

UNIVERSITY OF OXFORD

**Discussion Papers in
Economic and Social History**

Number 139, December 2015

**ECONOMIC IMPOSSIBILITIES FOR OUR
GRANDCHILDREN?**

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Economic impossibilities for our grandchildren?

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Keynes Lecture, British Academy, October 7 2015

This is a revised version of the Keynes Lecture, presented at the British Academy on October 7, 2015. I am extremely grateful to Mary Morgan who chaired that event, and to Roger Backhouse, Patrick O'Brien, Richard Portes, Morten Ravn, H  l  ne Rey, and Donald Winch, who attended the lecture and made many useful suggestions and comments. I particularly want to thank Morgan Kelly and Alan Taylor for many conversations on the subject of secular stagnation; and to Bob Allen, Charlie Bean, Paul Beaudry, Agust  n B  n  trix, Steve Broadberry, Nick Crafts, Brad DeLong, Rui Esteves, Ron Findlay, Mike Gavin, Richard Grossman, Leander Heldring, Svend Hylleberg, Philip Lane, Jacob Madsen, Perry Mehrling, Gian Maria Milesi-Ferretti, Cormac    Gr  da, Thomas Piketty, Filipa Sa, Claus Vastrup, Karl Whelan, Jeff Williamson, and Nikolaus Wolf, for many useful comments, help with data, and advice. The usual disclaimer applies.

Section 1. Introduction

For decades, textbook macroeconomics has tended to distinguish between the short run and the long run. The short run is taken to be the domain of Keynesian macroeconomics, or at least it is for those of us of a saltwater disposition. The long run, on the other hand, is the domain of the growth models of Solow and his successors. In 2013, however, Larry Summers revived an older, “medium run”, intellectual tradition, dating back to the interwar period, which saw the short run and the long run as mutually influencing each other, and not for the better.¹

According to this “secular stagnation” view, unemployment could persist into the long run absent an appropriate fiscal response by government: it might not be a mere blip around a benign long run trend. There might still be booms and busts, with unemployment falling and rising along the way, but these oscillations would occur around an average unemployment rate that was now higher than before. If savings were sufficiently abundant, relative to investment demand, then (in the modern formulation of the thesis) the equilibrium (or Wicksellian natural) interest rate might be negative. If this were the case, the zero lower bound implied that central banks would be unable to set interest rates at levels consistent with full employment.² Since investment demand might be low for long run reasons (for example, population growth might be slowing), we would now have a case of a “short run” variable (unemployment) being in part determined by long run forces. Worse, persistent unemployment could lower the long run growth potential of the economy via hysteresis effects: there would now

¹ A conscious desire to distinguish between the short run and the long run was present at the birth of modern growth theory; towards the beginning of his famous article, Solow (1956, p. 66) commented that “A remarkable characteristic of the Harrod-Domar model is that it consistently studies long-run problems with the usual short-run tools. One usually thinks of the long run as the domain of the neo-classical analysis, the land of the margin. Instead Harrod and Domar talk of the long run in terms of the multiplier, the accelerator, “the” capital coefficient.” But Solow has of course also been a prominent advocate of medium run macroeconomics (Solow, 1987; Solow, 2000).

² Admittedly the zero lower bound is no longer quite what it used to be (Yglesias, 2015); on the other hand, interest rates facing businesses in those Eurozone countries that really need low interest rates are far from negative.

be a pernicious feed-back effect from the short run to the long run as well (Ball et al., 2014; Blanchard et al., 2015).

Since this is a lecture about secular stagnation, I need to be clear about the sense in which I am using the term. I use it in the same way that Summers does, and that Hansen did before him: secular stagnation refers to the possibility that insufficient aggregate demand and unemployment may be with us in the long run, *unless government does something about it*. It's important to be clear about the qualification, since the secular stagnation hypothesis was always as much a policy prescription as a prediction, and probably more so. Secular stagnation is thus to be distinguished from the fear that long run growth trends may themselves be declining, as a result of slowing technological progress (Cowen, 2011), or various "headwinds" (in his well-known papers, Robert Gordon refers to ageing populations, slowing human capital accumulation, rising inequality, and rising government debt) (Gordon, 2012; Gordon, 2014). Such supply side forces may make secular stagnation more likely, by lowering investment demand; they do not constitute secular stagnation in and of themselves, since secular stagnation is all about unemployment. Secular stagnation should also be distinguished from the fear that *too much* of the wrong sort of technological change will lead to workers being displaced by machines or robots. Such fears date back at least to Ricardo, and are still with us today (Ricardo, 1973, Chapter XXXI; Mokyr et al., 2015), and they do concern unemployment, but this is unemployment being generated on the technological supply side. Secular stagnation, on the other hand, is all about aggregate demand.

Economists don't live in ivory towers. They react to the world around them, and change their theories, or invent new ones, or revive old ones, as circumstances change. Figure 1 plots world industrial output during the Great Depression and our own Great Recession, measured from their respective pre-crisis peaks (June 1929 and April 2008). We all know that recovery occurred much more quickly after 2008 than it did after 1929. We also know that its pace slowed rapidly, and eventually started petering out, to the extent that in August 2015 the current

world industrial output series was overtaken by that of the interwar period. This is a truly dismal performance.

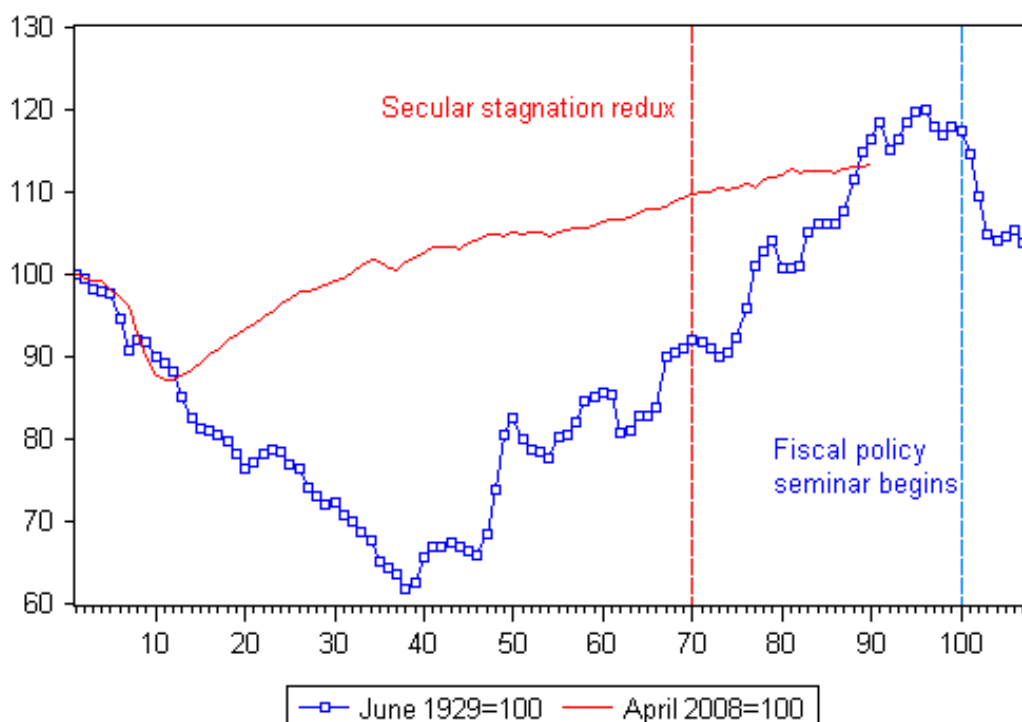


Figure 1. World industrial output during two crises

Source: Eichengreen and O'Rourke (2010), updated with data from <http://www.cpb.nl/en/node/>

And so it's no surprise that a saltwater economist like Summers (2013) sounded the alarm bell when he did, in November 2013; especially given the long history of stagnation in Japan, and especially given the series of financial bubbles that preceded the 2008 crisis. Bubbles are a classic symptom of a world in which savings are excessive, relative to available real investment opportunities; they should also, according to Summers, have led to much frothier and more inflationary growth than what we in fact saw, suggesting that the underlying level of aggregate demand was low.

