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The coefficient estimates are for the model described by Equation (2.6), where the dependent variable is the change in unemployment from $t-1$ to t in industry i and where "Δ Employed" is the change in employment from $t-k$ to t in industry i. This model only includes building industries. The estimates represent whether a decrease (increase) of employment in an industry coincided with a proportionate increase (decrease) of unemployment in the industry. Estimates near −1 indicate little to no adjustment across industries, as the entire change in employment is reflected in the change in unemployment in that industry. Estimates near 0 indicate almost perfect adjustment across industries. Standard errors given in parentheses. Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

A.3 Details on estimating Markov transition probabilities from aggregate data

With complete data, a transition matrix based on a Markov model can be used to describe the labor market mobility across industries. The Markov model has a discrete number of states, S, which in this case are employment status and industry pairs. At any point in time, all labor market participants can be classified into one of these employment-industry states, representing their employment or unemployment in a specific industry. The transition matrix P describes the probability of remaining in the current state or transitioning to a different state in one time step. Each element of P, p_{ij}, gives the probability of being in state i at time $t-1$ and then moving to state j for t. P is thus:

$$P[i,j] = \begin{bmatrix} p_{11} & p_{12} & \cdots . & p_{1S} \\ p_{21} & p_{22} & \cdots & p_{2S} \\ \vdots & \vdots & \ddots & \vdots \\ p_{S1} & p_{S2} & \cdots & p_{SS} \end{bmatrix}$$

There are two relevant assumptions. First, the Markov process is assumed to be first-order stationary, so the individual probabilities p_{ij} do not change over time. Second, it is assumed that an individual's state at time t is exclusively affected by their state at time $t-1$. If x_t represents the state of an individual at time t, then this means $p_{ij} = Pr(x_t = j|x_{t-1} = i) = Pr(x_t = j|x_{t-1} = i, x_0, \ldots, x_{t-2})$.

When data is available on transitions between employment-industry states, the probability of an individual moving from state i to state j between time $t-1$ and t is simply the total number of people who moved from i to j divided by the total number of people who were in state i at time $t-1$. Letting m_{ij} represent the number of people who moved from state i to j, then:

$$p_{ij} = \frac{m_{ij}}{\sum_{j=1}^{S} m_{ij}}$$

Then, the probability of being in state j at time t is given by the relationship $q_j(t) = \sum_{i=1}^{s} q_i(t-1)p_{ij}$. This weights the probability of moving from any state i into state j from $t-1$ to t by the probability of being in state i in $t-1$. Summing over all possible states, including j, gives the overall likelihood of being in state j at time t.

In our case, we do not have data on individual industry or employment status transitions. Instead, we are restricted to aggregate data on the proportion of workers in each industry and employment status pair. Using the same framework as in the full information case, we can replace the probabilities q_j with our aggregate proportions data to estimate p_{ij} for all j and i with some error.

The aggregate data is the number of labor force participants in each employment-industry state $s \in 1, \cdots, S$ at each each time $t \in [1, T]$. For each state s, we have a column vector y_s whose components $y_s(2), y_s(3), \cdots, y_s(T)$ give the proportion of individuals in the state at time t. Then,

$$y_s(t) = \sum_{i=1}^{S} y_i(t-1)p_{is} + u_s(t) \tag{A.1}$$

For each s, we want to estimate the column vector p_s with components representing the probability of transitioning into j from all states: $p_{1,s}, p_{2,s}, ..., p_{S,s}$. The data on the proportion of individuals in every state in every potential previous period can be written as:

$$X_s = \begin{bmatrix} y_1(1) & y_2(1) & \cdots . & p_S(1) \\ y_1(2) & y_2(2) & \cdots & y_S(2) \\ \vdots & \vdots & \ddots & \vdots \\ y_1(T-1) & y_2(T-1) & \cdots & y_S(T-1) \end{bmatrix}$$

For each state, the proportion of individuals at time t depends on the proportion of individuals in all other states, and the same state, at time $t-1$. Thus, X_s is the same for all states s, but the subscript is maintained for clarity.

Then (A.1) can be written in matrix form,

$$\mathrm{y}_s = X_s \mathrm{p}_s + \mathrm{u}_s$$

and put into a system of equations for all s. However, the equations for one of the states s are redundant because y is a series of proportions, p are probabilities that sum to 1 across states, and X is also given in proportions. Removing the final state S gives the system:

$$\mathrm{y} = X\mathrm{p} + \mathrm{u},$$

where

- y is the vector $[\mathrm{y}_1^\top, \mathrm{y}_2^\top, ...\mathrm{y}_{S-1}^\top]^\top$, which has the dimensions $((T-1)(S-1)) \times 1$
- X is a block diagonal matrix of dimension $((T-1)(S-1)) \times (S(S-1))$ where $X_1 = X_2 = \cdots = X_{S-1}$:

$$X = \begin{bmatrix} X_1 & 0 & \cdots . & 0 \\ 0 & X_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & X_{S-1} \end{bmatrix}$$

- p is $[\mathrm{p}_1^\top, \mathrm{p}_2^\top, ..., \mathrm{p}_{S-1}^\top]^\top$ with the dimensions $(S(S-1)) \times 1$.

The final system thus looks like:

$$\begin{bmatrix} y_1(2) \\ y_1(3) \\ \vdots \\ y_1(T) \\ y_2(2) \\ \vdots \\ y_2(T) \\ \vdots \\ y_{S-1}(2) \\ \vdots \\ y_{S-1}(T) \end{bmatrix} = \begin{bmatrix} X_1 & 0 & \cdots . & 0 \\ 0 & X_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & X_{S-1} \end{bmatrix} \begin{bmatrix} p_{1,1} \\ p_{2,1} \\ \vdots \\ p_{S,1} \\ p_{1,2} \\ \vdots \\ p_{S,2} \\ \vdots \\ p_{1,S-1} \\ \vdots \\ p_{S,S-1} \end{bmatrix} + \begin{bmatrix} \mathbf{u}_1 \\ \vdots \\ \mathbf{u}_{S-1} \end{bmatrix}$$

The transition probabilities p can be estimated using least squares with linear constraints so long as $(T-1) \geq S$. We require the transition probabilities to be between 0 and 1, inclusive, and for the rows of $P[i,j]$ to sum to 1. Following Walshe (2016) and M. T. Jones (2005), this can be written as the quadratic programming problem minimizing the sum of squared residuals subject to constraints:

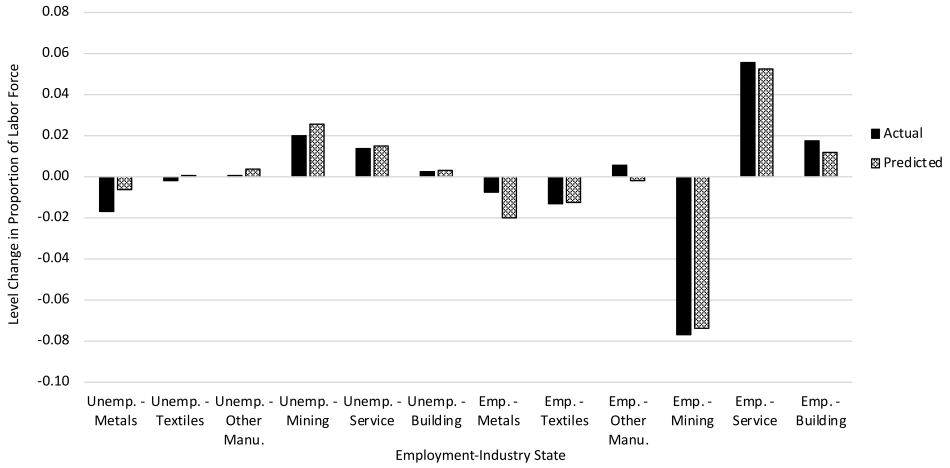
$$\begin{aligned} \underset{\mathrm{p}}{\text{minimize}} \quad & \mathrm{u}^\top \mathrm{u} = (\mathrm{y} - X\mathrm{p})^\top (\mathrm{y} - X\mathrm{p}) \\ \text{subject to} \quad & G\mathrm{p} \leq \eta, \quad G_{S \times (S(S-1))} = [I_1, I_2, \ldots I_{S-1}] \quad \eta_{S \times 1} = [1, 1, ..., 1]', \\ & \mathrm{p} \geq 0 \end{aligned} \tag{A.2}$$

The first constraint ensures that each transition probability is less than or equal to one and

that the probabilities of transitioning from a state s at a given time t sum to 1. The second constraint forces the probabilities to be greater than or equal to zero. Additional constraints can be used to assign $p_{i,j}$ for some i and j to a specific value, such as zero, as in the application.

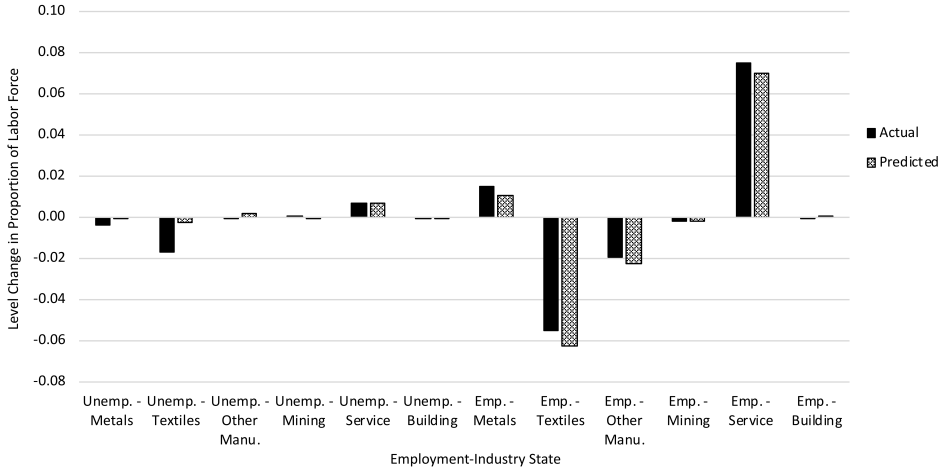
A.4 Markov analysis appendix

FIGURE A.1: PREDICTED VS. ACTUAL CHANGE IN PROPORTION OF THE LABOR FORCE IN EACH INDUSTRY CATEGORY, 1923–1936, MEN ONLY



Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936, for men only. The actual figures give the level change in the proportion of the labor force in each employment-industry state in the raw data over the period. The predicted figures give the level change predicted by the Markov process estimates in Table 2.14 when the probabilities are projected forward by 13 steps.

Figure A.2: Predicted vs. actual change in proportion of the labor force in each industry category, 1923–1936, women only



Analysis using employment and unemployment data from the Ministry of Labour *Gazette*, 1923–1936, for women only. The actual figures give the level change in the proportion of the labor force in each employment-industry state in the raw data over the period. The predicted figures give the level change predicted by the Markov process estimates in Table 2.15 when the probabilities are projected forward by 13 steps.

A.5 Determinants of industry-level unemployment rates appendix

Table A.19: Robustness to industry group clustered standard errors and industry category fixed effects

	Industry Clustered Std. Errors			Category Fixed Effects		
	Total (1)	Men (2)	Women (3)	Total (4)	Men (5)	Women (6)
% of output exported	0.122*	0.119*	-0.005	0.103*	0.103*	-0.013
	(0.050)	(0.053)	(0.033)	(0.046)	(0.047)	(0.034)
Output growth during WW1	0.074*	0.081*	0.063	0.080**	0.089**	0.046
	(0.033)	(0.032)	(0.040)	(0.030)	(0.032)	(0.031)
Year=1931	16.033***	15.467***	12.456***	15.855***	15.318***	12.408***
	(1.501)	(1.490)	(1.994)	(1.961)	(1.948)	(1.686)
Year=1931 × Output growth during WW1	-0.113*	-0.125*	0.047	-0.110*	-0.123*	0.037
	(0.053)	(0.051)	(0.041)	(0.047)	(0.048)	(0.047)
Real wage level	-0.031**	-0.025*	-0.034*	-0.037**	-0.030**	-0.026*
	(0.009)	(0.009)	(0.012)	(0.011)	(0.011)	(0.011)
Total wage bill as a % of net output	0.194**	0.218**	0.040	0.140*	0.167**	0.048
	(0.064)	(0.062)	(0.074)	(0.062)	(0.059)	(0.062)
Trade union density	1.835	0.646	4.492	2.072	1.137	2.371
	(4.893)	(4.090)	(4.244)	(3.739)	(3.123)	(3.434)
% of all employees that are female	-0.123**	-0.094**	0.020	-0.108**	-0.070*	0.017
	(0.031)	(0.028)	(0.037)	(0.039)	(0.035)	(0.039)
% administrative, technical, and clerical staff	-0.148	-0.091	-0.422**	-0.265	-0.185	-0.441***
	(0.112)	(0.124)	(0.131)	(0.158)	(0.165)	(0.126)
% of all employees under 18 years old	-0.100	-0.074	-0.136	-0.182	-0.131	-0.147
	(0.096)	(0.104)	(0.126)	(0.127)	(0.124)	(0.123)
Short-time hours per employee	1.256***	1.432***	0.542	1.315**	1.533**	0.265
	(0.309)	(0.302)	(0.530)	(0.439)	(0.464)	(0.453)
Constant	27.485***	22.472***	27.857**	34.928***	28.774**	26.775***
	(5.337)	(5.277)	(7.299)	(9.554)	(10.280)	(7.306)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Category Fixed Effects	No	No	No	Yes	Yes	Yes
Num. of observations	156	156	156	156	156	156
Num. of industries	19	19	19	79	79	79
Adj. R2	0.659	0.660	0.538	0.670	0.671	0.553

