Impact of Slum Redevelopment Projects on Labour Market Outcomes: Evidence from Addis Ababa

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Abstract

In this paper, I examined the impact of an in-situ slum redevelopment project on the hourly earnings of the labour force in Addis Ababa, Ethiopia. Combining 7 rounds of geo-coded Urban Employment Unemployment Survey with the condominium plans, I applied a difference in differences methodology with variation in treatment timing. As a novel approach, I investigated the impact of the construction and completion of the condominiums as two separate treatments. The results indicated that the construction and completion of the condominiums increased the hourly earnings by 17 percent and 31 percent, respectively. I also defined two mechanisms to explain the increase in earnings: 1) virtuous cycle and growth channel and 2) displacement and replacement channel. The former relied on the agglomeration effect, while the latter relied on inter-neighbourhood migration. Mediation analysis illustrated that both channels coexisted. The increase in earnings, however, was not equally distributed across different groups. During the construction stage, the construction workers were the main benefiters of the programme and the earnings of the workforce working outside the construction sector did not significantly increase. Additionally, both treatments failed to increase the earnings of women and lower-income groups, which might exacerbate existing gender and income inequalities in society. Moreover, I found that the construction stage increased informalization and decreased female work hours.

Keywords: Slum Redevelopment, Labour Markets, Urban Economics, Ethiopia

JEL Codes: E24, O18, R30

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1 Introduction

"All that is solid melts into air"

Karl Marx (2012: 77), in this quote, describes the impact of economic imperatives on our lives. Economic forces transform every aspect of our world and cities are no exceptions. Cities can be envisioned as living organisms: they grow, reach their height and then decay. Mumford et al. (2016) summarized this life cycle in six stages: eopolis, polis, metropolis, megalopolis, tyrannopolis and necropolis. From small farming settlements, called eopolis, cities grow into complex economic clusters with advanced infrastructure. When a city reaches its peak and becomes a megalopolis, the public good provision and management starts to decay. The final two stages are periods of recession for cities. Eventually, a city ceases to exist due to the further degeneration in infrastructure and institutions. A city, however, does not have to follow these steps and it can dodge the blow. The necessary measures to overcome the inertia can be summarized as *urban renewal* (Kulshrestha 2018). The redevelopment of residential units is one of the main tools of policymakers to increase the welfare of residents and mitigate urban blight. The reconfiguration of urban geography through these projects also influences the labour market outcomes.

In developing countries, urban renewal usually takes form of slum redevelopments. The previous studies examined their impact on labour markets either solely during the constructions or after the transfer of the condominiums but not within a single economic model.

The first group of studies which examined the relationship during constructions reported employment expansion and increase in earnings. Briscoe and Wilson (1993) and Ball (1981) maintained that construction projects expanded employment opportunities in the economy. Wong et al. (2010) analysed the impact of a public housing project on labour markets in Hong Kong and found the impact on wages and employment in the local construction sector to be positive. This positive effect also trickled down to the other sectors of the economy. Similarly, Macdonald et al. (2007) found that public housing projects increased employment in the construction sector during the construction period and every two construction jobs created another job elsewhere in the state. Moreover, Keare and Parris (1982) showed that slum redevelopments increased the income of the affected families and contributed positively to job creation. Relevant to the project examined in this paper, World Bank (2009) released a report based on quantitative surveys conducted with construction firms during the Integrated Housing

Development Program (IHDP), a public housing project in Ethiopia. They observed increased labour demand in the construction sector and found that the firms participated in the IHDP grew more than non-participating firms. The participating firms paid higher wages to both skilled and unskilled workers.

The second group of studies focused on labour market outcomes after the transfer of residences. Some studies observed that slum redevelopments have a positive impact on earnings and labour supply. Collins and Shester (2013) used a state-wide legal reform as an instrumental variable to estimate the impact of a federally subsidized urban renewal programme on labour markets in the United States. They found that 100$ increase in grant funding, which was used in condominium constructions, increased the median income of the neighbourhoods by 2.6 percent. They demonstrated that the condominium constructions increased population growth and employment, decreased proportion of old residential units, poverty rate and residential units without full plumbing. Similarly, Currie and Yelowitz (2000) found that public housing projects helped the academic success of children by enhancing their study environment and improved their labour market prospects. Franklin (2015) found that public housing projects increased family income, female labour force participation, and the likelihood of wage employment. Dinkelman (2011) highlighted the importance of electrification and showed that electrification increased labour participation.

Some studies, however, suggested that the transfer of public housing units is associated with low incomes and schooling, especially in developed country context (Olsen and Zabel 2015). Shester (2013) examined a public housing project in the United States, which took place between the 1940s and 1970s. She found that areas with higher proportions of public housing had lower median family incomes and higher poverty rates. Closer examination revealed that this negative effect took place only after 1960s. This negative effect was due to the fact that highly educated people started to leave condominiums around this time.

To sum up, although a common ground on whether transfer of the condominiums to residents positively or negatively affect the labour market has yet to be achieved, the previous studies successfully established a link in between.

I contribute to the literature by implementing two new approaches. First, previous studies evaluated only a certain stage of an urban renewal programme and presented it as an overall impact of the programme on labour market outcomes. I argue that different stages of an urban renewal programme have distinct characteristics as they influence the labour markets through separate channels and groups. The overall impact of a programme should be viewed as the combination of treatments. I suggest that separate evaluation of the distinct stages of an urban renewal programme in a single economic framework provides a more accurate representation of the programme. This disaggregation of the programme allowed me to observe how the benefits changed over the different stages. As a novel approach, I divided the project into two treatments: C*onstruction* and *Completion*.

The construction treatment starts with the site mobilization and completion treatment begins with the transfer of the condominiums to the residents. In other words, end of the construction treatment marks the beginning of the completion treatment. I found that during the IHDP, the construction and completion treatments increased hourly earnings by 17 and 31 percent, respectively.

Secondly, in the literature, the heterogeneous effect of public housing programmes on earnings is often overlooked. From the aforementioned studies, only Franklin (2015) and the World Bank (2009) examined the impact of the public housing projects across genders and income groups. In this paper, I investigated the impact across genders, educational attainments, business sectors, economic classes, age groups and marital groups separately. I found that the earnings of women and low-income groups did not increase as much as rest of the workforce. The construction treatment was beneficial mainly to the construction workers and workers from the other sectors did not reap the benefits of the construction treatment. I did not find differences in effects for different age groups or levels of education.

To implement these two approaches, I created a new dataset using 7 rounds of Urban Employment Unemployment Survey and a map of condominium constructions in Addis Ababa. This enabled me to study labour markets during the IHDP which is discussed in the next chapter.

This paper is structured as follows: Chapter 2 discusses the housing project. Chapter 3 describes the data and the main specification. Chapter 4 provides the results and Chapter 5 addresses the channels of influence. Chapter 6 provides robustness checks. Finally, Chapter 7 discusses the limitations and concludes.

