War Reparations, Structural Change, and Intergenerational Mobility

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Abstract

This paper presents evidence that government industrial policy can promote new industries, move labor out of agriculture into manufacturing, and have long-term effects via increased human capital accumulation and upward mobility. I use plausibly exogenous variation generated by the Finnish war reparations (1944-1952) that forced the largely agrarian Finland to give 5% of its yearly GDP to the Soviet Union in the form of industrial products. To meet these terms, the Finnish government provided short-term industrial support that persistently raised the employment and production of treated, skill-intensive industries. I trace the impact of the policy using individual-level registry data and show that the likelihood of leaving agriculture for manufacturing and services increased substantially in municipalities more strongly affected by the war reparations shock. These effects were persistent: 20 years after the intervention, the reallocated workers remained in their new sectors and had higher wages. Younger cohorts affected by the new skill-intensive opportunities obtained higher education and were more likely to work in white-collar occupations by 1970. This result is consistent with higher returns to education. Finally, I link parents to children to study how the policy affected upward mobility. I show that mobility in both income and education increased in the exposed locations, as people in lower socioeconomic groups benefited from the structural change.

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1 Introduction

Structural transformation is a crucial element of economic development. Historically, countries have become rich as labor has moved from agriculture to more modern activities, where productivity and productivity growth are higher (Clark, 1940; Gollin et al., 2013; Rodrik, 2012). Many countries, motivated by influential early work in development economics (Rosenstein-Rodan, 1943; Hirschman, 1958), have tried to expedite this structural transformation through active industrial policy. But despite the success stories in East Asia, there is still a considerable debate and limited causal evidence on the effectiveness of such policies.[1] This is partly a result of the endogeneity of policy assignment, as the policy-maker chooses certain sectors or places to promote, the evaluation of these interventions becomes difficult.[2]

We also do not understand well the mechanisms by which promoting specific industries can lead to lasting economy-wide growth. One plausible mechanism is through increased human capital accumulation. Successful industrial policy should then, in addition to reallocating labor from agriculture into low-skill manufacturing, create new opportunities that facilitate upward mobility and promote human capital accumulation. If the newly-formed industrial sectors instead lock workers in low-skill occupations that do not motivate future educational attainment (Atkin, 2016; Franck and Galor, 2018), the lasting effects of industrial promotion are more unclear. In order to assess the long-term development impacts of industrial promotion over time and generations, we need a plausibly exogenous policy shift and detailed individual-level data.

In this paper, I address both of these issues by exploiting a natural experiment induced by the Finnish war reparations to the Soviet Union following World War II, combined with rich intergenerational registry data.From 1944 to 1952, Finland, a country with 60% of its labor force still working in agriculture, had to export 5% of its yearly GDP in industrial products as a reparation for losses caused during the war. This episode introduces a plausibly exogenous variation in temporary government policy, as the Soviet Union dictated the structure of the indemnities.

The Soviet Union placed most of the reparations burden on relatively complex metal products such as ships, locomotives, cables, and engines – sectors in which Finland had

[1] See, for example, Krueger (1990); Wade (1990); Pack and Saggi (2006); Rodrik (2007, 2008); Harrison and Rodríguez-Clare (2009) for discussion, and Lane (2017) and Dell and Olken (2017) for recent empirical work.

[2] For example, (Rodrik, 2008) argues that due to these endogeneity issues in industrial policy: "the empirical analysis leaves us no better informed than when we started."

little previous experience. Figure 1 illustrates the stark difference between the reparations demanded and the structure of the Finnish economy before the war. While metal industry products were responsible for over 60% of the war reparations, they covered only 14% of manufacturing output in 1943 and 2.3% of the value of pre-war exports. Despite the Finnish inexperience of this type of manufacturing, the Soviet Union demanded complex metal products, as the Soviet production in these sectors was severely influenced by the ongoing war (Harrison, 2002; Rautakallio, 2014). The Soviet Union needed machinery to rebuild its economy but had trouble acquiring it from the world market (Rautakallio, 2014).

I proceed to show that this large policy experiment had a persistent impact on both the directly exposed workers and later generations, who experienced more upward mobility. First, I employ newly-collected data and a difference-in-differences strategy to establish that the temporary government support permanently increased production and labor in the treated industries relative to other Finnish manufacturing sectors. The temporary reparations shock led Finland to diversify from historically strong but relatively low-skill paper and woodworking industries into more skill-intensive manufacturing. A falsification test using Norwegian industrial data shows that the same sectors did not develop similarly in a comparable nearby country.[3]

Second, I present evidence that reparations fostered a structural transformation not only by merely moving labor between the manufacturing sectors but also by reallocating the workforce from lower-wage primary production (mainly agriculture) to higher-wage manufacturing and services.[4] I find this evidence by exploiting Finnish registry data and a shift-share instrument that allows me to study the individual-level impacts of the government intervention.[5] Using this empirical strategy, I show that older, already established workers were seven percentage points more likely to leave agriculture if their municipality received a one-standard-deviation larger share of the reparation shock.[6]

[3]Norway is the closest country for which comparable industrial statistics are available. Norway also had a similar GDP per capita as Finland in 1944.

[4]In 1938, male workers' average yearly wage in agriculture was 8383 markka, while in manufacturing, the average yearly wage was 13929 markka, or 66% larger. These figures translate to approximately 1700 and 2700 current US dollars, respectively.

[5]I construct these local labor market shocks for each Finnish municipality by calculating how a large portion of the workforce in 1939, before the treatment, worked in the war reparations industries and interact this calculation with the reparations the industry was assigned. This set-up follows the existing literature (Acemoglu et al., 2016; Autor et al., 2013; Bartik, 1991).

[6]Old is considered to be 25 years or older in 1944 when the reparations started. The assumption is that these workers were already part of the labor force and had made their educational choices before the start of the reparation payments. Younger cohorts are those below the age of 25 when the reparations started. I also provide flexible estimates in 5-year age bins to show that the results do not depend on this specific age group classification.

Linking individuals over censuses, I find that the sectoral reallocation persisted at least 20 years after the intervention. I further document that workers who lived in the more exposed municipalities in 1939 had higher incomes than other workers in 1970. This result is consistent with industrialization yielding higher wages, as suggested by the early development literature (Clark, 1940; Lewis, 1955; Kuznets, 1957; Rostow, 1960), and more recent work by Gollin et al. (2013). The magnitude of this reduced-form impact on income is approximately 10% for a one-standard-deviation increase in the local reparations shock.

Having shown that the older generation of workers left agriculture for more modern sectors and obtained higher wages, I move on to the third finding of the paper: the lasting intergenerational response to increased industrialization. I show that the increase in manufacturing led to better occupational and educational outcomes for younger cohorts in more exposed places. A one-standard-deviation increase in the local reparations shock led to a 0.3-year increase in educational attainment for the affected cohorts. More importantly, the new skill-intensive opportunities incentivized the acquisition of higher education. I find that a one-standard-deviation increase in the local reparations shock led to a 1.8-percentage-point increase in the probability of having a university degree. This translates into a 40% increase relative to the population mean of 4.3%. The reparation payments also led to significant occupational upgrading. Younger cohorts in the more exposed places were significantly less likely to work in production and more likely to be white-collar workers as adults (measured in 1970). These occupational results are consistent with the evidence on higher educational attainment.

I link parents to children to further study how the experiment affected intergenerational mobility. I find that the educational and occupational gains of the younger cohorts are driven by children of lower-educated parents. I proceed to show that the war reparations led to a higher absolute upward income mobility in more affected places. Specifically,, I find that a child of a parent without primary education had approximately 1.3 percentile ranks higher income if their municipality was exposed to a one-standard-deviation higher war reparations shock.

These lasting results for the younger generations are likely to follow from the increased skill premium offered by the new industrialization. The increase in physical capital in skill-intensive industries complemented accumulation of human capital leading to more growth. The war reparations shock seems to have been large enough to change children's expectations about their future possibilities. Although I cannot exhaustively rule out all other possible mechanisms, nor is that the goal of the paper, I provide evidence that an improvement in parents' income or an increase in educational possibilities in the municipality are not the main drivers of the results. I follow the methodology of Ciccone and Papaioannou (2009) to show that the industries most affected by the war reparations were skill-intensive, as measured by the workers' average years of education. As additional evidence, I then restrict the treatment to only relatively low-skill war reparation industries and do not find that the increase in this type of manufacturing led to any statistically significant increase in educational attainment.

While the human capital and occupational upgrading can be rationalized by the requirements posed by the expedited industrialization, these results are by no means mechanical or obvious. Recent studies have shown that interventions that increase manufacturing could lead to a middle-income or manufacturing trap, limiting movement to more complex activities.[7] For example, Franck and Galor (2018) show that more industrialized places in France in the 1800s are less prosperous today. They argue that this phenomenon is due to lower preferences for education among the children of manufacturing workers in the low-skilled sectors. In relation to this argument, Atkin (2016) finds that the opening of new manufacturing plants in Mexico was associated with lower human capital investments, as the opportunity costs for schooling increased. Similarly, Goldin and Katz (1997) describe how industrialization led to decreased educational attainment in the U.S. in the early 1900s. The key difference between my results and previous work is that the new industrial opportunities in Finland required higher skill levels, which plausibly encouraged further skill acquisition via increased returns to education.[8]

The importance of human capital accumulation for economic growth is well-established (Barro, 2001; Benhabib and Spiegel, 2005; Gennaioli et al., 2012; Mankiw et al., 1992; Nelson and Phelps, 1966). My results provide novel evidence that causation can run from increased high-skill opportunities to higher human capital investments, possibly leading to a virtuous circle of further educational attainment and economic growth. For example, Acemoglu (1997) provides a model of multiple equilibria in skill and technology to help guide this thinking. In his model, investment in technology that requires a certain skill level reduces the uncertainty in the related human capital investment, leading workers to forego wages for higher pay in the future, which makes

[7]The idea behind the middle-income trap is that a country first experiences growth due to manufacturing because it can compete with lower wages, but when the wage level rises, the country becomes stuck in a trap if there is no new innovation. Eichengreen et al. (2013) show that these types of growth slowdowns are mitigated by increased schooling.

[8]For example, Munshi and Rosenzweig (2006), Jensen (2012), and Oster and Steinberg (2013) find similar positive educational impacts from new high-skilled IT service job opportunities in India. The distinction between the present study and previous work is that I study the human capital impacts of large-scale industrialization promoted by the government.

firms more willing to invest in new technology, given the existence of a skilled workforce.[9] The results of this paper, which show increases in human capital due to new opportunities, are consistent with this model.

The overall conclusion is that the government promotion, focusing on skill-intensive sectors, likely affected short- and long-term growth by first reallocating labor to more productive sectors and by providing incentives for further investments in human capital. Shortly after the reparations payments, Finland began to catch up with its considerably richer neighbors.[10] A large share of this fast post-war growth is attributed to the structural change of the economy (Kokkinen et al., 2007) and increases in human capital (Kokkinen, 2012). The shift to more complex exporting may also have been important, as Hausmann et al. (2007) and Hidalgo et al. (2007) show that the complexity of exports matters for countries' long-term development.

The findings of this paper contribute to several literatures. A large body of work has studied the effect of temporary government action in shaping the structure of an economy (e.g., Amsden 1992; Hausmann and Rodrik 2003; Liu 2017; Pack and Saggi 2006; Robinson 2009; Rodrik 2007, 2008; Wade 1990).[11] I add to this literature by exploiting a rare plausibly exogenous variation in government policy to study structural transformation. I also use registry data to study the intergenerational impacts of the intervention, unlike the existing industrial policy literature.

My findings closely relate to the theoretical literature focused on market failures, poverty traps, and the multiplicity of equilibria (see, e.g., Acemoglu 1997; Azariadis and Stachurski 2005; Krugman 1991; Matsuyama 1991). Specifically, these studies relate to the idea that the government can correct for market failures, which goes back to at least the Rosenstein-Rodan (1943) Big Push model, formalized by Murphy et al. (1989). In recent empirical work, Juhász (2014) finds that the short-term trade protection provided by the Napoleonic blockage helped develop the French garment industry. Lane (2017) shows that protected South Korean industries experienced a faster development after the initial government action, and this impact propagated through the input-output network. Giorcelli (2016) finds that temporary management training associated with the Marshall plan in post-war Italy led to long-term productivity gains. My findings are in line with the empirical work by Nunn and Trefler (2010), who show consistent results that tariffs targeting skill-intensive sectors can promote growth. However, they do not find any

[9] In the Acemoglu (1997) model, firms are those offering the training. Since the model has a perfectly transferable utility, the results also hold if the worker spends money on schooling.

[10] Both Sweden and Denmark had a nearly 40% higher GDP per capita than Finland in 1940.

[11] Harrison and Rodríguez-Clare (2009) provide a comprehensive summary of this vast empirical literature studying industrial interventions.

similar evidence of an increase in human capital or knowledge accumulation (as measured by patents).

My results are also linked to the work on the long-term impact of place-based policies, e.g., Kline and Moretti (2013, 2014). The natural experiment I employ differs from this work, as the war reparations targeted specific sectors rather than specific locations and the industrial promotion was not directly accompanied by other large investments in infrastructure, education, or health. In recent work Criscuolo et al. (2019) find positive causal impacts of EU investment subsidies in the United Kingdom in a more current, developed world context. The war reparations were more sizable endeavor and took place in a country with 60% of population still working in agriculture.

Lastly, I contribute to the literature studying intergenerational mobility in incomes and educational attainment (Card et al., 2018; Chetty et al., 2014; Chetty and Hendren, 2018). To the best of my knowledge, this is the first study to show that the structural transformation of the economy can also promote intergenerational mobility.

The Finnish war reparations were a colossal undertaking and an important component of Finnish history. This episode has been extensively studied by historians and other scholars (Auer, 1956; Fellman, 1996; Harki, 1971; Kindleberger, 1987; Rautakallio, 2014). Nevertheless, my paper is the first quantitative assessment of the lasting economic effects of the war reparations and the first to look at the long-term, intergenerational impacts of the policy.

The rest of the paper is organized as follows. Section 2 discusses the historical background of the Finnish war reparations, and Section 3 introduces the various datasets used in this study. Section 4 presents the industry-level results and Section 5 the main individual-level results. Section 6 displays series of robustness and validity checks. Finally, Section 7 discusses the policy implications and briefly concludes the paper.

2 The Finnish War Reparation Payments

> *"Losses caused by Finland to the Soviet Union by military operations and the occupation of Soviet territory will be indemnified by Finland to the Soviet Union in the amount of three hundred million dollars payable over six years in commodities (timber products, paper, cellulose, seagoing and river craft, sundry machinery). "*
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> 11th of Article of the 1944 Finnish-USSR Armistice.

In September 1944, the Finnish delegation signed the Moscow Armistice, which included a war reparations sum of 300 million dollars. Finland was close to complete military defeat and signed the armistice without knowing the exact structure of the reparations it needed to pay. The wording of the signed Finnish-USSR treaty only defined these commodities as "timber products, paper, cellulose, seagoing and river craft, [and] sundry machinery." Because Finnish industrial production at the time was focused on timber and paper products, the structure of the final reparations came as a shock to the Finnish government. Only one-third of the reparations were paid in paper or timber products, and most were paid in more complex metal industry goods.