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors given in parentheses. Standard errors are clustered at the industry group level $n = 19$ in the first three models and at the industry level in the final three models. The coefficient estimates are for the model described by Equation (2.7), where the dependent variable is the industry-level unemployment rate. Controls include number insured in the industry and lagged output. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Table A.20: Robustness to no lagged output control and to different measure of unemployment as the dependent variable

	No Lagged Output			Diff. from National Unemp. Rate		
	Total (1)	Men (2)	Women (3)	Total (4)	Men (5)	Women (6)
% of output exported	0.153**	0.146*	0.015	0.122*	0.119*	-0.005
	(0.054)	(0.059)	(0.029)	(0.052)	(0.056)	(0.030)
Output growth during WW1	0.077*	0.085**	0.064	0.074**	0.081**	0.063
	(0.029)	(0.031)	(0.036)	(0.028)	(0.030)	(0.033)
Year=1931	13.011***	12.702***	10.325***	5.071**	3.868*	3.002*
	(1.244)	(1.225)	(1.050)	(1.748)	(1.746)	(1.492)
Year=1931 × Output growth during WW1	-0.136*	-0.146*	0.034	-0.113*	-0.125*	0.047
	(0.055)	(0.056)	(0.055)	(0.047)	(0.048)	(0.047)
Real wage level	-0.034**	-0.027*	-0.035**	-0.031**	-0.025*	-0.034**
	(0.010)	(0.012)	(0.011)	(0.010)	(0.012)	(0.011)
Total wage bill as a % of net output	0.220***	0.239***	0.059	0.194***	0.218***	0.040
	(0.057)	(0.053)	(0.064)	(0.054)	(0.052)	(0.060)
Trade union density	2.902	1.769	4.479	1.835	0.646	4.492
	(3.603)	(3.038)	(4.389)	(3.247)	(2.851)	(3.928)
% of all employees that are female	-0.091**	-0.063*	0.042	-0.123***	-0.094**	0.020
	(0.034)	(0.030)	(0.037)	(0.034)	(0.029)	(0.035)
% administrative, technical, and clerical staff	-0.152	-0.095	-0.427**	-0.148	-0.091	-0.422**
	(0.153)	(0.158)	(0.130)	(0.150)	(0.156)	(0.125)
% of all employees under 18 years old	-0.238	-0.200	-0.221	-0.100	-0.074	-0.136
	(0.135)	(0.130)	(0.127)	(0.123)	(0.122)	(0.132)
Short-time hours per employee	1.204*	1.381**	0.519	1.256**	1.432**	0.542
	(0.526)	(0.520)	(0.472)	(0.455)	(0.463)	(0.467)
Number insured	-0.000*	-0.000**	0.000	-0.000*	-0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lagged output				-0.154***	-0.140***	-0.104*
				(0.041)	(0.041)	(0.046)
Constant	13.058	9.611	17.745**	17.098	11.452	19.242**
	(7.095)	(7.911)	(6.109)	(9.074)	(9.985)	(7.114)
Num. of observations	156	156	156	156	156	156
Num. of industries	79	79	79	79	79	79
Adj. R2	0.631	0.638	0.520	0.465	0.465	0.273

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, clustered at the industry level, given in parentheses. The first three models omit lagged output as a control. The coefficient estimates are for the model described by Equation (2.7), where the dependent variable is the industry-level unemployment rate. The final three models estimate Equation (2.7) with a different dependent variable: the difference between the industry unemployment rate and the national unemployment rate. Analysis using gender-disaggregated employment and unemployment data from the Ministry of Labour *Gazette*, 1924–1936.

Appendix B

Appendices to Chapter 3

B.1 Non-disclosed employment figures in the QCEW

The US Bureau of Labor statistics suppresses the publication of data that could possibly identify individual employers in the QCEW. Disclosure restrictions only become an issue when industry-level analysis is conducted at the sub-national level, as the US totals include all observations. Disclosure restrictions therefore do not affect aggregate sectoral analyses such as in Figure 3.8 or Table 3.4.

On the state level, used to calculate industrial reallocation, 14.55% of observations of quarterly employment from 1975 to 1986 are not disclosed at refined industry categories. The majority of these cases are for industry categories located in local, state, and national government sectors. Few of the non-disclosed observations are for the private sector, so disclosure issues are minimized by restricting to the private sector. Restricting to the private sector leaves only 4.1% of all observations undisclosed.

All of these suppressed observations fall into three broad industry categorizations: agriculture, mining, and non-classifiable industries. Fortunately, in agriculture and mining, undisclosed quarterly employment observations are more likely to be one-off occurrences rather than missing for long periods of time. This makes it possible to simply interpolate from the surrounding rows an estimate of quarterly unemployment in the quarters in which such data is unavailable. On the state level, this interpolation frequently yields "0" as many states do not have any activity in these sectors. The interpolation leaves no undisclosed employment counts for agriculture and mining.

Undisclosed employment figures are more pervasive in non-classifiable industries, but this catch-all category is not a focus of the analysis and is omitted in many of the figures.