Nor is it any surprise that Hansen became a Keynesian when he did. His review of the General Theory hadn't been particularly enthusiastic. He arrived in Harvard in the fall of 1937, to take up a new chair in the brand new Graduate School of Public Administration, now the Kennedy School. The School's faculty

was mostly drawn from the existing Harvard faculty; the other outside appointment, it so happens, was Heinrich Brüning, former chancellor of Weimar Germany, who was appointed Lecturer in Government before being promoted to Professor the following academic year (Musgrave, 1976, p. 4; Harvard University, 1939, p. 293; Harvard University, 1940, p. 38). Brüning gets a walk-on role in most courses on the Great Depression, a dismal reminder of just how dangerous pro-cyclical fiscal policies during a deep recession can be. I've often wondered what he and Hansen talked about around the water cooler.³

What made Hansen Keynesian?⁴ Was it his newfound proximity to the briny waters of the Atlantic? Or was it the fact that his arrival at Harvard, and the start of the famous Fiscal Policy seminar which he ran with John Williams, coincided with the US economy falling off a cliff (Figure 1; Salant, 1976)? Perhaps Keynesian theories could explain why this was happening, in a way that other theories couldn't. And so it's no surprise that he started moving in a Keynesian direction at this time, and that his writings on secular stagnation started to appear in 1938. This wasn't necessarily what the Harvard department had been expecting. As Paul Samuelson (1976, p. 29) said, "Hansen received his call to Harvard by miscalculation. They did not know what they were getting. And neither did he."

Section 2. The early 19th century: the stationary state and capital gluts

But I want to begin by saying something about various early 19th century anticipations of the secular stagnation thesis, since this helps clarify what was novel about the argument. And first let me say that it also makes sense that they

³ Brüning gave the fifth-ever talk to the Monday Fiscal Policy seminar, on "Monetary and Fiscal Policies in Germany during the Depression" (Harvard University, 1939, p. 309). According to Schuker (1994, p. 347), after the war Hansen told Brüning that Keynes had intended, before dying, to make clear his view that "counter-cyclical spending provided no magic bullet to counter a depression" – or at least, so Brüning claimed.

⁴ As we'll see later, a less Anglocentric and perhaps more accurate question might be: what made Keynes a Hansen-ian?

appeared when they did, since economic life in Britain was difficult once the Napoleonic Wars had ended. Feinstein (1998, pp. 646-7) puts unemployment in industry and transportation at 17 per cent in 1816, as demobilised soldiers and sailors came home to a depressed economy; he estimates that the average rate of unemployment in these sectors rose from 5 per cent during 1770-1815 to 8 per cent between 1815 and 1850. Per capita GDP fell by 11 per cent between its 1815 peak and 1819, and barely increased between 1815 and 1830 (Broadberry et al., 2015). The period also saw considerable political unrest: the Peterloo Massacre of 1819, the agrarian Swing Riots of 1830, Chartism. It's hardly surprising that economists of the time tried to find explanations for the economic difficulties they saw all around them.

One obvious response to these difficulties was to point to rapid population growth, which was at its fastest at precisely the time that Malthus was writing his *Essay on the Principle of Population*. Diminishing returns, as these extra workers pressed against a fixed land supply, could potentially explain why life was so hard for so many. As Tony Wrigley has frequently emphasised (e.g. Wrigley 2010), such an analysis made quite a lot of sense in an "organic economy" in which land was still an input into most productive activities, and a fundamental constraint on economic growth.

But it wasn't just population that was growing rapidly in early 19th century Britain. Britain's capital stock grew at an accelerating rate between 1760 and 1790; the acceleration came to a halt during the wartime years; and it resumed once peace broke out in 1815 (Mitchell, 1988, p. 864). Contemporary observers didn't have access to figures like these, but they would have been aware that accumulation was proceeding increasingly rapidly. They could also observe closed factories and unemployed workers in post-war Britain, and it seems understandable that some of them would have concluded that the accumulation had been excessive. Since diminishing returns could explain why excessive population growth was bad for workers, it made sense to wonder whether it also implied that excessive capital accumulation was bad for capitalists as well.

And so a variety of arguments were developed during these years in which as capital accumulates, the return to capital falls. Exactly what the implications of this were depended on the economist concerned. In the hands of Ricardo and his followers, the implications were not too disastrous. In a closed economy, as capital and labour supplies rose they would increasingly press against a fixed land supply; diminishing returns meant that the price of food and nominal wages would rise, and that profit rates would fall. Eventually they would fall to the point where future accumulation would cease altogether. This was the famous stationary state.

Was the stationary state necessarily a bad thing? Implicitly, yes, if you thought that economic growth was a good thing, and especially if you thought that wages could only be above subsistence in a growing economy (Donald Winch, Introduction to Ricardo, 1973, p. xiv). The idea that free trade was desirable, largely because it would prevent the onset of the stationary state, was at the heart of Ricardo's thinking. But on the other hand, the stationary state emphatically did not involve stagnation:

When in the course of things profits should be so low from a great accumulation of capital and a want of means of providing food for an increasing population, all motive for further savings will cease; but there will be no stagnation; all that is produced will be at its fair relative price, and will be freely exchanged. Surely the word stagnation is improperly applied to such a state of things, for there will not be a general glut, nor will any particular commodity be necessarily produced in greater abundance than the demand shall warrant.⁵

Say's Law ensured that everything that was produced would be purchased by somebody. Excessive accumulation was impossible. Furthermore, later Ricardians, faced with the reality of rising real wages, increasingly emphasised that if workers exercised moral restraint, the stationary state might be consistent with high equilibrium real wages (O'Brien, 1975, pp. 61-64). And

⁵ Cited in Winch (1965, p. 75)

perhaps there is something to be said for a quiet life, especially if you are a successful middle-aged man like John Stuart Mill (Mill, 1849, Book IV, Chapter VI), or for that matter Maynard Keynes (1978a).

Mill (1849, p. 293) was famously optimistic about the stationary state, but at the same time he worried that as the economy approached it, lower returns on capital would lead savers to engage in “over-trading and rash speculation”, which would necessarily end in tears. Far more radical, however, were those authors who maintained that “gluts” of capital and commodities were possible, involving “the distress both of a redundant population among the labourers, and of a redundant capital among the mercantile classes” (Chalmers, 1832, p. 134). That such a tradition should have surfaced at this time is hardly surprising, as we have seen. Thus Lauderdale, writing in 1804 and 1819, argued that accumulating capital beyond what “the present state of the knowledge of mankind enables him to lay out with advantage” was wasteful, for the capital would not be employed, but lie idle, like the finest palaces in Delhi, or the spacious warehouses of Antwerp, “unoccupied and undesired” (Lauderdale, 1804, pp. 221-223).⁶ Worse, excessive accumulation would reduce output and employment in consumer goods industries, and even worse, this would also lead to a decline in the value of investment goods, with output in both sectors falling in consequence (Lauderdale, 1819, pp. 214-5). Malthus worried that excessive saving, leading to too much capital accumulation and too many “productive workers”, would lead to an excessive supply of commodities in general, given the parsimony of the rich, and in consequence to a sharp fall in profits (Malthus, 1836, pp. 315-6).

According to Chalmers (1832), diminishing returns meant that just as “there might be too many ploughmen, so there might be too many ploughs” (p. 80); just as overpopulation could lead to wages falling below the subsistence level, and to population declining, so excess accumulation could lead to negative returns on capital and a fall in the capital stock. Both excesses would lead to economic distress (Chalmers, 1832, pp. 110-11). Wakefield (1833, Volume 2, p. 97), who

⁶ Note the link that is made here between the state of technology and the demand for capital.

approvingly quoted Chalmers, argued that excess saving could lead to capital lying idle “for want of employment for capital”. Just as moral restraint could serve as a preventive check, avoiding excess population and the need for a positive population check, so increased spending and lower saving could serve as a preventive check for capitalists, helping them to avoid excess capital accumulation and the destruction of capital this would entail (Smith et al., 1835, p. 253). An admirable theory, indeed, that made sexual restraint by the poor, and extra consumption by the rich, functionally equivalent, and equally necessary for the smooth functioning of the capitalist system! Unfortunately, the rich might continue to save, despite the fact that the new capital could not be “productively employed” (Torrens, 1836, p. 241).

These theories were not Keynesian, since they assumed that ex ante savings automatically translated into an equivalent amount of investment and a higher capital stock. The problem was that this capital stock, and its associated production, could be excessive.⁷ They didn’t spell out what seems obvious to us: that over-investment in one period doesn’t cause unemployment directly; it’s the lower investment in the next period that does that.⁸ These writers argued that aggregate demand might be lower than aggregate supply, once accumulation had proceeded too far; this did *not* imply that increased investment was the solution to the problem, since this would merely aggravate its root cause. Increased spending by the rich, and possibly public works, were better solutions.⁹ If capitalists did not restrain themselves via the preventive check of profligacy, crises of over-investment might be a recurrent phenomenon.

