Structural Change and Intergenerational Mobility: Evidence from the Finnish War Reparations

Matti Mitrunen*

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. I show that the likelihood of leaving agriculture for manufacturing and services increased substantially in municipalities more strongly affected by the war reparations shock. These

*matti@uchicago.edu, Harris School of Public Policy, University of Chicago. I thank Andreas Madestam, Torsten Persson, David Strömberg, Ran Abramitzky, Daron Acemoglu, Ingvild Almås, Pol Antràs, David Atkin, Manuel Bagues, Martina Björkman Nyqvist, Chris Blattman, Timo Boppart, Konrad Burchardi, Paula Bustos, Dave Donaldson, Melissa Dell, Taryn Dinkelman, Mitch Downey, Gordon Hanson, Richard Hornbeck, Ruixue Jia, Réka Juhász, Nathan Lane, Hannes Malmberg, Jaakko Meriläinen, Joel Mokyr, Suresh Naidu, Arash Nekoei, Peter Nilsson, Nathan Nunn, Oskar Nordström Skans, Jon de Quidt, James Robinson, Matti Sarvimäki, Abhijeet Singh, Jakob Svensson, Anna Tompsett, Roope Uusitalo, Has van Vlokhoven, Eric Verhoogen, Fabian Waldinger, Dean Yang, and Noam Yuchtman, as well as seminar participants at Harris School University of Chicago, Harvard University, IIES-Stockholm University, LMU Munich, NBER/BREAD 2019 Conference on Economic Development, Northwestern University, Stockholm School of Economics, University of Helsinki, University of Notre Dame, University of Oslo, and Uppsala University for their helpful comments. I thank the Yrjö Jahnsson Foundation for financial support.

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 most from the structural change.

Keywords: Structural change, industrial policy, human capital, intergenerational mobility, war reparations.

JEL Codes: O14, O25, I25, J62, J24.

1 Introduction

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). Motivated partly by influential early work in development economics (Rosenstein-Rodan, 1943; Hirschman, 1958), many states have tried to expedite 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. This lack of evidence is partly due to the endogeneity of policy assignment, as the policymaker chooses specific sectors or places to promote, the evaluation of these interventions becomes difficult.[1,2] We know even less about how industrial policies affect later generations, which is essential for understanding their persistence and mechanisms. For these policies to generate long-term growth, reallocating labor from agriculture into low-skill manufacturing is not enough; industrialization should also create new opportunities that facilitate upward mobility and promote human capital

[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."

accumulation. In order to assess the long-term 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 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, persistently changing the structure of the economy. 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 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]

[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.

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 lasting individual-level impacts of the government intervention.[5] Using this empirical strategy, I show that older, already established workers were 8 percentage points more likely to leave agriculture if their municipality received a one-standard-deviation larger share of the reparation shock.[6] 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 the 1970s. This result is consistent with industrialization yielding higher wages, as suggested by the early development literature (Clark, 1940; Lewis, 1955; Kuznets, 1957), 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 0.2-year increase in educational attainment for the affected cohorts. More importantly, the new skill-intensive opportunities incentivized the acquisition of higher education

[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 30 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 30 when the reparations started. I also provide flexible estimates in 3-year age bins to show that the results do not depend on this specific age group classification.

and increased upper-tail human capital, considered particularly important for economic growth (Mokyr, 2005; Squicciarini and Voigtländer, 2015). I find that a one-standard-deviation increase in the local reparations shock led to a 1.1-percentage-point increase in the probability of having a university degree. This translates into a 22% increase relative to the population mean of 5.1%. The reparation payments also led to significant occupational upgrading. Younger cohorts in the more exposed places were significantly 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 2 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 opportunities and 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. I provide evidence that an increase in educational possibilities in the municipality is not driving the results, but an improvement in parents' income mediates higher education I 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 (e.g., Goldin and Katz (1997); Atkin (2016); Franck and Galor (2018)). 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.[7]

The importance of human capital accumulation for economic growth is well-established (Nelson and Phelps, 1966; Mankiw et al., 1992; Barro, 2001; Benhabib and Spiegel, 2005; Gennaioli et al., 2012). 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. [8]

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.[9] 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).[10]

The findings of this paper contribute to several literatures. A large body of work has studied the effect of industrial policy 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

[7] 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.

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

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

[10] 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.

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

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 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) also find positive causal impacts of EU investment subsidies in the United Kingdom.I complement this work by studying the lasting intergenerational impacts of larger industrial intervention in a more historical and less developed context.

Lastly, I contribute to the literature studying intergenerational mobility in incomes and educational attainment (Chetty et al., 2014; Card et al., 2018; 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; 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 presents the industry-level results. Section 4 presents the main individual-level, intergenerational results. Section 5 displays series of robustness and validity checks, as well as discusses heterogeneity and spillovers. Finally, Section 6 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). "*
>
> 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 payable in commodities chosen by the Soviet Union. 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 was to be paid in paper or timber products, and most were to be paid in more complex metal industry goods.

The reparation products the Soviet Union required 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 where Finland had little experience. 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 1944-1952.

The Soviet Union had experienced large losses in their metal industry production during the war, which in part explains the structure of the war reparations demands (Harrison, 2002; Rautakallio, 2014). 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, the reparations were instead based on the Soviet rebuilding needs(Auer, 1956; Rautakallio, 2014).[12]

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

[12]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).

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.[13] The final sum of reparations shipped by Finland in the years 1944-1952 was 226.5 million dollars in 1938 prices (Rautakallio, 2014). The Finnish state would most likely not have been able to fulfill the reparations without the Soviet alleviations, suggesting that the initial reparations sum was unfeasible given the Finnish production structure.

The burden to the Finnish state was considerable. Because the Finnish production capability in the Soviet-chosen 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 reparations represented on nearly 5% of the GDP for eight years (Rautakallio, 2014). 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(Rautakallio, 2014). [14]

Historians often consider the actual burden to the government to be significantly higher than 226.5 million dollars (Rautakallio, 2014).[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 Finnish government established a large government bureau called

[13]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).

[14]Because 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.

[15]226.5 million dollars in 1938 translate into approximately 4 billion dollars in 2018.

[16]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: *"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."*

Sotakorvausteollisuuden valtuuskunta (Soteva) to oversee and organize the war reparations effort.[17] 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 (Auer, 1956; Sahari, 2018). The Soviet Union again 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 strict and specific If an item in the cargo shipment at the border was not up to code, the Soviets declined the shipment(Auer, 1956).

In 1952, Finland became the only country after World War II to to manage its war reparation burden. This is was because, on the incentive side, there existed a credible threat that the Soviets would invade if the reparations were not paid in their entirety.[18] Finland also received large and favorable loans from Sweden, the U.S. and the Bank of International Settlements to help with the reparations (Auer, 1956).[19] These loans allowed taxation not to become too excessive and less recourses needed to be taken away elsewhere.

3 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 use 4-digit industry-level information drawn from Finnish industrial censuses combined with the amount of war reparations

[17] Soteva was a sizable organization, with over 500 employees, and was extremely involved in production, providing continuous help to companies.

[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. Finland did not receive any Marshall Aid because of Soviet pressure.

taken from trade statistics to estimate the following equation:[20]

$$Y_{It} = \beta_t Reparations_I + \gamma_I + \delta_t + \theta_t \mathbf{X}_I + \varepsilon_{It} \quad (1)$$

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.[21]

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.[22] 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.

I begin the empirical analysis by first 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 A.1. 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

[20] See the data appendix for further information on the data construction.

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

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

presented in column (5). I also flexibly control for these pre-treatment baseline variables in my future specifications. 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.

The basic difference-in-differences results from equation (1) for the sample period 1934-1970 are presented graphically in the event study in Figure 2. Here, the start (1944) and the end (1952) dates of the reparations payments are highlighted. The war reparations payments had a statistically significant long-term impact on the size of the exposed industries with impact sizesincreasing 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). The graphs 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.

These main industry-level results are also presented Table **??**. The estimates have similar sizes when controlling for pre-treatment characteristics. In the second panel of Table **??**, I examine the intensity of this treatment as 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 ($\approx$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.

These long-term within manufacturing results yield not only from the large demand shock the war reparations caused, but the government also paid all the capital investments that the exposed industries needed in order to meet the Soviet demand. This capital upgrading helps to explain part the persistence after the reparations payments ended. These within manufacturing results of temporary promotion are in line with those found in previous work, including Lane (2017), Giorcelli (2016) and Juhász (2014).

4 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 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.

4.1 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).[23]

To assess the endogeneity of the $Bartik_m$ variable and the validity of my identification strategy, I 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 industrial structure, 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 defined in equation (2). I standardize the $Bartik_m$ variable to have mean of zero and standard deviation of one.[24] These balance test results are presented in Table **??**. Prior to the reparations, the exposed and non-exposed municipalities are estimated to have had similar levels and changes in most outcomes conditional on the baseline industrial structure.

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

[24] Before standardizing the $Bartik_m$ variable, I dismiss the highest 1% of the values. These are mainly municipalities where I can link very few (less than 10) people to the industry in 1939 when constructing the measure. These extreme values have little effect on the main results, as these are small municipalities, but the outliers affect the standardization.

4.2 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 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. 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.

$$(Y_{im} \mid Agriculture\,1939_i) = \beta Bartik_m + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \tag{6}$$

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 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, 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).

To study cohort differences in the response to the policy, I estimate the effect separately for older and younger cohorts in the following equation (7):

$$Y_{im} = \beta_1 \left(Bartik_m \times Young \right) + \beta_2 \left(Bartik_m \times Old \right) + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \qquad (7)$$

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 31-40 in 1944 at the start of the reparations. When estimating equation (7) 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. Due to the war entering the labor market and education might be significantly delayed, so I allow the young cohort to be more sizable.