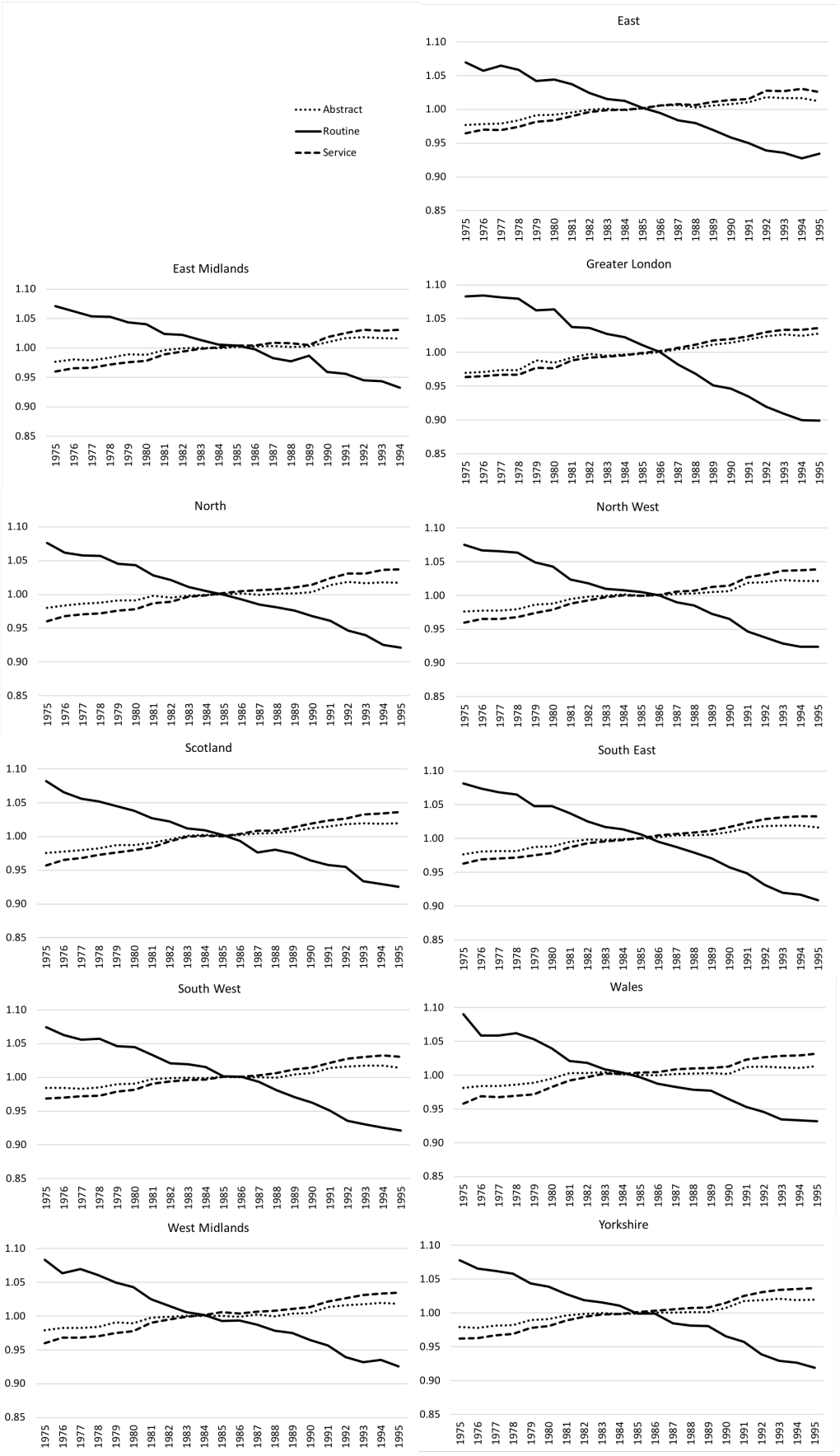
B.2 Abstract, service and routine task trends by region

Figure B.1 demonstrates that the trend in abstract, routine, and service tasks across occupations was extremely similar across regions of Britain.

B.3 Shifts in occupational deciles for the US, 1979–1984

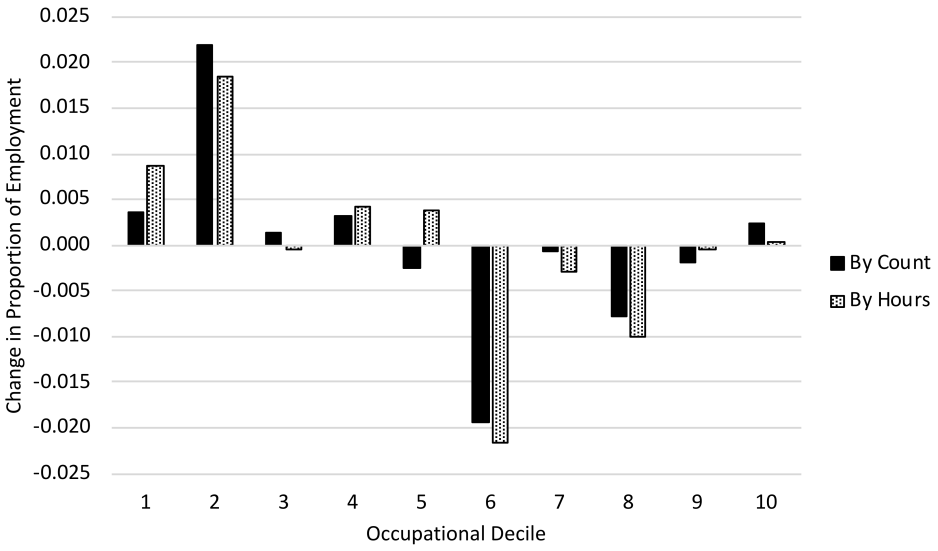
Figure B.2 gives the change in the share of employment from 1979 to 1984 in the US for occupational deciles based on average hourly earnings in 1979. This period represents the complete recession-recovery cycle for the US. There is no indication of a U-shaped pattern of employment share changes, indicating that job polarization was insignificant during this period.

Figure B.1: Change in task composition in Britain by region, 1975–1995



Source: ONS confidential ASHE data. Y-axis gives the task score as a percent of the average from 1975-1995.

Figure B.2: Change in the proportion of employment by occupational decile in the United States, 1979–1984



Analysis using CPS May Supplement data

Appendix C

Appendices to Chapter 4

C.1 Robustness to probit specification

Table C.1 presents the coefficients and marginal effects of a probit specification. All of the models are estimated for the labor force only, controlling for industry and occupational class.