The reparations were different from the Finnish production and export structure of the time. The Soviet Union wanted the reparations to be paid in industrial products even though over half of the Finnish labor force still worked in primary production. A particularly disproportionate share of the reparations was assigned to metal products. The metal industry exports covered only 14% of industrial production and 2.3% of the pre-war exports but were responsible for over 60% of the war reparation. The Soviet Union had experienced large losses in their metal industry production during the war, which in part explains the peculiar structure of the war reparations demands (Harrison, 2002; Rautakallio, 2014). Because the Finnish production capability in these sectors was so underdeveloped, the Finnish government did not only pay for the production but also for the investments needed to produce the reparations products.

The Soviet Union required detailed knowledge about the Finnish production structure, including estimates of the production capacity for different goods, before it settled on its demands. The Finnish companies provided assessments of their production capacity, but these assessments were rarely taken into account in the Soviet demands. For example, the maximum yearly production capacity of cable, one of the largest reparation product groups, reported by the Finnish companies to the Soviets was approximately 200 km. The Soviet Union, however, demanded a yearly production of 375 km of power cable, 200 km of other cable, and 4250 tons of copper wire. The Finns were able to meet these demands in the initial years years only by buying cable from Sweden and expropriating domestic copper (Auer, 1956).

The Finnish government had no input regarding the structure of the reparations, as the amount and the vague terms were previously determined in the signed armistice. If the Finnish government had been able to have any influence on the terms, it would have greatly preferred the structure of the reparations to focus on the well-established timber industry (Auer, 1956; Suviranta, 1948). That the structure of these reparations was not open to negotiation is well summarized by a letter the Finnish government received from the high-ranking engineer Antonenko in charge of organizing the reparations:

"You [the Finnish government] have asked to negotiate about the war reparation

payments. I personally do not understand what there is to negotiate. Finland has signed a peace treaty, in which it has committed to carrying out certain indemnities to the Soviet Union. Finland can either carry out these reparations or it will be occupied."

The initial organization of the reparations was the following: each year, for a period of 6 years, Finland was to export 50 million dollars worth of merchandise. In 1945, the payment duration of the reparations was increased to eight years, and in 1948, the remaining reparations were unilaterally halved by the Soviet Union.[12] The final sum of reparations shipped by Finland in the years 1944-1952 was 226.5 million dollars in 1938 prices (Rautakallio, 2014). However, this alleviation of the terms was most useful for the remaining timber products that Finland was more likely to be able to deliver (Auer, 1956).

The burden to the Finnish state was considerable. The reparations represented on average 5% of the GDP for eight years and at worst 27% of government expenditures in 1946 (Rautakallio, 2014). The largest single items exported were ships, locomotives, engines, cable, and machinery for factories. For example, the amount of ships built in Finland rose from 14 in the 1924-1938 period to 581 during the reparations period. Overall, Finland shipped nearly 400,000 cargo carriages of war reparations items to the Soviet Union from 1944 to 1952. The Soviet Union required the quality of the production to meet international standards, which meant that the Finnish production did not only need to scale up but also to increase in complexity. [13]

Historians often consider the actual burden to the government to be significantly higher than 226.5 million dollars (Rautakallio, 2014).[14,15] The companies producing the reparations received production costs and a "reasonable" profit, which means that the government also subsidized in full all the capital needed to produce the reparations products. The reparations orders were undoubtedly a good deal for the producing companies.[16] The producers were also generally more optimistic than the government

[12]The reduction may have been made to help the Finnish communist party in the elections of 1948. However, the reparations to be paid by Romania and Hungary were also reduced at the same time (Kindleberger, 1987).

[13]Because single companies were often too small to handle the larger orders, they had to cooperate to be able to produce the required items. One famous and illustrative example of a war reparations product is the PT-4 steam locomotive, a joint project of three Finnish conglomerates.

[14]226.5 million dollars in 1938 translate into approximately 4 billion dollars in 2018.

[15]Because the reparations were to be paid in products, the valuation became an important question. The Soviets demanded that the reparations were to be priced in U.S. pre-war prices, ignoring the inflation that occurred during the war and increasing the reparations by almost one-third. Finally, the Soviets conceded and added inflation increases to the 1938 prices: 10% to consumption goods and 15% to capital goods. These agreed prices were still significantly below the current 1944 prices.

[16]This type of production incentivizes rent-seeking; however, the Finnish government investigations carried out after the reparations found no proof of excess profits (Auer, 1956).

about their capacity to produce these goods. However, given the gravity of the war reparations, even some of the managers of the benefiting factories were worried about the size of the undertaking. Wilhelm Wahlforss, the manager of the single largest war reparations producing company, Wärtsilä, said in 1947:[17]

> *"The strain on metal manufacturing is higher than it can accomplish. There has been too much optimism relating to its capacity in certain circles since the beginning."*

The Finnish government established a large government bureau called Sotakorvausteollisuuden valtuuskunta (Soteva) to oversee and organize the war reparations effort. Soteva decided on the orders and helped with the coordination and communication between the producing companies and the Soviets. It also provided engineering and legal help to the companies trying to implement new technologies. Soteva was a sizable organization, with over 500 employees, and was extremely involved in production, providing continuous help to companies. The Soviet Union also established its own organization in Finland called Karelia to oversee the quality of the production. The quality requirements were set by the Soviets and were extremely specific and strict. If one item in the cargo shipment at the border was not up to code, the Soviets declined the entire shipment.

In 1952, Finland became the only country after World War II to pay its reparations in full, as on the incentive side, there existed a credible threat that the Soviets would invade if the reparations were not paid in their entirety.[18] In addition to these incentives, the demand for timber was high after the war, and Finland benefited from good terms of trade. Finland also received many favorable loans from Sweden, the U.S. and the Bank of International Settlements to help with the reparations.[19] Furthermore, the Soviet Union alleviated Finland's reparation terms in 1945 and 1948.

When the reparation payments began in 1944, Finland was a lower middle-income country. Bolt et al. (2018) calculate that the Finnish real GDP per capita was 4366 dollar in 1944, which is slightly less than the standard of living in Vietnam, Moldova or India in 2016, and a figure achieved by Sweden in 1922, Denmark in 1900, and by the United States in 1879.[20] In 1940, Finland was still mainly an agrarian nation, with over 60% of the

[17]Cited in Joukio (2015).

[18]The reparations were part of the armistice agreement between Finland and the Soviet Union, which would be invalid if the reparations were not completed. Moreover, during the Teheran conference, Stalin stated that the war reparations were one of his terms for peace. Stalin expressed that if Finland did not complete the payments in time, the Russian army would invade parts of Finland (Kindleberger, 1987)

[19]Many of these loans were given in goodwill and would probably not be achievable in normal times. However, Finland did not receive any Marshall Aid because of Soviet pressure.

[20]Values in 2011 international dollars.

labor force working in the primary sector. This figure dropped to 10% by 1970, as Finland quickly became a more modernized nation, while converging to the EU average income (Kokkinen et al., 2007).

3 Data

In this section, I briefly describe the main datasets used in this study.

Reparation products shipped. Data on the reparation products shipped to the Soviet Union come from Statistics Finland's foreign trade publications from 1944 to 1952. These data contain the value and amount of products shipped, classified by the Finnish product classification (Tavaralaji). I map the value of reparations products to the relevant industries in order to measure the intensity of treatment for each industry. I perform this mapping using concordances provided by Statistics Finland and the United Nations Statistics Division. I deflate all values to be in 1935 Finnish marks.

Manufacturing industry panel data. I collect a new dataset of Finnish industrial production and harmonize these data over several years. Ultimately, I have a balanced panel of 163 industries in the Finnish version of the International Standard Industrial Classification of All Economic Activities (ISIC) at the four-digit level. The data on these industrial outcomes are drawn from Statistics Finland's publications of industrial statistics for the years 1934-1970. Unfortunately, after 1970, there was a change in the industry classification and the mapping of industries became significantly more difficult, so I end my industry-level examination here.

These collected data do not include the primary sector or services. The manufacturing census includes information on the main variables of interest, the labor force and production in every industry group for every year. These data also include a rich set of pre-treatment 1943 and 1938 variables that I can use as controls. I deflate all values to be in 1935 Finnish marks.

Municipality-level variables. I follow Sarvimäki (2011) and measure the labor share in manufacturing and primary production for the years 1930 and 1940 using Statistics Finland's publication Finnish Population by Industry 1880-1975. This publication provides the share of workers in five large industry groups for each decade. These industry groups are primary, manufacturing, construction, transport, and services. I take the average income taxes paid in 1930 and 1938 from the Statistics Finland's Income and Property publications. I further collect baseline information on arable land, the number of cows, and the number of tractors from the Agricultural census of 1930 and 1940.

1950 census individual data. I use the 1950 census microdata collected and digitized by Statistics Finland. From the original individual cards, a 10% sample was digitized by selecting every tenth folder. These data were linked by Statistics Finland to the social security numbers of the respondents, facilitating the link to later information. The 1950 census contains the basic individual variables, such as, age, sex, municipality of residence, and industry in 1950. These data also include information on the municipality and industry of the respondent in 1939 to compensate for the missed census in 1940. The 1939 information allows me to identify if the person has left agriculture between 1939 and 1950 and to calculate the municipal industry shares in 1939. Unfortunately, these data do not contain the information on wages or income.

1970-1985 census individual data. I use full census information from Statistics Finland for 1970-1985. I can link individuals in these data to their 1950 and 1939 information using their encrypted social security numbers. I use 1970 wage, industry, and educational attainment information to asses the long-term individual impact. [21]

4 Industry-Level Analysis

In this section, I compare the reparations-producing industries with other manufacturing industries with similar baseline characteristics. I show that the short-term government action permanently increased the production and labor force in the affected industries. I show that this policy also led to an increased capacity in the relatively high-skilled industries.

4.1 Industry-Level Empirical Strategy

The industry-level empirical analysis is based on estimating the difference-in-differences in outcomes by the reparations paid. The main estimating equation takes the following form:

$$Y_{it} = \beta_t Reparations_i + \gamma_i + \delta_t + \theta_t \mathbf{X}_i + \varepsilon_{it} \tag{1}$$

Here, Y_{it} is the outcome variable, for the value of production, the labor force, or the value added in industry i at time t, on a logarithmic scale. The dependent variable $Reparations_i$ is either a dummy for whether or not the industries were treated or the logarithm of the sum of the reparations paid.[22]

[21] The same individual-level data are used in Sarvimäki et al. (2018).

[22] In the logarithmic treatment, I add a small positive constant.

In this fully flexible estimation, the coefficients (β_ts) tell the yearly estimated differences in industries by their reparations treatment relative to the omitted base year 1943. γ_i presents the industry fixed effects to control for any time-invariant industry-specific factors. Year effects δ_t control for common time effects. Finally, ε_{it} presents the error term. I further add control variables interacted with year effects $\theta_t X_i$, which allows the effects of each control to vary flexibly over time. These industry-level controls include a set of pre-treatment variables visible in Table **??**: the share of skilled labor, the power-to-labor ratio, the logarithm of average wage, the amount of labor and the lagged outcome variable, and the log value of production in the base year 1943 and the pre-war year 1938.[23] In this way, I allow the differentially treated industries to experience systematically different changes along these observable dimensions after 1944.

The main identifying assumption of this difference-in-differences strategy is that, absent the reparations payments and the resulting government intervention, the treated and non-treated industries would have developed similarly. Some further notes on the estimation. The standard errors are clustered at the industry level to account for possible heteroskedasticity and autocorrelation. To simplify the presentation of the flexible estimates, I pool years together and estimate the coefficients (βs) as an average effect for these longer time periods. I still allow the controls to vary for each year. All these estimated flexible differences are reported relative to the omitted base year, 1943.

4.2 Long-Term Industry Results

I begin the empirical analysis by comparing the differences in reparation-paying and repatriation-nonpaying industries in the pre-treatment year 1943. This comparison is a balance check to further show that these reparations were not only allocated to the largest industries. I present summary statistics and pre-treatment 1943 levels, as well as 1934-1943 changes by treatment status in Table **??**. The treated industries seemed to be larger in 1943 than the non-treated industries, with statistically significant differences in the total labor force and the power used per labor. The identification strategy in this section does not depend on differences in levels but on the lack of trends in the variables, as presented in column (5). I also flexibly control for these pre-treatment baseline variables in my future specifications.[24]

[23]Controlling for the size of the industry is particularly important, as the same size of a reparations burden is different for different size industries.

[24]If I exclude the established timber and paper industries from the examination, I find that only the relative wage was higher in the treated industries before the war reparations began.

The basic difference-in-differences results from equation (1) for the sample period 1934-1970 are presented in Table 2, where the war reparations payments had a statistically significant long-term impact on the size of the exposed industries. The impact sizes are increasing over time. The difference in production between the reparations-paying and -non-paying industries relative to 1943 is 85% (0.619 log points) in the 1960s. The same difference in the labor force is 67% (0.514 log points).

In the second panel of Table 2, I examine the intensity of this treatment. Some of the industries were hit by larger shocks than others. I find that a one-standard-deviation increase in the logarithm of reparations paid (≈6.3) led to approximately a 25% (0.22 log point) increase in production and a 20% (0.18 log point) increase in the labor force in the 1960s.

Estimates show that prior to the reparations payments, the treated and non-treated industries had similar changes in the outcomes, that is, there are no visible pre-trends, giving validity to the parallel paths assumption of my difference-in-differences estimation. The estimates have similar sizes when controlling for pre-treatment characteristics. These main results are also presented graphically in the event study in Figure 2. Here, the start (1944) and the end (1952) dates of the reparations payments are highlighted.[25]

These long-term within manufacturing results may not be surprising. Not only did the large demand shock occur, but the government also paid all the capital investments that the exposed industries needed in order to meet the Soviet demand. This can explain part of the persistence and these within manufacturing results of temporary promotion are in line with those found in previous work, including Lane (2017), Giorcelli (2016) and Juhász (2014). In the next section I turn to the individual-level impacts of the policy.

5 Individual-Level Analysis

In this section, I study the individual-level impacts of this policy. I take advantage of the rich registry data available in Finland and follow individuals from 1939 to 1970. I begin by defining a shift-share measure of how much a region was affected by the war reparations shock and the resulting government intervention. I then divide the sample

[25]From these flexible results, we learn something about the dynamics of the response. After the initial jump and the war reparations payments, which are visible in Figure 2, the effect persists, but there is a clear flattening between 1953 and 1960. The capacity remains higher than before the reparations, but there is no growth during this period relative to other manufacturing industries. However, after 1960, a clear increase is visible in the reparations-paying industries, which could be due to the fact that the production followed some larger global trends or that it took some time for the Finnish production to adjust to compete in the global market.

into two groups: those younger and older than 25 in 1950, respectively. I show how these different cohorts respond differently to the increased possibilities created by industrialization. The older generation was more likely to leave agriculture for manufacturing, meaning that the government intervention promoted structural transformation. The younger cohort again became more educated and worked in higher-skilled occupations 20 years after the experiment ended. These results are consistent with increased returns to schooling arising from the new industrial opportunities. Finally, I link parents to children to study how the policy affected intergenerational mobility. I show that absolute upward mobility in both incomes and education increased in the more exposed locations.