These theories also assumed a certain irrationality on the part of savers-cum-investors, which Keynes picked up on in the General Theory.¹⁰ This irrationality

⁷ See Corry (1959) and O'Brien (1975, pp. 229-232).

⁸ Samuelson (1976, p. 28) makes this point with respect to a later generation of writers. For a model in which an excessive supply of durable goods can cause a recession in a world with flexible prices, see Beaudry et al. (2014).

⁹ On Malthus’ views on public works, see O'Brien (1975, pp. 231-2).

¹⁰ On Hobson’s theory of over-saving, he writes that it assumes that “it is a case of excessive saving causing the *actual* accumulation of capital in excess of what is

might be enough for you to rule out the possibility of over-investment on *a priori* grounds. On the other hand, consider the hypothetical case of a centrally controlled economy, where investment decisions are made, not by rational profit-maximizing entrepreneurs, but by nervous officials contemplating the political consequences of a major economic downturn. Might over-investment be possible in such an economy, and can we think of any possible examples today?¹¹

Insofar as these writers assumed a negative relationship between the capital stock and the returns to capital, and insofar as they assumed that accumulation was the driving force of the economy, they tended to conclude that – at least in a closed economy – there was something inevitable in the long run about either the stationary state, or capital gluts, as the case may be. They knew that these outcomes could be averted by technological change, and some authors emphasised this a lot. But if you conceive of technological change as something episodically shifting out what we would now think of as the demand for capital curve, rather than as something continuous, which continuously shifts that curve outwards, then it's going to be easier to conclude that the stationary state, or gluts, as the case may be, is something that will tend to inevitably happen in the long run.

Section 3. The secular stagnation thesis

To get from these classical arguments to secular stagnation required at least three conceptual breakthroughs. First, and most obviously, you needed the Keynesian thesis linking aggregate demand and employment, in which investment drives savings rather than the other way around. Second, you needed to analyse a dynamic, growing economy, as Hansen always did, and acknowledge that continuous technical progress and population growth meant that accumulation and investment could continue forever. And third, you needed to

required, which is, in fact, a secondary evil which only occurs through mistakes of foresight" (Keynes, 1973, p. 367, emphasis in the original).

¹¹ Writing about China, Martin Wolf asks: "does it make economic sense for an economy to invest 44 per cent of GDP and yet grow at only 5 per cent? No. These data suggest ultra-low, if not, negative marginal returns" (Wolf, 2015).

synthesize these two arguments, and ask whether this long run sustainable investment rate would be sufficient to absorb savings supply.

The General Theory provided the first of these breakthroughs. The book is famously about the short run. However, when Keynes was writing it, he was doing so not only in the light of the Great Depression, but of the disastrous British 1920s. Things had been so bad for so long that it must have been tempting for Keynes to seek structural explanations for Britain's interwar economic performance. And there is a short section in Chapter 16 (section III) that seems to move in this direction, and provide the foundations for a theory of unemployment in the long run (Keynes, 1973, pp. 217-220).¹²

As Alvin Hansen (1953, p. 157) noted, it isn't a particularly well-written section, but the story seems to be as follows. As accumulation proceeds, the marginal efficiency of capital schedule shifts to the left, due to diminishing returns. Ideally the central bank will lower interest rates to maintain investment at a high level, but there is a limit to how low interest rates can fall, which could be zero, or could be something higher. When that limit is reached, investment will decline, aggregate demand will fall, and unemployment will rise. Moreover, there is something inevitable about this, because of diminishing returns; and once we're in this state of the world, there is no reason to suspect that we will ever leave it. If government doesn't intervene, the outcome will be persistent unemployment. If it does intervene, on the other hand, to maintain aggregate demand, then the result will be a "quasi-stationary" state in which returns to capital will be zero, and rentiers will be a thing of the past.

Now this is very obviously not a classical story. Investment drives savings, not the other way around; we have the consumption function and multiplier to link the two; it is under-investment, not over-investment, that is the problem. But on

¹² There is a debate about the extent to which Keynes had a long run vision of secular stagnation (Guthrie and Tarascio, 1992) and I'm aware that I'm no historian of thought. But if I'm wrong in thinking that the *General Theory* contains such a vision, then so was Hicks, so at least I'm in good company.

the other hand, there does seem to be a classical element lurking in the background; some fixed downward sloping relationship between the stock of capital on the one hand, and the return to capital on the other, down which the economy slides on its *rendez vous* with destiny.

Because of this downward sloping relationship, the implication is that capital accumulation will eventually and inevitably lead to some sort of stationary or “quasi-stationary” state, which may be either desirable (the euthanasia of the rentier) or undesirable (involving long-run unemployment), depending on government policy.¹³ Indeed, in this respect Keynes seems more classical than the classics, since while they often wrote about the impact of technological progress on the position of this schedule, technical change doesn’t get a look-in with Keynes. Interestingly, Keynes doesn’t think he is just engaged in idle theoretical speculation; he argues that the post-war difficulties experienced in Britain and America are “actual experiences” (p. 219) of these processes in action.

In his review of the book, which appeared in June 1936, Hicks (1936, pp. 249-50) zoomed in on this “novel and startling” theory of “secular unemployment”, and in particular on the assumption of diminishing marginal returns to capital. He pointed out that this implicitly assumes that population and technology are constant. He pointed to a striking passage elsewhere in the *General Theory* in which Keynes himself argued that quite high interest rates had been compatible with “a reasonably satisfactory average level of employment” during the 19th century, as a result of “the growth of population and of invention, the opening-up of new lands, the state of confidence and the frequency of war” (Keynes, 1973, p. 309). Hicks pointed out that invention might put off the decline in the marginal efficiency of capital “almost indefinitely”, as would a growing population, which

¹³ Reduced working hours might be part of the policy mix, providing a link between the euthanasia of the rentier and the economic possibilities for our grandchildren (Aspromourgos, 2012, p. 154).

was thus “actually favourable to employment” (Hicks, 1936, p. 252).¹⁴ Unfortunately, it was likely that the population in Britain and her closest trading partners would soon start to decline, or remain stationary, and when that happened Keynes’ theory would become relevant. Britain might not already be engulfed in a situation of secular unemployment, “but there is little doubt that we are heading for these dangers” (p. 253). It seems strange that Hicks is never credited with, or blamed for, the development of the secular stagnation thesis in its modern form, since he so clearly anticipated it. And he presumably got Keynes thinking about technological change: a letter to Hicks reveals that he was a little put out by the suggestion that he had ignored it in his book.¹⁵

Another review that presumably mattered for the development of the secular stagnation hypothesis is Hansen’s (Hansen, 1936). Alvin Hansen was the son of Danish immigrants. He was born in 1887 in Daneville, a small settlement in South Dakota. When he was about six the railway came, about half a mile down the road. The settlement relocated in response, and was re-christened Viborg.¹⁶ The late 19th century expansion of the American frontier, and the waves of railway investment that accompanied it, were constant themes in Hansen’s work, and it’s easy to see why.

Viborg was and is proud of its Danish heritage, and this is an important part of the story: Hansen’s prairie background made him an intellectual cosmopolitan. He grew up speaking Danish (Mehrling, 1997, p. 85), and read writers like Frisch, Wicksell and Myrdal in the original Scandinavian (Hansen, 1941, p. 196; Hansen, 1951, pp. 6, 328). He also read extensively in German: not just Wicksell, or the German economists we are familiar with in the English-speaking world, but people like Arthur Spiethoff who published almost exclusively in that language.¹⁷

¹⁴ This is the second of the breakthroughs needed to get from the classics to secular stagnation, listed at the start of this section. It is something that would always have seemed obvious to Hansen.

¹⁵ Keynes and Moggridge (1973, Part II, pp. 72-3)

¹⁶ Mehrling (1997, p. 85); <http://www.viborgsd.org/history-of-viborg/>, accessed 18 November 2015.

¹⁷ The French economist Albert Aftalion was another important influence, and Hansen read him in the original too.

As Samuelson (1976, pp. 27-8) noted, these writers fit well with his views on the importance of technological change, and the notion that long run waves of innovation can propel waves of investment and economic growth. And another factor that led him to emphasise technological change much more than Keynes must have been the fact that the United States was so much more technologically progressive than Britain (Figure 2).