Model (1) interacts interviewer-assessed race with the year indicator. The coefficients and marginal effects correspond to Table 4.2 model (2), which is estimated for the labor force with industry and occupational class controls. Table 4.2 model (2) found that in 1982, nonwhite workers were 8.2 percentage points less likely to be employed than white workers ($p < 0.001$), and that this effect decreased to 5.3 percentage points by 1985 ($p < 0.01$). The probit estimates in Table C.1 are broadly similar but slightly smaller: nonwhite workers were 5.9 percentage points less likely to be employed in 1982 ($p < 0.001$), decreasing to 4.9 percentage points in 1985 ($p < 0.05$).

Model (2) in Table C.1 estimates a probit model for first-generation immigrant status, corresponding to Table 4.3 model (4). The results are almost identical. In the main text, immigrant workers were 2.2 percentage points less likely to be employed than native-born workers in 1981 ($p < 0.05$), increasing to 6.0 percentage points less likely in 1984 ($p < 0.001$). Table C.1 shows that the corresponding figures with a probit model are 2.0 percentage points in 1981 ($p < 0.05$) and 6.0 percentage points in 1984 ($p < 0.001$).

Likewise, for gender, the probit estimates are very similar. In Table 4.4 model (2) in the main text, women were estimated to be 4.3 percentage points more likely to be employed than

men in 1984 ($p < 0.001$), and in Table C.1, model (3) indicates that they were 4.5 percentage points more likely ($p < 0.001$).

Table C.2 gives the coefficients and marginal effects of the results for regions from a probit model. The results are very similar to those using the LPM model in Table 4.5 model (2). With the probit model, workers in the North of England were on average 3.1 percentage points less likely to be employed than those in the South and Midlands from 1980–1985 ($p < 0.001$), while the comparable estimate from Table 4.5 is 3.0 percentage points ($p < 0.001$). Likewise, workers in Wales and Scotland were 3.0 percentage points less likely to be employed on average from 1980–1985 in both the LPM model in Table 4.5 model (2) and in the probit model in Table C.2 ($p < 0.001$).

Table C.3 gives the marginal effects of the probit model for industry. The same patterns as in Table 4.6 can be seen, with manufacturing and construction workers less likely to be employed than those in other services.

C.2 Robustness to estimation with a single model

In the main text of Chapter 4, separate regressions are estimated for the time-varying effect of interviewer-assessed race, immigration status, gender, and industry. In this appendix, Table C.4 presents a single model where a time interaction is included for all of the variables of interest at the same time. Note that regions are not included in this robustness check, as the models in subsections 4.5.1–4.5.3 and 4.5.5 control for eleven regions, while the model for regions in subsection 4.5.4 groups regions into three categories for simplicity.

Table C.4 presents the results. Both models (1) and (2) are estimated for the labor force only and include controls for education and region. Model (2) introduces industry controls, which are interacted with year indicators, and occupational class controls.

Table C.4 confirms the main results from Chapter 4. In the main results, in 1982, nonwhite workers were 8.2 percentage points less likely to be employed than white workers controlling for industry and race ($p < 0.001$), immigrants were 2.2 percentage points less likely to be employed than native-born workers ($p < 0.001$), and men were 4.4 percentage points less likely to be employed than women ($p < 0.001$), all else equal. The results in Table C.4 model (2) are remarkably similar for 1982, with nonwhite workers 6.8 percentage points less likely to be employed than white workers ($p < 0.01$), immigrants 2.8 percentage points less likely to be employed than

Table C.1: Probit models for differences in the probability of employment by interviewer-assessed race, immigration status, and gender

	(1)		(2)		(3)	
	m = Nonwhite		m = First-Gen Immigrant		m = Female	
	Coef.	Margins	Coef.	Margins	Coef.	Margins
m * 1976	-0.125	-0.010	-0.127	-0.011	0.125**	0.009**
	(0.125)	(0.012)	(0.084)	(0.008)	(0.041)	(0.003)
m * 1977	0.000	0.000	0.050	0.003	0.061	0.004
	(0.113)	(0.008)	(0.082)	(0.006)	(0.041)	(0.003)
m * 1978	-0.028	-0.002	-0.038	-0.003	0.001	0.000
	(0.109)	(0.008)	(0.079)	(0.006)	(0.041)	(0.003)
m * 1979	-0.112	-0.009	-0.094	-0.007	0.126**	0.009**
	(0.103)	(0.009)	(0.078)	(0.006)	(0.044)	(0.003)
m * 1980	-0.178*	-0.018	-0.114	-0.011	0.151***	0.014***
	(0.088)	(0.010)	(0.071)	(0.008)	(0.038)	(0.003)
m * 1981	-0.134	-0.019	-0.139*	-0.020*	0.233***	0.030***
	(0.078)	(0.012)	(0.061)	(0.009)	(0.033)	(0.004)
m * 1982	-0.334***	-0.059***	-0.228***	-0.038**	0.272***	0.038***
	(0.081)	(0.017)	(0.063)	(0.012)	(0.035)	(0.005)
m * 1983	-0.268***	-0.057**	-0.232***	-0.048***	0.223***	0.041***
	(0.079)	(0.019)	(0.063)	(0.014)	(0.036)	(0.006)
m * 1984	-0.318***	-0.065***	-0.300***	-0.060***	0.260***	0.045***
	(0.083)	(0.019)	(0.068)	(0.015)	(0.040)	(0.007)
m * 1985	-0.245**	-0.049*	-0.154*	-0.029*	0.206***	0.036***
	(0.089)	(0.020)	(0.068)	(0.014)	(0.037)	(0.006)
m * 1986	-0.182*	-0.035	-0.000	-0.000	0.205***	0.035***
	(0.093)	(0.020)	(0.073)	(0.013)	(0.037)	(0.006)
m * 1987	-0.103	-0.019	-0.160	-0.030	0.230**	0.039**
	(0.160)	(0.031)	(0.130)	(0.026)	(0.072)	(0.012)
Age	0.036***	0.004***	0.036***	0.004***	0.036***	0.004***
	(0.003)	(0.000)	(0.003)	(0.000)	(0.003)	(0.000)
Age^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.181***	0.021***	0.181***	0.021***		
	(0.013)	(0.002)	(0.013)	(0.002)		
Married	0.221***	0.024***	0.222***	0.024***	0.224***	0.024***
	(0.020)	(0.002)	(0.020)	(0.002)	(0.020)	(0.002)
Nonwhite			-0.188***	-0.025***	-0.189***	-0.025***
			(0.034)	(0.005)	(0.034)	(0.005)
First-Gen. Immigrant	-0.137***	-0.017***			-0.137***	-0.017***
	(0.027)	(0.004)			(0.027)	(0.004)
Constant	1.308***		1.308***		1.326***	
	(0.086)		(0.087)		(0.088)	
Education	Yes		Yes		Yes	
Region	Yes		Yes		Yes	
Year Main Effects	Yes		Yes		Yes	
Industries	Yes		Yes		Yes	
Occupations	Yes		Yes		Yes	
Number of observations	141012		141012		141012	
Number of households	83457		83457		83457	
Psuedo R2	0.0999		0.1000		0.1003	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Probit models. Robust standard errors, adjusted for clustering by household, are presented in parentheses. When applicable, the omitted categories are white, non-first-generation immigrant, male, and non-married. All models include industry and occupational class controls and are estimated for the labor force only. Model (1) interacts nonwhite with year, model (2) interacts first-generation immigrant status with year, and model (3) interacts gender with year.