5.1 Location Treatment Intensity and Baseline Differences

In order to study the causal impact of the war reparations on individuals, I construct a municipal-level measure of the intensity of the treatment in each location. I follow the large existing literature (Acemoglu et al., 2016; Autor et al., 2013; Bartik, 1991) and calculate a Bartik instrument as the sum of interactions of the industry labor shares in the municipality and the industry reparations shock:

$$Bartik_m = \sum_i \frac{L_{im}}{L_m} \frac{Reparations_i}{L_i} \tag{2}$$

I use the 1939 industry and municipality information available in the 1950 census to measure how large a part of the labor force in a certain municipality worked in the exposed sectors before the reparation payments began. In (2), $\frac{L_{im}}{L_m}$ is the share of workers in a 2-digit industry in a municipality in 1939. $Reparations_i$ is the total amount of reparations assigned to this industry. I follow Autor et al. (2013) and scale the industry shock with the initial labor force working in the industry L_i.

Because the reparation production was largely a massive extension of the existing manufacturing base and did not originate from completely new factories, this measure is a good indicator of which municipalities were more exposed to the reparation payments. The large issue with using this measure is that it is highly correlated with overall manufacturing. In Figure 3, I map the measured shocks and the overall share of manufacturing in 1940 for each Finnish municipality side by side. A strong correlation means that I only compare individuals in more industrialized places with those in less industrialized places in the following estimations. To keep the sample balanced at the baseline, I control for the initial 1940 employment share in manufacturing and agriculture in all future regressions following Autor et al. (2013).[26]

To assess the endogeneity of the $Bartik_m$ variable and the validity of my identification strategy, I follow Hornbeck and Naidu (2014) and estimate the following equations (3) and (4) at the municipal level:

$$Y_{m(1940)} = \beta Bartik_m + \gamma_r + \eta \mathbf{X}_m + \varepsilon_m \tag{3}$$

$$Y_{m(1940)} - Y_{m(1930)} = \beta Bartik_m + \gamma_r + \eta \mathbf{X}_m + \varepsilon_m \tag{4}$$

These equations show that, conditional on the baseline controls, the exposed municipalities were not demonstrably different before the reparation payments began. The outcome is either the pre-treatment 1940 levels or the 1930-1940 changes in the observed municipal characteristic. $Bartik_m$ is the measure of the intensity of reparations treatment. These balance test results are presented in Table 3. Prior to the reparations, the exposed and non-exposed municipalities are estimated to have had similar levels and changes in most outcomes.

Unfortunately, the many complicated municipal mergers that occurred after the 1950s make comparing long-term differences at the municipal level extremely difficult and noisy.[27] This limitation is part of the reason why I use this 1939 municipal-level treatment at the individual level. More importantly, however, the focus of this study is to follow individuals over time and over generations. Place-based information is not sufficient to study these individual impacts, as people were likely to move.

5.2 Individual-Level Empirical Strategy

I use Finnish individual-level registry data to study the long-term impact of this government intervention. The main source of data in this section is the 1950 census, of which 10% exist in digitized format. The 1950 census includes information on individuals' industry and municipality in 1939. I identify the impact of this policy on individuals assigning the treatment variable to their municipality of residence in 1939. This way, people are not sorted to the more exposed places. The youngest people in my sample are 11 years old in 1950. I limit my examination in the baseline analysis to

[26] I also use a more data-driven approach to validate this selection of controls. I also use LASSO to identify the best predictors for the $Bartik_m$ variable.

[27] The number of municipalities dropped from 548 in 1950 to 311 in 2017. These municipal mergers were often complex, as municipalities are split among many units. Tracking these separations over time will require more detailed data than what is currently available. In future work, I will focus more on these location-based impacts of the policy.

workers below the age of 45 in 1950, as these workers are still more likely to be in the labor force in 1970, when I measure the long-term impacts.

I begin the individual-level examination by studying the impact of the reparations shock to the industry in which the individual worked in 1950. I estimate the following equation:

$$Y_{im} = \beta Bartik_m + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \tag{5}$$

Here, the outcome Y_{im} is a dummy variable that measures if person i worked outside of primary production in 1950, worked in manufacturing in 1950, or worked in services in 1950. $Bartik_m$ is the variable derived in the previous part to measure how exposed the municipality in which the person lived in 1939 was to the war reparations production. β is the coefficient of interest. I add municipal control variables $\mathbf{X}_m$ to account for the initial differences in the industries.[28] I standardize the $Bartik_m$ variable to have a mean of zero and a standard deviation of one to help with the interpretation of the results. I also add 11 Finnish region fixed effects to take into account any region-specific variation. These municipal-level variables are assigned to the worker's 1939 municipality. I also control for individual fixed effects for sex and age $\mathbf{X}_i$. I estimate equation (5) separately for two samples. I study the whole population and only the workers who were working in primary production in 1939 separately. In the second group, I identify the actual departure from agriculture, not just the municipal averages in employment structure.

Using the $Bartik_m$ measure instead of the actual war reparations production helps with the identification. It would be concerning if the government assigned reparations production to the locations it wished to develop more. However, there is no record of this kind of preferential assignment, but the fact that $Bartik_m$ is measured using pre-treatment labor shares means that the studied places had an observed comparative advantage in the industries more exposed to the reparations payments.

I then link the individual to the next available Finnish census from 1970 to study the persistence of the impacts. Because Finland has registry data and the observations are assigned personal numbers, if the person is alive, I can match over censuses with near certainty. I estimate the same equation (5) with the same sample, but now, the Y_{im} variable is the individual's industry in 1970. Because the 1970 census information includes information about earnings, I also estimate the long-term wage impacts of the reparations shock using the same equation (5).

[28] The most intuitive control variable is the 1940 manufacturing share following Autor et al. (2013). I use controls chosen by LASSO from a rich set of pre-treatment variable levels. The chosen variables are the 1940 manufacturing share and the 1940 agriculture share.

To study cohort differences in the response to the policy, I estimate the effect separately for those already in the labor force in 1950 (31-45) and those who just entered the labor market (11-30). To study the cohort differences, I estimate the following equation (6):

$$Y_{im} = \beta_1 \left(Bartik_m \times Young \right) + \beta_2 \left(Bartik_m \times Old \right) + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \tag{6}$$

Here, Y_{im} is the education or occupation of the individual in 1970. *Young* is a dummy variable indicating if the person is under 30, and *old* is an indicator for the person being aged 31-45 in 1950. These correspond to above and below 25 in 1944 at the start of the reparations. When estimating equation (6) for education outcomes, the coefficient β_2 can be taken as a falsification test, as the shock should not affect the educational outcomes of the older cohorts.

The identifying assumption in the individual-level examination is a conditional independence assumption $Cov(Bartik_m, \varepsilon_{im} \mid \mathbf{X}_m) = 0$. Thus, given the controls, the individuals in the exposed places were not expected to have different outcomes than less-exposed individuals without the reparations shock. This identifying assumption is supported by the balance test in Table 3, where I show that conditional on the baseline covariates, there are no differences in other observables in 1940 and no differential pre-treatment trends at the municipality level in 1930-1940. In the following individual-level estimations, I cluster the standard errors at the level of the 1939 municipality, where the treatment varies.

5.3 Individual-Level Impacts: Older Cohorts

In this section, I focus on how the older cohorts (aged 25-45 in 1950) who are already part of the workforce respond to the government intervention that expanded industrial production. I choose these cohorts because I can identify their industries in 1939 and their sectoral reallocation. In Panel A of Table 3, I present the estimated impacts of the local reparations shock on a person's industry in 1950. Here, the outcomes are dummies for working in agriculture, manufacturing or services.[29] The first column presents the estimates of working in agriculture for all workers. Here, a one-standard-deviation increase in the reparations shock lowers the probability of working in agriculture by nearly 10 percentage points. In the second column, I restrict the sample to those who I know worked in agriculture in 1939, which means that I can identify any departures from agriculture. The estimated impact in this subsample is approximately 7 percentage

[29] Agriculture also includes other primary production, such as forestry. Services also include government services and transport services.

points.

I estimate where the workers ended up and find that for the entire population, a one-standard-deviation increase in the local war reparations shock led to a 4-percentage-point increase in the probability of working in manufacturing and a 5-percentage-point increase in the probability of working in services. An increase in service labor suggests that the increased demand in manufacturing also led to spillovers to the service sector. In the subsample of agricultural workers, a one-standard-deviation increase in the local reparations shock caused a 4-percentage-point increase in the probability of working in manufacturing in 1950. This is a large impact compared to the mean of only 7.3%. Similarly, in this subsample, the service labor increased by 2.2 percentage points.

These estimates mean that the war reparations caused a considerable structural transformation in Finland. To illustrate the magnitudes of the estimates, I perform a simple back-of-the-envelope calculation of how much of the share of the Finnish labor force working in agriculture and manufacturing in 1950 can be explained by the war reparations. I first calculate the shares of people working in manufacturing and agriculture for each municipality (Y_m). Then, I calculate counterfactual shares as the actual share minus the estimated impact of the shock multiplied by the reparations shock or $Counterfactual_m = Y_m - \beta Bartik_m$, which is done using the estimates (β) for the entire population taken from Table 3. I then use the municipal population weighted averages of these values to find the industry shares for the entire counterfactual Finland. According to the calculations, without the reparations payments, the share of the population working in agriculture would have been 45% instead of 39% and the population working in manufacturing would have been 19% instead of 23%. In other words, the share of labor in manufacturing would have been approximately 13% lower in 1950 without the war reparations. In 1940, the share of labor in manufacturing was 14% according to the official statistics, so if we assume this share to be the baseline level,[30] the change in manufacturing between 1940 and 1950 would have been 5 percentage points instead of 9 percentage points without the intervention. Therefore, the war reparations can explain four-ninths – or nearly half – of the Finnish manufacturing labor share growth between 1940 and 1950.

Because the year 1950 occurred during the war reparations production period and followed the government promotion, these results might not be surprising. Next, I focus

[30]These 1940 numbers are not completely comparable with the 1950 individual-level figures because they come from a different data source collected by the Finnish clergy. I also use a sample of prime-age workers, meaning that the number in the official statistics is actually smaller than the comparable number would have been, where the war reparations would explain a higher share of the growth.

on the long-term impacts of this policy on affected individuals. I link the workers over censuses to first study the impact of the policy on workers' industries in 1970. In Panel B of Table 3, I show that the workers exposed to a one-standard-deviation higher war reparations shock were still 6 percentage points more likely to work outside of agriculture in 1970. From the following columns, we see that more of this labor is now working in services than in manufacturing, with estimated impacts of a 2.4-percentage-point increase in the probability of working in manufacturing and a 4.7-percentage-point increase in the probability of working in services. Similar estimates are visible for the workers who I can identify as agricultural workers in 1939; however, the share working in manufacturing is relatively larger in this subgroup.

As a large body of literature has argued that agriculture is less productive than manufacturing (e.g., Gollin et al. 2013), I study the impacts of this structural change on long-term wages. In Table 4, I present the estimated reduced-form impacts of the reparations shock on income and wages for people living in the exposed municipality in 1939. As discussed in Sarvimäki et al. (2018), taxable income offers a better comparison between agricultural and non-agricultural incomes than wage earnings, so I use these more conservative estimates as my preferred outcome of interest.

I measure income as levels and logs (without zeros) and use an inverse hyperbolic sine transformation. I again divide the sample into all workers and those working in agriculture in 1939. According to my preferred specification, the impact of a one-standard-deviation increase in the Bartik variable is associated with an increase of 1970 incomes by 218 Finnish markka for the whole population. This figure is approximately a 14% increase relative to the mean of 1601 markka. In the subsample of those who were agricultural workers in 1970, the estimated impact of a one-standard-deviation increase in the Bartik measure is 122 Finnish markka, or 10% relative to the mean.

These reduced-form impacts might seem relatively small, given the large differences between agricultural and manufacturing earnings observed around the world (Gollin et al., 2013). However, one should keep in mind that the estimates in Table 4 are reduced-form estimates of increased industrialization and not of departure from agriculture. If one were to make the strong assumption that the intervention affected incomes only by reallocating labor across sectors, these reduced-form estimates would need to be scaled by the hypothetical first-stage estimates from Table 3, resulting in considerably larger estimates.[31]

[31] The reduced-form income estimates are also in line with the previous estimates for gains from leaving agriculture in Finland provided in Sarvimäki et al. (2018).

5.4 Individual-Level Impacts: Younger Cohorts

I then turn to study the outcomes of the younger cohorts aged 11-30 in 1950 or 5-24 in 1944 when the reparations started. As the increasing manufacturing opportunities plausibly offer these younger generations more options than the older generation, I will estimate how the increase in industrialization affected the occupational and educational choices of these cohorts.

I begin the exploration by studying the occupations of the exposed cohorts in 1970. I divide the occupations into four larger groups by socioeconomic rankings provided by Statistics Finland.[32] The groups are agricultural occupations, blue-collar production occupations, white-collar office occupations, and executive occupations. I present the estimated impacts of the war reparations shock on occupational choice separately for the older and younger cohorts in Table 5. For the older cohorts, the policy expedited structural transformation, as workers left agriculture for production and middle-class office work. However, those exposed at a younger age were affected differently. The increased industrialization made these cohorts less likely to become production workers and agricultural workers, and instead, they became middle-class office workers and executives. The impact sizes are such that a one-standard-deviation increase in the Bartik shock is associated with a 2-percentage-point decrease in the probability of being a production worker, which corresponds to approximately 6% of the mean. Likewise, these younger cohorts were 2.6 percentage points more likely to be in executive occupations, which corresponds to a 35% increase relative to the mean. I present these estimates and 95% confidence intervals for production and executive occupations by 5-year cohorts graphically in Figure 5. Here, the striking pattern is even more evident, as the cohorts older than 30 in 1950 (older than 24 in 1944 when the reparations began) were 5 percentage points more likely to become production workers if exposed to the industrialization shock, where the younger cohorts were less likely to be production workers. The older cohorts again were not more likely to become executives if exposed to the war reparations, whereas the younger cohorts were more likely to do so.

These results suggest that the exposed places were not subject to any kind of middle-income manufacturing trap or lock-in effects, where the increase in industrial opportunities would crowd out future occupational upgrading that requires education. The likely mechanism for these occupation results is that the increase in new high-skill opportunities incentivized further human capital accumulation through new opportunities and higher returns to education arising from complementaries between

[32] I study occupations instead of industries, as skill upgrades are easier to see using occupation data.

physical capital and skills. These results are in line with the previous work showing how opportunities affect the demand for schooling (Munshi and Rosenzweig, 2006; Jensen, 2010, 2012; Oster and Steinberg, 2013).

I link the census data on individual degrees to study how the exposure to the war reparations as a child and young adult affected future human capital accumulation. I again estimate the impacts of the war reparations separately for the younger and older cohorts and present the resulting estimates in Table 6. Because the reparations shock should not affect the educational attainment of the older cohorts, the non-significant estimates for this group can be taken as a further falsification test. The younger exposed cohorts, on the other hand, increased their years of education by 0.3 years for each standard deviation increase in the Bartik variable. The impacts on higher education were larger. The effect on completing a post-secondary degree was 3 percentage points, or 15% relative to the mean. Likewise, the impact of a one-standard-deviation increase in the Bartik variable when completing a university degree or a graduate degree was 1.8 percentage points (40% to the mean) and 1 percentage point (over 50% relative to the mean), respectively.