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 more exposed locations 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.[25]

4.3 Individual-Level Impacts: Established Workers

In this section, I focus on how the established workers (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 1970. In Panel A of Table 2, 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.[26] 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 11 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 8 percentage 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 8-percentage-point increase in the probability of working in manufacturing and a 3-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 5-percentage-point increase in the probability of working in manufacturing in 1950. This is a large impact compared to the mean of only 7.1%. Similarly, in this subsample, the service labor increased by 3.4 percentage points.

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

[25] I show in section 4.6 that the main results are significant at the standard levels when using industry-level inference methods from (Adão et al., 2018; Borusyak et al., 2018).

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

Next, I focus 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 2, 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 4.5-percentage-point increase in the probability of working in manufacturing and a 2.4-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 services 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 also present the estimated reduced-form impacts of the reparations shock on income In Panel B of Table 2. [27] I take the average income of a person in 1971 and 1975 to minimize missing incomes. I again divide the sample into all workers and those working in agriculture in 1939. I find that, the impact of a one-standard-deviation increase in the Bartik variable is associated with an increase of 1970s incomes by 12%. In the subsample of those who were agricultural workers in 1939, the estimated impact of a one-standard-deviation increase in the Bartik measure is 8.8%.[28]

4.4 Individual-Level Impacts: Younger Cohorts

I then turn to study the outcomes of the younger cohorts aged 5-30 in 1944 when the reparations started. As the increasing manufacturing opportunities plausibly offer these younger generations more options than the older generation, I will shed light on the long-term impacts and persistence of the policy by estimating how the

[27] 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.

[28] 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 Panel B of Table 2, 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 Panel A of Table 2, resulting in considerably larger estimates.

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.[29] 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 3. 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 agricultural workers and only slightly more likely to become production 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 2.4-percentage-point increase in the probability of being a production worker, which corresponds to approximately 3% of the mean. Likewise, these younger cohorts were 1.3 percentage points more likely to be in executive occupations, which corresponds to a 18% increase relative to the mean.

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 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

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

the younger and older cohorts and present the resulting estimates in Table 3. 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 increased their years of education by 0.215 years for each standard deviation increase in the Bartik variable. The impacts on higher education or upper-tail human capital were considerably larger. the impact of a one-standard-deviation increase in the Bartik variable on completing a university degree was 1.1 percentage points or 22% to the mean.

I present the main estimates for years of education and completing a university degree graphically in Figure 4. Here, the Bartik variable is interacted with 3-year cohorts. Larger exposure to the war reparations had no statistically significant effect for older cohorts (30 or older in 1944 when the reparations began) but had larger and statistically significant impacts on the younger cohorts.

4.5 Intergenerational Mobility

In this section, I show that the new industrial opportunities benefited especially those with less-fortunate backgrounds leading to more 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.[30] Kuznets' original 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]

[30] In addition to this intergenerational mobility mechanism, Kuznets (1955) presents that increased redistribution, demographic changes in class-composition, and faster growth in new industries, not necessarily owned by the initially high-income groups, can account for the lessening income inequality after a certain point of industrialization.

> 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."

I link the younger generation (aged 5-30 in 1944) to their father in the same household in the 1950 census to study intergenerational mobility following the intervention.[31]To estimate impacts on absolute upward mobility, I restrict the sample first to those whose father had only primary education or less. 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 estimate the following equation to study impact of the war reparations on individual's income rank, occupation, and education in 1970:

$$(Y_{im} \mid \textit{Father without primary education}_i) = \beta Bartik_m + \gamma_r + \eta \mathbf{X}_m + \theta \mathbf{X}_i + e_{im} \quad (8)$$

I present the results in Panel A of Table 4. A one-standard-deviation increase in the reparations exposure led to 0.17 years more schooling, 2.17 ranks higher average income, and a 1-percentage-point increase in the probability of holding an executive occupation for those whose parents had no education. I present these absolute upward mobility estimates also graphically in Figure 5. I follow Chetty et al. (2014) and rank the children into 100 equal-sized groups in the national income distribution in the 1970s to study their position in the income distribution.[32,33]

In Panel B of Table 4 I restrict the sample to those whose father had an upper school or high school diploma, the two highest educational categories available in the census, and again estimate the conditional outcomes in 1970. The estimates are

[31] Probability of locating the father is naturally higher for the younger cohorts.

[32] 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.

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

small and statistically insignificant at the 5% level.

In all measures: income rank, years of schooling, having a university degree, and having an executive or white-collar occupation, the effect is larger, relative to the mean, in the group where the parent had less than primary education. 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.

4.6 Robustness

I perform a set of robustness checks on the main results in this section. I start by reporting different specifications for all the outcomes in Table 2; Agriculture, Manufacturing, and Services in 1950 and 1970 and log Income in the 1970s in Table B.1. The results are not sensitive to the specification. In the first column, I report the unconditional estimates, that are always larger than the baseline estimates in the second column. In the third column, I use a data-driven method (Lasso) to choose the control variables instead of the baseline results with similar results. In the fourth column, I create four quartiles of the control variables to investigate if some non-linearities are important to control; these results are similar to the baseline results. Similarly, in columns 5 and 6, I divide the treatment, either into four or two groups. In both cases these non-linear specifications yield statistically significant results.

In Table B.2, I assess the robustness of table 7. The results are again little affected by the addition of different control variables. I further show that the baseline education and occupational upgrading results remain similar under more stringent specifications. I first add municipal fixed effects and then flexibly control the baseline controls interacted with cohort fixed effects.

I study the robustness of the upward mobility results in Table B.3. The specifications without controls, with data-driven controls, and with non-linear controls have little effect on the baseline specification. I further present that results remain similar when the sample includes all whose fathers had less than primary education, instead of the sample where the father has no education.

Recent papers have suggested for further robustness tests when using a shift-share or Bartik measure. Goldsmith-Pinkham et al. (2018) show that the

Bartik instrument is numerically equivalent to using pre-treatment shares as instruments. This equivalence means that the identification assumption is based on the exogeneity of the shares. To understand which share instrument has the largest weigh in the Bartik estimate, Goldsmith-Pinkham et al. (2018) advocate calculating Rotemberg weights to decompose the estimate to just-identified share-instrument estimates.

I calculate reduced-form versions of the Rotemberg weights (αs) and estimates (βs) for each of the industry-shares in Table B.4. Here the highest weight is on the 2-digit industry shares for Manufacture of transport equipment (38), Manufacture of electrical machinery, apparatus, appliances and supplies (37), and Manufacture of machinery, except electrical machinery (36). The places with this type of manufacturing in 1939 are driving the results. As the identification assumption is based on theexogeneity of the shares, Goldsmith-Pinkham et al. (2018) propose that knowing which industries are the most important lets us know which industries to test the identifying assumptions . In Table **??**, I present the same balance Table **??**, butexamining the conditional independence assumption of the municipality pre-treatment shares for industry groups 36, 27, and 38 instead of the Bartik-measure.

Borusyak et al. (2018) presents another type of numerical equivalence of the Bartik instrument that allows the implementation of the research design using industry or shock-level procedure. This equivalence means that one can estimate a municipality-level equivalent regression at the industry level, which helps, for example, with inference. In Table B.6, I implement this shock-level procedure aggregated to the 52 2-digit industries available in the 1950 census. All the paper's primary outcomes: leaving agriculture, log income in 1970, child income rank, and child years of education remain highly statistically significant when implementing this method. In Table B.6, I also report the AKM and AKM0 confidence intervals calculated using the methodology introduced in Adão et al. (2018). These confidence intervals, albeit larger, exclude zero except in the Years of Schooling variable, where the lower bound for the more conservative AKM0 95% confidence interval barely includes zero.

5 Further Analysis

5.1 Heterogeneity

5.1.1 Heterogeneity by Baseline Characteristics

To better understand factors correlated with the policy's success, I interact the Bartik variable with three pre-treatment municipal characteristics: income, infrastructure, and education level. I create an indicator measure for high initial income level if the average income tax in the municipality was above average. Similarly, I create an indicator measure for high average education level in municipality using the imputed years of schooling for the older, non-treated, cohorts in the 1950 census. Finally, I proxy infrastructure with the existence of a railway, built before the treatment.

In Table A.4 I report the heterogeneity of the effects for the long-term 1970s outcomes. The inclusion of the interaction terms does not affect the outcomes of the first generation in Panel A, meaning that there is little heterogeneity in the treatment in these dimensions. Similarly, there seems to be little heterogeneity in the upward mobility estimates presented in Panel B of Table A.4. However, the overall education effect appears to be driven by higher income and better connected places affected by the war reparations.

5.1.2 Impacts by Industry Skill Intensity

I separate the war reparations shock by industry skill intensity, measured by average years of schooling, to examine if the increase in human capital accumulation is due to an increase in manufacturing or an increase in high skill manufacturing opportunities.[34,35] This exercise will help illuminate the possible

[34] 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.

[35] 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.1. 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.

mechanisms behind the lasting impacts. Table A.5 reports the estimated impacts on human capital accumulation with low- and high-skill Bartik variables interacted with age groups. 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 with less skill-intensive industrial structure.

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.[36] Strong positive impacts for the younger cohorts in the high-skill areas again support the increase in the returns to schooling narrative.

5.2 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 opened in Oulu (1959), Tampere (1960), Vaasa (1968), Lappeenranta (1969), Joensuu (1969), and Kuopio (1972). I estimate equation 7 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.7, 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.

5.3 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

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

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.[37] 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.6 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.

5.4 Change in the Production Structure

In this section I examine if the locations that experienced more substantial war reparations exposure also diversify to other more complicated industries. I do this by (i) following (Dell and Olken, 2017) to calculate how much additional upstream and downstream production the war reparations create in a given municipality and by (ii) measuring the capital and education intensity of the industries in a given municipality. [38] I explain the construction of these measures in further detail in the appendix.

Estimates in Table 5 show that municipalities more exposed to the war reparations production had in 1970 more workers employed in sectors upstream and downstream from these industries.[39] A one-standard-deviation increase in the Bartik variable leads to a 0.213 increase in upstream production and a 0.455 increase in downstream production, accounting to 9.8 and 10.3 percent relative to the mean.