Table C.2: Probit model for differences in the probability of employment by region

	Coef.	Margins
North of England 1976	-0.121*	-0.009*
	(0.047)	(0.004)
North of England 1977	-0.169***	-0.012***
	(0.048)	(0.004)
North of England 1978	-0.220***	-0.016***
	(0.047)	(0.004)
North of England 1979	-0.186***	-0.013***
	(0.048)	(0.004)
North of England 1980	-0.233***	-0.021***
	(0.043)	(0.004)
North of England 1981	-0.231***	-0.032***
	(0.037)	(0.005)
North of England 1982	-0.194***	-0.029***
	(0.041)	(0.006)
North of England 1983	-0.203***	-0.039***
	(0.040)	(0.008)
North of England 1984	-0.138**	-0.025**
	(0.045)	(0.008)
North of England 1985	-0.218***	-0.040***
	(0.043)	(0.008)
North of England 1986	-0.211***	-0.038***
	(0.043)	(0.008)
North of England 1987	-0.027	-0.005
	(0.084)	(0.015)
Wales and Scotland 1976	-0.178**	-0.014**
	(0.057)	(0.005)
Wales and Scotland 1977	-0.274***	-0.021***
	(0.056)	(0.005)
Wales and Scotland 1978	-0.324***	-0.025***
	(0.057)	(0.005)
Wales and Scotland 1979	-0.265***	-0.020***
	(0.059)	(0.005)
Wales and Scotland 1980	-0.301***	-0.029***
	(0.053)	(0.006)
Wales and Scotland 1981	-0.212***	-0.029***
	(0.046)	(0.007)
Wales and Scotland 1982	-0.181***	-0.027***
	(0.051)	(0.008)
Wales and Scotland 1983	-0.137**	-0.025**
	(0.050)	(0.010)
Wales and Scotland 1984	-0.165**	-0.030**
	(0.054)	(0.010)
Wales and Scotland 1985	-0.224***	-0.041***
	(0.052)	(0.010)
Wales and Scotland 1986	-0.172**	-0.030**
	(0.054)	(0.010)
Wales and Scotland 1987	-0.060	-0.011
	(0.110)	(0.020)
Age	0.036***	0.004***
	(0.003)	(0.000)
Age^2	-0.000***	-0.000***
	(0.000)	(0.000)
Female	0.179***	0.021***
	(0.013)	(0.002)
Married	0.221***	0.024***
	(0.020)	(0.002)
Non-White	-0.205***	-0.027***
	(0.034)	(0.005)
First-Gen Immigrant	-0.132***	-0.017***
	(0.027)	(0.004)
Constant	1.556***	
	(0.086)	
Education and Year Main Effects	Yes	
Industries and Occupations	Yes	
Number of observations	141012	
Number of households	83457	
Psuedo R2	0.0971	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, are presented in parentheses. The omitted categories are South and Midlands, male, non-married, white, and non-first generation immigrant.

Table C.3: Probit model for differences in the probability of employment by industry

	Agr, forest, fish	Energy & water	Mineral extract.	Metal, engineer, vehic	Other manu.	Const-ruction	Dist, hotel, catering	Transport, communic.	Bank, insurce
Industry × 1976	0.013	0.016	-0.005	-0.000	-0.006	-0.034***	-0.007	0.008	-0.004
	(0.008)	(0.009)	(0.011)	(0.005)	(0.005)	(0.007)	(0.005)	(0.006)	(0.008)
Industry × 1977	0.019**	-0.006	0.003	-0.001	-0.001	-0.027***	-0.001	0.007	-0.003
	(0.006)	(0.014)	(0.009)	(0.004)	(0.005)	(0.007)	(0.005)	(0.006)	(0.008)
Industry × 1978	0.001	0.002	0.005	0.009*	-0.003	-0.031***	-0.013*	-0.002	-0.023*
	(0.009)	(0.013)	(0.010)	(0.004)	(0.004)	(0.007)	(0.005)	(0.006)	(0.009)
Industry × 1979	-0.005	-0.001	-0.000	-0.004	-0.000	-0.033***	-0.011*	0.004	-0.008
	(0.010)	(0.012)	(0.011)	(0.004)	(0.004)	(0.008)	(0.005)	(0.006)	(0.008)
Industry × 1980	0.025***	0.018	0.017*	-0.023***	-0.024***	-0.049***	-0.012*	-0.005	0.003
	(0.005)	(0.010)	(0.008)	(0.005)	(0.006)	(0.008)	(0.005)	(0.007)	(0.008)
Industry × 1981	0.015	0.012	-0.054***	-0.047***	-0.044***	-0.081***	-0.041***	-0.008	-0.008
	(0.009)	(0.009)	(0.012)	(0.007)	(0.008)	(0.010)	(0.006)	(0.008)	(0.009)
Industry × 1982	0.003	-0.017	-0.080***	-0.070***	-0.067***	-0.095***	-0.057***	-0.034***	-0.006
	(0.011)	(0.012)	(0.016)	(0.009)	(0.009)	(0.011)	(0.007)	(0.010)	(0.009)
Industry × 1983	0.017	0.018	-0.042*	-0.071***	-0.065***	-0.079***	-0.048***	-0.020	0.002
	(0.015)	(0.015)	(0.018)	(0.012)	(0.012)	(0.014)	(0.010)	(0.014)	(0.013)
Industry × 1984	0.045***	-0.008	-0.041*	-0.052***	-0.050***	-0.074***	-0.025**	-0.014	-0.000
	(0.013)	(0.020)	(0.021)	(0.013)	(0.012)	(0.015)	(0.010)	(0.015)	(0.014)
Industry × 1985	0.029	0.011	-0.013	-0.045***	-0.043***	-0.086***	-0.046***	-0.028*	-0.011
	(0.016)	(0.017)	(0.016)	(0.012)	(0.011)	(0.014)	(0.010)	(0.014)	(0.013)
Industry × 1986	0.024	0.001	-0.014	-0.023*	-0.012	-0.071***	-0.020*	0.019	0.002
	(0.020)	(0.020)	(0.019)	(0.012)	(0.011)	(0.014)	(0.009)	(0.013)	(0.013)
Industry × 1987	-0.015	0.001	-0.030	-0.056*	-0.064*	-0.070*	-0.034	-0.015	-0.002
	(0.034)	(0.037)	(0.031)	(0.023)	(0.025)	(0.027)	(0.018)	(0.025)	(0.023)
Age					0.004***				
					(0.000)				
Age^2					-0.000***				
					(0.000)				
Female					0.021***				
					(0.002)				
Married					0.024***				
					(0.002)				
Non-White					-0.025***				
					(0.005)				
First-Gen Imm.					-0.017***				
					(0.004)				
Education					Yes				
Region					Yes				
Year Main Effects					Yes				
Occupation					No				
Number of observations					141012				
Number of households					83457				
Psuedo R2					0.1033				