I present the main estimates for years of education and completing a university degree graphically in Figure 5. Here, the reparations shock is interacted with 5-year cohorts. The shock had no statistically significant effect for cohorts older than 30 in 1950 (older than 24 in 1944 when the reparations began) but had larger and statistically significant impacts on the older cohorts.

5.5 Intergenerational Impacts and Upward Mobility

5.5.1 Absolute Mobility

In this section, I show that the new industrial opportunities especially benefited those with less-fortunate backgrounds leading to upward mobility. In his seminal work, Kuznets (1955) argues that allocating labor from agriculture into manufacturing will lead to higher income inequality. According to Kuznets, this is because the within sector inequality is higher in (urban) manufacturing than it is in (rural) agriculture, so the relative increase in one group will mechanically increase the national income inequality. However, Kuznets argues that in the long run, industrialization can instead lead to lower income inequality because it expands professional and income opportunities, what he calls service income, more to the lower-income population than to the higher-income elites.[33] Kuznets' original

[33]In addition to this mechanism, Kuznets (1955) presents that increased redistribution, demographic changes in class-composition, and faster growth in new industries, not necessarily owned by the

paper is worth quoting at length:

> "The service incomes of the descendants of an *initially high* level unit are not likely to show as strong an upward trend as the incomes for the large body of population at lower income levels. ... [a] substantial part of the rising trend in per capita income is due to interindustry shift, i.e., a shift of workers from lower-income to higher-income industries. The possibilities of rise due to such interindustry shifts in the service incomes of the initially high-income groups are much more limited than for the population as a whole: they are already in high-income occupations and industries and the range for them toward higher-paid occupations is more narrowly circumscribed."

To estimate such impacts on upward mobility, I link parents' war reparation exposure to the outcomes of their children. Specifically, I link children (aged 0-20 in 1950) to the heads of the household to study intergenerational mobility at the time of the intervention.[34]

The main interest in the recent literature (Chetty et al., 2014; Chetty and Hendren, 2018) is to study absolute upward mobility, that is how well a child born to a parent in a lower income group does as an adult. In my preferred specification, I use parental education as a proxy measure for the parent income group because the earliest individual-level income data are from the 1970s. I follow Chetty et al. (2014) and rank the children and their parents into 100 equal-sized groups in the national income distribution after the treatment.[35] R_{im} shows the percentile rank of child i in the national income distribution in 1985. [36]

To estimate the impacts of the war reparation on absolute upward mobility, I restrict the sample to those with a head of household without any education [37] In this sample, I estimate the following equation:

$$Y_{im} = \beta BartikParent_m + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \quad (7)$$

Where $BartikParent_m$ denotes the reparations shock assigned to the municipality of the parent in 1939. Here, Y_{im} indicates the years of education, the income rank, or the

initially high-income groups, can account for the lessening income inequality after a certain point of industrialization.

[34]This group is 80% male. I can assign the treatment to only one parent, as parents might come from different municipalities. I can link to the municipality of the child in 1939, following the previous section, and find both parents, but this step will restrict my sample to those aged above 11 in 1950.

[35]If there are several equal values, these are assigned the median rank of the values following Chetty et al. (2014). For example, if there are 10% of zeros, these are all assigned to the 5% rank.

[36]Because older cohorts tend to have higher incomes, I measure the income ranks within the cohort.

[37]As the municipality-income rank cells can be small in my sample, I consider those with parents in the 20-30 percentiles of the national income distribution.

executive occupation of the individual in 1985. I control for parent occupation and education groups. I also add municipal control variables $\mathbf{X}_m$ to account for the initial differences in the municipalities.

In panel A of Figure 6, I restrict the sample only to those who had a parent in the lowest education group and graphically present the estimates for the child's years of education, income rank, and occupational group in 1985. A one-standard-deviation increase in the parent reparations shock led to 0.24 years more schooling, 2 ranks higher average income, and nearly a 5-percentage-point increase in the probability of holding an executive or white-collar occupation for those whose parents had no schooling. The estimates for years of schooling show that the war reparations led to an upward mobility in education, as studied, for example, in Card et al. (2018). I ALSO PRESENT THESE RESULTS IN TABLE XX.

I study what groups are driving these results by estimating the following equation:

$$\begin{aligned} Y_{im} = \beta_1 BartikParent_m + \beta_2 \left(BartikParent_m \times No\ Education_{im}\right) + \\ \beta_3 \left(BartikParent_m \times Primary_{im}\right) + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \end{aligned}$$

Here, I interact the treatment variable with the two lowest educational attainment groups of the parent $No\ Education_{im}$ and $Primary_{im}$.[38] These interaction effects tell how much more those from a given background benefit from the war reparations. I again control for parent occupation and education groups in all estimations. I also add municipal control variables $\mathbf{X}_m$ to account for the initial differences in the municipalities.

I present the results in Table XX, where adding the two interaction terms significantly lowers the direct impact of the $BartikParent_m$ variable. In all three outcomes, income rank, years of schooling, and having an executive or white-collar occupation, the effect is largest for the group where the parent had less than primary education. The results are driven by those whose parents had primary education or less. These results give validity to Kuznets' point that industrialization can benefit more the lower-income groups as these new opportunities may not help the already high-income groups.

5.5.2 Relative Mobility

I then turn to study the relative mobility in occupations and education. The difference between the previous section and this one is that here we are interested in outcomes

[38] I restrict the parents to be older than 30 so that the parents' education would be less endogenous.

relative to the parent's outcomes instead of absolute upward measures. I study this relative mobility by estimating the following equation:

$$Y_{im} = \beta_g BartikParent_m + \beta BartikParent_m + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \tag{8}$$

Here, Y_{im} indicates the education group or the occupation of the individual and all other terms follow from (**??**). Here the term $BartikParent_m$ captures the absolute gains of the reparations, and the parent occupation and education terms capture the intergenerational persistence, leading the coefficients of the interaction term (β_g) to tell the effect of the war reparations on intergenerational persistence.

I present these relative estimates in Table 8. In panel A of Table 8, the negative coefficients β_gs tell that the education levels between generations were less correlated in places more exposed to the war reparations shock. A one-standard-deviation increase in the parent reparations shock lead to nearly a 4 percentage point drop in the correlation between parent and child both having less than 9 years of education. In other words, column 4 of panel A tells that a one-standard-deviation increase in the shock increased years of schooling on average by .4 years, but this effect is smaller for those with more educated parents, meaning that the generational persistence in education was reduced by the war reparations.

In panel B of Table 8, I present estimates for the persistence in occupational status. Similar to the education results, I find that the occupational persistence was decreased by the war reparations. A one-standard-deviation increase in the reparations shock led to a 2 percentage-point decrease in intergenerational farmer-to-farmer persistence, a 2 percentage-point decrease in blue collar-to-blue collar persistence, and a .4 percentage-point decrease in white collar-to-white collar intergenerational occupational persistence.

6 Validity and Robustness

6.1 Heterogeneity by Industry Human Capital Intensity

These reduced-form results could follow from only increasing the capacity in the established timber and paper industries. Then, the concern is that the intervention did not increase the labor force in the more skill-intensive manufacturing industry but only that of the already strong timber and paper production. To show that the new type of highly skill-intensive manufacturing industry also increased, I estimate equation (9) by dividing the treated industries into larger 2-digit groups.[39]

$$Y_{it} = \sum_s \beta_s \left(Sector_s \times Reparations_i \times post \right) + \gamma_i + \delta_t + \theta_t \mathbf{X}_i + \varepsilon_{it} \tag{9}$$

In equation (9), the coefficients (β_ss) show the treatment effects in the larger 2-digit $Sector_s$. The $Reparations_i$ variable is again a dummy for whether or not the industries were treated. The treated industries that produced war reparations are divided into 11 larger 2-digit groups. I interact the treatment with a *post* indicator variable for the years after 1943, and report these basic difference-in-differences results for all sectors.

I present these industry-specific estimates in Figure A.2. Here, it is visible that the industry groups 35-39 were the only ones with a robust statistically significant growth relative to the non-treated industries.[40] Even though the estimates in industry groups 35-39 are rarely statistically distinguishable from the estimates for the other treated groups, it is clear that the impact is not entirely driven by the previously established timber and paper production in industry groups 25-27.

The industries in sectors 35-39 can be classified as highly skill intensive, which means that the war reparations did not only expanded manufacturing but also promoted more complex production in Finland. To show that these industries were actually more high skilled, I use a measure of human capital intensity taken from Ciccone and Papaioannou (2009). These authors use 1980 U.S. microdata and calculate the average years of schooling in each industry. I map these U.S. numbers into the Finnish classification and plot the average values of schooling by sectors in Figure A.3.[41] There is a clear pattern that sectors 35-39 are more high-skilled than groups 25-34 on average. Ciccone and Papaioannou (2009) argue that these industries are skilled-labor augmenting, which means that there are increased opportunities for more skilled workers in these sectors.

I corroborate the U.S. numbers by performing a similar exercise using Finnish 1980 census microdata and calculate the average years of schooling for each larger sector. These descriptive numbers presented in Figure A.3 are measured after the war reparations payments in Finland, so they could be outcomes of the policy. However, the Finnish sector-specific human capital intensity measures are similar to the Ciccone and Papaioannou (2009) values from the U.S., as sectors 35-39 seem to have higher levels of schooling on average. The increased opportunities in these sectors could then increase

[39] I group the industries into 2-digit groups because I can measure the human capital intensity at this level of aggregation.

[40] The results using the logarithm of the reparations paid are almost identical.

[41] Unfortunately, the industry classifications in Ciccone and Papaioannou (2009) are not perfectly comparable between the U.S. and Finland. However, the assigned U.S. 3-digit groups are similar to the assigned Finnish 2-digit codes.

the (perceived) returns to schooling.

6.2 Separating Impacts by Industry Skill Intensity

I separate the war reparations shock by industry skill intensity, measured by average years of schooling, to see if the increase in human capital accumulation is due to an increase in manufacturing or an increase in high skill manufacturing opportunities.[42] This exercise will help illuminate the possible mechanisms behind the lasting impacts. Table A.4 reports the estimated impacts on human capital accumulation with low- and high-skill Bartik variables interacted with age groups. We observe that the main result remains, as the young people in the more high-skill exposed places attain more human capital. I do not find any statistically or economically significant impact on young people living in the exposed regions that are less skill-intensive.

The results for low-skill production – mostly timber and paper production – are in line with the previous work by Atkin (2016), showing that an increase in low-skill production might not motivate future human capital accumulation.[43] Strong positive impacts for the younger cohorts in the high-skill areas support the increase in the returns to schooling narrative.

6.3 Parent Income

A likely channel that explains these human capital results is increased parental income, which facilitates children's higher education. I attempt to test this mechanism by controlling for parents' income in the sample in which parents are matched to children. These estimates are, however, difficult to interpret because both the child's education and parents' income are outcomes of the war reparation shock.[44] Keeping this caveat in mind, I find that the Bartik measure is still a strong and statistically significant predictor of later education after controlling for parent incomes. Conditioning on parent income in Table A.5 decreases the Bartik estimates by approximately 30%. Taking these estimates at face value means that other channels, such as an increase in the returns to education, explain 70% of the impact.

[42] I separate the treated industries roughly into a high-skill category (35-39) and a low-skill category (25-34) and measure the local-level shock using these industry groups.

[43] Atkin (2016) finds adverse effects of industrialization on education as the opportunity cost for education increases.

[44] This is a bad control regression with many issues, see Angrist and Pischke (2008) for a discussion.

6.4 Distance to New Universities

I show that the estimated increase in higher education is not due to the opening of new universities in the exposed regions. A possible mechanism to explain the higher educational attainment is that the industrial owners lobbied for new universities in these places. After the war reparations, six new universities were opened in Oulu (1959), Tampere (1960), Vaasa (1968), Lappeenranta (1969), Joensuu (1969), and Kuopio (1972). I estimate equation 6 controlling for the distance to the closest new university. Similarly to the Bartik variable, I interact the distance to a new university with young and old indicators, allowing the impacts to vary by cohort. I present the results of this estimation in Table A.6, where the distance to a new university interacted with young has a statistically significant impact on educational attainment, but adding this covariate does not affect the coefficient of the Bartik variable. This result shows that the main mechanism is not the increase in the availability of higher education in the places highly exposed to the war reparations. Furthermore, this exercise helps illuminate the magnitude of the war reparations shock. According to Table A.6, a one-standard-deviation increase in the Bartik variable has the same impact on acquiring an undergraduate degree as opening a new university within 200 kilometers.

6.5 Falsification Exercise with Norwegian Industrial Data

As a further validity check, I show that the war reparation industries did not grow more quickly than other industries in Norway. A concern with my empirical assessment is that all of Europe was rebuilding after the war, and the Soviet rebuilding needs could have been correlated with the needs of Western Europe. Given this possibly great and disproportional demand for metal sector products, these industries may have grown more quickly than other industries even without any government intervention. I cannot directly test this hypothesis, but I can test it indirectly by running a falsification exercise using Norwegian data.

I focus on Norway for two reasons. The first reason is the availability and comparability of the data.[45] The second is that Norway, as a small and poor Nordic country, is a realistic counterpart to Finland. The treatment also occurred well before the Norwegian oil boom of the 1970s, so the countries should be comparable over the period of study.

[45]Swedish industrial statistics are not comparable over time, which makes constructing a panel impossible. Danish industrial statistics have similar issues, but they are generally not comparable with the Finnish industrial statistics. The datasets used in this study are, to the best of my knowledge, the only existing panels of harmonized industrial statistics covering the 1935-1970 period at the 4-digit level.

To complete this falsification exercise, I collect a separate new dataset covering the manufacturing production in Norway at the 4-digit level for the years 1934-1969.[46] I assign the same treatment to the Norwegian industries, and using these data, I estimate the same fully flexible model (1) as I did with the Finnish industrial data. I also perform the analysis for nearly the same time period: 1934-1969. I present the results of this falsification exercise in Table A.7, where the estimated coefficients do not have any consistent signs and the estimates are statistically insignificant. The results from this exercise suggest that the same industries did not develop significantly more quickly in Norway relative to other manufacturing industries and the war-reparation-producing industries were not destined to grow after World War II in Europe.

7 Discussion

This paper shows that the forced war reparations ended up being a relatively successful form of government industrial policy leading to economic development. In this section, I discuss possible reasons for its success and the policy lessons that we can learn from this study.

First, it is important not to dismiss the political economy aspects of industrial promotion. The Finnish state was developmental and attempted to support the companies in their war reparations effort to the best of its ability. This approach is rare, and attempts to promote certain sectors are prone to corruption and elite capture (Robinson, 2009). Even though Finland was, by current standards, a lower middle-income country, the fundamentals for growth were established. Finland was a democratic state with stable established institutions, such as property rights, which are often regarded as requirements for growth (Acemoglu et al., 2005). Finland also had a relatively large state with enough bureaucratic power to carry out this intervention. State capacity is often regarded as a big hurdle to implementing government interventions (Besley and Persson, 2011).

These political economy considerations mean that this experiment is unlikely to be replicable in many of today's low-income countries with poor institutional quality. However, many middle-income countries, such as Brazil, India, or Botswana, have an institutional quality and state capacity comparable to those of Finland in 1944 and, for example, 40% of the Indian labor force still work in agriculture.[47] The results of this

[46]The Finnish and Norwegian datasets are not completely comparable because of slightly different industrial codes between countries. However, the industries exposed in Finland match well with the data in Norway, but the control industries differ.