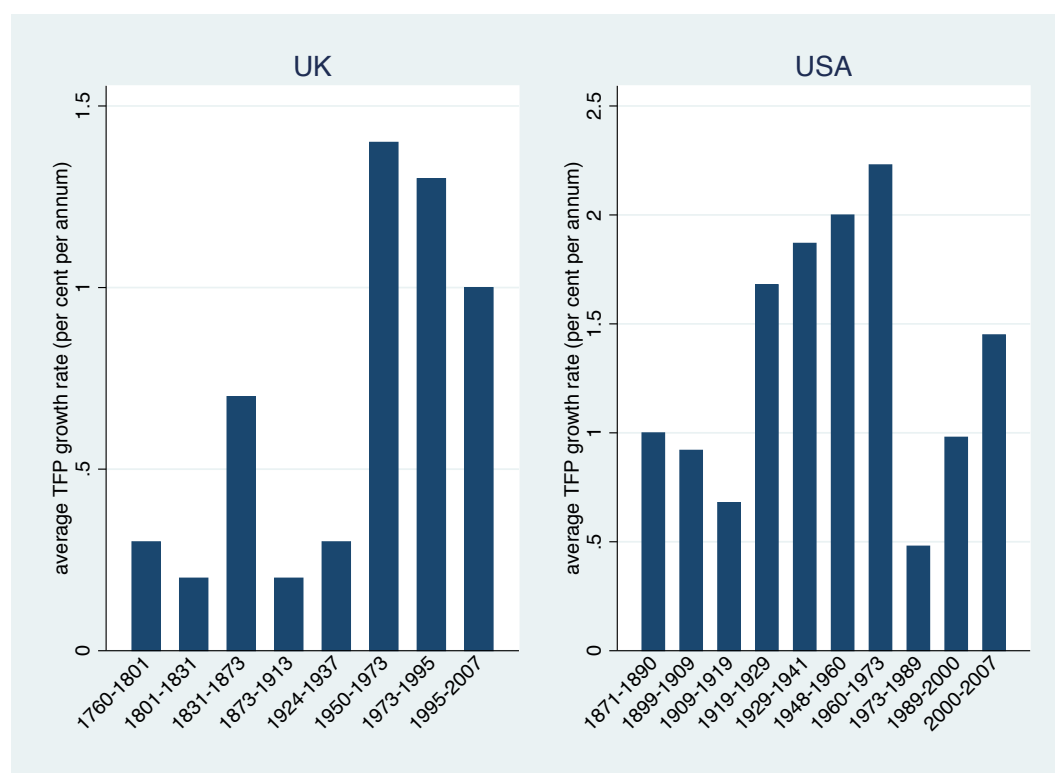


Figure 2. TFP growth, UK and US, 1760-2007

Source: Crafts (2014), pp. 32-33 (UK, and US 1871-90); Bakker et al. (2015).

Given all of this, it's hardly surprising that Hansen's initial judgement of the *General Theory* was not particularly glowing. In his review of the book he argued that wage and price rigidity were a "necessary condition" for a "stable underemployment equilibrium" (p. 680). Like Hicks, he pointed out that technological progress raised the marginal efficiency of capital and increased investment: "Thus economic progress constantly tends toward equilibrium at full employment" (p. 680). However, he also anticipated the secular stagnation thesis, arguing that without new capital-intensive technologies such as the railroad, without the frontier, and without population growth, "the problem of structural, or secular, unemployment...is almost certain to present itself for solution in the decades before us" (p. 681). At this stage, however, he also laid

stress on “increasing cost rigidities” as a cause of secular unemployment (*ibid.*), and he was sceptical about Keynesian solutions of “forced investment” brought about by “artificially contrived measures”, fearing that if savings were forced into investment by government, “business is likely to stagnate... it is not improbable that the continued workability of the system of private enterprise will be made possible, not by changes in prevailing economic institutions (such as those advocated by Keynes), but rather by the work of the inventor and the engineer” (pp. 682-3).

Were these two reviews important in getting Keynes to think about whether he could say something more rigorous about unemployment in the long run, and in particular make his analysis more dynamic, in the sense of incorporating technical change, population growth and other factors shifting out the demand for capital curve on an on-going basis? It seems likely. An additional possible influence on Keynes may have been the fact that fears about a declining birth rate were in the air around this time, as Hicks’ review suggests (Thane, 1990; Toye, 2000, pp. 199-202). In any event, in February 1937 Keynes set out the major elements of the secular stagnation hypothesis, when he delivered the annual Galton Lecture at a meeting of the Eugenics Society (Keynes, 1937).

In the lecture, he focussed squarely on the question of whether investment demand was likely to be sufficient to offset savings supply.¹⁸ Net investment is equal to the increase in the capital stock dK , and the net investment rate (expressed as a share of GDP, Q) is thus dK/Q . But this is equal to the rate of increase of the capital stock, dK/K , multiplied by the capital-output ratio K/Q ; and if the capital-output ratio is constant, as Keynes asserted it was – an assumption that we would see a lot of in the coming years! – then this is equal to

¹⁸ He was vague about whether he was talking about net or gross savings and investment, but the argument suggests that it was net investment that he had in mind. In that case, he was implicitly assuming that net savings rate were constant also, which as those of you who have been reading Krusell and Smith (2015) on Piketty (2013) know is a mistake. So he got some important things wrong; but he still managed to lay out the essential points of the analysis.

the growth rate of output (n , the growth rate of population, plus g , the growth rate of output per capita) multiplied by K/Q .

Expressed as a share of GDP, net investment demand was thus $(n+g)*K/Q$. Was this going to be sufficient to offset net savings supply, which Keynes asserted was 8-15% of GDP? Keynes thought that K/Q was around 4, and that $n+g$ thus had to lie between about 2 and 4 per cent per annum. If population growth fell to zero, as seemed likely, then this seemed to Keynes to be a very tall order indeed. And if you look at British TFP growth rates of the time (Figure 2), you can see why he was worried.¹⁹

We know that Hansen read the Galton lecture carefully. Barber (1987) argues that it was an important factor in his conversion to Keynesianism, though it might be more accurate, as Mehrling (1997, p. 133) suggests, that Hansen viewed the Galton lecture as indicating that Keynes was moving in Hansen's (that is to say, a more dynamic) direction. Its stress on technology would have resonated with Hansen, and since it was published shortly before the US economy fell off a cliff, the Keynesian elements of the analysis (and in particular the multiplier) would soon have seemed more acceptable to him as well. And so when Hansen reprinted his review of the General Theory in a 1938 collection of essays (Hansen, 1938), the view that wage and price rigidity were "necessary" for Keynesian underemployment equilibrium had been deleted, along with the fear that government investment would lead to the stagnation of business. Hansen's career as America's leading exponent of Keynes was about to begin.

In his 1938 presidential lecture, with is most often associated with the secular stagnation thesis, he argued that the "seven fat years" of 1923-29 were due to "special conditions...of a sufficiently temporary character to raise grave

¹⁹ The late 19th century British net savings rate seems to have been close to 8 per cent, if Feinstein's data reported in Mitchell (1988) are to be believed: it was the gross rates that were at the upper end of Keynes' range. This would have made Keynes more optimistic; on the other hand, the *net* capital output ratio seems to have been around 2, which he would have thought was very bad news (based on the data in Feinstein (1972) and <http://www.measuringworth.com>).

questions about the future”, and that the same was true of the British recovery of 1935-37 (Hansen, 1938, p. 7). The longer run prospects were dim, owing to the closing of the frontier and slowing population growth. Furthermore, it was no longer clear that innovations would be as capital-using as they had been in the 19th century. Boosting innovation was crucial, as he had always believed; indeed it was more crucial than ever. But Hansen now also believed that fiscal policy had a role to play in combatting unemployment under conditions of secular stagnation (although he still worried about the political implications).