2 Integrated Housing Development Program

Ethiopia has a relatively low level of urbanization which is 20 percent. The annual urbanization rate, however, is 5 percent which is one of the highest figures in the world (UNHABITAT 2011). The unprecedented urbanization rate indicates the excessive need for housing, which local authorities have failed to satisfy to this day. In addition to the inadequate supply, housing quality in the Ethiopian cities has been systematically low. In 1975, Derg regime nationalized all urban land and houses. From this existing housing stock, the regime created Kebele housing units and rented them to residents. Kebele housings constituted 95 percent of all rental residences and were constructed only with mud and straw (Balcha 2014; Mota 2015). Moreover, the residents were not able to make any changes in the units, as they did not enjoy any property rights. Since the government lacked incentives to upgrade the houses, the Kebele houses have started to be associated with overcrowding, squalor and poverty. As a consequence, slums constitute 80 percent of total housing in Addis Ababa. The sewerage system only covers around 3 percent of the city and single-story houses account for 98.3 percent of all housing (UNHABITAT 2011).

In 2005, the government launched the IHDP, one of the most ambitious public housing projects on the planet to combat the urban decay and poverty traps posed by the slums. The programme intends to provide affordable condominium housing. Also, with its massive job creation capacity, the programme is seen as a further stimulus to the economy by creating 200,000 jobs (Keffa 2014). In the long run, the programme aims to build 50,000 condominium units annually (Gardner 2017). To achieve that, in the inner city, the Kebele houses are being redeveloped through in-situ condominium constructions and in the outer circle new condominiums are being constructed on previously agricultural areas.

The condominiums are distributed with randomized lotteries and eligible households pay a front payment which is around 20 percent of the condominium unit's value. The entrants have

to be officially registered in Addis Ababa by withholding a Kebele ID and they must not have any property registered under their name. In 2005, 453,000 applicants registered to the lottery for a condominium unit and in 2013 the number increased to 900,000 (Goytom 2015). In a city of 3,384,569 people (2007 census), this colossal demand for condominiums reflects the desire for a better life and affordable housing.

For in-situ redevelopments, the government presents three options to the Kebele residents: They can either be asked to be resettled to a nearby Kebele housing, get compensated or purchase a condominium in the same redevelopment area if they can afford the down-payment. For the final group, the government also pledges to provide temporary shelter during the construction.

After making the down-payment, the beneficiaries are given access to subsidized credit without any income or collateral conditions. This is planned as a remedy for the poor, who could not utilize formal credit channels to upgrade their houses. The households that do not have the means to pay the mortgage are encouraged to rent their houses to finance the credit.

During the first five years, the administration prioritized constructions of the condominiums on the outskirts. Starting from 2010, the first period covered by this study, the government implements in-situ developments only (UNHABITAT 2011). Hence, after 2010, the constructions are not geographically concentrated in certain areas. This allowed me to create a new dataset to assess the impact of the condominiums, which is discussed in the next chapter.

3 Data and Methodology

3.1 Data

According to the Addis Ababa City Administration, the city is composed of 10 sub-cities (*Kifle-Ketemas*) and the sub-cities are again sub-divided into 99 neighbourhoods called Kebeles, which are the lowest levels of administration of the city.

To assess the impact of the project on local labour market outcomes within the city, I appended 7 different rounds of Urban Employment Unemployment Surveys (UEUS), conducted by the Central Statistical Agency of Ethiopia between 2010-18 (2013 and 2017 not included)[1]. I homogenized the variables of interest across survey rounds. For Addis Ababa, each UEUS round was conducted in 75 Enumerated Areas[2] (EA) with a total number of 2250 of households. The EAs were randomly selected and they covered 46 of the Kebeles. My appended dataset had 46,525 observations, recorded over 7 years.

To assess the treatment statuses of Kebeles, I used the plan of the project and matched it with Kebeles using official geolocations. To come up with the treatment years, I manually located the condominium locations[3] on Google Earth. I quantified the construction and transfer dates of the condominiums by using Google Earth's Historical Imagery tool. This allowed me to create variables indicating construction and post-construction periods at Kebele level.

I created a new dataset by merging locations of condominium constructions with previously appended UEUS rounds at Kebele level. For the Kebeles that had multiple condominium constructions, I used the dates of the condominium which had the greatest number of blocks for the whole Kebele. To test the validity of this aggregation, I later relaxed this rule and used the condominium with the earliest construction and latest completion date for the whole Kebele. I revisited this issue in the robustness checks in Chapter 6.

Table 1 provides the summary statistics for the dataset. Monthly earnings and work hours were available in the UEUS. My main variable of interest was hourly earnings because it enabled me to control changes in labour supply following earnings adjustments. I constructed hourly earnings by dividing the monthly earnings to monthly work hours[4]. Monthly and hourly earnings were right-skewed and had high positive kurtosis. In other words, there were significant outliers whose earnings were substantially different from the rest of the group. Since the presence of outliers can distort real results, I winsorized earnings at the 99th percentile. The

[1] I was not able to find the surveys for 2013 and 2017. Hence, I appended and harmonized the available 7 rounds between 2010 and 2018
[2] EAs are subgroups of Kebeles.
[3] I identified 119 separate condominium projects
[4] There were 422 observations who had 0 weekly work hours and non-zero earnings. I recoded the hourly wages of these individuals as missing.

cut-offs for monthly and hourly earnings were 10126 ETB[5] and 71.53 ETB, respectively. For the rest of the paper, I used the winsorized hourly and monthly earnings as dependent variables.

Table 1: Summary Statistics

	Observations	Mean	St.Dev	Min	Max	p25	p50	p75	p99	Skewness	Kurtosis
Monthly Earnings	16,577	1895.2	2388.1	80	63000	600	1200	2400	10126	6.57	99.3
Weekly Work Hours	24,298	48.57	19.89	0	99	39	48	60	97	-.04	3.38
Hourly Earnings	16,005	11.12	16.16	.24	410.88	3.12	6.56	13.2	71.53	7.73	121.83
Winsorized Hourly Earnings	16,005	10.67	12.32	.24	71.53	3.12	6.56	13.2	71.53	2.58	11.05
Household Size	17,173	4.85	2.44	1	17	3	5	6	11	.67	3.27
Age	46,525	30.63	13.44	0	97	21	28	38	65	.74	3.63
Years of Schooling	13,289	8.46	4.64	0	18	6	9	12	16	-.41	2.35
Female	46,525	.55	.5	0	1	0	1	1	1	-.2	1.04
College	45,583	.18	.38	0	1	0	0	0	1	1.7	3.88
Married	37,938	.37	.48	0	1	0	0	1	1	.53	1.28
Unemployed	37,948	.22	.41	0	1	0	0	0	1	1.36	2.84
Informal Employment[6]	8,530	.098	.088	0	1	0	0	0	1	2.71	8.35

Informal Employment variable takes value 1 for the informally employed and 0 for the formally employed. For the unemployed it was considered missing. Winsorized hourly earnings are winsorized at the 99th percentile. Information on years of schooling was only available for two years (2010 and 2011) and informality was available for three years (2012, 2014 and 2018)