In Table 5 also shows that industries in the more exposed locations have in 1970 higher capital intensity as well as human capital intensity. A one-standard-deviation increase in the Bartik variable leads to a 0.049 increase in capital intensity (24% relative to the mean) and a 0.319 increase in human capital intensity (19% relative to the mean).

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

[38] I measure the capital intensity and education intensity in manufacturing using U.S measures taken from Ciccone and Papaioannou (2009).

[39] I lose approximately 15% of observations because of complicated municipal mergers between 1939 and 1970.

5.5 Spillovers

In this section, I measure spillover impacts of the war reparations to other municipalities. I follow the existing literature (Dell and Olken, 2017; Lane, 2017), and calculate a war reparation upstream and downstream connection for each municipality. I do this similarly to the $Bartik_m$ measure, but instead of using direct pre-treatment share of war reparation producing industries, I use upstream and downstream linked industry shares using the 1959 Finnish input-output table.[40] To measure higher-order upstream and downstream links, I calculate a local (Leontief-weighted) measure for downstream (s^d_{mi}) and upstream (s^u_{mi}) impact for each industry. I then use these municipality level measures as shares for upstream and dowstream Bartik measures $Bartik^u_m = \sum_i s^u_{im} \frac{Reparations_i}{L_i}$ and $Bartik^d_m = \sum_i s^d_{im} \frac{Reparations_i}{L_i}$. [41]

In Table A.8, II present estimates for agricultural employment in 1950 and 1970, log income in 1970, and years of schooling and income rank, taking into account these upward and downward spillovers to other municipalities. The main estimates are not statistically different from the baseline estimates. I find that in locations that had production upstream from the war reparation industries, workers were less likely to work in agriculture in 1950 and 1970. I find no differential impact in incomes or years of schooling. There is a statistically significant impact in all the outcomes in municipalities that had production downstream of the war reparation industries. These results taken together suggest that the war reparations did not only lead to local economic development but also had positive spillover impacts on other regions.

5.6 Falsification Exercise with Norwegian Industrial Data

As a further validity check, I show that the war reparation industries did not grow faster 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 high and disproportional demand for metal sector products, these industries may have grown faster than other industries, even without any

[40] This is the first available input-output table with comparable industrial classification

[41] The creation of these measure is further clarified in the appendix.

government intervention. I cannot test this hypothesis directly, 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.[42] 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.

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.[43] 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.9, 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.

6 Discussion

This paper shows that the forced war reparations ended up being a relatively successful form of government industrial policy leading to industrialization as well as increases in human capital accumulation and upward mobility. 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

[42]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. To the best of my knowledge, the datasets used in this study are the only existing panels of harmonized industrial statistics covering the 1935-1970 period at the 4-digit level.

[43]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.

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).

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, the Finnish experience reminisces of other successful industrial policies. 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.[44] 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.[45]

These political economy considerations mean that this experiment is unlikely to be directly replicable in many of today's low-income countries with poor institutional quality. However, many middle-income countries have comparable or higher institutional quality than Finland in 1944 and, for example, 40% of the

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

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

Indian labor force still work in agriculture.[46] The results of this paper highlight that policies helping to move this labor force out of agriculture may not only raise the incomes of the workers but also further incentivize education and help upward mobility.

6.1 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 and promoted structural transformation by incentivizing people to leave agriculture for more modern sectors, increasing their long-term incomes. The war reparations further created important additional impacts by incentivizing schooling and promoting upward mobility.

The war reparations 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 for example in Krugman (1994) and Young (1995), this type of growth is subject to diminishing returns, and cannot continue without new innovation. The intergenerational results of this paper show that the war reparations did not only increase the initial manufacturing labor opportunities but also human capital accumulation, facilitating more sustainable growth.

The findings of this paper further 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 promote sectors such as tourism and cut flowers.[47] 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.

[46] Finland had experienced a devastating civil war in 1918 and introduced compulsory education in 1921, later than many comparable countries.

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

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 especially illustrates the possibility of furhter externalities of such policies. 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.

References

Acemoglu, D.: 1997, Training and innovation in an imperfect labour market, *The Review of Economic Studies* **64**(3), 445–464.

Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H. and Price, B.: 2016, Import competition and the great us employment sag of the 2000s, *Journal of Labor Economics* **34**(S1), S141–S198.

Acemoglu, D., Johnson, S. and Robinson, J. A.: 2005, Institutions as a fundamental cause of long-run growth, *Handbook of economic growth* **1**, 385–472.

Adão, R., Kolesár, M. and Morales, E.: 2018, Shift-share designs: Theory and inference, *arXiv preprint arXiv:1806.07928* .

Amsden, A. H.: 1992, *Asia's next giant: South Korea and late industrialization*, Oxford University Press on Demand.

Angrist, J. D. and Pischke, J.-S.: 2008, *Mostly harmless econometrics: An empiricist's companion*, Princeton university press.

Atkin, D.: 2016, Endogenous skill acquisition and export manufacturing in mexico, *American Economic Review* **106**(8), 2046–85.

Auer, J.: 1956, *Suomen sotakorvaustoimitukset Neuvostoliitolle: tutkimus tavaroiden luovutusohjelmista, niiden toteuttamisesta ja hyvityshinnoista*, W. Söderström.

Autor, D., Dorn, D. and Hanson, G. H.: 2013, The china syndrome: Local labor market effects of import competition in the united states, *American Economic Review* **103**(6), 2121–68.

Azariadis, C. and Stachurski, J.: 2005, Poverty traps, *Handbook of economic growth* **1**, 295–384.

Barro, R. J.: 2001, Human capital and growth, *American economic review* **91**(2), 12–17.

Bartik, T. J.: 1991, Who benefits from state and local economic development policies?

Benhabib, J. and Spiegel, M. M.: 2005, Human capital and technology diffusion, *Handbook of economic growth* **1**, 935–966.

Besley, T. and Persson, T.: 2011, *Pillars of prosperity: The political economics of development clusters*, Princeton University Press.

Borusyak, K., Hull, P. and Jaravel, X.: 2018, Quasi-experimental shift-share research designs, *arXiv preprint arXiv:1806.01221* .

Card, D., Domnisoru, C. and Taylor, L.: 2018, The intergenerational transmission of human capital: Evidence from the golden age of upward mobility.

Chetty, R. and Hendren, N.: 2018, The impacts of neighborhoods on intergenerational mobility i: Childhood exposure effects, *The Quarterly Journal of Economics* **133**(3), 1107–1162.

Chetty, R., Hendren, N., Kline, P. and Saez, E.: 2014, Where is the land of opportunity? the geography of intergenerational mobility in the united states, *The Quarterly Journal of Economics* **129**(4), 1553–1623.

Ciccone, A. and Papaioannou, E.: 2009, Human capital, the structure of production, and growth, *The Review of Economics and Statistics* **91**(1), 66–82.

Clark, C.: 1940, The conditions of economic progress, *The conditions of economic progress* .

Criscuolo, C., Martin, R., Overman, H. G. and Van Reenen, J.: 2019, Some causal effects of an industrial policy, *American Economic Review* **109**(1), 48–85.

Dell, M. and Olken, B. A.: 2017, The development effects of the extractive colonial economy: the dutch cultivation system in java, *Technical report*, National Bureau of Economic Research.

Evans, P. B.: 2012, *Embedded autonomy: States and industrial transformation*, Princeton University Press.

Fellman, S.: 1996, Suomen sotakorvaukset ja metalliteollisuus, *Historiaa tutkimaan. Jyväskylä* .

Franck, R. and Galor, O.: 2018, Flowers of evil? industrialization and long run development.

Gennaioli, N., La Porta, R., Lopez-de Silanes, F. and Shleifer, A.: 2012, Human capital and regional development, *The Quarterly journal of economics* **128**(1), 105–164.

Giorcelli, M.: 2016, The long-term effects of management and technology transfer: Evidence from the us productivity program, *Stanford Institute for Economic Policy Research, Discussion Paper* (16-010).

Goldin, C. and Katz, L. F.: 1997, Why the united states led in education: lessons from secondary school expansion, 1910 to 1940, *Technical report*, National Bureau of Economic Research.

Goldsmith-Pinkham, P., Sorkin, I. and Swift, H.: 2018, Bartik instruments: What, when, why, and how, *Technical report*, National Bureau of Economic Research.

Gollin, D., Lagakos, D. and Waugh, M. E.: 2013, The agricultural productivity gap, *The Quarterly Journal of Economics* **129**(2), 939–993.

Harrison, A. and Rodríguez-Clare, A.: 2009, Trade, foreign investment, and industrial policy for developing countries, *Technical report*, National Bureau of Economic Research.

Harrison, M.: 2002, *Accounting for war: Soviet production, employment, and the defence burden, 1940-1945*, Vol. 99, Cambridge University Press.

Hausmann, R., Hwang, J. and Rodrik, D.: 2007, What you export matters, *Journal of economic growth* **12**(1), 1–25.

Hausmann, R. and Rodrik, D.: 2003, Economic development as self-discovery, *Journal of development Economics* **72**(2), 603–633.

Hidalgo, C. A., Klinger, B., Barabási, A.-L. and Hausmann, R.: 2007, The product space conditions the development of nations, *Science* **317**(5837), 482–487.

Hirschman, A. O.: 1958, *The strategy of economic development*, Vol. 58, yale university Press New Haven.

Jensen, R.: 2010, The (perceived) returns to education and the demand for schooling, *The Quarterly Journal of Economics* **125**(2), 515–548.

Jensen, R.: 2012, Do labor market opportunities affect young women's work and family decisions? experimental evidence from india, *The Quarterly Journal of Economics* **127**(2), 753–792.

Juhász, R.: 2014, Temporary protection and technology adoption: Evidence from the napoleonic blockade.