[47]Finland had experienced a devastating civil war in 1918 and introduced compulsory education in 1921,

paper highlight the possibilities of industrialization to not only raise the incomes of the workers but also incentivize education and help upward mobility in these countries.

Second, the incentive structure for both the government and the companies to expand their production discouraged corruption and rent-seeking. Because the Soviet threat of invasion was credible, companies were not inclined to seek excess profits. Such an effective incentive structure would obviously be difficult to replicate.

Otherwise, in many ways, the Finnish experience comes straight out of the industrial policy playbook. The Finnish government promoted entire sectors, often asking companies to work together, leading to economies of scale. The production was not dictated by bureaucrats, but the government and the companies worked together in what sociologist Peter Evans called an embedded autonomy (Evans, 2012). The Finnish state had a considerable amount of power and autonomy, but it did not need to be omniscient, as the companies provided feedback on what worked.[48] Furthermore, the incentive structure came in the form of sticks and carrots, the importance of which is discussed, for example, in Rodrik (2009). The companies received large, often profitable, orders, but they also had to abide by the strict Soviet quality requirements and shipping times. The promotion was overall large enough and credible enough to change the expectations of the companies and workers.[49]

Comparable direct industrial promotion is currently banned by the the World Trade Organization. The ban on direct industrial interventions has led some countries such as China to circumvent these rules and resort to less targeted – and perhaps less effective – policies, such as exchange rate manipulation, to promote their manufacturing industries.

There are also problems with expanding the lessons from this study to the current environment – even to relatively similar middle-income countries – because of changes in manufacturing. Even though the development process has historically almost always occurred through industrialization, this type of economic growth might be increasingly more difficult to achieve. As shown in Rodrik (2016), countries become deindustrialized at lower income levels than previously. Rodrik (2016) argues that this phenomenon is due to the fact that globalization and new labor-saving technologies in manufacturing have made this old path to development more difficult to achieve.

The findings of this paper suggest that the types of sectors the government promotes are important for long-term growth. Recent policy work, discouraged by the outlined challenges in manufacturing, has suggested that lower-income countries should instead

later than many comparable countries.

[48]See Scott (1998) for examples of failures due to this state planning.

[49]This finding relates to the theoretical work on multiple equilibria in development (Azariadis and Stachurski, 2005; Krugman, 1991; Matsuyama, 1991; Murphy et al., 1989).

promote sectors such as tourism and cut flowers.[50] This strategy may be beneficial in the short term if the productivity in these sectors is higher than that in agriculture, but the prospects of this type of production promoting intergenerational mobility and educational attainment are more uncertain.

7.1 Concluding Remarks

The war reparations Finland paid to the Soviet Union 1944-1952 aided the structural transformation of Finland. This temporary intervention permanently increased production and the labor force in the exposed, skill-intensive industries. The war reparations also promoted structural transformation by incentivizing people to leave agriculture for more modern sectors, which increased their long-term incomes.

The experiment facilitated the investments needed to rapidly increase the manufacturing base and likely helped to solve the coordination failures by focusing resources on specific sectors. The rapid Finnish development after World War II was likely a type of input-led growth, where labor was reallocated from less productive sectors into more productive ones. As discussed in Krugman (1994), this type of growth can be subject to diminishing returns, and growth cannot continue without innovation. However, the intergenerational results of this paper show that the shock did not only increase the initial manufacturing labor opportunities but also led to further development by incentivizing human capital accumulation.

The government subsidized reparation production, aiding new industries, structural change, upward mobility, and human capital accumulation in a country that had a GDP per capita at the same level as Vietnam or India today and in which over half of the population worked in agriculture. This experience of the Finnish war reparations illustrates opportunities and challenges for government action to spur structural transformation in developing countries today. A deeper understanding of the exact market failures and precise, often case-specific, mechanisms behind successful government industrial promotion remains an important area for future research.

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[50]See, for example, Newfarmer et al. (2018)

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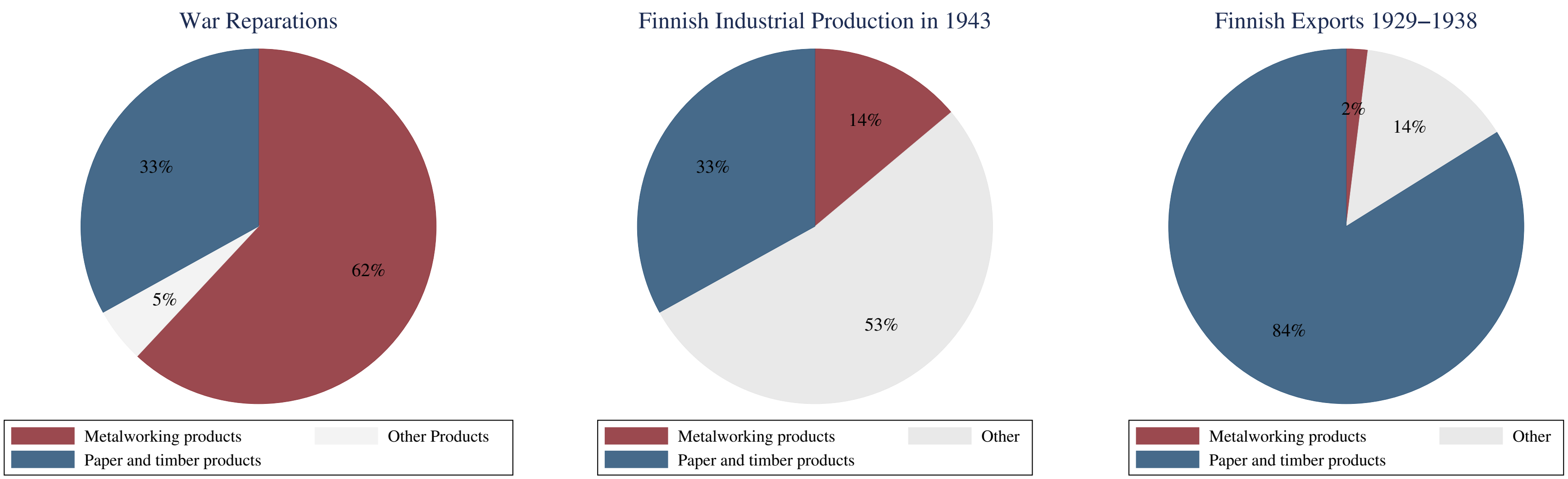
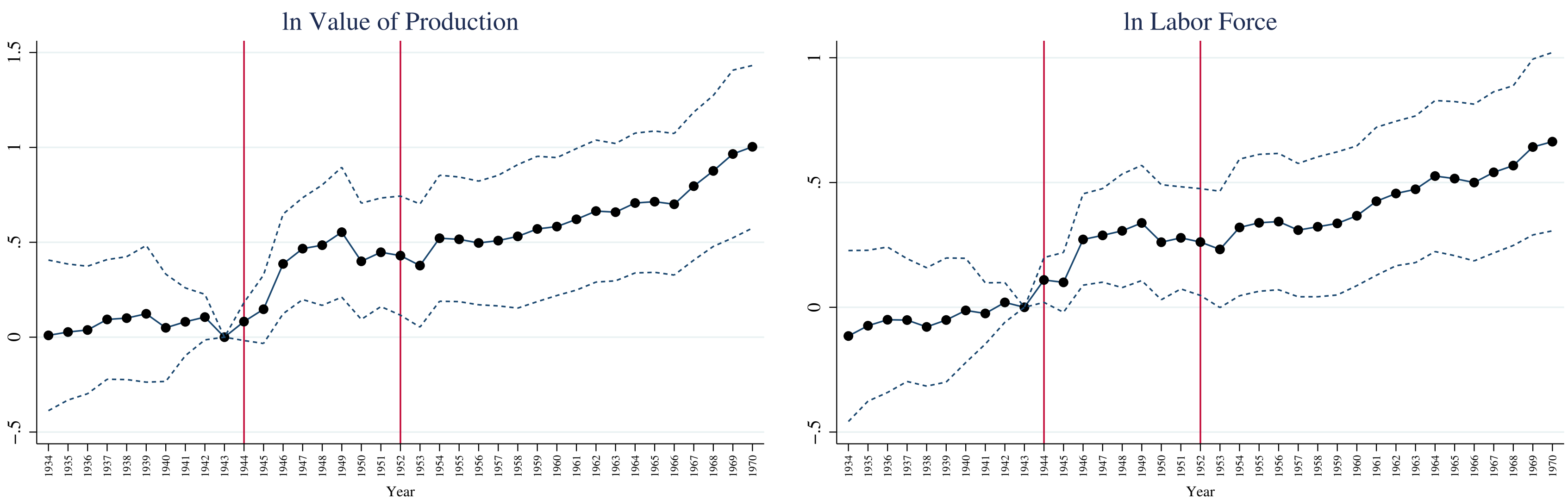
Figure 1. War Reparations Relative to the Finnish Production Structure



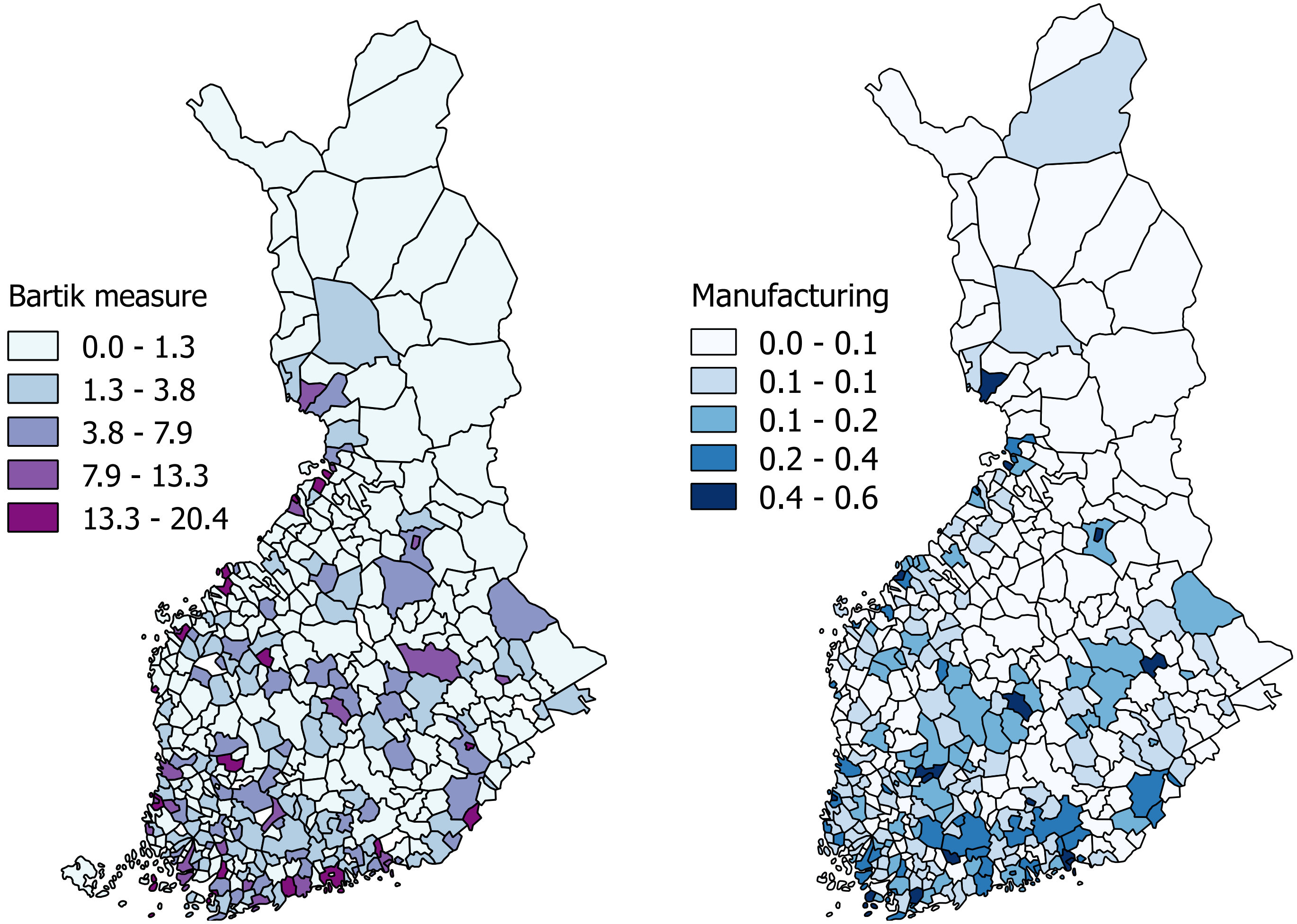
Notes: The figures present the percentages of values. The first pie chart documents the structure of the war reparation payments Finland was ordered to make in 1944 in three large industry groups. The following charts relate these values to the Finnish production structure. The values of Finnish industrial production are within manufacturing that comprised 14% of the Finnish labor force. The data are taken from Auer (1956) and the Finnish Statistical Yearbook 1943.

Figure 2. Estimated Differences in Outcomes, by War Reparations Treatment Relative to 1943



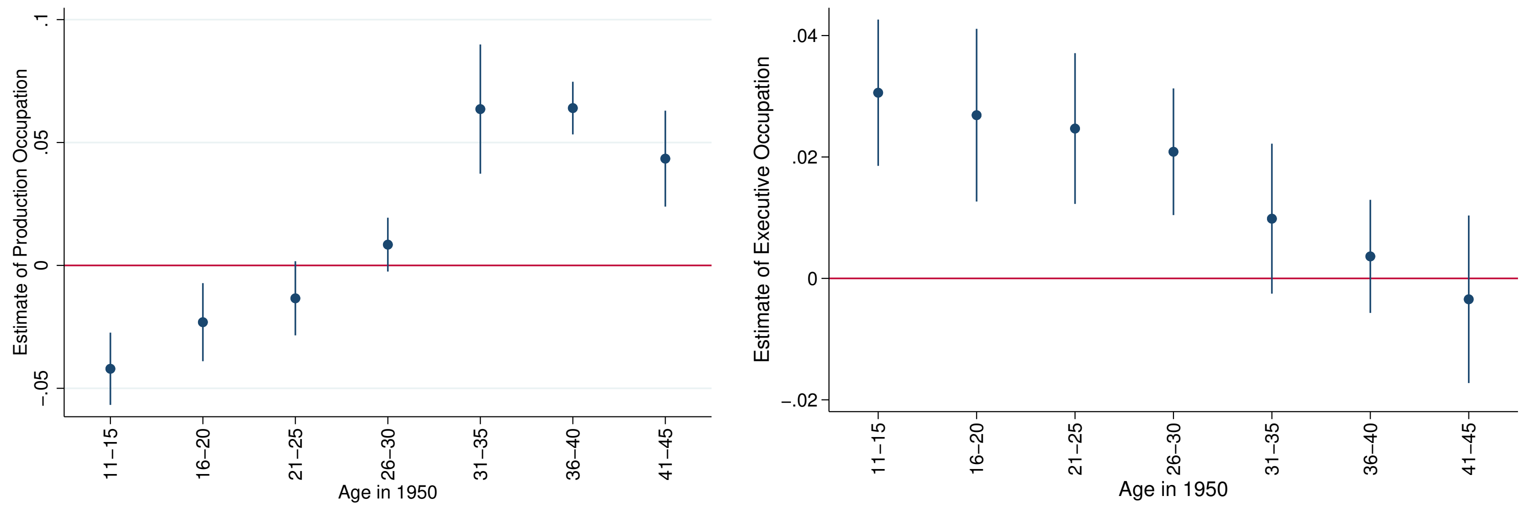
Notes: The graphs present estimated difference-in-differences coefficients (β_t) from equation (1). The outcome is regressed on the war reparations treatment dummy interacted with year effects. The model also includes year fixed effects and industry effects, as well as 1943 baseline controls for the industry log average wage, the log value of inputs, the share of white-collar workers, and the power used per worker, interacted with year fixed effects. Differences are estimated relative to 1943. The dashed lines present 95% confidence intervals, based on industry-level clustered standard errors. The unit of observation is the 4-digit industry. The vertical lines present the start and end of the war reparations payments.