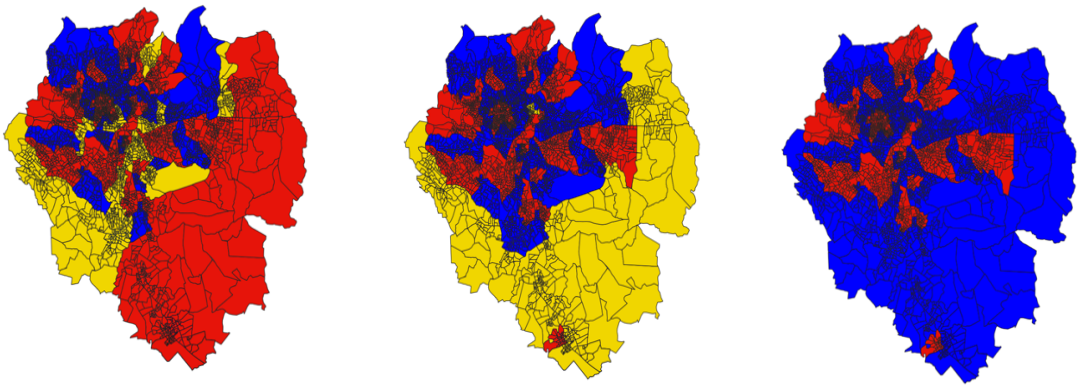

Figure 1: Comparison of treatment and control Kebeles in 2010 (Left), 2014 (Middle) and 2018 (Right). Red signifies the control Kebeles which did not have any project sites. Yellow and blue denote the construction and completion treatment stages, respectively.

[5] 1 USD ≈ 13 Ethiopian Birr in 2010

[6] 90 percent of the informal workers preferred not to disclose their income. As a result, I could not examine the heterogeneity of the treatment across formal and informal workers.

Table 2 reports the baseline comparison of the treatment and control Kebeles. The treatment Kebeles had significantly higher years of schooling, percentage of secondary school graduates, average age, and lower unemployment rate. Whereas in terms of labour market outcomes and gender compositions, the differences were not statistically significant. Figure 1 provides the location of the treatment and control groups.

Table 2: Baseline Tests for 2010 Survey

	(1) Control Mean	(2) Control Sd	(3) Treatment Mean	(4) Treatment Sd	(5) Difference	(6) t value
% of Females	54.39	49.81	53.28	49.90	1.11	0.90
% of Secondary School Graduates	13.87	34.57	16.07	36.74	-2.20*	-2.50
Monthly Earnings	930.46	1139.25	884.66	875.36	45.79	1.11
Weekly Work Hours	49.53	21.83	49.25	21.55	0.28	0.38
Hourly Earnings	5.25	7.02	5.27	7.11	-0.02	-0.05
Age	30.18	12.13	30.96	11.85	-0.78**	-2.65
% of Married or Living Together	34.34	47.49	35.09	47.73	-0.74	-0.63
% of Unemployed	29.67	45.69	25.38	43.53	4.29***	3.38
Years of Education	8.11	4.55	8.48	4.63	-0.37**	-3.25
Number of Observations	3462		3155			

*** *p<0.01*, ** *p<0.05*, * *p<0.1* 2010 UEUS results are provided for treatment and control Kebeles. The null hypothesis of the t-test is the equality of means for two groups.

3.2 Two-way Fixed Effects Model

In this paper, I investigated the impact of the project on labour markets during and after the constructions separately because the channels of influence are not the same in these stages. The construction treatment starts with site mobilization and ends with the transfer of the units to the residents. The completion treatment begins with the transfer of condominiums to the residents.

The basic model is specified as the following:

$$Y_{ikt} = \beta_0 + \beta_1 Construction_{kt} + \beta_2 Complete_{kt} + KB_k + \theta_t + \varepsilon_{ikt}$$

for k = 1, 2,..., 46 and t = 2010, 2011, 2012, 2014, 2015, 2016, 2018

The subscripts *i, k,* and *t* denote individual, Kebele, and time, respectively. Y_{ikt} corresponds to the labour market outcomes. $Construction_{kt}$ stands for the construction treatment and $Complete_{kt}$ denotes the completion treatment at Kebele level. KB_k corresponds to Kebele fixed effects and θ_t symbolizes year fixed effects. Lastly, ε_{ikt} stands for the error term.

Addis Ababa is a city where people from different socio-economic backgrounds coexist. Since these groups are geographically distributed heterogeneously, the labourers within the same Kebele have akin demographic characteristics and labour market outcomes (Desta 2018). The intra-neighbourhood correlation can decrease the true standard errors and p-values. So, with intra-neighbourhood correlation, researchers can falsely reject null hypotheses and estimate fictitious impacts. To tackle this problem, I clustered my standard errors at Kebele level[7]. It is advised to bootstrap clusters if the number of clusters are less than 42 (Angrist and Pischke 2009). Since my dataset had 46 Kebeles that were used as clusters, and observations were homogeneously distributed among them, I did not apply bootstrap or wild bootstrap procedures described in Cameron et al. (2008) (Mackinnon 2019). For the first model, I refrained from using control variables because all demographic and labour market characteristics are endogenous to the treatments. In other words, I assumed that treatments might directly influence age, gender, marital status, job characteristics, and labour market outcomes of neighbourhoods. For example, the constructions are likely to attract male young construction workers, which can alter the demographic composition of a Kebele. Adding these time-varying control variables to the regression can cause *bad control* bias[8] (Angrist and Pischke 2009). In the next chapter, I discuss the validity of the assumptions necessary to make valid estimations.

3.3 Assumptions

The parallel trends assumption is sine qua non for making valid comparisons. According to the assumption, in the absence of a treatment, the difference between treated and non-treated groups must be constant over time (Field and Kremer 2006). Generally, researchers graph the pre-treatment trends to test the validity of this assumption but with multiple groups and

[7] I did not have distance measures, which prevented me from accounting for inter-Kebele correlation. Naturally standard errors become less correlated as the spatial distance between observations grows. With distance measures, the spatial autocorrelation of standard errors in different kebeles can be solved using Conley standard errors (Conley 1999).

[8] Bad controls themselves are outcome variables of the treatment. Including them as controls creates a selection bias in estimate, which reflects the impact of treatment on composition of the control variable (Angrist and Pischke 2009).

treatments, the visual comparisons are not practical (Pischke 2005). Still, the following regression can be utilized to test if the construction treatment was independent of the outcomes of the previous years, considering only the observations before 2012. The regression allowed me to compare the pre-treatment trends of the control group and the observations that received the construction treatment in 2012:

$$Y_{ikt} = \beta_0 + \beta_1 Year_{2011} + \beta_2\, Construction_{2012} * Year_{2011} + \beta_3\, Construction_{2012} + KB_k + \varepsilon_{ikt} \qquad for\ k = 1, 2, \ldots, 46$$

Y_{ikt} stands for the hourly earnings. $Year_{2011}$ denotes year dummy, which takes value 1 for the observation from 2011 and 0 for the rest. $Construction_{2012}$ is a dummy variable taking value 1 for the observations that received the treatment in 2012. Lastly, KB_k corresponds to Kebele fixed effects and ε_{ikt} stands for the error term.

Table 3 provides the results of the parallel trends test. Since the interaction term is not statistically significant, the pre-treatment trends of this treatment group and pure control groups were not different. This finding supports the validity of the parallel trends assumption.