In a 1941 book (Hansen, 1941, pp. 301-312) he sets out his views in greater detail, arguing that you will only get business cycles occurring in the context of a dynamic, innovating, growing economy. In a static economy where Q and K are fixed, and net savings are zero, there is no reason why equilibrium would ever be disrupted, or why unemployment would ever emerge. In a dynamic economic, however, technical change will increase investment demand. As an aside, at this stage in the technological cycle, the more you can save, the more you will invest, and the faster you will grow. For example, several economic historians have argued that countries with a greater capacity to generate profits and savings grew more rapidly in Golden Age Europe (Crafts et al., 1996; Eichengreen, 2007). When growth slows, however, investment demand will fall as well, and it is unlikely that consumption will rise sufficiently to fill the gap in expenditure, since savings and consumption behaviour are deeply embedded in a variety of social institutions. Those high savings rates, which had been beneficial in the boom, now become a chronic drag on aggregate demand; unless government steps in to boost the propensity to consume, unemployment will be the result. As we know, World War II soon intervened. The Americans started seriously rearming from June 1940, and the economy moved rapidly towards full employment (Gordon and Krenn, 2010). Hansen himself was worried about the possibility of post-war inflation (Tobin, 1976, p. 37). However, others worried that with the end of wartime expenditure, unemployment would re-emerge. As is well known, their fears were unrealised. Instead, the western world experienced a “Golden Age” of economic growth that lasted until the oil crises of the 1970s. And so secular stagnation gradually faded from view. On its way out, however, the

attempt to graft together Keynesian and dynamic thinking led to the development of accelerator-multiplier models (Samuelson, 1939); a range of other models in which investment depended positively on income, and negatively on the capital stock (Matthews, 1955); Harrod (1939a) and Domar (1946) models; and finally, ironically, and in reaction to the latter, the Solow growth model and the separation of the short run and the long run.²⁰ If this was a cul-de-sac, it was a pretty productive one.

Why did the prediction of secular stagnation not come to pass? Figure 2 presented TFP growth rates for various phases of British and US history, and I've converted these into equivalent rates of labour-augmenting technical progress g (assuming a Cobb-Douglas production function, and a labour share of 0.67). We also have the population growth rate for each of these periods. These are the variables that should matter for long run growth, in either a Hansen-Keynes or a Solovian world (and in a Hansen-Keynes world they should matter for unemployment rates as well). When you look at the numbers (Figure 3), it's obvious what the pessimists got wrong. In the US, it was the baby boom. Far from continuing to decline, as seemed a good bet in the 1930s, population growth rates more than doubled after the war. The UK story is different: population growth did pick up a bit, but far more important was a dramatic acceleration of technological progress. The UK Golden Age was pretty feeble compared with the German *Wirtschaftswunder*, or the French *Trentes Glorieuses*, but it was revolutionary by British standards.

²⁰ For a fascinating account of the decline of the secular stagnation hypothesis, see Backhouse and Boianovsky (2015).

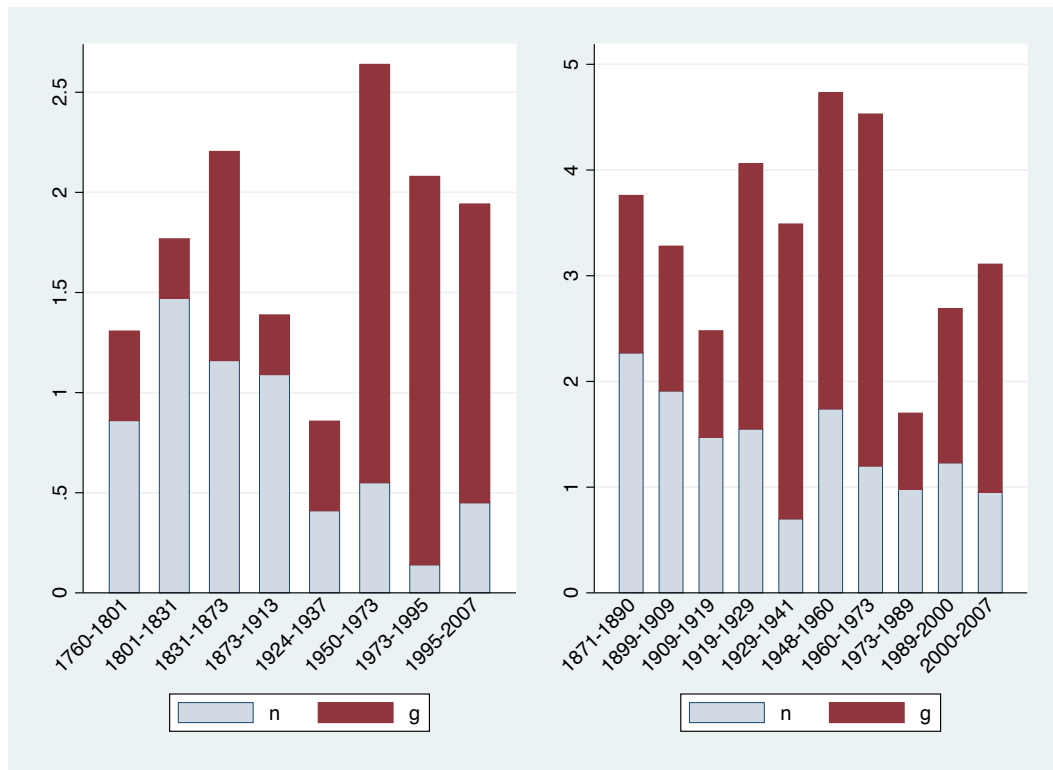


Figure 3. n plus g, UK and USA, 1760-2007

Source: TFP growth as in Figure 2, converted to g by dividing by the labour share, taken to be 0.67. Population growth: Britain: 1700-1870: Broadberry et al. (2015); 1870-1970: Palgrave Macmillan (2013); 1971-2014: ONS. USA: Carter et al. (2006), Series Aa7 (total resident population), spliced with FRED, <http://research.stlouisfed.org/fred2/series/POP#>. For each sub-period the growth rate is calculated by regressing the log of population on time.

Just because the secular stagnation *prediction* didn't come about doesn't automatically mean that we should scrap the underlying *theory*, which is that there is a predictable relationship between n plus g and unemployment rates, operating through the net investment channel. Is it the case that when $n+g$ is higher, unemployment is lower? The data for the UK (Figure 4) suggest that the answer is "yes"; the correlation is -0.8. The data for the US also suggest that the answer is yes, with two qualifications. First, the medium run unemployment rate never seems to fall below around 4 per cent, even during periods of very rapid growth like the roaring 20s or the Golden Age. And second, the Great Depression was a massive outlier. The underlying growth fundamentals were good: population growth was low by US standards, but TFP progress was famously high (Field, 2011). And yet unemployment was also extremely high. Exclude this observation, and the US correlation is -0.78.

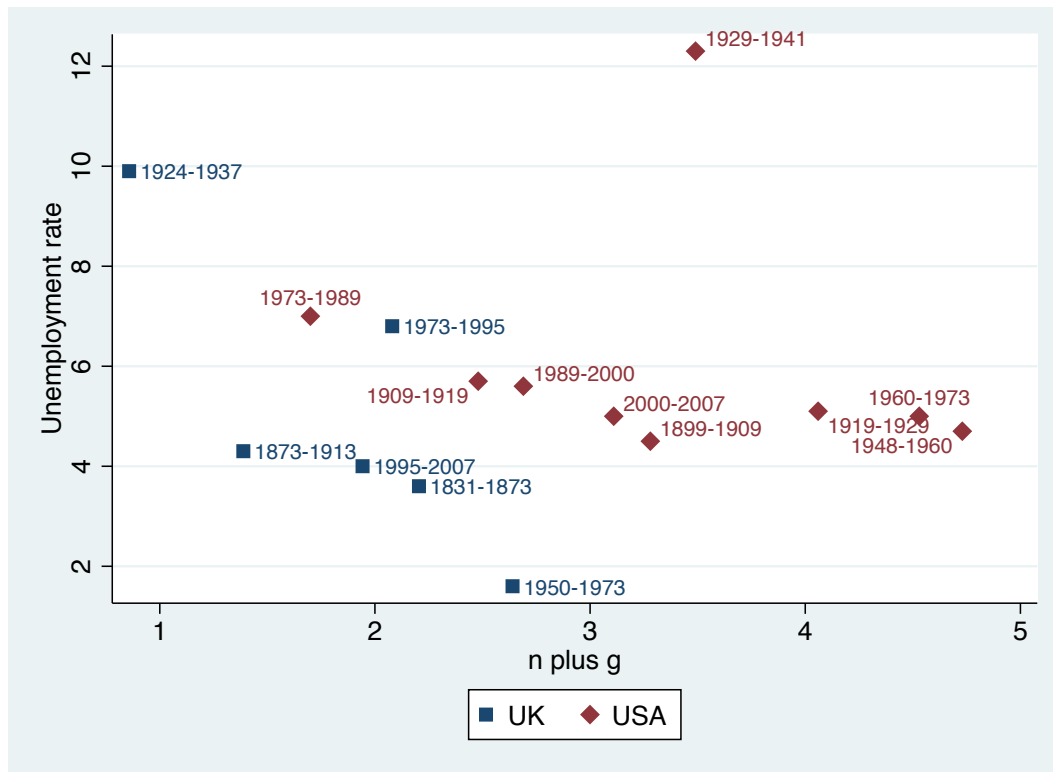


Figure 4. Unemployment versus n plus g

Sources: n plus g: Figure 3. Unemployment: UK: Thomas et al. (2010), updated with ONS series BCJE, <http://www.ons.gov.uk/ons/rel/lms/labour-market-statistics/september-2015/dataset--claimant-count-and-vacancies.html>; US: Carter et al. (2006) until 1947, FRED civilian unemployment rate, <https://research.stlouisfed.org/fred2/series/UNRATE/downloaddata>, thereafter.