Figure 3. Geographical Distribution of the War Reparations Shock and Manufacturing



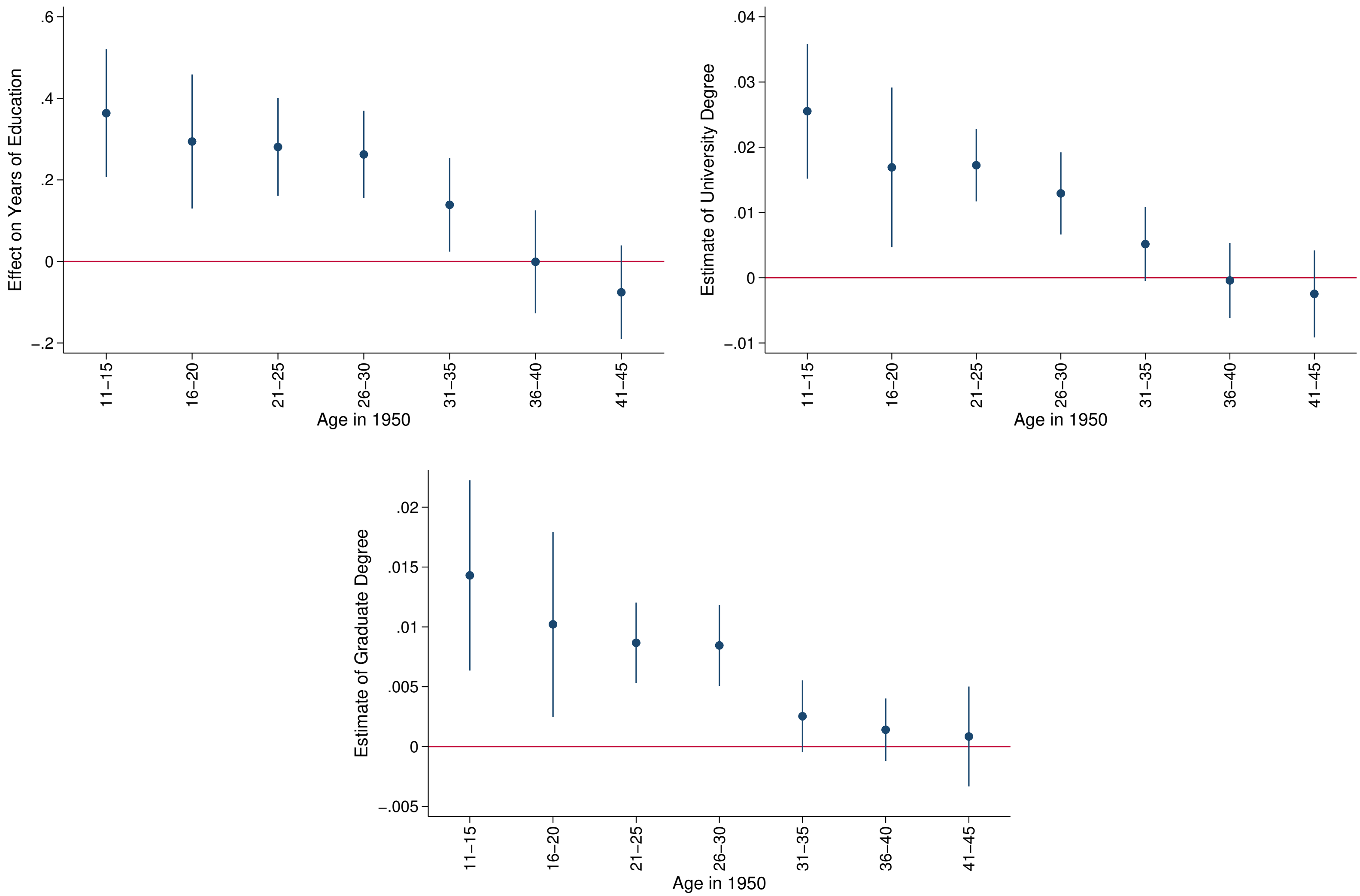
Notes: The left-hand map presents the war reparations shock of Finnish municipalities measured using the $Bartik_m$ variable, where labor shares are calculated using the pre-treatment 1939 shares. The right-hand map presents the baseline 1940 manufacturing labor shares controlled in the estimations.

Figure 4. Impact of the War Reparations Shock on Occupations in 1970, by Cohort



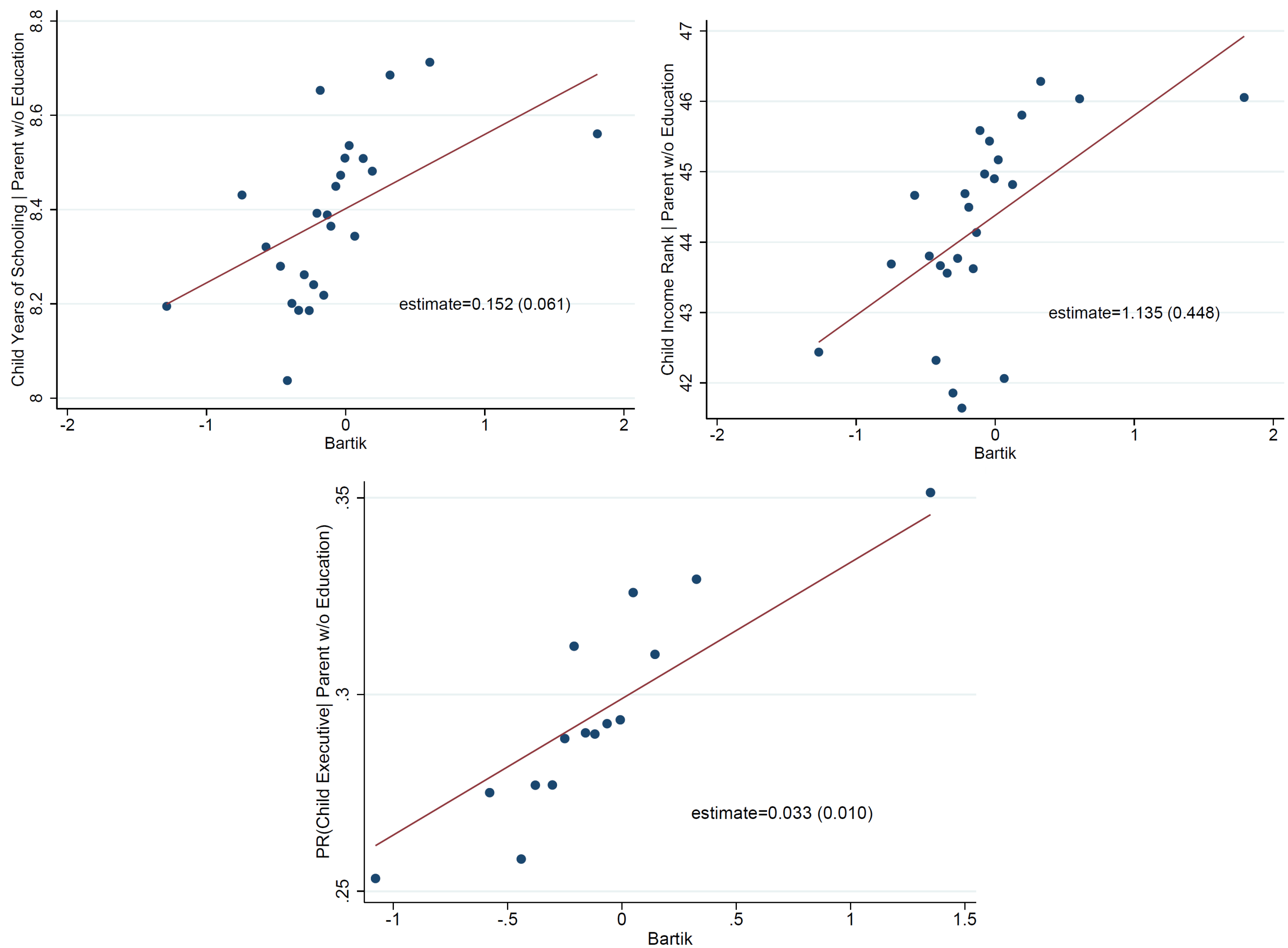
Notes: The graphs present the estimated impacts of the local war reparations shock interacted with age in 1950 on occupation in 1970. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. The lines present 95% confidence intervals, based on standard errors clustered at the municipality of 1939 level.

Figure 5. Estimated Impact of the Local War Reparations Shock on Education, by Cohort



Notes: The graphs present the estimated impacts of the local war reparations shock interacted with age in 1950 on education in 1970. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. The lines present 95% confidence intervals based on standard errors clustered at the municipality of 1939 level.

Figure 6. Estimated Impact of the Local War Reparations Shock on Absolute Upward Mobility



Notes: The graphs present binned scatterplots of the relationship between the local war reparations shock and absolute upward mobility. Upward mobility is measured as the outcome of a child in 1985 with parents without primary education . The baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects are partialled away.

Table 1. Baseline Industry Characteristics and Balance

	All Industries	Control Industries	Treated Industries	Difference in levels (3)−(2)	Difference in trends 1934-1943
	(1)	(2)	(3)	(4)	(5)
ln(Value of Production)	17.063	16.940	17.769	0.829*	0.011
	(1.647)	(1.535)	(2.082)	(0.359)	(0.177)
ln(Labor Force)	6.018	5.887	6.773	0.886**	0.072
	(1.511)	(1.414)	(1.836)	(0.328)	(0.179)
ln(Establishments)	2.402	2.348	2.715	0.367	0.015
	(1.192)	(1.155)	(1.369)	(0.263)	(0.093)
ln(Value of Inputs)	15.673	15.569	16.272	0.703	0.023
	(3.367)	(3.230)	(4.098)	(0.745)	(0.224)
Power Used/Labor Force	3.985	3.153	8.768	5.615***	2.614
	(7.296)	(4.803)	(14.393)	(1.557)	(1.362)
White Collar Share	0.104	0.105	0.098	-0.007	-0.015
	(0.064)	(0.065)	(0.056)	(0.014)	(0.012)
ln(Average Wage)	9.268	9.248	9.381	0.133*	0.020
	(0.254)	(0.262)	(0.159)	(0.055)	(0.039)
Number of Industries	162	138	24	162	162

Notes: The unit of observation is industry. Baseline industry characteristics are given in 1943 values. Columns (2)-(3) report average values for the variables by treatment group, with standard deviations in brackets. Column (3) reports the baseline differences between levels in the control group and the treatment groups in 1943. Column (4) reports the differences in changes between the control group and the treatment groups from 1934 to 1943. Standard errors are in parentheses, *** 1%, ** 5%, * 10% significance levels.

Table 2. Baseline Municipality Characteristics, by Reparations Shock

		Differences by Reparations Shock			
		1940 levels		1930-1940 changes	
	Pre-treatment 1940 mean	Within-region	Controls	Within-region	Controls
ln(Population)	8.13	0.241**	0.004	0.166	0.002
	(.99)	(0.065)	(0.025)	(0.159)	(0.003)
Share of Population in Primary	.67	-0.426**		-0.112*	-0.002
	(.25)	(0.055)		(0.066)	(0.002)
Share of Population in Manufacturing	.11	0.524***		-0.040	-0.002
	(.11)	(0.09)		(0.057)	(0.002)
Share of Population in Services	.05	0.105*	0.001	0.001	0.000
	(.04)	(0.066)	(0.001)	(0.023)	(0.000)
Share of Population in Construction	.02	0.30***	0.001	-0.011	0.000
	(.02)	(0.06)	(0.000)	(0.015)	(0.000)
Share of Population Swedish	.12	0.033	0.006	-0.030	-0.001
	(.29)	(0.03)	(0.005)	(0.022)	(0.000)
Average income tax	19.32	0.09	0.027	-0.08**	-0.038
	(3.81)	(0.06)	(0.082)	(0.04)	(0.033)
ln(Arable Land)	8.35	0.031	-0.017	0.040	-0.006
	(1.20)	(0.03)	(0.026)	(0.03)	(0.019)
Cows Relative to Population	.42	-0.183**	-0.003	-0.016	0.003
	(.18)	(0.064)	(0.003)	(0.092)	(0.001)
Tractors Relative to 1000s Population	2.59	-0.002	-0.000	-0.001	0.000
	(3.61)	(0.003)	(0.000)	(0.002)	(0.000)
ln(Area)	6.17	-0.00	-0.021		
	(1.16)	(0.058)	(0.019)		
Latitude	6910.79	-0.03	-0.04		
	(191.04)	(0.02)	(0.04)		
Number of Municipalities	518				

Notes: The unit of observation is the municipality. The table presents the coefficients and standard errors of regressing standardized observable variables with the standardized treatment variable, as well as region and urban fixed effects. In the second column, I also control for the 1940 manufacturing share and the 1940 agricultural share. The second column presents the baseline specification. Robust standard errors are in parentheses, *** 1%, ** 5%, * 10% significance levels.