Table 3: Test for Parallel Trends Assumption

	(1) Earnings	(2) Earnings per Hour
Year Dummy (2011)	201.91***	0.97**
	(68.87)	(0.48)
Construction Treatment (2012)	-104.54	0.31
	(113.09)	(0.80)
Construction Treatment (2012) X Year Dummy (2011)	-20.77	-0.31
	(40.96)	(0.33)
Obs.	4778	4626
R-squared	0.06	0.05
Kebele Dummy	YES	YES

*** *p<0.01,* ** *p<0.05,* * *p<0.1*. Standard errors are in parenthesis and are clustered at Kebele level. X denotes the interaction term.

Stable Unit Treatment Value Assumption (SUTVA) is necessary for unbiased treatment effect. According to this, the potential outcome of one unit cannot be affected by the assignment of treatment to the other units. Since this study is focused on the condominiums in a single city, the spill-overs between groups are likely. For example, construction workers living in untreated areas but working in the project sites may create bias. To account for that, I used an aggregated unit of analysis. The surveys were at EA level which are subgroups of Kebeles. Aggregating

the treatment at EA level would increase my precision but using smaller areas would exacerbate the spill-over problem. Thus, I aggregated treatment at Kebele level and accounted for the intra-neighbourhood commuting, which mitigated concerns about a violation of SUTVA.

4 Results

4.1 Core Results

Table 4: Regression Results for the Main Specification

	(1) Monthly Earnings	(2) Earnings per Hour	(3) Unemployment Rate	(4) Work Hours
Construction Treatment	72.86	0.96*	-0.023	-1.69
	(73.14)	(0.50)	(0.020)	(1.067)
Completion Treatment	152.67	1.74**	-0.017	-0.87
	(108.02)	(0.78)	(0.021)	(1.80)
Obs.	16577	16005	46525	24298
R-squared	0.18	0.16	0.41	0.20
Kebele Dummy	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES

Standard errors are in parenthesis *** p<0.01, ** p<0.05, * p<0.1. Earnings and Earnings per Hour are winsorized at the 99th percentile. Standard errors are clustered at Kebele Level.

Core results are provided in Table 4. The impact of the project on work hours, monthly earnings and Kebele-wide unemployment rate was not statistically significant. The only statistically significant effect was in earnings per hour. Compared to the pre-treatment level of 5.54 ETB, the constructions increased the hourly earnings by 0.96 ETB while the transfer of the condominiums increased the hourly earnings by 1.74 ETB. This is equivalent to an increase of 17 percent and 31 percent, respectively.

4.2 Heterogeneous Treatment Effects

To find the impact of the programme for different groups, I re-used the two-way fixed effects model and constrained regressions to the subgroups. For intersectoral distributions, in Table 5, I examined the average treatment effect for construction workers (Column 1) and the rest of the workforce (Column 2) separately. Then, I ran seemingly unrelated regressions (SUR) and tested the null hypothesis that the treatment effects were not significantly different for two groups using Wald Tests. For construction treatment, the test rejected the null hypothesis. Therefore, the condominium constructions increased the earnings of the construction workers more than the other workers. The constructions increased the hourly earnings of the

construction workers by 3.36 ETB or 39.2 percent which was statistically significant at 10 percent level. The impact of the constructions on the rest of the workforce, however, was not statistically significant. The transfer of the condominiums increased the hourly earnings of all workforce net construction workers by 1.23 ETB. This was equivalent to a 12 percent increase and it was statistically significant at 10 percent level. For the completion treatment, I failed to reject the null hypothesis that the transfer of the condominiums affected two groups differently. While the impact of the completion treatment was not significant for the construction workers, the size of the point estimate was substantial. Hence, it could well be that the completion treatment had a large treatment effect on the construction workers as well. To sum up, constructions alone failed to generate earnings increases for workers outside the construction sector and the construction workers profited extensively from the project.

As for the gender subpopulations, both of the treatments only increased the hourly earnings of the male workforce (Table 5 Column 3-4). The construction and completion treatments increased the hourly earnings of men by 26 and 40 percent, respectively. Neither of the treatments was significant for women. SUR and Wald tests for two gender subpopulations revealed that the impact of the construction and completion treatments was statistically different for two genders with p values of 0.0009 and 0.027 respectively. This showed that the benefits of the programme were limited for the female workforce. Given the already existing gender pay gap, the programme exacerbated the gender inequality problem.

Table 5: Regression Results for Different Groups

	(1) Earnings per Hour for Construction Workers	(2) Earnings per Hour for Workforce net Construction Workers	(3) Earnings per Hour for Females	(4) Earnings per Hour for Males	(5) Earnings per Hour for Married	(6) Earnings per Hour for Single	(7) Earnings per Hour for 25 - 34-Year-Olds	(8) Earnings per Hour for Other Age Groups
Construction T	3.36*	0.44	-0.36	1.71**	1.99**	-0.70	0.79	1.12
	(1.81)	(0.60)	(0.73)	(0.82)	(0.94)	(0.61)	(0.79)	(0.83)
Completion T	3.56	1.28*	0.36	2.57**	1.66	0.39	1.81*	1.69*
	(2.296)	(0.73)	(0.86)	(1.02)	(1.49)	(0.84)	(0.95)	(1.01)
Obs.	1393	14595	7636	8369	5053	8597	7671	8334
R-squared	0.24	0.15	0.14	0.20	0.14	0.11	0.19	0.13
Kebele Dummy	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES	YES	YES	YES	YES

*** *p<0.01*, ** *p<0.05*, * *p<0.1* T stands for treatment dummies. The earnings per hour are winsorized at the 99th percentile. Standard errors are in parenthesis and clustered at Kebele level.

The exclusion of the female workforce from the benefits of the programme contradicted main objectives of the IHDP. During the project, the administration placed positive female quotas for construction jobs and condominium allocations (UNHABITAT 2011). Moreover, several

NGOs such as NEWA[9] provided monetary aid to the female-led households to ease their integration to condominiums. Yet, the affirmative action measures alone failed to equalize the benefits between women and men. The lifestyle imposed by the condominiums can be one of the possible explanations. Preparing beverages and cooking *injera*[10] are important income sources for women in Kebele housing, but the rigid site management and lack of personal open spaces hinder these economic activities in condominiums (Mota 2015).

The condominiums were branded as the ideal residences for families, and married couples were encouraged to participate in the condominium lotteries (UNHABITAT 2011). Since the condominiums were designed for couples, the programme was expected to benefit the married households more than single individuals. I tested the validity of this expectation in Table 5 Columns 5-6. The SUR and Wald test revealed that compared to their single counterparts, the construction treatment was more beneficial to the married workers and the difference was statistically significant at 5 percent level. For the completion treatment, however, there was no significant difference between the two groups. Since the difference was expected to take place during the completion treatment, I found no evidence supporting the claim.

The World Bank (2009) reported that the main beneficiaries of the IHDP were expected to be the 25-34-year-olds. In Table 5 Columns 7-8, I ran SUR to see if the expectations were valid. The Wald test indicated that the impact of the treatments was not different for 25-34-year-olds and the rest of the workforce, thus I failed to validate the expectation. I also examined the impact of the programme for different ages by adding interaction terms with age variable to the main model. Table A2 Column 3 in Appendix reports the results. The insignificance of the interaction terms shows that the programme did not benefit the young workers more than the older workers.