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Entries are marginal effects. Robust standard errors, adjusted for clustering by household, are presented in parentheses. The omitted categories are other services, male, non-married, white, and non-first generation immigrant. All estimates from a single model with the active labor force only.

native-born workers ($p > 0.05$), and men 3.2 percentage points less likely to be employed than women ($p < 0.001$). The effects for first-generation immigrants, however, are only significant for the years 1981 and 1984, suggesting some overlap with the interaction with non-white workers.

Table C.4 model (2) also indicates that workers in other manufacturing and construction were significantly disadvantaged relative to those in other services, as was found in the main text.

Finally, for all of the variables, the trends over time are similar to those in the main text, with the size of gaps expanding during the recession and often intensifying during the jobless recovery period.

Table C.4: Single model for differences in the probability of employment by race, immigration status, gender, and industry

	(1) Labor Force	(2) Labor Force
Non-White × 1976	-0.017	-0.014
	(0.017)	(0.017)
Non-White × 1977	-0.007	-0.012
	(0.014)	(0.013)
Non-White × 1978	-0.011	-0.009
	(0.017)	(0.015)
Non-White × 1979	-0.027	-0.010
	(0.016)	(0.013)
Non-White × 1980	-0.023	-0.026
	(0.017)	(0.017)
Non-White × 1981	-0.038	-0.019
	(0.020)	(0.018)
Non-White × 1982	-0.104***	-0.068**
	(0.025)	(0.024)
Non-White × 1983	-0.096***	-0.047*
	(0.025)	(0.024)
Non-White × 1984	-0.078**	-0.045*
	(0.024)	(0.023)
Non-White × 1985	-0.081***	-0.052*
	(0.024)	(0.022)
Non-White × 1986	-0.090***	-0.059**
	(0.022)	(0.020)
Non-White × 1987	-0.018	-0.012
	(0.018)	(0.036)
First-Gen Immigrant × 1976	-0.022*	-0.014
	(0.010)	(0.010)
First-Gen Immigrant × 1977	-0.006	0.001
	(0.008)	(0.008)
First-Gen Immigrant × 1978	-0.014	-0.009
	(0.010)	(0.010)
First-Gen Immigrant × 1979	-0.014	-0.013
	(0.009)	(0.009)
First-Gen Immigrant × 1980	-0.022	-0.011
	(0.012)	(0.012)
First-Gen Immigrant × 1981	-0.028*	-0.028*
	(0.014)	(0.012)
First-Gen Immigrant × 1982	-0.017	-0.028
	(0.017)	(0.016)
First-Gen Immigrant × 1983	-0.029	-0.038*
	(0.017)	(0.016)
First-Gen Immigrant × 1984	-0.041*	-0.052**
	(0.017)	(0.017)
First-Gen Immigrant × 1985	-0.016	-0.017
	(0.013)	(0.013)
First-Gen Immigrant × 1986	0.015	0.013
	(0.012)	(0.011)
First-Gen Immigrant × 1987	-0.032*	-0.035
	(0.013)	(0.026)
Female × 1976	0.020***	0.024***
	(0.003)	(0.004)
Female × 1977	0.012***	0.018***
	(0.003)	(0.004)
Female × 1978	0.006	0.015***
	(0.003)	(0.004)
Female × 1979	0.015***	0.022***
	(0.003)	(0.004)
Female × 1980	0.021***	0.022***
	(0.004)	(0.004)
Female × 1981	0.034***	0.033***
	(0.005)	(0.005)
Female × 1982	0.045***	0.032***
	(0.005)	(0.006)
Female × 1983	0.047***	0.036***
	(0.006)	(0.006)
Female × 1984	0.048***	0.040***
	(0.006)	(0.006)
Female × 1985	0.039***	0.033***
	(0.005)	(0.006)
Female × 1986	0.042***	0.034***
	(0.005)	(0.005)
Female × 1987	0.037***	0.035**
	(0.005)	(0.011)
Age	0.010***	0.004***
	(0.000)	(0.000)
Age^2	-0.000***	-0.000***
	(0.000)	(0.000)
Married	0.057***	0.043***
	(0.003)	(0.003)
Agr, forest, fish × 1976		0.023*
		(0.010)
Agr, forest, fish × 1977		0.031***
		(0.009)
Agr, forest, fish × 1978		0.002
		(0.012)
Agr, forest, fish × 1979		-0.001
		(0.013)
Agr, forest, fish × 1980		0.033***
		(0.007)
Agr, forest, fish × 1981		0.022
		(0.012)
Agr, forest, fish × 1982		0.006
		(0.015)
Agr, forest, fish × 1983		0.019
		(0.018)
Agr, forest, fish × 1984		0.052***
		(0.014)
Agr, forest, fish × 1985		0.028
		(0.015)
Agr, forest, fish × 1986		0.015
		(0.019)
Agr, forest, fish × 1987		-0.013
		(0.030)
Energy and water supply × 1976		0.012
		(0.010)
Energy and water supply × 1977		-0.008
		(0.013)
Energy and water supply × 1978		-0.004
		(0.012)
Energy and water supply × 1979		-0.004
		(0.012)
Energy and water supply × 1980		0.016
		(0.009)
Energy and water supply × 1981		0.017
		(0.010)
Energy and water supply × 1982		-0.015
		(0.013)
Energy and water supply × 1983		0.017
		(0.013)
Energy and water supply × 1984		-0.001
		(0.016)
Energy and water supply × 1985		0.014
		(0.014)
Energy and water supply × 1986		0.003
		(0.016)
Energy and water supply × 1987		0.005
		(0.027)
Mineral extraction × 1976		-0.003
		(0.014)
Mineral extraction × 1977		0.006
		(0.013)
Mineral extraction × 1978		0.007
		(0.012)
Mineral extraction × 1979		0.002
		(0.014)
Mineral extraction × 1980		0.023*
		(0.011)
Mineral extraction × 1981		-0.061***
		(0.015)
Mineral extraction × 1982		-0.092***
		(0.019)
Mineral extraction × 1983		-0.039*
		(0.018)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors, adjusted for clustering by household, are presented in parentheses. All estimates from a single model with the active labor force only.