One interesting difference between the two countries concerns the Great Depression. It appears as an outlier in the US graph, but not in the British one; as we saw, both population growth and technical progress were dismal in interwar Britain. Perhaps it made sense for Keynes to speculate that Britain’s interwar problems were structural in nature. America’s problems, in contrast, seem like a clear case of “magneto trouble” (Keynes, 1978b, p. 129).

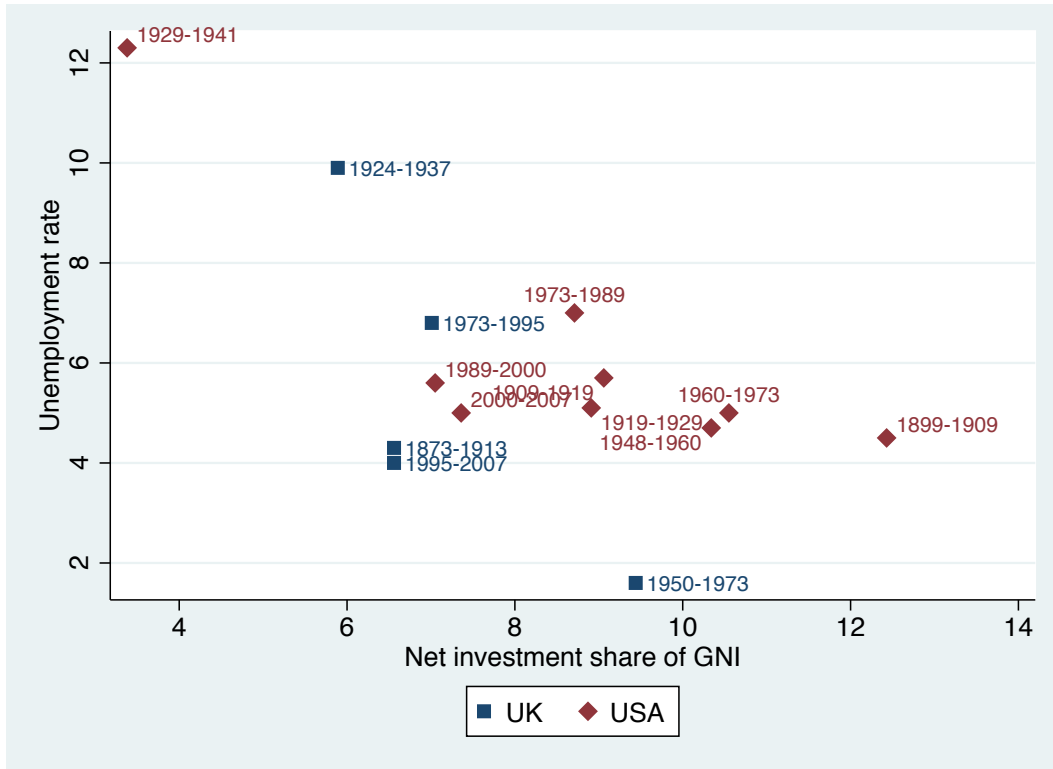


Figure 5. Net investment versus unemployment

Source: for unemployment, the source is as in Figure 4. Net investment from Piketty and Zucman (2014, Data Appendix, Tables UK12B, US12B)



Figure 6. Net investment versus n plus g

Source: as for Figures 4, 5

These are just correlations, and of necessity (since I am looking at medium run relationships) they involve very few data points. And if there is a causal relationship here, it could go in many different ways.²¹ The Hansen-Keynes argument proceeds in two steps. The first is that there is a negative relationship between net investment rates and unemployment. The data suggest that this is indeed true (Figure 5). The second step suggests that there is a positive relationship between $n + g$ and net investment. While it's a little less clearcut, especially in the US case, the correlation is positive, just as it should be, with the US Great Depression once again appearing as a major outlier (Figure 6). Perhaps this positive relationship is coincidental; perhaps it is driven by savings supply rather than investment demand. I don't want to make any claims based on these data. But perhaps we should be willing to keep an open mind about these matters, in which case at least three conclusions would seem to follow. First, we need more macroeconomic medium run theorizing (Solow, 1987; Solow, 2000; Beaudry, 2005; Comin and Gertler, 2006). Second, we need statistical techniques capable of dealing with low frequency relationships (Müller and Watson, 2015). And finally, perhaps we should be open-minded about the secular stagnation *mechanism*, while remaining prudently sceptical about any secular stagnation *predictions* that people may make about the future.

Section 4. The future

What about the future? What will happen to world savings supply and world investment demand? Might the Wicksellian natural interest rate remain low or even negative?

Pessimists tend to focus on investment demand. The main force that will predictably reduce investment demand in the future is falling population growth.

²¹ I should mention that the correlation survives when I lag population growth by 20 years, although it gets weaker, falling to around 0.65. Another obvious point is that you really want to use cyclically adjusted TFP, but unfortunately we lack such series stretching back into the 19th century. In Figure 4 I opted for consistency over time; if you replace Crafts' US numbers with Fernald's (Fernald, 2014) for the post-1945 period, the negative correlation survives (it is now -0.71 excluding the Great Depression).

Its trajectory is highly uncertain, but all scenarios have it eventually declining.²² Mind you, falling population growth seemed a reasonable prediction in the 1930s as well.

If we take the UN's medium fertility scenario, population growth will fall in all major world regions, but there is a lot of variation in the levels of growth. On this score, investment prospects will be lousy in Europe and Japan, and will sharply worsen in East Asia. Population growth will remain a lot higher for a lot longer in Africa, however, suggesting where the investment should be heading in the future.

What about the rate of technical progress? Here we need to distinguish between TFP growth at the frontier, which we can take to be the US, and TFP growth in countries far from the frontier. Theory suggests that the latter should behave somewhat predictably. TFP growth may remain strong for a while in countries successfully converging on the frontier, like China; but it will eventually slow down. On the other hand, if convergence growth really takes off in sub-Saharan Africa, you could see a long spell of high TFP growth there.

TFP growth on the frontier is much more unpredictable. In fact, I'd describe it as unpredictable full stop. The available data (Fernald, 2014) show a sharp slowdown in US TFP growth after 1973, since when it gradually recovered; the question now is whether 2000-2007 was a (good) blip, or whether it was the period since then that was a (bad) blip, and what we should expect going forward. To which I think the only honest answer is "I don't know". Economists have typically been much too pessimistic about the technological future. Simon Kuznets used to tell his students that if you want an accurate forecast, your best bet is to read science fiction (Fogel, 2005, p. 13). The available forecasts for future US TFP growth vary so wildly that it isn't clear that any of them are very useful.²³

²² United Nations file POP/1-1, at <http://esa.un.org/unpd/wpp/DVD/>

²³ Erumban and de Vries (2014, p. 19) put US TFP growth at 0.2 per cent per annum during 2015-19, and just 0.1 per cent per annum during 2020-25. Bob

Perhaps it makes most sense to admit that the future is unknowable, but to suggest ways in which simple growth theory can help us to think about what might be driving future trends. Fernald and Jones (2014) make the point that if modern theories of endogenous growth are to be believed, then it makes sense to attribute the majority of TFP progress in the United States since World War II to rising levels of education and R&D activity. Since there are limits to these trends in any society, the implication is that “frontier” US TFP growth will decline. On the other hand, growing numbers of scientists in Asia may join in the quest to extend the technological frontier, and this effect will work in the opposite direction, as would the involvement of robots in the R&D process. Quantifying these opposing trends will be more difficult, however, especially since the relationship between R&D inputs and technological outputs is not well known, and may be changing over time.