Moreover, I inspected the heterogeneity of treatment across groups with different educational attainments. The regression in Table A2 Column 2 in Appendix includes the interaction terms, capturing the interaction between educational characteristics and the treatments. Compared to the observations that received no education, the impact of the treatments on the hourly earnings was not significantly different across educational subpopulations.

[9] Network of Ethiopian Women's Associations
[10] Ethiopian sour fermented flatbread.

To examine the treatment effects across different income groups, I ran simultaneous quantile regressions of the hourly earnings on treatment effects. Out of three groups (25th, 50th and 75th percentile), the programme only increased the earnings of the 75th percentile and the change was statistically significant at 1 percent level (Table 6). For this group, the construction and completion treatments increased the hourly earnings by 22.5 and 44.6 percent, respectively. Consequent F test rejected the null hypothesis that the impact of the treatments was constant across the three income groups. Therefore, both of the treatments mainly benefitted the upper-class workers. This conclusion contradicts the firm surveys conducted by the World Bank (2009) during the IHDP, which claimed that the wage increase was only significant for the lower 25 percent of the workers in earnings distribution.

Table 6: Quantile Regression Results

	(1) Earnings per Hour for Q(0.25)	(2) Earnings per Hour for Q(0.50)	(3) Earnings per Hour for Q(0.75)
Construction Treatment	0.05	0.45	1.46***
	(0.24)	(0.36)	(0.35)
Completion Treatment	-0.12	0.79	2.89***
	(0.37)	(0.62)	(0.74)
Obs.	16005	16005	16005
R-squared	0.13	0.15	0.15
Kebele Dummy	YES	YES	YES
Year Dummy	YES	YES	YES

Standard errors are in parenthesis. *** p<0.01, ** p<0.05, * p<0.1 Standard errors are clustered at Kebele level. Earnings per hour winsorized at 99 percent.

Compared to the total working population, the construction workers had significantly higher average earnings even in pre-treatment period (5.27 vs 8.39 ETB). Therefore, the construction workers were upper-class and they might have accounted for the increase in the upper-class earnings. To test the validity of this explanation, I ran a quantile regression for workforce net construction workers, which can be found in Appendix Table A1. The following F test reported that the impact of the completion treatment for workforce net construction workers was different for the three income groups. The impact of the construction treatment, however, was not different among the income groups. Hence, the construction workers were the main drivers for the earnings increase of the upper-class workers during the construction treatment. As for the completion treatment, since purchasing a condominium required at least 20 percent down-payment, only upper-income workers were able to relocate to the condominiums (Yntiso 2008).

Therefore, it is expected to see that the impact of condominium transfers was different across the economic classes. As a result, the programme magnified income inequality.

In Ethiopian context, formality is an important determinant of the labour market outcome. In Addis Ababa, 30 percent of the total workforce is employed in the informal sector (Desta, 2018). In my sample, however, the informality rate was around 10 percent. It is often argued that the slum redevelopments destroy the informal jobs because these jobs are often network and location-specific (Shaikh, 2019). In the field studies conducted during the IHDP, informal workers reported decreases in their earnings and job prospects (Tiumelissan and Pankhurst 2013). Formalization was one of the goals of the IHDP and the government took deliberate steps to formalize the informal workers during the project (UNHABITAT 2011). To see if there was a substantial decrease in informality, I ran a logistic regression of formality rate in Table 8 Column 5. Given the employment, the odds of being formally employed decreased by 45.6 percent following the construction treatment, and the impact was statistically significant at 5 percent level. The impact of the completion treatment, however, was not statistically significant. These results contradict the past evidence, as the programme failed to increase the formality rate. On the contrary, the construction treatment decreased the likelihood of being formally employed. This can be explained by the employment routines in the construction sector. Constructions generally require large teams of workers for short terms and firms achieve this flexibility by creating informal jobs (Wells and Jason 2010). Complementary jobs to construction, such as food provision to workers and construction material production, are also informal (Wells, 2007). Therefore, an increase in construction plants can be accompanied by an expansion in the informal sector, and it is confirmed by the results.

4.3 Female Labour Supply

As mentioned in Chapter 2, the previous studies argued that by providing electricity, slum redevelopments increased female labour supply through decreasing the time spent on cooking and heating (Franklin 2015; Dinkelman 2011). According to Table 7 Column 2, however, women worked 3.31 hours or 6.7 percent less following the construction treatment. The completion treatment failed to increase female labour supply, and neither of the treatments significantly influenced the unemployment and labour participation rates of women. Thus, regarding female labour supply, the results countered the previous studies.

According to the previous studies, one of the possible impetuses for the significant decrease in work hours for women during the constructions was the increased labour demand in constructions (Macabodbod et al. 2017). In Ethiopian context, a significant portion of construction workers are women, and during the IHDP, the contractors were required to prioritize female employment in construction sites by law. In my sample, 25.2 percent of the construction workers were women. Similarly, according to the World Bank (2009), women constituted 50 percent of the construction workers during the IHDP. Since female construction workers are engaged in tiring physical work, they tend to work less compared to the rest of the female labour force. In my dataset, female construction workers on average worked for 44.38 hours weekly, as opposed to 48.95 hours of non-construction female employees. The difference between the two means was statistically significant at 1 percent level. Ergo, shift of the female labour force to the construction sector can be the underlying reason for the decrease in female work hours, as newer project sites were found to employ a higher percentage of women (Macabodbod et al. 2017). To test the validity of this explanation I ran a logistic regression of construction worker dummy on treatment dummies and constrained the sample to the female observations in Table 7 Column 3. The treatment dummies were not statistically significant; therefore, I found no evidence proving that women shifted to the construction sector. A more plausible explanation for the decrease in women's work hours can be the relocation to the temporary shelters during constructions. The quality of these shelters was even lower than the Kebele housing, which might have increased the time spent on chores for women (Ongel 2019).

Table 7: Regression Results of the Labour Market Outcomes for Females

	(1) Unemployment Rate for Females	(2) Work Hours for Females	(3) Being Construction Worker for Females	(4) Labour Participation Rate for Females
Construction Treatment	-0.0422	-3.3130**	0.2013	0.0057
	(0.0287)	(1.3658)	(0.4497)	(0.0143)
Completion Treatment	-0.0294	-1.4093	0.2102	0.0189
	(0.0293)	(2.3262)	(0.7731)	(0.0181)
Obs.	25524	10756	11207	0.4029***
R-squared	0.4408	0.0280	0.0422	(0.0171)
Kebele Dummy	YES	YES	YES	25095
Year Dummy	YES	YES	YES	0.0165

*** *p<0.01,* ** *p<0.05,* * *p<0.1* Standard errors are in parenthesis. Standard errors are clustered at Kebele level. Column 3 reports a logistic regression of construction worker dummy for the female subpopulation.

4.4 Demographic Changes

The regressions of demographic variables, given in Table 8, reveal that pre and post-treatment groups did not have significantly different odds of being married or female. Qualitative studies indicated that compared to the Kebele housing, condominiums placed significant maintenance costs on the residents, which encouraged multiple families to live in a single unit (Yntiso 2008). Yet, I found no evidence supporting this claim, as the change in the household size was not statistically significant (Column 4).