Kindleberger, C.: 1987, Suomen sotakorvaukset, *Kansantaloudellinen aikakauskirja* **93**(2).

Kline, P. and Moretti, E.: 2013, Local economic development, agglomeration economies, and the big push: 100 years of evidence from the tennessee valley authority, *The Quarterly Journal of Economics* **129**(1), 275–331.

Kline, P. and Moretti, E.: 2014, People, places, and public policy: Some simple welfare economics of local economic development programs, *Annu. Rev. Econ.* **6**(1), 629–662.

Kokkinen, A.: 2012, On finland's economic growth and convergence with sweden and the eu15 in the 20th century.

Kokkinen, A., Jalava, J., Hjerppe, R. and Hannikainen, M.: 2007, Catching up in europe: Finland's convergence with sweden and the eu15, *Scandinavian Economic History Review* **55**(2), 153–171.

Krueger, A. O.: 1990, Government failures in development, *Journal of Economic perspectives* **4**(3), 9–23.

Krugman, P.: 1991, History versus expectations, *The Quarterly Journal of Economics* **106**(2), 651–667.

Krugman, P.: 1994, The myth of asia's miracle, *Foreign affairs* pp. 62–78.

Kuznets, S.: 1955, Economic growth and income inequality, *The American economic review* **45**(1), 1–28.

Kuznets, S.: 1957, Quantitative aspects of the economic growth of nations: Ii. industrial distribution of national product and labor force, *Economic development and cultural change* **5**(S4), 1–111.

Lane, N.: 2017, Manufacturing revolutions: Industrial policy and networks in south korea, *Technical report*.

Lewis, W. A.: 1955, Theory of economic growth.

Liu, E.: 2017, Industrial policies in production networks.

Mankiw, N. G., Romer, D. and Weil, D. N.: 1992, A contribution to the empirics of economic growth, *The quarterly journal of economics* **107**(2), 407–437.

Matsuyama, K.: 1991, Increasing returns, industrialization, and indeterminacy of equilibrium, *The Quarterly Journal of Economics* **106**(2), 617–650.

Mokyr, J.: 2005, Long-term economic growth and the history of technology, *Handbook of economic growth*, Vol. 1, Elsevier, pp. 1113–1180.

Munshi, K. and Rosenzweig, M.: 2006, Traditional institutions meet the modern world: Caste, gender, and schooling choice in a globalizing economy, *American Economic Review* **96**(4), 1225–1252.

Murphy, K. M., Shleifer, A. and Vishny, R. W.: 1989, Industrialization and the big push, *The Journal of Political Economy* **97**(5), 1003–1026.

Nelson, R. R. and Phelps, E. S.: 1966, Investment in humans, technological diffusion, and economic growth, *The American economic review* **56**(1/2), 69–75.

Newfarmer, R., Page, J. and Tarp, F.: 2018, *Industries without Smokestacks: Industrialization in Africa Reconsidered*, Oxford University Press.

Nunn, N. and Trefler, D.: 2010, The structure of tariffs and long-term growth, *American Economic Journal: Macroeconomics* **2**(4), 158–94.

Oster, E. and Steinberg, B. M.: 2013, Do it service centers promote school enrollment? evidence from india, *Journal of Development Economics* **104**, 123–135.

Pack, H. and Saggi, K.: 2006, Is there a case for industrial policy? a critical survey, *The World Bank Research Observer* **21**(2), 267–297.

Rautakallio, H. e.: 2014, *Suomen Sotakorvaukset*, Paasilinna.

Robinson, J. A.: 2009, Industrial policy and development: a political economy perspective, *Washington, DC: The World Bank* .

Rodrik, D.: 2007, Industrial development: Some stylized facts and policy directions, *Industrial development for the 21st century: Sustainable development perspectives* pp. 7–28.

Rodrik, D.: 2008, *Normalizing industrial policy*, The World Bank.

Rodrik, D.: 2009, Industrial policy: don't ask why, ask how, *Middle East Development Journal* **1**(1), 1–29.

Rodrik, D.: 2012, Unconditional convergence in manufacturing, *The Quarterly Journal of Economics* **128**(1), 165–204.

Rosenstein-Rodan, P. N.: 1943, Problems of industrialisation of eastern and south-eastern europe, *The Economic Journal* pp. 202–211.

Sahari, A.: 2018, Valtio ja suurteollisuuden synty: Laivanrakennusteollisuuden kehittyminen yhteiskunnallisissa teknopoliittisissa järjestelmissä suomessa 1918–1954.

Sarvimäki, M.: 2011, Agglomeration in the periphery.

Sarvimäki, M., Uusitalo, R. and Jäntti, M.: 2018, Habit formation and the misallocation of labor: evidence from forced migrations, *Technical report*.

Scott, J. C.: 1998, *Seeing like a state: How certain schemes to improve the human condition have failed*, Yale University Press.

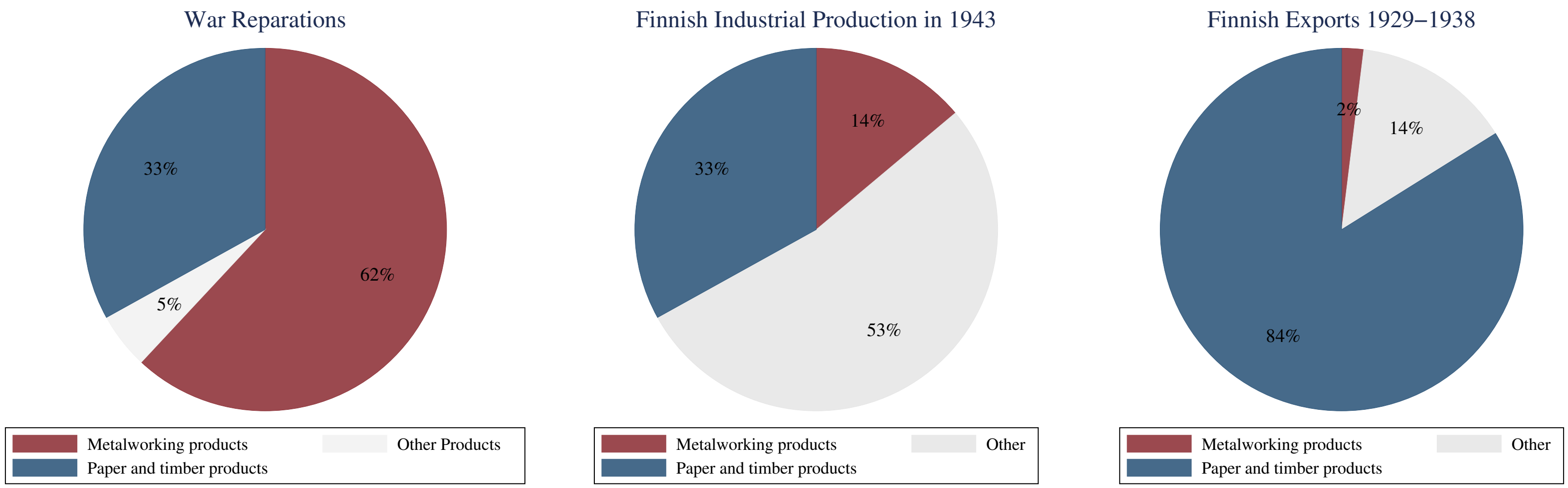
Squicciarini, M. P. and Voigtländer, N.: 2015, Human capital and industrialization: Evidence from the age of enlightenment, *The Quarterly Journal of Economics* **130**(4), 1825–1883.

Suviranta, B.: 1948, *Suomen sotakorvaus ja maksukyky*, Otava.

Wade, R.: 1990, *Governing the market: Economic theory and the role of government in East Asian industrialization*, Princeton University Press.

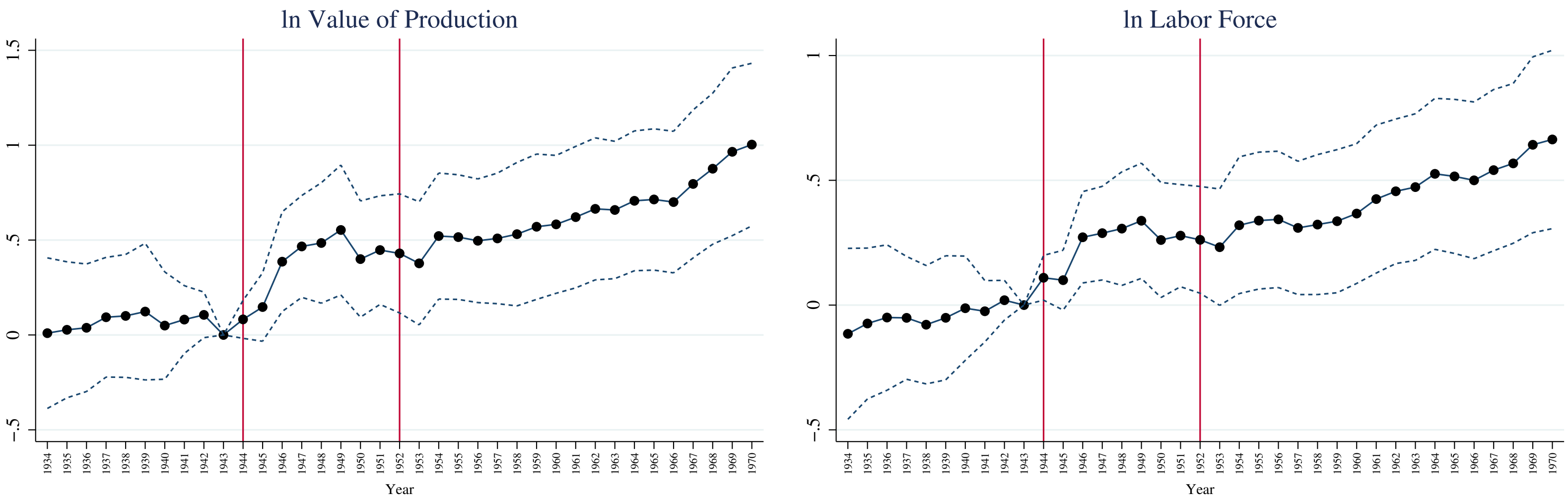
Young, A.: 1995, The tyranny of numbers: confronting the statistical realities of the east asian growth experience, *The Quarterly Journal of Economics* **110**(3), 641–680.