Obvious areas where one might expect rapid technological progress include robotics and energy-related technologies. As regards the former, there is a debate about whether *excessive*, rather than insufficient, rapid technological progress might turn out to be a problem, in that it might lead to large lay-offs of workers engaged in various routine activities, both physical and mental. The extent to which this is likely to be a problem is going to depend on several factors, including the rate and direction of technological progress and the labour supply response of countries’ educational and training systems (Autor, 2015; Crafts, 2015; Pratt, 2015). As regards the latter, the efficiency of alternative energy technologies has been rapidly advancing, and we may reach a point where massive investments start to make sense. If so, that will be good news for those concerned about secular stagnation. Even more importantly, if we don’t

Gordon (2010, Table 10), an author known for his technological pessimism, guesses that US TFP growth will average 1.05 per cent per annum between 2007 and 2027. Nick Crafts (2015) cites one estimate that US productivity growth will average 1 per cent per annum between 2014 and 2023 (with Eurozone TFP growth at just 0.5 per cent), and a second, due to the OECD, that it will average 1.6 per cent per annum between 2014 and 2014 (with Eurozone TFP growing at 1 per cent per annum).

make rapid progress on this front, secular stagnation risks being the least of our worries.

Many other factors may influence net investment demand going forward, but let me highlight three. The first is the Great Recession, which many fear will lead to a durable decline in investment demand in rich countries (IMF, 2014). The second is the relative price of investment goods, which some think may fall in the future, further lowering the dollar value of investment demand (ibid; Eichengreen, 2015). And third, Krusell and Smith (2015) have recently reminded us, rather forcefully, that people decide to engage in gross rather than net saving. Depreciation has accounted for more than half of world gross savings in recent decades. While normal wear and tear may happen automatically, firms still have to choose to replace depreciated capital. From the point of view of an individual country, it matters whether they choose to replace it in that country or elsewhere. If depreciation is due to obsolescence, economic choices seem to be even more clearly involved. Any analysis of where the natural interest rate is headed would seem to require thinking about where depreciation rates are headed, even if we typically don't think about depreciation very much, and can't measure it properly.

Optimists tend to focus on savings supply. The factor that should most predictably lower savings supply is ageing populations (World Bank, 2013; Gavin, 2015; Goodhart et al., 2015). The fact that populations are going to be ageing in East Asia is especially important, since the region accounts for such a big share of world savings. On the other hand, as poorer countries converge on richer ones, their share of world income will rise, and this will predictably increase world savings rates, since poor countries save so much more than the rich (35 versus 22 per cent in 2013).²⁴ Indeed, this compositional effect means that everyone could save less, but the world could end up saving more – the World Bank (2013) estimates that the net effect will be a wash.

²⁴ World Development Indicators.

Growth rates also matter for savings rates: the consensus is that high per capita growth translates into high savings (IMF, 2014, Chapter 3; Krusell and Smith, 2015). Slowing growth in those developing countries that have been successfully converging on the technological frontier is one predictable factor that should lower savings supply and raise interest rates, although a serious growth slowdown may be some way away still; a growth take-off in Africa would work in the opposite direction. Financial development should lower savings rates in developing countries, and changing economic and social policies in China might some day do the same.

Given that there are so many factors working in opposite directions, it would be a brave man or woman who would stick their neck out and predict what the balance of effects will be. Two international organisations (the World Bank and IMF) have recently guesstimated that the net effect on world interest rates will be minimal. Bean et al. (2015) suggest that while real interest rates will eventually recover, they may remain low for some time yet. Since world interest rates would be remaining roughly constant starting from historically low levels, this suggests that the zero lower bound *might* be something to worry about in the years ahead.²⁵

Ben Bernanke (2015) has suggested that international capital flows should solve this problem, since a country with excess savings can export them, depreciating the exchange rate, and boosting net exports. Secular stagnation, he points out, should be thought of as a global problem in a world of internationally mobile capital. That makes sense, but one can turn the argument around, and argue that as far as countries like the US and UK are concerned, secular stagnation could only possibly be a problem in a global context, since their net savings rates are close to zero.

Furthermore, if recurrent financial crises are one of the symptoms of secular stagnation, then it seems odd to argue that international capital flows will fix the

²⁵ Dobbs et al. (2010), Gavin (2015) and Goodhart et al. (2015) are much more optimistic.

problem, since international capital flows and sudden stops have been at the heart of so many crises in recent years, from Latin America in the 1980s to the Tequila, Asian and Russian crises of the 1990s, through to the Eurozone crisis of 2010 (Barkbu et al., 2012). Third, if the problem with secular stagnation is that central bankers can no longer hit their Wicksellian interest rate target, then do international capital flows make their life easier? Not if H el ene Rey (2015) is right, and capital mobility makes it impossible for you to run an independent monetary policy, irrespective of your exchange rate regime.²⁶

One thing that might be informative is to look at the experience of John Hobson's Britain. Hobson (1902) thought that Britain was exporting vast amounts of capital, and conquering large chunks of the world, all of which was a bad thing in his view, because of the excess savings of the rich. He also thought that excess savings could lower demand and production. Would savings have been excessive in late 19th century Britain, had capital exports not been possible? How low would interest rates have been in their absence? Might the zero lower bound have been a problem? And did capital exports help to solve the problems caused by excessive savings, by lowering unemployment?

If you take the IMF's (2014, pp. 21-22) estimates of the elasticities of savings supply (0.15) and investment demand (-0.5) (both expressed as shares of GDP) with respect to real interest rates; data on UK savings and investment rates (Mitchell, 1988, pp. 831-5); and data on real ex ante consol yields,²⁷ you can calculate a no-capital-export counterfactual series for real interest rates for 1830-1913. As can be seen in Figure 7, if you believe the calculation nineteenth century capital exports raised interest rates considerably; without them interest rates between 1870 and 1913 would on average have been 1.2 percentage points lower than they actually were. They would have steadily declined over the course of the period, rather than sharply increasing after the turn of the century. And by the end of the period they would have been even lower than they are

²⁶ Unless you are the United States.

²⁷ Kindly provided by Charlie Bean.

today.²⁸ If we are entering secular stagnation territory now, perhaps Britain would have entered it then as well. Estimates of what repatriating the capital stock would have done to the marginal return to capital, in the context of a CES aggregate production function, suggest a similar-sized percentage effect on profit rates as well.²⁹

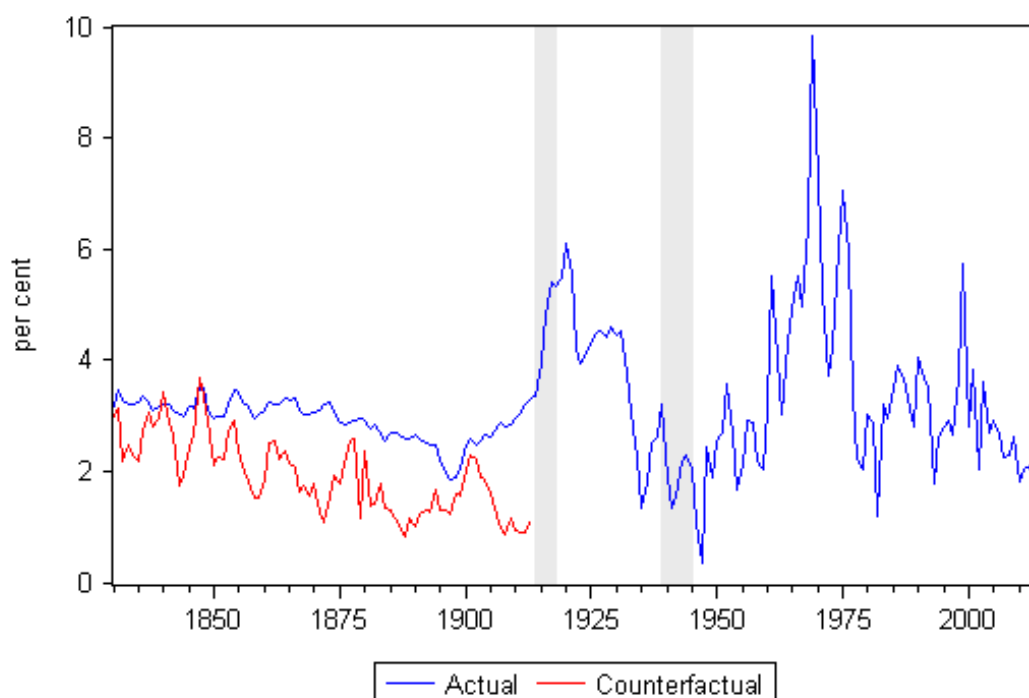


Figure 7. Actual and counterfactual real ex ante consol yields, 1830-2014
Source: see text

Capital exports may have been good for capitalists, but were they necessarily good for workers? Keynes thought not: after all, they raised interest rates, which was never a good thing. And it turns out that in the medium run there was a clear *positive* relationship between capital exports and unemployment, presumably linked to the fact that as capital exports rose, domestic investment fell (Figure 8). Economic historians have long discussed these correlations (Ford, 1958); the best explanations for them locate the ultimate driver of these Kuznets cycles, as

²⁸ Since I am calculating counterfactual interest rates assuming constant interest rate elasticities of savings supply and investment demand, negative interest rates are ruled out by assumption.