Table 8: Regression Results on Demographic Variables

	(1) Married	(2) Female	(3) Age	(4) Household Size	(5) Formality Rate
Construction Treatment	-0.031	0.023	-0.81**	-0.10	-0.61**
	(0.11)	(0.040)	(0.34)	(0.20)	(0.25)
Completion Treatment	-0.16	0.084	-1.22**	0.18	0.030
	(0.12)	(0.054)	(0.59)	(0.23)	(0.33)
Obs.	37938	46525	46525	17173	8530
R-squared	.z	.z	0.015	0.12	0.11
Kebele Dummy	YES	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES	YES

Columns 1 and 2 depict the logistic regression results for binary variables of being married and being female, respectively. Standard errors are clustered at Kebele level.

The only statistically significant impact was on age (Column 3). Compared to the pre-treatment average of 30.5, the constructions decreased average age by 0.81 years. It was a plausible result, as the constructions attracted younger workers due to the compulsive nature of the physical work. Also, the completion treatment decreased the average age by 1.22 years and the impact was statistically significant at 5 percent level. This finding is parallel to Moos's youthification argument. Moos (2016) suggested that gentrification and higher population density attracted younger groups and displaced *empty nesters*. Qing (2018) found that the youthification effect was even stronger in public housing developments. In the next chapter, I address the underlying mechanisms for the treatments.

5 Decomposing Treatments: Possible Explanations

5.1 Construction Treatment

The underlying logic of the construction treatment is straightforward at theoretical level. Construction expenditures are associated with the expansion of employment opportunities in the overall economy (Ball 1981; Briscoe and Wilson 1993). The projects directly increase demand for construction workers and materials. Aforementioned studies suggested that the expansion in this sector spills over the rest of the economy. Yet, the SUR results in Table 5 show that the construction sector became the engine of growth for the economy and the rest of the workforce failed to benefit significantly from the increases in hourly earnings. Therefore, it can be suggested that the significant earnings increase for the workforce (Table 4 Column 2) was driven by the construction sector and construction workers were the sole benefiters.

5.2 Completion Treatment: Displacement or Virtuous Cycle Channel

To examine the impact of the completion treatment, borrowing from Collins and Shester (2013), I identified two channels of influence on earnings: 1) *virtuous cycle and growth channel* and 2) *displacement and replacement channel*.

The virtuous cycle and growth channel relies on the agglomeration effect and positive local amenities. Roback (1982) suggested that in general equilibrium, local amenities can influence the wages of the workers. Accompanied by business centres and commercial areas, the condominiums are intended to increase the desirability of the area for the firms. Consequently, according to the Rosen-Roback models, firms are willing to pay higher wages in the presence of local amenities that attract businesses (Saarimaa n.d.; Wrede 2015).

Furthermore, the vertical growth of the city and in-situ redevelopments decrease the commuting costs and increase the overall welfare (Bertaud and Brueckner 2005). This saved income can be used as working capital to generate supplementary income. Moreover, due to the agglomeration effect, increased population density is expected to enhance productivity and earnings around the project sites (Wheaton and Lewis 2002).

Additionally, demolition of slums alone can increase wages. By definition, slums lack adequate infrastructure, are densely populated and have insecure residential statuses (UNHABITAT 2003). In addition to their negative impact on city infrastructure, slums trap people in poverty (Marx et al. 2013). In other words, slums impede the upward mobility of the residents as the residents cannot ameliorate their living conditions by making marginal investments.

There are three traps that fix the households to a low-level equilibrium: human capital, investment, and policy traps (Marx et al. 2013). As for the human capital trap, poor sanitation facilities and small living spaces give birth to illnesses. Illnesses prevent people from fulfilling their business potentials (Duflo et al. 2012). For example, earthen floors are impossible to keep clean, which leads to worming. Also, the lack of windows paves the way for respiratory diseases. The improved sanitation via condominium constructions can increase productivity, work hours, and earnings.

Since slum dwellers lack political representation and formal documents, they are not eligible for some of the public services, which creates the policy trap. The condominium constructions grant official documentation and help mitigation of the policy trap. Proper documentation expands healthcare provision, formal employment opportunities and thus increases earnings.
Regarding the investment trap, De Soto (2001) claimed that lack of legal property rights prevented households from getting credit, insurance and utility services. In other words, many of the slum residents are ineligible for credit for education or entrepreneurial activity, since they do not have collaterals for mortgages (Woodruff 2001). The IHDP provides access to the credit channels and transfers the property rights to residents, which can ameliorate the investment trap. Through access to credit channels, programme participants can solve their capital problem and increase their earnings.

The second impact course is the displacement and replacement channel. According to this, after the constructions, the average earnings increase due to the decreased ratio of poor households in the neighbourhood. This can either occur through the displacement of the original Kebele residents or the inflow of highly educated households to the condominiums. The novel cohort of residents is likely to earn higher wages, but the main reason for this increase is neither agglomeration effect nor new job opportunities but the resident characteristics. Since they are more educated, their wages tend to be higher regardless of the condominiums. In other words,

the project solely creates pull and push factors that change resident characteristics which influence the earnings. Destruction of the left-hand tail of the housing quality distribution can be seen as a stick to push poor and uneducated from the areas (Shester and Collins 2013). The condominium housing with upmarket infrastructure is a pull factor for upper-middle classes and the unprecedented demand for the condominium lotteries underscore it. Regarding the IHDP, qualitative studies showed that the uneducated and informal workers lack the financial resources to make the front payment and they were forcefully relocated to other Kebele housing (Ongel 2019). Additionally, a significant portion of previously Kebele residents migrated back to the rural areas to engage in agricultural activities (Yntiso 2008). This is expected, as the informal jobs are location and network specific. Therefore, the concentration of the poorest of the poor, characterized by low levels of education, is likely to be lower in the new neighbourhoods. This can drive up the average earnings, and the higher human capital of the new residents is the underlying reason.

Since a sudden increase in the level of education is not possible for the former Kebele residents, if the increase in schooling explains the increase in hourly earnings, then the inflow of highly educated groups and decreased concentration of the poor are the main drivers of the earnings increase. In other words, if the virtuous cycle and growth channel is dominant, then the earnings increase should be independent of the improved educational attainment.

To decompose the completion treatment and assess the significance of increased human capital, I launched a mediation analysis. I used binary post-secondary education variable as the mediator, the completion treatment as treatment variable, and the hourly earnings as the outcome. The reimplementation of the procedures of mediation inference described by Imai, Keele, and Tingley (2010) illustrated that the mediation effect accounted for 28 percent of the total effect (Table 9). Given the total effect of 1.84 ETB, the average causal mediation effect was 0.52 and the direct impact found to be 1.32. In other words, 28 percent increase in the hourly earnings was a consequence of the increased concentration of secondary school graduates. The presence of the indirect effect shows that the displacement and replacement channel existed. Similarly, the strong direct effect proves the existence of the virtuous cycle and growth channel. Therefore, both of the channels were effective and coexisted together. In the next chapter, I address the robustness of these results.