Figure 1. War Reparations Relative to the Finnish Production Structure



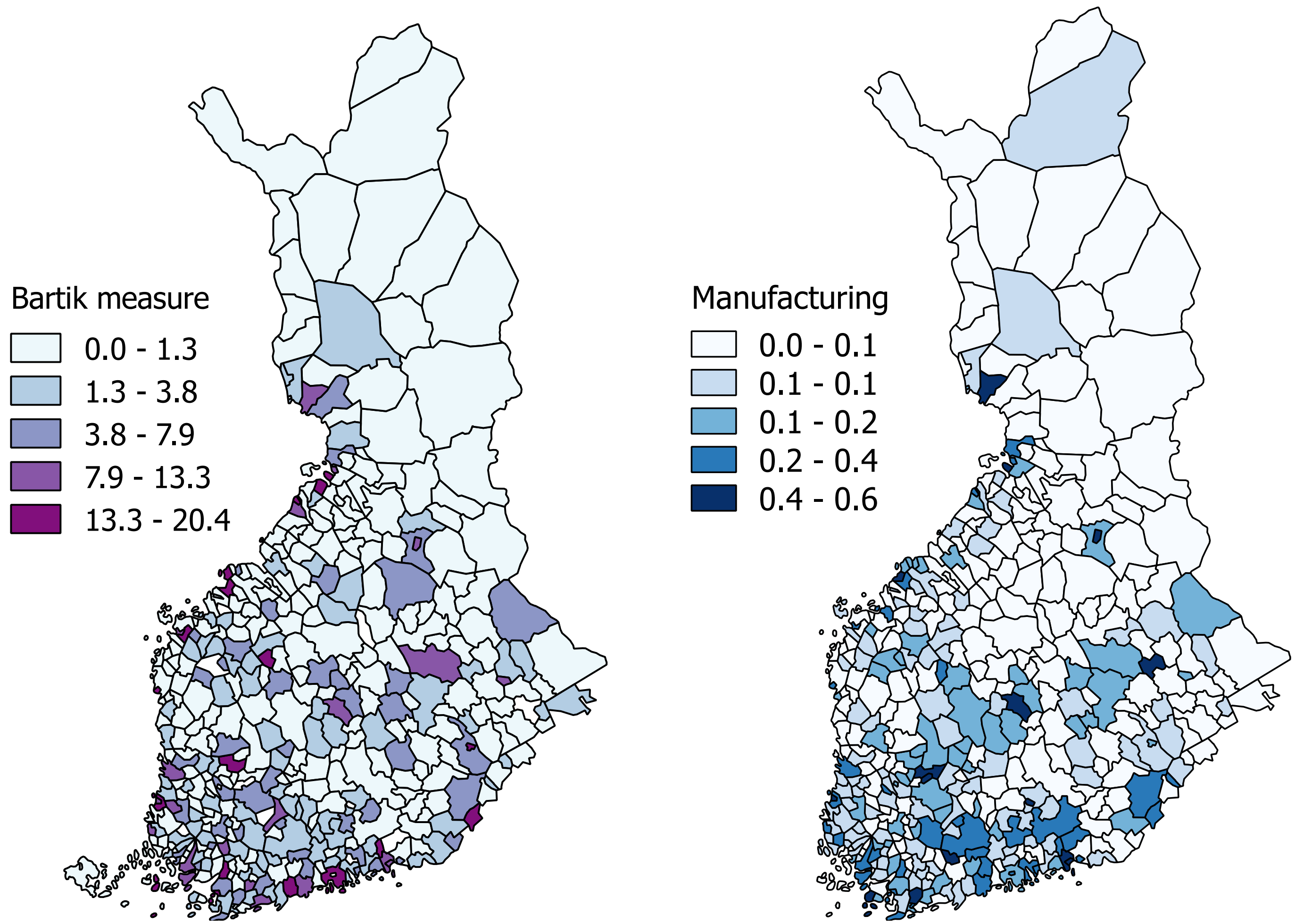
Notes: The figures present the percentages of values. The first pie chart documents the structure of the war reparation payments Finland was ordered to make in 1944 in three large industry groups. The following charts relate these values to the Finnish production structure. The values of Finnish industrial 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



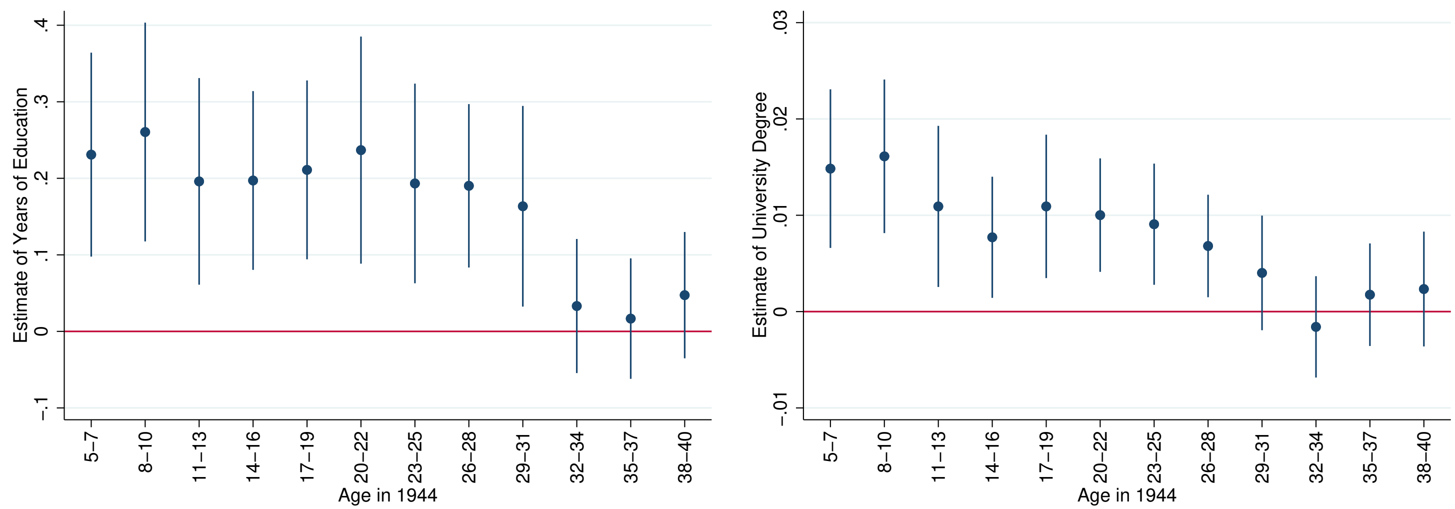
Notes: The graphs present estimated difference-in-differences coefficients (β_t) from equation (1). The outcome is regressed on the war reparations treatment dummy interacted with year effects. The model also includes year fixed effects and industry effects, as well as 1943 baseline controls for the 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



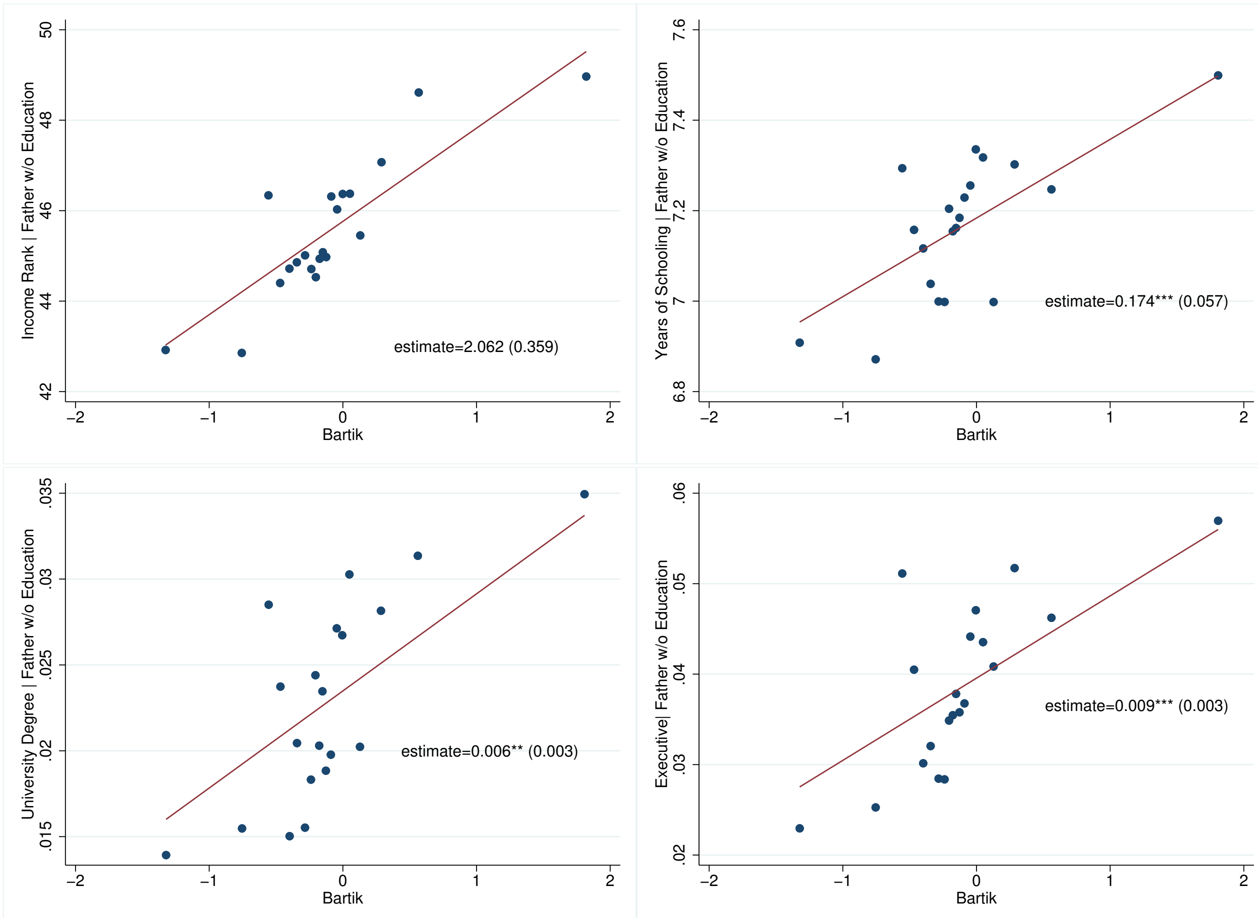
Notes: The left-hand map presents the war reparations shock of Finnish municipalities measured using the $Bartik_m$ variable, where labor shares are calculated using the pre-treatment 1939 shares. The right-hand map presents the baseline 1940 manufacturing labor shares controlled in the estimations.