Mineral extraction × 1984	-0.036
	(0.020)
Mineral extraction × 1985	-0.010
	(0.014)
Mineral extraction × 1986	-0.014
	(0.017)
Mineral extraction × 1987	-0.027
	(0.029)
Metal, engineer, vehic × 1976	0.002
	(0.005)
Metal, engineer, vehic × 1977	-0.003
	(0.005)
Metal, engineer, vehic × 1978	0.011*
	(0.005)
Metal, engineer, vehic × 1979	-0.004
	(0.005)
Metal, engineer, vehic × 1980	-0.026***
	(0.006)
Metal, engineer, vehic × 1981	-0.053***
	(0.009)
Metal, engineer, vehic × 1982	-0.071***
	(0.010)
Metal, engineer, vehic × 1983	-0.060***
	(0.010)
Metal, engineer, vehic × 1984	-0.042***
	(0.011)
Metal, engineer, vehic × 1985	-0.036***
	(0.010)
Metal, engineer, vehic × 1986	-0.021*
	(0.010)
Metal, engineer, vehic × 1987	-0.049*
	(0.020)
Other manufacturing × 1976	-0.005
	(0.006)
Other manufacturing × 1977	0.001
	(0.006)
Other manufacturing × 1978	-0.000
	(0.006)
Other manufacturing × 1979	0.003
	(0.005)
Other manufacturing × 1980	-0.027***
	(0.007)
Other manufacturing × 1981	-0.054***
	(0.009)
Other manufacturing × 1982	-0.076***
	(0.010)
Other manufacturing × 1983	-0.066***
	(0.011)
Other manufacturing × 1984	-0.049***
	(0.012)
Other manufacturing × 1985	-0.041***
	(0.010)
Other manufacturing × 1986	-0.017
	(0.010)
Other manufacturing × 1987	-0.060**
	(0.022)
Construction × 1976	-0.043***
	(0.009)
Construction × 1977	-0.036***
	(0.009)
Construction × 1978	-0.040***
	(0.008)
Construction × 1979	-0.040***
	(0.009)
Construction × 1980	-0.059***
	(0.010)
Construction × 1981	-0.093***
	(0.012)
Construction × 1982	-0.107***
	(0.013)
Construction × 1983	-0.076***
	(0.013)
Construction × 1984	-0.068***
	(0.014)
Construction × 1985	-0.085***
	(0.014)
Construction × 1986	-0.069***
	(0.013)
Construction × 1987	-0.066*
	(0.026)
Dist, hotel, catering × 1976	-0.008
	(0.006)
Dist, hotel, catering × 1977	-0.002
	(0.005)
Dist, hotel, catering × 1978	-0.015**
	(0.006)
Dist, hotel, catering × 1979	-0.013*
	(0.005)
Dist, hotel, catering × 1980	-0.014*
	(0.006)
Dist, hotel, catering × 1981	-0.045***
	(0.007)
Dist, hotel, catering × 1982	-0.057***
	(0.008)
Dist, hotel, catering × 1983	-0.044***
	(0.008)
Dist, hotel, catering × 1984	-0.020*
	(0.008)
Dist, hotel, catering × 1985	-0.037***
	(0.008)
Dist, hotel, catering × 1986	-0.019*
	(0.007)
Dist, hotel, catering × 1987	-0.027
	(0.014)
Transport, comunicans × 1976	0.012
	(0.007)
Transport, comunicans × 1977	0.008
	(0.006)
Transport, comunicans × 1978	-0.004
	(0.007)
Transport, comunicans × 1979	0.005
	(0.007)
Transport, comunicans × 1980	-0.005
	(0.008)
Transport, comunicans × 1981	-0.006
	(0.009)
Transport, comunicans × 1982	-0.032**
	(0.011)
Transport, comunicans × 1983	-0.010
	(0.013)
Transport, comunicans × 1984	-0.007
	(0.014)
Transport, comunicans × 1985	-0.020
	(0.012)
Transport, comunicans × 1986	0.020
	(0.011)
Transport, comunicans × 1987	-0.009
	(0.022)
Bank, finance, insurce × 1976	-0.009
	(0.007)
Bank, finance, insurce × 1977	-0.009
	(0.007)
Bank, finance, insurce × 1978	-0.027***
	(0.008)
Bank, finance, insurce × 1979	-0.015*
	(0.007)
Bank, finance, insurce × 1980	-0.006
	(0.006)
Bank, finance, insurce × 1981	-0.011
	(0.007)
Bank, finance, insurce × 1982	-0.011
	(0.007)
Bank, finance, insurce × 1983	0.005
	(0.008)
Bank, finance, insurce × 1984	0.006
	(0.009)
Bank, finance, insurce × 1985	-0.003
	(0.008)
Bank, finance, insurce × 1986	0.005
	(0.008)
Bank, finance, insurce × 1987	-0.003
	(0.015)
Constant	0.662*** 0.836***
	(0.009) (0.009)
Education, Region, Year Main Effects	Yes Yes
Occupations	No Yes
Number of observations	152539 141012
Number of households	89347 83457
Adjusted R2	0.056 0.054

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