Table 9: Results of the Mediation Analysis

	Mean	95% Confidence Intervals	
Average Causal Mediation Effect	0.52	0.080	0.97
Direct Effect	1.32	0.29	2.35
Total Effect	1.84	0.70	2.97
% of Total Effect that was Mediated[11]	28	18	74

6 Robustness Checks

6.1 Alternative Specification of Treatment Timing

Until this chapter, for the Kebeles that had more than one condominium construction, I used the dates of the condominium with the greatest number of blocks for the whole Kebele. In this chapter, I dropped this aggregation strategy to test the robustness of my results. Here, I used the condominium with the earliest site mobilization for date of the construction treatment and the condominium with the most recent transfer date for date of the completion treatment for the whole Kebele. This new specification provided the largest treatment window and it was more conservative. Consequently, the number of Kebeles that received the construction treatment within my time horizon (2010-18) decreased from 6 to 2. Similarly, the number of Kebeles that were treated by the completion treatment decreased from 15 to 6. As provided in Table 10, the completion treatment increased hourly earnings by 1.98 ETB or 35.4 percent, and it was significant at 1 percent level. Compared to the original results in Table 4, the alternative specification estimated a greater increase in earnings for the completion treatment. For the construction treatment, however, the impact was not statistically significant. Compared to the core results in Table 4, the hourly earnings increase reported for the construction treatment decreased from 17 to 12 percent. It is expected, as by definition the timing of the construction treatment is crucial. The mobilization of the construction site is a sudden transformation, all of the labour demanded flows into the construction sites on a specific date. The transfer of the condominiums, however, is a gradual transformation, the newcomers relocate piecemeal. Hence, dates of the construction treatment were rigid, while the completion treatment was more flexible in terms of date assignment. Additionally, the condominium with the earliest site mobilization is not necessarily the greatest in terms of blocks. Therefore, the construction treatment dummy in the alternative specification might be capturing the impact of a smaller

[11] The confidence intervals for percentage of total effect that was mediated is large. Yet, both the direct and mediation effects are positive for given confidence intervals, which supports the coexistence of channels.

project, which might not be significant. Since the completion treatment materializes gradually, selecting a more recent date is likely to increase the positive impact. In sum, the alternative specification supports the robustness of the completion treatment and highlights the importance of the treatment timing for the construction treatment.

Table 10: Regression Results for Alternative Specification

	(1) Monthly Earnings	(2) Earnings per Hour	(3) Unemployment Rate	(4) Work Hours
Construction Treatment	51.14	0.68	-0.02	-1.18
	(80.17)	(0.56)	(0.02)	(0.70)
Completion Treatment	187.75*	1.98***	0.00	-0.70
	(102.46)	(0.70)	(0.02)	(1.54)
Obs.	16577	16005	46525	24298
R-squared	0.18	0.15	0.41	0.02
Kebele Dummy	YES	YES	YES	YES
Year Dummy	YES	YES	YES	YES

*** *p<0.01*, ** *p<0.05*, * *p<0.1*. Standard errors are clustered at Kebele level.

6.2 Bias of the Two-Way Fixed Effects Estimate

The two-way fixed effect models have been widely used in estimating average treatment on the treated, including the cases with variation in treatment timing and multiple treatments. In 2015, 49 percent of the difference in differences (DiD) papers in top tier economics journals[12] used variation in treatment timing (Goodman-Bacon et al. 2019a). My specification relied on a similar model. Recent studies, however, showed that when two-way fixed effect model is used to estimate the average treatment effect with variation in treatment timing, the results can be biased if the treatment effect is heterogeneous across time (Abraham and Sun 2018; Baker 2019; Cengiz et al. 2019; Imai and Kim 2019). Goodman-Bacon (2018) found that if already treated units are used as control groups, the individual 2x2[13] DiD estimator can contain the treatment effect from earlier periods as well. It is because, when used as controls, already treated groups introduce an additional treatment effect from earlier years to the 2x2 DiD estimator. If the treatment effect varies over time, then the treatment effect calculated now will not be equal to the treatment effect from the past, and the estimator will not be able to account for it. In other words, if treatment effects change over time, then the treatment effect on the control and treatment groups will be different. To see if my estimator suffered from this problem, I aggregated my variables of interest at Kebele level and created balanced panels.

[12] AER/QJE/JPE/ReStud/JHE/JD

[13] 2x2 estimators can be summarized as: $(\bar{Y}^{POST}_{TREAT} - \bar{Y}^{PRE}_{TREAT}) - (\bar{Y}^{POST}_{CONTROL} - \bar{Y}^{PRE}_{CONTROL})$

Using hourly wages as the dependent variable, I applied Bacon Decomposition to categorize 2x2 DiD estimators under four categories (Goodman-Bacon et al. 2019b).

Table 11: Bacon Decomposition of the Construction Treatment:

DiD Comparison	Weight Assigned	Average DiD Estimate:
Earlier T vs Later C[14]	0.0080	0.026
Later T vs Earlier C[15]	0.011	-0.62
T vs Never Treated[16]	0.84	-0.098
T vs Already Treated[17]	0.14	0.71

T = Treatment; C = Control. For the *Construction* treatment, weighted DiD estimate is **0.014**[18]

Table 12: Bacon Decomposition of the Completion Treatment:

DiD Comparison	Weight Assigned	Average DiD Estimate:
Earlier T vs Later C	0.071	-1.17
Later T vs Earlier C	0.054	-1.08
T vs Never Treated	0.48	1.70
T vs Already Treated	0.40	0.48

T = Treatment; C = Control. For the *Completion* treatment, weighted DiD estimate is **0.85**

Table 11 and Table 12 provide the results of Bacon Decomposition for the construction and completion treatments, respectively. As explained previously, using already treated groups as the control groups can create bias. Therefore, "Treatment vs Already Treated" (Row 4) and "Later Treatment vs Earlier Control" (Row 2) 2x2 DiD estimators can be biased in the case of heterogeneous treatment effects over time. "Earlier Treatment vs Later Control" (Row 1) estimators are considered unbiased and safe to use even in heterogeneous treatment effects

[14] This row reports the estimators which use the observations from treatment groups that are not yet treated, as control group. Therefore, the control group is not treated, and the estimator is unbiased.
[15] This row reports the estimators which use already treated observations as control group. It can be biased in the case of heterogeneous treatment effects.
[16] This row reports the estimators which use the never treated pure control groups. It is unbiased.
[17] This row reports the estimators which use the observations treated prior to the study as control groups. It can be biased in the case of heterogeneous treatment effects
[18] Since I aggregated the average hourly earnings on Kebele level to create balanced panels, these estimates are different than the ones reported in Table 4. In other words, in Table 11-12 I assumed all Kebeles to have same number of observations and observation group size did not influence the weight of the estimator. The estimators reported here should not be regarded as main results, but as robustness checks.

since the control group is formed from the treatment group observations that are not treated yet. But in my study, this group of estimators can be biased as well, due to two main reasons. First, since I have two separate treatments in a single model, even the untreated observations from the treatment groups can be treated with the other treatment. Secondly, 18 of the Kebeles had multiple project sites. As the aggregation strategy, I used the treatment dates of the condominium with the greatest number of blocks for the whole Kebele. This means that smaller projects can be omitted, and they might be already treated by smaller treatments even if they are in control group. Therefore, I argue that "Earlier Treatment vs. Later Control" estimators should not be utilized in a model with multiple treatments. Thus, for the robustness check in rest of this chapter, I focus on the estimators with the pure control group (Row 3).