Figure 4. 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 1944 on education in 1970. All regressions include the baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, 11 region fixed effects, and urban fixed effects interacted with age fixed effects, as well as sex 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 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 those 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 Municipality Characteristics, by War Reparations Exposure

		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 2. Impact of the War Reparations on Established Workers

Panel A: Outcomes in 1950

	Agriculture 1950		Manufacturing 1950		Services 1950	
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik	-0.111***	-0.083***	0.079***	0.050***	0.032***	0.034***
	(0.012)	(0.012)	(0.005)	(0.006)	(0.010)	(0.008)
N	83545	24919	83545	24919	83545	24919
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939
Y mean	0.403	0.821	0.235	0.071	0.361	0.108

Panel B: Outcomes in 1970

	Agriculture 1970		Manufacturing 1970		Services 1970		Ln Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bartik	-0.064***	-0.052***	0.045***	0.026***	0.024***	0.030***	0.120***	0.088***
	(0.008)	(0.010)	(0.004)	(0.005)	(0.007)	(0.008)	(0.018)	(0.017)
N	76696	22919	76696	22919	76696	22919	61272	18502
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939	All	Agriculture 1939
Y mean	0.242	0.498	0.158	0.079	0.323	0.170	6.806	6.543

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. Income is measured as average between 1971 and 1975. The log transformation in columns (7)-(8) drops out the zero values. 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 3. Impact of the War Reparations on Occupation and Education in 1970, by Cohort

	Agriculture	Production	White-collar	Executive	Years of Education	Uni Degree
	(1)	(2)	(3)	(4)	(5)	(6)
Bartik x (Over 30 in 1944)	-0.050***	0.040***	0.008***	0.003	0.052	0.001
	(0.007)	(0.004)	(0.003)	(0.002)	(0.034)	(0.002)
Bartik x (Under 30 in 1944)	-0.055***	0.024***	0.022***	0.013***	0.215***	0.011***
	(0.008)	(0.004)	(0.005)	(0.004)	(0.056)	(0.003)
N	144804	144804	144804	144804	144804	144804
Y mean	0.267	0.324	0.163	0.071	7.478	0.051
$\beta_1 = \beta_2$ (p-val)	0.282	0.001	0.000	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 30 and those aged above 30 in 1944. Occupation is measured in 1970 using Statistics Finland's classifications for socio-economic groups. Uni degree indicates that the person had at least an undergraduate degree. Years of education is imputed measure from the census. 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, 11 region fixed effects, and urban fixed effects interacted with age fixed effects, as well as sex 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 War Reparations on Intergenerational Mobility

Panel A: Father in the Lowest Education Group

	Income Rank	Years Schooling	Uni Degree	White Collar	Executive
	(1)	(2)	(3)	(4)	(5)
Bartik	2.168***	0.174***	0.006**	0.020***	0.009***
	(0.343)	(0.057)	(0.003)	(0.006)	(0.003)
N	19146	19146	19146	19146	19146
Y mean	45.410	7.163	0.023	0.151	0.039

Panel B: Father in One of the Two Highest Education Groups

	Income Rank	Years Schooling	Uni Degree	White Collar	Executive
	(1)	(2)	(3)	(4)	(5)
Bartik	0.708	0.274*	0.026*	0.007	0.006
	(1.099)	(0.153)	(0.015)	(0.014)	(0.013)
N	1918	1918	1918	1918	1918
Y mean	69.503	12.745	0.458	0.290	0.515

Notes: The unit of observation is an individual in 1970. The sample includes individuals aged 5-29 in 1944 linked to their Father within household. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. Income rank tells the rank within cohort by average income between 1971 and 1975. Uni degree indicates that the person had at least an undergraduate degree. Years of education is imputed measure from the census. 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 5. Local Industrial Development Impacts of the War Reparations in 1970

	Upstream Employment	Downstream Employment	Capital Intensity	Human Capital Intensity
	(1)	(2)	(3)	(4)
Bartik	0.213***	0.455***	0.049***	0.319***
	(0.063)	(0.110)	(0.014)	(0.077)
N	396	396	396	396
Y mean	2.172	4.391	0.208	1.616

Notes: The unit of observation is a municipality in 1970. Bartik is a municipality-level measure of the reparations shock assigned to the 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. Upstream Employment and Downstream Employment measure the municipal employment effect in industries upstream and downstream from the war reparation industries. Capita Intensity and Human Capital Intensity measure the industries within a municipality. Industry capital intensity and human capital intensity drawn from Ciccone and Papaioannou (2009). Robust standard errors are in parentheses. *** 1%, ** 5%, * 10% significance levels.

Online Appendix. Not For Publication.

Data Appendix

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). Tavaralaji codes, which are explained in table 4b of the Foreign trade publication 1944. 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. [48]

Classification Changes

The reparations data are in Finnish product classification (Tavaralaji), from which Statistics Finland offers a crosswalk to the UN Standard International Trade Classification (SITC) in Publication for Foreign trade (1958). Using further concordances provided by United Nations Statistics Division, I can map these products into ISIC 1948. These classification changes will probably introduce some measurement error, but the final product groupings are similar compared with the original Finnish product classification. Furthermore, there is nothing in the classification changes that should introduce systematic measurement error.

Industrial classification does not remain constant over the entire period. To make the data comparable over time, I have to change the classification from Finnish industry classification to International Standard Industrial Classification

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

of All Economic Activities (ISIC 1948), using classification crosswalks provided by Statistics Finland. The change in classification occur in year 1954.

To make the values comparable over time, I deflate the data using indices obtained for Statistics Finland. For the industrial production I use the Finnish wholesale price index, and for the reparations exports the Finnish price index for exported goods, both from the Statistical yearbook of Finland 66 (1970). The reference year for both is 1935=100.

Similar exercise is performed with the Norwegian industrial statistics to create counterparts for the treated Finnish industries. In Norway changes in the classification occur in year 1949. In the end I have Norwegian counterparts over the years 1934-1965.

A.1 Main Finnish Data Sources

Suomen virallinen tilasto I A. Ulkomaankauppa = Utrikeshandel = Foreign trade: 1944 - 1952. Helsinki: Tullihallitus, 1945-1953.

Suomen virallinen tilasto XVIII A . Teollisuustilastoa = Industristatistik = Industrial statistics of Finland : 1930-1970. - Helsinki : Tilastollinen päätoimisto, 1932-1973.

A.2 Crosswalks Between the Classifications

From the Finnish Industry classification to Finnish version of ISIC (1949).

Suomen virallinen tilasto XVIII A . Teollisuustilastoa = Industristatistik = Industrial statistics of Finland : 1954. - Helsinki : Tilastollinen päätoimisto, 1955.

From the Finnish product classification (Tavaralaji) to SITC.

Suomen virallinen tilasto I A. Ulkomaankauppa = Utrikeshandel = Foreign trade: 1958. Helsinki: Tullihallitus, 1959

Allocate SITC products into ISIC industries.

Standard International Trade Classification (1950). Statistical Papers, Series M, No. 10. United Nations.

A.3 Indices to Deflate the Values from the Statistical Yearbook of Finland

Wholeprice index and the Exports price index from:

Suomen tilastollinen vuosikirja= Statistisk årsbok för Finland = Statistical yearbook of Finland. Helsinki : Tilastokeskus. 1970

A.4 Data Sources for Norwegian Industrial Production

Norges offisielle statistikk: Norges industri; produksjonsstatistikk . Statistisk sentralbyrå (SSB). 1931-1970.

Norwegian Sales index available online at:

http://www.ssb.no/en/priser-og-prisindekser/statistikker/pif/maaned/2015-05-11#content

Municipal Industrial Development 1970

I construct a measure of industry capital intensity and human capital intensity in 1970 at a municipal-level. I start by calculating the 1970 municipality-level employment share in each industry:

$$S_{Im} = \frac{e_{Im}}{t_m}$$

Where e_{Im} is the amount of workers in industry I in municipality m and t_m is total employment in the municipality in 1970.

I multiply the municipal industry share in 1970 with the industry capital intensity and human capital intensity. These 1980 U.S. industry-specific measures come from Ciccone and Papaioannou (2009). In the end I have two measures for each municipality m:

$$Capital\ Intensity_m = \sum_I S_{mi} Capital\ Intensity_I$$

$$Human\ Capital\ Intensity_m = \sum_I S_{mi} Human\ Capital\ Intensity_I$$

Leontief-Weighted Outcomes in 1970

I follow Dell and Olken (2019) and construct local-level upstream and downstream employment effects in 1970. I start by calculating the 1970 municipality-level employment share in each industry:

$$S_{Im} = \frac{e_{Im}}{t_m}$$

Where e_{Im} is the amount of workers in industry I in municipality m and t_m is total employment in the municipality in 1970.