²⁹ Assuming an elasticity of substitution of 0.52, as cited by Rognlie, repatriating Britain's overseas capital in 1913 would have lowered the return to capital in Britain by 38%. Details available on request.

they are called, in Hansen’s prairies (Harley, 1978; Knick Harley, 1980). But whatever the ultimate causalities at work here, it seems difficult to make the case that capital exports helped lower unemployment rates in Hobson’s Britain. Bernanke would presumably reply that since Britain was on the gold standard, his “capital exports causing depreciation” mechanism was ruled out, and that would be perfectly reasonable. Even so, the British experience is a useful reminder that the initial impact of capital exports is to export capital, which is generally not seen as being good for labour

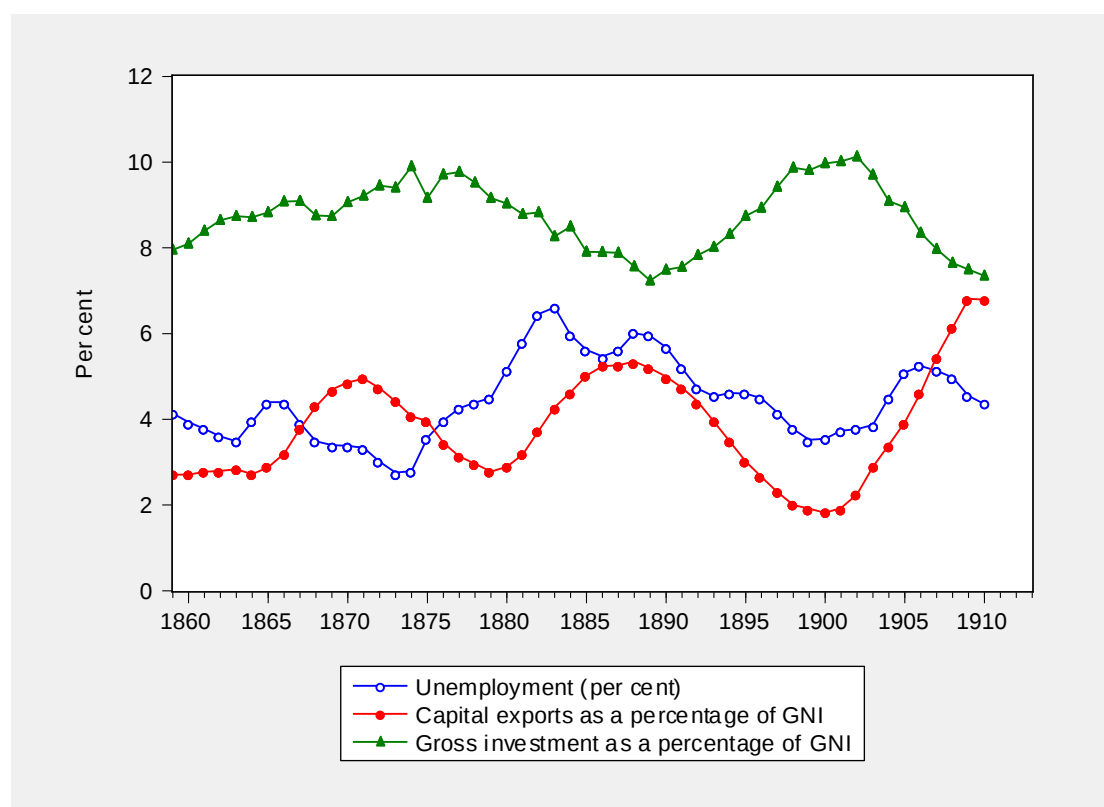


Figure 8. Nine year (centred) moving averages of capital exports, home investment and unemployment, UK 1859-1910

Source: for unemployment, as in Figure 3; and Mitchell (1988, pp. 831-5).

Were late 19th century British capital exports good or bad for the rest of the world? Britain exported capital via portfolio bond purchases, which was safer for everyone than channelling them through banks. It invested the money in capital-scarce frontier economies, helping to finance real investment in railways and a wide range of other infrastructure. This may have been portfolio investment, but it overwhelmingly went into greenfield projects. It occasionally led to financial

crises (Meissner, 2013), but to my knowledge foreigners at the time didn't complain about being flooded with a glut of British savings.

The obvious comparison today is with China. China accounts for a larger share of world GDP than did nineteenth century Britain (13 per cent and climbing, compared with a British peak of around 9 per cent) and its savings rates are much higher. 2014 Chinese gross savings accounted for over 6 per cent of world GNI, compared with roughly one per cent in the nineteenth century British case; and for almost a quarter of world savings.³⁰ In 2007 China's non-Hong-Kong investments were overwhelmingly in the US and other advanced economies (Milesi-Ferretti et al., 2010), although things may have changed since then. Was this as useful for the world economy as British investments had been a century earlier? I am inclined to doubt it.

If international capital flows are not a magic bullet ruling out the possibility of secular stagnation, then what, apart from the obvious (promoting R&D), should we do to make it less likely? I have three suggestions.

The first is to boost investment in Africa. That's where the population growth will be; it's where the big catch-up growth potential is going to be. And we want Africa to grow anyway, for lots of reasons, and this will require investment. An African growth miracle might go a long way to rule out secular stagnation at the global level for the foreseeable future.

The second is to become more like Japan. They have lousy demographics, without TFP growth sufficiently rapid to counteract it; and yet their unemployment performance in recent decades has been admirable, much better than in other rich countries. They must be doing something right.

The third concerns fiscal policy. Many people worry that rich economies today have run out of fiscal space, and will be ill-prepared to meet the next negative shock to aggregate demand. Would secular stagnation imply a choice between

³⁰ Figures based on World Development Indicators.

persistent budget deficits and persistent unemployment? Roy Harrod (1939b, p. 19) thought so: “The more the population declines the greater the need will be for public works to absorb redundant savings; but equally the more intolerable will be the growth in the burden of indebtedness”. The good news, it turned out however, was that Harrod was wrong. This was the conclusion of the balanced budget multiplier theorem, first discovered and published by Jørgen Gelting in 1941 (Gelting, 1941), and soon rediscovered by William Salant and Paul Samuelson. Samuelson noted the discovery³¹ in a 1943 paper that discussed ways of offsetting savings so that full employment could be maintained after the war. He separately listed government deficits, and a large government paid for by taxes, as separate options, and stated that “only recently” had he been persuaded that a large government per se provides a “genuine offset to saving”, that was “employment- and income-creating”, and that this might be a means “by which our economy can maintain the level of effective demand” (p. 1446).

There was thus a political trade-off: budgetary orthodoxy implied a bigger government, while a smaller government would require larger deficits (Samuelson 1948, p. 146). What is striking to a modern economist is that the participants in these debates were so forthcoming about the political implications of their theories.³² Bob Fogel (2005, p. 7) had it right, I think, when he wrote that “The key issue, as the stagnationists defined it, was not whether the growth of the GDP would come to an end, but whether a high level of government spending was necessary to prevent a high level of permanent unemployment, even if GDP did grow.” And that is perhaps the question that we should be posing today.

We can’t know if secular stagnation will be a problem in the years ahead, since the technological future is unknowable. But perhaps a prudent government should be prepared for all eventualities. If you think it possible that net investment demand will remain low, or even decline in the future, and that this

³¹ Without specifying the underlying logic.

³² Gelting on the other hand seems to have been motivated by the love of theory for its own sake; I am grateful to Claus Vastrup for clarification on this point.

will not be sufficiently offset by a decline in savings; and if you are the kind of person who worries about excessive budget deficits; then perhaps you should logically conclude that this is no time to shrink the state.

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