The average of the estimators with pure control groups for the construction and completion treatment were -0.098 and 1.70, respectively. This strengthens the robustness of the core results for the completion treatment, as the new estimators were quite similar to the main treatment effect of 1.74, reported in Table 4. For the construction treatment, however, the impact changed sign. This is not a problem if there are homogeneous treatment effects over time. I argue that this assumption is plausible for the construction treatment, but it might be violated for the completion treatment. The impact of the construction treatment is likely to be constant over time as the labour demand is mostly uniform throughout the construction projects. Compared to the global average, Ethiopian construction workers have a higher percentage of fixed contracts and 260 percent longer job tenures (Oya and Schaefer 2019). This highlights the ability of the construction workers to stabilize their earnings and retain their earnings increase even after the project. Therefore, the treatment effect for the construction treatment is not likely to suffer from the bias I describe in this chapter, due to the likelihood of homogenous treatment effects over time. The impact of the completion treatment, however, is less likely to be constant over time. As I underscored in Chapter 6.1, residents relocate to the condominiums gradually, therefore the treatment effects tend to increase over time. Additionally, the local businesses around the condominiums might not flourish immediately after the transfer of condominiums as they gradually adapt to their new locations and consumer demand. Still, the removal of this potential bias from the treatment effect of the completion treatment did not substantially change the core estimator, reported in Table 4 Column 2. Consequently, even though the estimator for the completion treatment can be biased when treatment effects vary over time, the unbiased

estimator I found in this chapter is almost identical to the original estimation. This finding underscores the robustness of the treatment effects.

7 Discussions

7.1 Limitations

This study has several limitations. Firstly, due to the unavailability of a genuine panel data, I used repeated cross-sectional data to estimate the treatment effect. This prevented me from tracking individuals and mapping the migration between Kebeles. Without a genuine panel data, the effectiveness of the displacement channel for the completion treatment cannot be completely assessed. Secondly, data on earnings of self-employed individuals was not available in the surveys, which restricted my analyses to the wage workers. In Addis Ababa, the ratio of self-employed over total employment exceeds 30 percent (Poschke 2019). The omission of self-employed prevented me from commenting on the actual workforce.

7.2 Conclusion

This paper examined the impact of an urban renewal project on labour market outcomes and demographic composition. As a novel approach, I evaluated the condominium constructions and transfer of the condominiums as two separate treatments. I found that both treatments significantly increased the hourly earnings of the workforce in Addis Ababa. Despite this initial optimism, I observed that the benefits were not distributed equally among different subgroups. The construction treatment benefitted mainly the construction workers. The rest of the workforce, however, could not reap the benefits of the construction treatment. Thus, the condominium constructions alone failed to generate an inclusive earnings increase, as the construction boom only served to a certain segment of the society. The hourly earnings of women and lower-income groups did not significantly increase in both treatments. The exclusion of the vulnerable groups from the benefits of the programme can intensify the already existing gender pay gap and income inequality. Therefore, the urban renewal programs should be accompanied by social programs that support lower-income groups and women. The female quotas in condominium allocation and positive action measures in the construction firms failed

to equalize the impact across men and women. Moreover, contrary to previous studies, I reported a significant decrease in women's work hours in the construction period.

Additionally, I observed that the programme increased informality rate during constructions, meaning the programme failed to fulfil its promise of rapid formalization. This result showed that in developing country context, rapid employment expansion in the construction sector can be accompanied by informalization. Hence, the programme director who aims to increase the formalization rate should closely monitor the contractors during constructions. As a demographic change, I found that the project decreased the average age, as the condominiums attracted younger cohorts. Finally, I discussed the underlying mechanisms that increase the wages after the transfer of the condominiums. Two channels I investigated were the virtuous cycle and growth channel and displacement and replacement channel. The virtuous cycle and growth relied on the agglomeration effect, while the displacement and replacement channel relied on the inflow of highly educated workforce and decreased concentration of the households with poor education. My analysis illustrated that the channels co-existed. The presence of the agglomeration effect can pave the way for a long-term earnings increase. But the uneven distribution of the programme's benefits endangers the sustainability of the programme. As Plutarch (2013) observed, the imbalances in wealth and poverty are the greatest enemies of the political institutions and they endanger the sustainability of the policy initiatives. Therefore, slum redevelopment projects should be supported by supplementary social policies.

This conclusion leaves a scope for future research. It is crucial to examine the persistence of the heterogeneous treatment effects, as the unevenness I observed can be temporary or frictional.

Appendix

Table A1: Quantile Regression Results for Workforce net Construction Workers

	(1) Earnings per Hour for Q(0.25)	(2) Earnings per Hour for Q(0.50)	(3) Earnings per Hour for Q(0.75)
Construction Treatment	0.04	0.40	1.02***
	(0.21)	(0.35)	(0.32)
Completion Treatment	-0.15	0.51	2.48***
	(0.35)	(0.60)	(0.83)
Obs.	14595	14595	14595
R-squared	0.13	0.15	0.15
Kebele Dummy	YES	YES	YES
Year Dummy	YES	YES	YES

Standard errors are clustered at Kebele level. Earnings per hour winsorized at 99 percent.

Table A2: Regressions with Educational Characteristics

	(1) Earnings per Hour	(2) Earnings per Hour	(3) Earnings per Hour
Construction Treatment	0.73	0.17	-0.91
	(0.54)	(1.07)	(2.75)
Completion Treatment	1.03	1.02	2.05
	(0.80)	(1.02)	(1.43)
Age			0.24***
			(0.04)
Construction Treatment X Age			0.06
			(0.09)
Completion Treatment X Age			-0.01
			(0.04)
Incompleted Primary	1.05***	1.30***	
	(0.28)	(0.33)	
Completed Primary	2.81***	2.85***	
	(0.30)	(0.36)	
Completed Secondary and Above	10.81***	10.50***	
	(0.46)	(0.85)	
Adult Education	7.64***	7.13***	
	(0.86)	(1.31)	
Construction Treatment X Incompleted Primary		0.19	
		(0.63)	
Construction Treatment X Completed Primary		0.62	
		(0.84)	
Construction Treatment X Completed Secondary		0.91	
		(2.04)	
Construction Treatment X Adult Education		-2.64	
		(2.06)	
Completion Treatment X Incompleted Primary		-0.61	
		(0.67)	
Completion Treatment X Completed Primary		-0.27	
		(0.62)	
Completion Treatment X Completed Secondary		0.38	
		(1.09)	
Completion Treatment X Adult Education		0.88	
		(1.86)	
Obs.	15981	15981	
R-squared	0.33	0.33	
Kebele Dummy	YES	YES	
Year Dummy	YES	YES	

Standard errors are clustered at Kebele level. The base of the level of education variable is no education. The X denotes the interaction terms.

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