To calculate industry Leontief weights, I use the 1959 Finnish input-output table.Using this table, I construct a first-order upstream linkage matrix U, where U_{IJ} is inputs from industry I to industry J divided by total output of industry J. U_{IJ} tells how much industry j needs industry i to make its product. Similarly, I construct a first-order downstream linkage matrix D, where D_{IJ} is inputs from industry i to industry j divided by the total production of industry i. D_{IJ} tells how much of industry i's relative production go to industry j.

To measure higher-order upstream and downstream links, I calculate Leontief Matrices as $\widehat{U} = (I - U)^{-1}$ and $\widehat{D} = (I - D)^{-1}$. Using these measures I can calculate a local (Leontief-weighted) measure for downstream (s^d_{Im}) and upstream (s^u_{Im}) impact for each industry.

$$s^u_{Im} = \frac{1}{\sum_{\widehat{U}}} \left(\sum_{j=1}^{N} S_{Im} \widehat{U}_{IJ} \right)$$

$$s^d_{Im} = \frac{1}{\sum_{\widehat{D}}} \left(\sum_{j=1}^{N} S_{Im} \widehat{D}_{IJ} \right)$$

Here, N is the number of industries and $\sum_{\widehat{U}}$ and $\sum_{\widehat{D}}$ are the sums of Leontief weights within a municipality in 1970. I don't consider the link when industry $I = J$ to take out the own effect.

Finally, I calculate the local employment shares upstream and downstream from the war reparations in 1970 by multiplying the shares with reparations shock:

$$Upstream_m = \sum_I s^u_{Im} \frac{Reparations_J}{L_J}$$

$$Dowstream_m = \sum_I s^d_{Im} \frac{Reparations_J}{L_J}$$

Here, the industry-level reparations shock ($\frac{Reparations_J}{L_J}$) is scaled by the local

(Leontief-weighted) measure for downstream (s^d_{Im}) and upstream (s^u_{Im}) impact for each industry. The variables $Upstream_m$ and $Dowstream_m$ measure the local downstream and upstream employment impacts of the war reparations.

Leontief-weighted Bartik Measures

I follow Dell and Olken (2019) in constructing the local-level upstream and downstream linkages also on treatment. I start by calculating the pre-treatment 1939 municipality-level employment share in each non-primary industry using the 1950 Finnish census, which includes the municipality and industry of a person in 1939.[49]

$$S^{1939}_{Im} = \frac{e_{Im}}{t_m}$$

Where e_{mi} is the amount of workers in industry i in municipality m. t_m is total employment in the municipality. I discard all workers without industry in 1939. I calculate a local (Leontief-weighted) measure for downstream ($s^{d,1939}_{Im}$) and upstream ($s^{u,1939}_{Im}$) impact for each industry using the same 1959 input-output weights described in the previous section:

$$s^{u,1939}_{Im} = \frac{1}{\sum_{\widehat{U}}} \left(\sum_{j=1}^{N} S^{1939}_{Im} \widehat{U}_{IJ} \right)$$

$$s^{d,1939}_{Im} = \frac{1}{\sum_{\widehat{D}}} \left(\sum_{j=1}^{N} S^{1939}_{Im} \widehat{D}_{IJ} \right)$$

Here, N is the number of industries and $\sum_{\widehat{U}}$ and $\sum_{\widehat{D}}$ are the sums of Leontief weights within a municipality pre-treatment in 1939. I don't consider the link when industry $i = j$ to take out the own effect.

Finally, I use these municipality-level measures as shares in two Bartik-measures:

[49] I use the non-primary industries as these sectors are extremely large and linked through the Leontief matrix to all industries. Then the upstream measure $s^u_{im} \frac{Reparations_i}{L_i}$ is driven by these sectoral shares.

$$Bartik^u_m = \sum_I s^{u,1939}_{Im} \frac{Reparations_J}{L_J}$$

$$Bartik^d_m = \sum_I s^{d,1939}_{Im} \frac{Reparations_J}{L_J}$$

Here, the industry-level reparations shock $(\frac{Reparations_j}{L_j})$ is scaled by the local (Leontief-weighted) measure for downstream $(s^{d,1939}_{Im})$ and upstream $(s^{u,1939}_{Im})$ impact for each industry. The variables $Bartik^u_m$ and $Bartik^d_m$ measure the local downstream and upstream exposure to the war reparations.

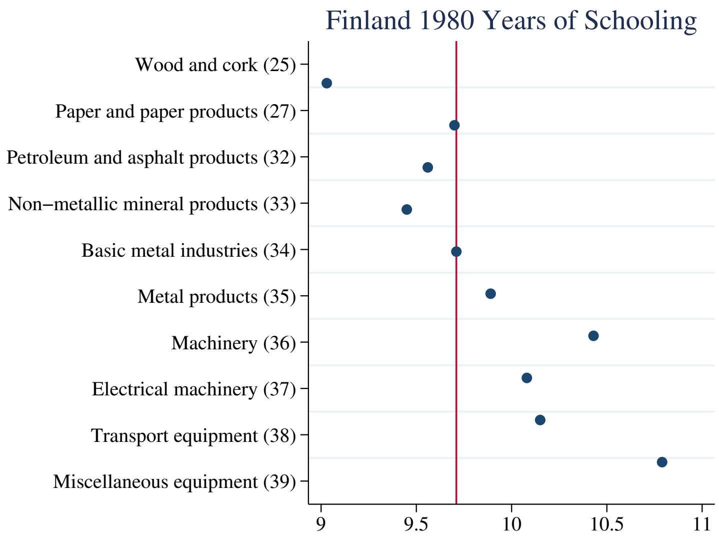
A.5 The Input-Output Coefficients

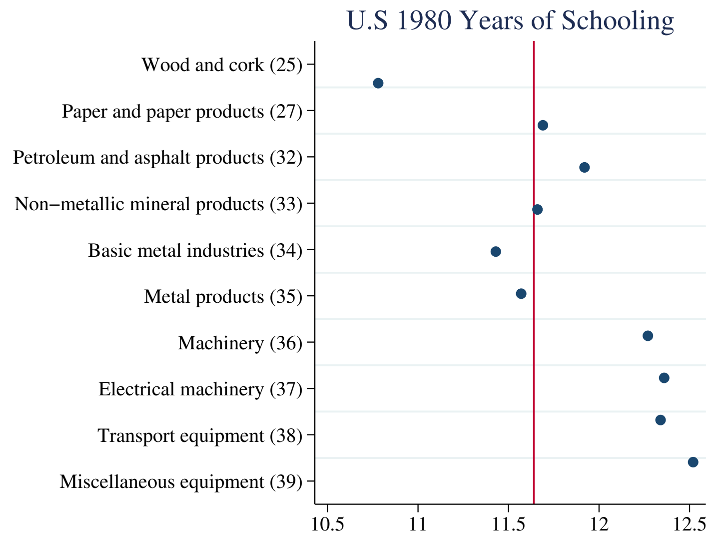
The input-output coefficients are for the first available year 1959, and are drawn from Statistics Finland's publication:

Forssell, Osmo, "The interindustry structure on the Finnish economy ; an input-output study for 1959", Tilastollisia Tiedonantoja 42. 1965.

Appendix Tables and Figures

Figure A.1. 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. Baseline Industry Characteristics and Balance

	All Industries (1)	Control Industries (2)	Treated Industries (3)	Difference in levels (3)−(2) (4)	Difference in trends 1934-1943 (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 A.2. 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.3. Estimated Differences in Industrial 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.4. Heterogeneity by Baseline Municipal Characteristics

Panel A: First Generation

	Agriculture 1970				Income Rank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bartik	-0.081***	-0.093***	-0.081**	-0.055***	2.389***	2.621***	2.312***	2.267***
	(0.022)	(0.025)	(0.037)	(0.014)	(0.332)	(0.501)	(0.487)	(0.335)
Bartik x High income		0.024				-0.359		
		(0.037)				(0.522)		
Bartik x Railway			-0.000				0.036	
			(0.018)				(0.155)	
Bartik x High Education				-0.001				0.407
				(0.018)				(0.431)
N	2189	2189	2189	19703	78647	78647	78647	78647
Y mean	0.515	0.515	0.515	0.515	49.636	49.636	49.636	49.636
Ages	30-40	30-40	30-40	30-40	30-40	30-40	30-40	30-40
Sample	Agriculture	Agriculture	Agriculture	Agriculture	All	All	All	All

Panel B: Second Generation

	Years Schooling				Income Rank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bartik	0.158***	0.068**	0.076*	0.104**	1.855***	2.048***	1.826***	2.779***
	(0.046)	(0.032)	(0.046)	(0.043)	(0.337)	(0.473)	(0.497)	(0.529)
Bartik x High income		0.152**				-0.353		
		(0.063)				(0.612)		
Bartik x Railway			0.038*				0.014	
			(0.023)				(0.198)	
Bartik x High Education				0.079				-1.389**
				(0.058)				(0.615)
N	104751	104751	104751	104751	19169	19169	19169	19169
Y mean	7.674	7.674	7.674	7.674	45.412	45.412	45.412	45.412
Sample	5-29	5-29	5-29	5-29	5-29 + Parent No education	5-29 + Parent No education	5-29 + Parent No education	5-29 + Parent No education

Notes: The unit of observation is an individual. 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, existence of a railway in municipality, dummy if the average years of schooling for cohorts above the age of 40 in the municipality in 1950 was above average, dummy if the mean income tax in the municipality in 1938 was above average, 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, by Cohort and Industry Skill