Table 3. Impact of the Reparations Shock on Individual's Industry in 1950 and 1970

Panel A: Outcomes in 1950

	Agriculture 1950		Manufacturing 1950		Services 1950	
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik	-0.098***	-0.074***	0.040***	0.043***	0.053***	0.022*
	(0.013)	(0.013)	(0.006)	(0.008)	(0.013)	(0.012)
N	93287	27038	93287	27038	93287	27038
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939
Y mean	0.383	0.800	0.229	0.073	0.353	0.113

Panel B: Outcomes in 1970

	Agriculture 1970		Manufacturing 1970		Services 1970	
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik	-0.061***	-0.048***	0.024***	0.033***	0.047***	0.032**
	(0.010)	(0.014)	(0.007)	(0.008)	(0.010)	(0.013)
N	84867	24675	84867	24675	84867	24675
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939
Y mean	0.242	0.501	0.164	0.083	0.337	0.182

Notes: The unit of observation is an individual. The sample includes individuals aged 25-45 in 1950. The outcomes are dummies measuring the industry in which the person works in 1950 or 1970. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. In the even columns, the sample is restricted to those who were working in agriculture in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table 4. Impact of the Reparations Shock on Income, Measured in 1970

Panel A: Wage earnings, 1970

	Earnings 1971		Log Earnings 1971		IHS Earnings 1971	
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik	203.709***	118.468***	0.140***	0.160***	0.373***	0.297***
	(32.308)	(24.829)	(0.021)	(0.040)	(0.065)	(0.082)
N	84867	24675	41107	9638	84867	24675
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939
Y mean	979.014	531.703	7.181	6.717	3.819	2.895

Panel B: Taxable income, 1970

	Income 1971		Log Income 1971		IHS Income 1971	
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik	207.036***	119.085***	0.114***	0.089***	0.247***	0.191***
	(37.282)	(27.429)	(0.019)	(0.027)	(0.060)	(0.059)
N	84867	24675	59215	17131	84867	24675
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939
Y mean	1364.742	1014.891	7.139	6.909	5.463	5.276

Notes: The unit of observation is an individual. The sample equals individuals aged 25-45 in 1950. The income of a person is measured in 1970. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. In the even columns, the sample is restricted to only those who were working in agriculture in 1939. The log transformation in columns (3)-(4) drops out the zero values. In columns (5)-(6), the values are transformed using the inverse hyperbolic sine. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table 5. Impact of the Reparations Shock on Occupation in 1970, by Cohort

	Agriculture	Production	White-collar	Executive
	(1)	(2)	(3)	(4)
Bartik x (30-45 in 1950)	-0.064***	0.056***	0.020***	0.004
	(0.010)	(0.007)	(0.008)	(0.004)
Bartik x (under 30 in 1950)	-0.044***	-0.021***	0.042***	0.026***
	(0.010)	(0.006)	(0.006)	(0.006)
N	153305	153305	153305	153305
Y mean	0.272	0.339	0.172	0.073
$\beta_1 = \beta_2$ (p-val)	0.000	0.000	0.016	0.000

Notes: The unit of observation is an individual. The sample includes individuals aged 11-45 in 1950. The sample is divided into those aged below 30 and those aged above 30 in 1950. Occupation is measured in 1970 using Statistics Finland's classifications for socio-economic groups. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table 6. Impact of the Reparations Shock on Education, by Cohort

	Years of Education	Degree	Undergraduate	Graduate
	(1)	(2)	(3)	(4)
Bartik x (30-45 in 1950)	0.024	0.004	0.001	0.002
	(0.058)	(0.005)	(0.003)	(0.001)
Bartik x (under 30 in 1950)	0.299***	0.030***	0.018***	0.010***
	(0.064)	(0.006)	(0.004)	(0.003)
N	153305	153305	153305	153305
Y mean	7.407	0.203	0.043	0.018
$\beta_1 = \beta_2$ (p-val)	0.000	0.000	0.000	0.001

Notes: The unit of observation is an individual. The sample equals individuals aged 11-45 in 1950. The sample is divided into those aged below 30 and those aged above 30 in 1950. Degree indicates that the person had a post-secondary degree. Undergraduate indicates that the person had a university degree, and graduate indicates that the person had a post-graduate degree. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table 7. Impact of the Reparations Shock on Relative Intergenerational Mobility

	Income Rank			Years Schooling			White collar or Executive		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bartik	1.143***	0.137	1.241***	0.106***	-0.113***	0.152***	0.024***	-0.002	0.034***
	(0.250)	(0.610)	(0.426)	(0.038)	(0.068)	(0.059)	(0.005)	(0.011)	(0.010)
Bartik x Parent no education		1.549**			0.347***			0.041***	
		(0.743)			(0.088)			(0.013)	
Bartik x Parent primary school		0.662			0.211***			0.026**	
		(0.618)			(0.065)			(0.012)	
N	65043	65043	16878	73221	73221	19114	65043	65043	16878
Y mean	50.618	50.618	44.276	9.527	9.527	8.389	0.441	0.441	0.297
Parent sample	All	All	No education	All	All	No education	All	All	No education

Notes: The unit of observation is an individual. The sample equals individuals aged 0-20 in 1950 linked to their household head. Bartik is a municipality-level measure of the reparations shock assigned to the parent's municipality in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, parent occupation and education effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table 8. Impact of the Reparations Shock on Relative Intergenerational Mobility

Panel A: Mobility in Education

	<9 yrs	9-12 yrs	>12 yrs
	(1)	(2)	(3)
Bartik x parent <9 yrs	-0.037***		
	(0.007)		
Bartik x parent 9-12 yrs		-0.015**	
		(0.007)	
Bartik x parent > 12 yrs			-0.007
			(0.009)
Bartik	0.013	0.001	0.021***
	(0.012)	(0.007)	(0.006)
Parent <9 yrs	0.270***	0.082***	-0.327***
	(0.017)	(0.009)	(0.019)
Parent 9-12 yrs	0.079***	0.083***	-0.149***
	(0.016)	(0.013)	(0.021)
N	65814	65814	65814
Y mean	0.560	0.256	0.184

Notes: The unit of observation is an individual. The sample equals individuals aged 0-20 in 1950 linked to their household head. Parent and child years of schooling are allocated in three corresponding groups: less than 9 years of education, 9-12 years of education, more than 12 years of education. Bartik is a municipality-level measure of the reparations shock assigned to the parent's municipality in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

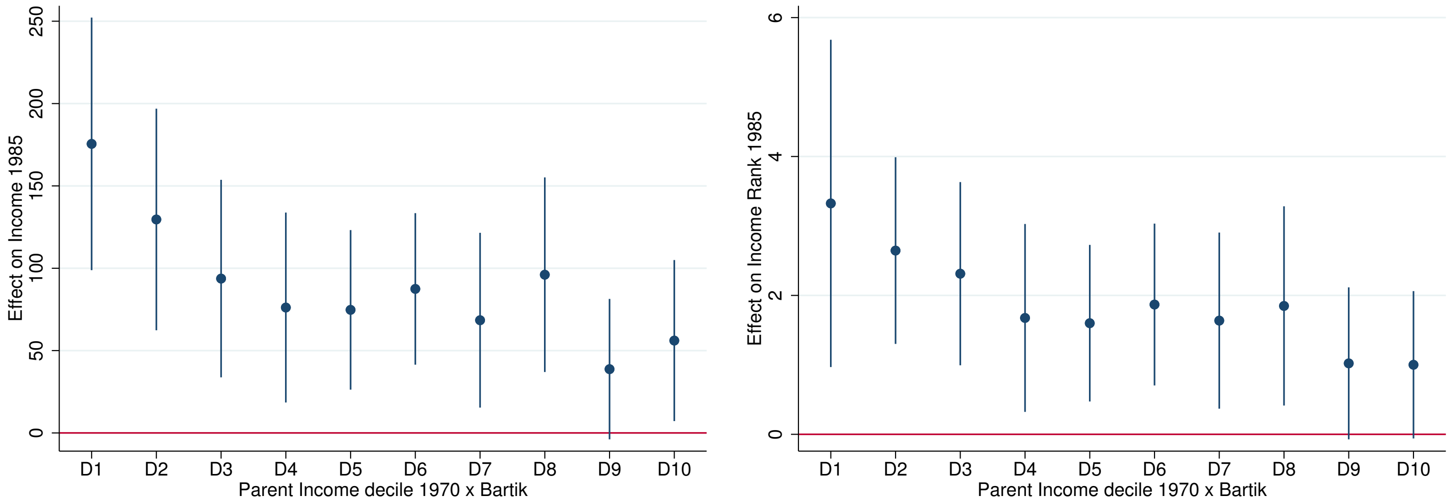
Panel B: Mobility in Occupations

	Agriculture	Production	White-collar
	(1)	(2)	(3)
Bartik x Farmer	-0.022**		
	(0.010)		
Bartik x Blue-collar		-0.022***	
		(0.006)	
Bartik x White-collar			-0.042***
			(0.007)
Bartik	-0.011**	-0.003	0.046***
	(0.005)	(0.008)	(0.007)
Blue-collar	-0.083***	0.050***	0.013*
	(0.006)	(0.007)	(0.007)
White-collar	-0.096***	-0.137***	0.242***
	(0.007)	(0.011)	(0.012)
N	58452	58452	58452
Y mean	0.147	0.333	0.403

Notes: The unit of observation is an individual. The sample equals individuals aged 0-20 in 1950 linked to their household head. Parent and child occupations are allocated into three corresponding groups: Agriculture, Blue-collar, and White-collar or executive. Bartik is a municipality-level measure of the reparations shock assigned to the parent's municipality in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

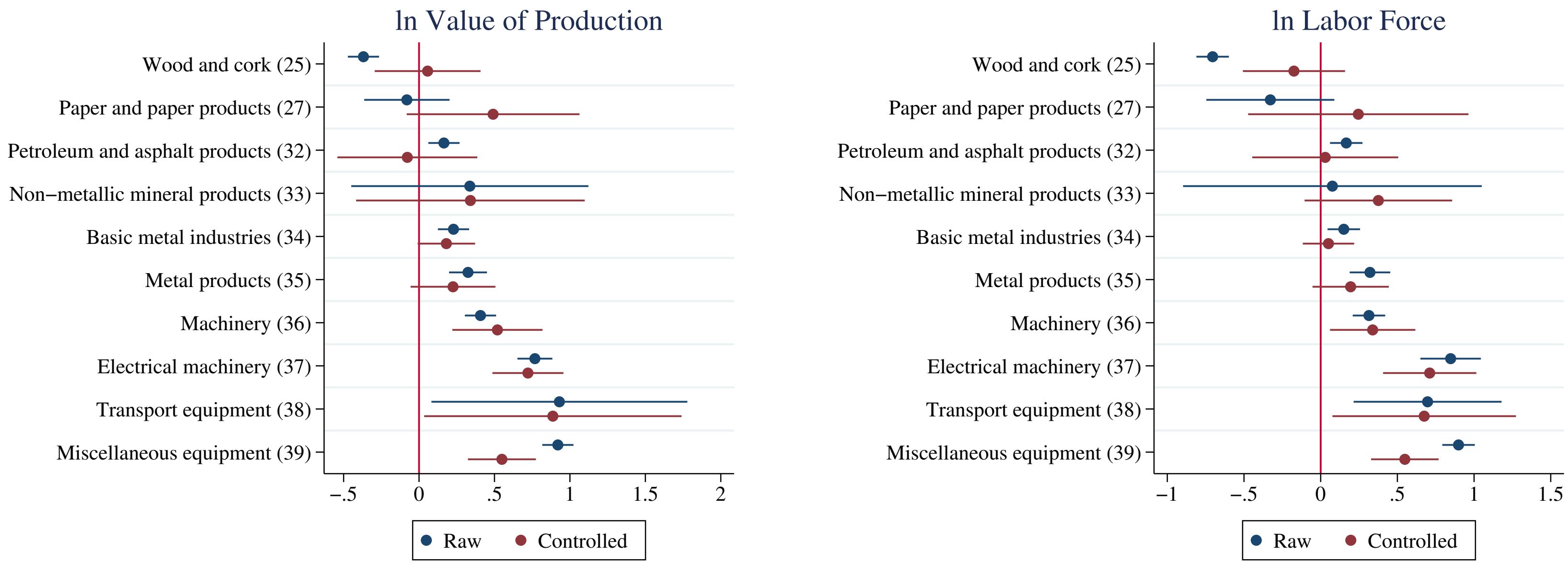
8 Appendix Figures and Tables

Figure A.1. Estimated Impact of the Local War Reparations Shock on Income, by Parent Income Decile in 1970



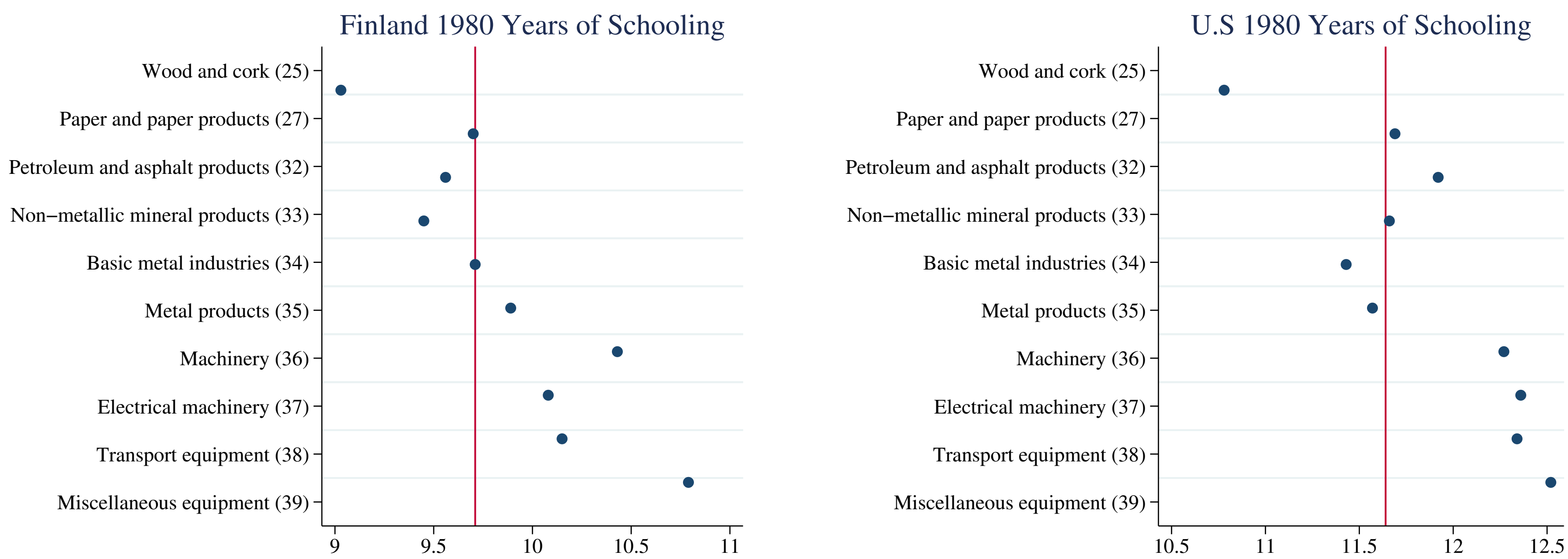
Notes: The graphs present the estimated impacts of the local war reparations shock interacted with the parent income decile in 1970 on child income in 1985. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, parent income decile fixed effects, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. The lines present 95% confidence intervals based on standard errors clustered by parent municipality at the 1939 level.

Figure A.2. Estimated Impact of the War Reparations Treatment, by 2-Digit Sector



Notes: The graphs present estimated differences-in-differences coefficients (β_s) from equation (9). The unit of observation is the 4-digit industry. Sectors are allocated into larger 2-digit industry groups. Outcome is regressed on the war reparations treatment dummy interacted with a post indicator and a 2-digit sector indicator. Post is a dummy indicating time after 1944, meaning that the presented estimates are relative to the pre-treatment period of 1934-1943. The model also includes year fixed effects and industry effects, as well as 1943 baseline controls for the industry log average wage, the log value of inputs, the share of white-collar workers, the power used per worker, the log labor force and the log value of production. The lines present 95% confidence intervals based on industry-level clustered standard errors.

Figure A.3. Average Years of Schooling, by 2-Digit Sector



Notes: The graphs present the average years of schooling in 2-digit industry groups. Years of schooling are calculated from Finnish census microdata for the years 1950 and 1980. The 1980 U.S. industry-specific years of schooling are from Ciccone and Papaioannou (2009) translated into the Finnish industry groups. The vertical lines present the mean values of schooling in the entire manufacturing sector in the given country-year.

Table A.1. Highest Treated Industries

Code	Industry	Reparations in millions	Value of Production 1943 in millions
3812	Steel ship building and repairing	1961	313
3630	Manufacture of other machinery and their parts	1189	558
2713	Sulphite pulp mills	305	436
3811	Other ship building and repairing	285	2.5
3752	High-power machine manufacturing	247	37
2511	Woodworking	183	663

Notes: The table presents the industries in the highest treated quartile. The reparations share shows the value of total reparations products produced by an industry over 8 years, scaled by 1943 production. Almost all ships produced over the war reparations period were exported to the Soviet Union. The code corresponds to the Finnish version of the United Nations International Standard Industrial Classification of All Economic Activities (1949). All values are in 1935 Finnish marks.

Table A.2. Estimated Differences in Outcomes by Reparations Treatment, Relative to 1943

Panel A: Extensive margin

	ln Value of Production			ln Labor Force		
	(1)	(2)	(3)	(4)	(5)	(6)
1934-1942 x Treatment	0.090	0.045	-0.005	0.022	-0.080	0.005
	(0.104)	(0.126)	(0.025)	(0.097)	(0.102)	(0.019)
1944-1952 x Treatment	0.333***	0.336***	0.309***	0.192**	0.200**	0.260***
	(0.104)	(0.110)	(0.116)	(0.074)	(0.078)	(0.090)
1953-1960 x Treatment	0.433***	0.443***	0.350**	0.280**	0.322***	0.329***
	(0.144)	(0.157)	(0.158)	(0.120)	(0.119)	(0.122)
1961-1970 x Treatment	0.652***	0.689***	0.552***	0.456***	0.540***	0.491***
	(0.165)	(0.177)	(0.184)	(0.151)	(0.141)	(0.156)
N	5994	5994	5994	5994	5994	5994
Controls 1943		✓	✓		✓	✓
Controls All			✓			✓

Panel B: Intensive margin

	ln Value of Production			ln Labor Force		
	(1)	(2)	(3)	(4)	(5)	(6)
1934-1942 x ln(Reparations)	0.003	0.002	-0.000	-0.001	-0.005	0.000
	(0.006)	(0.007)	(0.001)	(0.005)	(0.006)	(0.001)
1944-1952 x ln(Reparations)	0.019***	0.021***	0.019***	0.011**	0.013***	0.016***
	(0.006)	(0.007)	(0.007)	(0.004)	(0.005)	(0.005)
1953-1960 x ln(Reparations)	0.023***	0.027***	0.021**	0.014**	0.019***	0.019***
	(0.008)	(0.009)	(0.009)	(0.007)	(0.007)	(0.007)
1961-1970 x ln(Reparations)	0.034***	0.042***	0.032***	0.023***	0.032***	0.028***
	(0.009)	(0.010)	(0.011)	(0.009)	(0.008)	(0.009)
N	5994	5994	5994	5994	5994	5994
Controls 1943		✓	✓		✓	✓
Controls All			✓			✓

Notes: The unit of observation is the 4-digit industry. The time interacted treatment is a dummy indicating if an industry produced reparations or the logarithm of the value of the reparations shipped. Time-invariant controls are pre-treatment 1943 and 1938 characteristics interacted with year effects. Controls include skilled worker share, log average wages and power-to-labor ratio, ln(labor) and ln(value of production). The period of study is 1934-1970, and the reparations payments began in 1944. Robust standard errors are given in parentheses, clustered at the industry level. *** 1%, ** 5%, * 10% significance levels.

Table A.3. Impact of the Reparations Shock on Income in 1970, by Quantile

Panel A: Taxable income 1970 (All)

	Income Quantile			
	0.3	0.5	0.75	0.9
Bartik	130.502***	230.322***	251.287***	374.354***
	(25.208)	(40.166)	(46.093)	(79.936)
N	65998	65998	65998	65998

Panel B: Taxable income 1970 (Agriculture)

	Income Quantile			
	0.3	0.5	0.75	0.9
Bartik	26.917**	123.895***	205.737***	220.270***
	(11.745)	(30.967)	(36.358)	(63.622)
N	19307	19307	19307	19307

Notes: The unit of observation is an individual. The sample equals individuals aged 25-45 in 1950. An individual's income is measured in 1970. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table A.4. Impact of the Reparations Shock on Education, by Cohort and Industry Skill

	Years of Education	Undergraduate	Graduate
	(1)	(2)	(3)
High-skill Bartik x Old	0.025	0.001	0.002
	(0.060)	(0.003)	(0.002)
High-skill Bartik x Young	0.275***	0.018***	0.010***
	(0.081)	(0.004)	(0.002)
Low-skill Bartik x Old	-0.025	-0.002*	-0.000
	(0.030)	(0.001)	(0.001)
Low-skill Bartik x Young	0.083	0.002	0.001*
	(0.055)	(0.001)	(0.001)
N	153305	153305	153305
Y mean	7.407	0.043	0.087
$\beta_1 = \beta_2$ (p-val)	0.000	0.000	0.000
$\beta_2 = \beta_4$ (p-val)	0.052	0.000	0.000

Notes: The unit of observation is an individual. The sample equals individuals aged 11-45 in 1950. The sample is divided into those aged below 25 and those aged above 25 in 1950. Degree indicates that the person had a post-secondary degree. Undergraduate indicates that the person had a university degree, and graduate indicates that the person had a post-graduate degree. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. Industries are divided into high and low skill by average years of schooling, as shown in Figure A.3. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table A.5. Impact of the Reparations Shock on Education, Controlling for Parent Income

	Years of Education			Degree			Undergraduate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bartik	0.290***	0.187*	0.220**	0.029***	0.018**	0.020***	0.016***	0.009**	0.011**
	(0.110)	(0.099)	(0.094)	(0.009)	(0.007)	(0.007)	(0.005)	(0.004)	(0.004)
Parent income 1970		0.050***			0.005***			0.004***	
		(0.006)			(0.001)			(0.000)	
Parent income rank 1970			0.027***			0.003***			0.002***
			(0.001)			(0.000)			(0.000)
N	27727	27727	27038	27727	27727	27038	27727	27727	27038
Y mean	8.549	8.549	8.549	0.157	0.157	0.157	0.076	0.076	0.076

Notes: The unit of observation is an individual. The sample equals individuals aged 11-20 in 1950, linked to their parents in the same household. Degree indicates that the person had a post-secondary degree. Undergraduate indicates that the person had a university degree. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. Parent income is measured post-treatment in 1970, which makes it a "bad control". All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table A.6. Impact of the Reparations Shock on Education, Controlling for Distance to Universities

	Years of Education	Degree	Undergraduate
	(1)	(2)	(3)
Bartik x (30-45 in 1950)	0.018	0.004	0.000
	(0.055)	(0.005)	(0.003)
Bartik x (under 30 in 1950)	0.312***	0.031***	0.019***
	(0.063)	(0.006)	(0.004)
Distance to New University x Old	-0.031	0.001	0.000
	(0.057)	(0.004)	(0.003)
Distance to New University x Young	-0.197***	-0.015***	-0.007***
	(0.051)	(0.004)	(0.003)
N	153305	153305	153305
Y mean	7.406	0.087	0.043
$\beta_1 = \beta_2$ (p-val)	0.000	0.000	0.000

Notes: The unit of observation is an individual. The sample includes individuals aged 11-45 in 1950. The sample is divided into those aged below 25 (young) and those aged above 25 (old) in 1950. Degree indicates that the person had a post-secondary degree. Undergraduate indicates that the person had a university degree. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. Distance to university is the distance between municipality centroids in hundreds of kilometers. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, age and sex fixed effects, 11 region fixed effects, and urban fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table A.7. Falsification Exercise with Norway: Estimated Differences in Outcomes by Reparations Share Relative to 1943

	ln Value of Production			ln Labor Force		
	(1)	(2)	(3)	(4)	(5)	(6)
1934-1942 x Treated	0.085	0.032	-0.057	-0.006	-0.046	-0.064*
	(0.070)	(0.091)	(0.039)	(0.060)	(0.079)	(0.038)
1944-1952 x Treated	0.073	0.046	-0.012	-0.014	-0.044	-0.053
	(0.074)	(0.091)	(0.077)	(0.054)	(0.072)	(0.068)
1953-1960 x Treated	0.141	0.119	0.006	-0.022	-0.000	-0.026
	(0.173)	(0.183)	(0.185)	(0.138)	(0.155)	(0.159)
1961-1969 x Treated	0.237	0.242	0.109	0.008	0.083	0.065
	(0.196)	(0.212)	(0.201)	(0.164)	(0.171)	(0.179)
N	4931	4931	4931	4931	4931	4931
Controls 43		✓	✓		✓	✓
Controls All			✓			✓

Notes: The unit of observation is industry. The time-interacted treatment shows the value of the total reparations produced by an industry scaled by the 1943 production of the industry. Controls include baseline year 1943 and 1938 characteristics interacted with year effects. These controls are skilled worker share, log mean wage, ln(Labor) and ln(Production). The period of study is 1934-1969. Robust standard errors in parentheses, clustered at the industry level. *** 1%, ** 5%, * 10% significance levels.

Table A.8. The most Impactful Industries

Industry	α	β	Reparations shock
32 Manufacture of products of petroleum and asphalt	0.00	-7.67	0.10
35 Manufacture of metal products, except machinery and transport equipment	0.03	-0.48	0.02
36 Manufacture of machinery, except electrical machinery	0.17	-0.73	0.07
37 Manufacture of electrical machinery, apparatus, appliances and supplies	0.20	-3.41	0.63
38 Manufacture of transport equipment	0.65	-3.01	0.21

Industry	α	β	Reparations shock
25 Manufacture of wood and cork, except manufacture of furniture	0.00	0.29	0.00
35 Manufacture of metal products, except machinery and transport equipment	0.02	0.32	0.02
36 Manufacture of machinery, except electrical machinery	0.23	1.34	0.07
37 Manufacture of electrical machinery, apparatus, appliances and supplies	0.34	9.51	0.63
38 Manufacture of transport equipment	0.52	2.84	0.21

Industry	α	β	Reparations shock
19 Other mineral quarrying + digging and preparation of peat	0.01	7.31	0.00
33 Manufacture of non-metallic mineral products	0.01	1.26	0.00
37 Manufacture of electrical machinery, apparatus, appliances and supplies	0.26	11.65	0.63
36 Manufacture of machinery, except electrical machinery	0.34	2.11	0.07
38 Manufacture of transport equipment	0.62	5.16	0.21

Notes: The table reports the Rotemberg weights (αs) and the just-identified estimates (βs) as suggested in Goldsmith-Pinkham et al. (2018).

Table A.9. Baseline Municipality Characteristics, by Industry Shares

	Transport	Transport	Transport	Transport	Electric Machinery & Cables	Electric Machinery & Cables	Electric Machinery & Cables	Electric Machinery & Cables	Machinery	Machinery	Machinery	Machinery
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
ln(Population)	0.241**	0.004	0.166	0.002	0.241**	0.004	0.166	0.002	0.241**	0.004	0.166	0.002
	(0.065)	(0.025)	(0.159)	(0.003)	(0.065)	(0.025)	(0.159)	(0.003)	(0.065)	(0.025)	(0.159)	(0.003)
Share Primary	-0.426**		-0.112*	-0.002	-0.426**		-0.112*	-0.002	-0.426**		-0.112*	-0.002
	(0.055)		(0.066)	(0.002)	(0.055)		(0.066)	(0.002)	(0.055)		(0.066)	(0.002)
Share Manufacturing	0.524***		-0.040	-0.002	0.524***		-0.040	-0.002	0.524***		-0.040	-0.002
	(0.09)		(0.057)	(0.002)	(0.09)		(0.057)	(0.002)	(0.09)		(0.057)	(0.002)
Share Services	0.105*	0.001	0.001	0.000	0.105*	0.001	0.001	0.000	0.105*	0.001	0.001	0.000
	(0.066)	(0.001)	(0.023)	(0.000)	(0.066)	(0.001)	(0.023)	(0.000)	(0.066)	(0.001)	(0.023)	(0.000)
Share Construction	0.30***	0.001	-0.011	0.000	0.30***	0.001	-0.011	0.000	0.30***	0.001	-0.011	0.000
	(0.06)	(0.000)	(0.015)	(0.000)	(0.06)	(0.000)	(0.015)	(0.000)	(0.06)	(0.000)	(0.015)	(0.000)
Share Swedish	0.033	0.006	-0.030	-0.001	0.033	0.006	-0.030	-0.001	0.033	0.006	-0.030	-0.001
	(0.03)	(0.005)	(0.022)	(0.000)	(0.03)	(0.005)	(0.022)	(0.000)	(0.03)	(0.005)	(0.022)	(0.000)
Average income tax	0.09	0.027	-0.08**	-0.038	0.09	0.027	-0.08**	-0.038	0.09	0.027	-0.08**	-0.038
	(0.06)	(0.082)	(0.04)	(0.033)	(0.06)	(0.082)	(0.04)	(0.033)	(0.06)	(0.082)	(0.04)	(0.033)
ln(Arable Land)	0.031	-0.017	0.040	-0.006	0.031	-0.017	0.040	-0.006	0.031	-0.017	0.040	-0.006
	(0.03)	(0.026)	(0.03)	(0.019)	(0.03)	(0.026)	(0.03)	(0.019)	(0.03)	(0.026)	(0.03)	(0.019)
Cows per capita	-0.183**	-0.003	-0.016	0.003	-0.183**	-0.003	-0.016	0.003	-0.183**	-0.003	-0.016	0.003
	(0.064)	(0.003)	(0.092)	(0.001)	(0.064)	(0.003)	(0.092)	(0.001)	(0.064)	(0.003)	(0.092)	(0.001)
Tractors per capita	-0.002	-0.000	-0.001	0.000	-0.002	-0.000	-0.001	0.000	-0.002	-0.000	-0.001	0.000
	(0.003)	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)	(0.002)	(0.000)
ln(Area)	-0.00	-0.021			-0.00	-0.021			-0.00	-0.021		
	(0.058)	(0.019)			(0.058)	(0.019)			(0.058)	(0.019)		
Latitude	-0.03	-0.04			-0.03	-0.04			-0.03	-0.04		
	(0.02)	(0.04)			(0.02)	(0.04)			(0.02)	(0.04)		
Number of municipalities												

Notes: The unit of observation is the municipality. The table presents the coefficients and standard errors of regressing standardized observable variables with the standardized industry share variable, as well as region and urban fixed effects (1) and (3). In the columns (2) and (4), I also control for the 1940 manufacturing share and the 1940 agricultural share. The column (2) and (4) present the baseline specification. Industries are 37 Manufacture of electrical machinery, apparatus, appliances and supplies, 36 Manufacture of machinery, except electrical machinery, and 38 Manufacture of transport equipment. Robust standard errors are in parentheses, *** 1%, ** 5%, * 10% significance levels.

Table A.10. Impact of the Reparations, by Industry Shocks

	Agriculture 1950	Ln income 1970	Child Income Rank	Child Years of Education
	(1)	(2)	(3)	(4)
Bartik	-0.067***	0.090***	2.156***	0.220***
	(0.019)	(0.022)	(0.228)	(0.039)
N	54	54	54	54

Notes: Industry-level results as suggested in Borusyak et al. (2018). The unit of observation is the 2-digit industry. Robust standard errors are in parentheses. *** 1%, ** 5%, * 10% significance levels.