	Years of Education	Degree	Undergraduate
	(1)	(2)	(3)
High-skill Bartik x Old	0.047	0.007**	0.001
	(0.037)	(0.003)	(0.002)
High-skill Bartik x Young	0.182***	0.021***	0.011***
	(0.052)	(0.004)	(0.003)
Low-skill Bartik x Old	0.007	-0.002	-0.000
	(0.022)	(0.002)	(0.001)
Low-skill Bartik x Young	0.080	0.002	0.001
	(0.053)	(0.002)	(0.001)
N	141383	141383	141383
Y mean	7.493	0.097	0.051
β_1 = β_2 (p-val)	0.000	0.000	0.000
β_2 = β_4 (p-val)	0.192	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 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.1. 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 Parent Income

	Years Schooling			Degree			Uni Degree		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bartik	0.267***	0.194**	0.216***	0.023***	0.015**	0.018***	0.010**	0.004	0.005
	(0.085)	(0.079)	(0.072)	(0.007)	(0.006)	(0.005)	(0.005)	(0.004)	(0.004)
Father income rank 1970s		0.031***			0.003***			0.002***	
		(0.002)			(0.000)			(0.000)	
Father income 1970s			0.464***			0.052***			0.040***
			(0.071)			(0.010)			(0.006)
N	9583	9583	9583	9583	9583	9583	9583	9583	9583
Y mean	8.510	8.510	8.510	0.174	0.174	0.174	0.089	0.089	0.089

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.7. Impact of the Reparations Shock on Education, Controlling for Distance to Universities

	Distance Old Uni	Distance New Uni	Years of Education
	(1)	(2)	(3)
Bartik	-1.603	-1.004	
	(2.191)	(2.052)	
Bartik x (30-39 in 1944)			0.041
			(0.034)
Bartik x (under 30 in 1944)			0.204***
			(0.055)
Distance to New University x Old			-0.131***
			(0.049)
Distance to New University x Young			-0.209***
			(0.050)
N	479	479	141383
Y mean	145.904	97.878	7.493
β_1 = β_2 (p-val)			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 (young) and those aged above 30 (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.8. Upstream and Downstream Spillovers of the War Reparations

	Agriculture 1950	Agriculture 1970	Ln Income	Years of Schooling	Income Rank
	(1)	(2)	(3)	(4)	(5)
Bartik	-0.092***	-0.052***	0.098***	0.173***	1.564***
	(0.011)	(0.007)	(0.018)	(0.056)	(0.393)
Bartik Upstream	-0.107**	-0.075***	0.097	-0.171	1.755
	(0.043)	(0.028)	(0.066)	(0.155)	(1.220)
Bartik Downstream	-0.288***	-0.183***	0.410***	0.744***	7.186***
	(0.097)	(0.061)	(0.140)	(0.234)	(2.662)
N	83456	76613	61205	80825	80825
Sample	25-45	25-45	25-45	11-30	11-30
Y mean	0.403	6.806	6.806	7.844	49.417

Notes: The unit of observation is an individual. 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. Bartik Upstream measures a municipality-level shock to industries upstream from the reparation paying industries and Bartik Downstream to industries downstream from the reparation paying industries. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table A.9. 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.

Robustness

Table B.1. Robustness of Table 2

Panel A

	Agriculture in 1950										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Bartik	-0.167***	-0.111***	-0.169***	-0.112***			-0.087***	-0.086***	-0.084***		
	(0.012)	(0.012)	(0.013)	(0.012)			(0.010)	(0.010)	(0.011)		
Bartik high					-0.177***					-0.058***	
					(0.022)					(0.011)	
Bartik q2						-0.041*					-0.006
						(0.022)					(0.011)
Bartik q3						-0.152***					-0.040***
						(0.024)					(0.012)
Bartik q4						-0.327***					-0.149***
						(0.036)					(0.021)
N	83965	83545	83965	83965	83545	83545	24980	24980	24980	24919	24919
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	0.403	0.403	0.403	0.403	0.403	0.403	0.821	0.821	0.821	0.821	0.821
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓		✓	✓	✓	✓

Panel B

	Manufacturing 1950										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Bartik	0.093***	0.079***	0.094***	0.081***			0.049***	0.048***	0.048***		
	(0.006)	(0.005)	(0.006)	(0.006)			(0.005)	(0.005)	(0.006)		
Bartik high					0.076***					0.029***	
					(0.010)					(0.006)	
Bartik q2						0.018**					0.002
						(0.009)					(0.006)
Bartik q3						0.052***					0.016**
						(0.011)					(0.007)
Bartik q4						0.170***					0.085***
						(0.019)					(0.012)
N	83965	83545	83965	83965	83545	83545	24980	24980	24980	24919	24919
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	0.235	0.235	0.235	0.235	0.235	0.235	0.071	0.071	0.071	0.071	0.071
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Panel C

	Services in 1950										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Bartik	0.074***	0.032***	0.075***	0.030***			0.038***	0.038***	0.036***		
	(0.009)	(0.010)	(0.009)	(0.010)			(0.007)	(0.007)	(0.007)		
Bartik high					0.102***					0.029***	
					(0.015)					(0.007)	
Bartik q2						0.023					0.005
						(0.017)					(0.007)
Bartik q3						0.100***					0.024***
						(0.019)					(0.008)
Bartik q4						0.158***					0.064***
						(0.027)					(0.013)
N	83965	83545	83965	83965	83545	83545	24980	24980	24980	24919	24919
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	0.361	0.361	0.361	0.361	0.361	0.361	0.108	0.108	0.108	0.108	0.108
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓		✓	✓	✓	✓

Panel D

	Agriculture in 1970											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bartik	-0.103***	-0.064***	-0.102***	-0.066***			-0.065***	-0.053***	-0.065***	-0.056***		
	(0.008)	(0.008)	(0.008)	(0.008)			(0.009)	(0.011)	(0.010)	(0.010)		
Bartik high					-0.104***						-0.038***	
					(0.015)						(0.012)	
Bartik q2						-0.029*						-0.016
						(0.018)						(0.015)
Bartik q3						-0.094***						-0.034**
						(0.019)						(0.016)
Bartik q4						-0.195***						-0.103***
						(0.027)						(0.024)
N	77074	76696	77074	77074	76696	76696	22975	22919	22975	22975	22919	22919
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	0.242	0.242	0.242	0.242	0.242	0.242	0.498	0.498	0.498	0.498	0.498	0.498
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Baseline	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Panel E

	Manufacturing in 1970											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bartik	0.050***	0.045***	0.053***	0.048***			0.033***	0.027***	0.032***	0.030***		
	(0.005)	(0.004)	(0.005)	(0.004)			(0.005)	(0.005)	(0.005)	(0.005)		
Bartik high					0.037***						0.020***	
					(0.007)						(0.006)	
Bartik q2						0.009						0.004
						(0.007)						(0.006)
Bartik q3						0.022***						0.015**
						(0.008)						(0.007)
Bartik q4						0.094***						0.052***
						(0.013)						(0.011)
N	77074	76696	77074	77074	76696	76696	22975	22919	22975	22975	22919	22919
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	0.158	0.158	0.158	0.158	0.158	0.158	0.079	0.079	0.079	0.079	0.079	0.079
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Baseline	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Panel F

	Services in 1970											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bartik	0.046***	0.024***	0.052***	0.023***			0.035***	0.031***	0.034***	0.032***		
	(0.006)	(0.007)	(0.006)	(0.007)			(0.008)	(0.008)	(0.008)	(0.008)		
Bartik high					0.073***						0.027***	
					(0.011)						(0.008)	
Bartik q2						0.020						0.010
						(0.012)						(0.010)
Bartik q3						0.075***						0.027***
						(0.014)						(0.010)
Bartik q4						0.113***						0.059***
						(0.019)						(0.015)
N	77074	76696	77074	77074	76696	76696	22975	22919	22975	22975	22919	22919
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	0.323	0.323	0.323	0.323	0.323	0.323	0.170	0.170	0.170	0.170	0.170	0.170
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Baseline	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Panel G

	Log Income											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bartik	0.171***	0.122***	0.222***	0.119***			0.109***	0.093***	0.119***	0.100***		
	(0.014)	(0.019)	(0.017)	(0.018)			(0.017)	(0.018)	(0.015)	(0.018)		
Bartik high					0.251***						0.101***	
					(0.033)						(0.025)	
Bartik q2						0.070*						0.040
						(0.040)						(0.035)
Bartik q3						0.241***						0.113***
						(0.043)						(0.036)
Bartik q4						0.427***						0.180***
						(0.057)						(0.049)
N	61586	61272	61586	61586	61272	61272	18553	18502	18553	18553	18502	18502
Sample	All	All	All	All	All	All	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939	Agriculture 1939
Y mean	6.806	6.806	6.806	6.806	6.806	6.806	6.543	6.543	6.543	6.543	6.543	6.543
Municipal controls	None	Baseline	Lasso	Baseline groups	Baseline	Baseline	None	Baseline	Lasso	Baseline groups	Baseline	Baseline
Region Fes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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. Income is measured as average between 1971 and 1975. 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. In baseline groups, agricultural share and the manufacturing share in 1940 are divided into 4 equal size groups. Lasso controls are agricultural labor share in 1940, share in services in 1940, manufacturing labor share in 1940, and the share of people who payed income taxes in 1938. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table B.2. Robustness of Table 3

Panel A

	Agriculture						Production					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
bartik_standardized_old	-0.082***	-0.046***	-0.066***	-0.035***			0.043***	0.036***	0.062***	0.025***		
	(0.008)	(0.009)	(0.008)	(0.004)			(0.004)	(0.006)	(0.005)	(0.003)		
bartik_standardized_young	-0.082***	-0.050***	-0.055***	-0.055***	0.007**	0.002	0.024***	0.020***	0.024***	0.024***	-0.034***	-0.021***
	(0.006)	(0.008)	(0.008)	(0.008)	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)
N	142475	141845	124542	168369	142475	141845	141845	141845	124542	168369	142475	141845
Sample	11-45	11-45	11-40	11-60	11-45	11-45	11-45	11-45	11-40	11-60	11-45	11-45
Y mean	0.233	0.233	0.233	0.233	0.233	0.233	0.274	0.274	0.274	0.274	0.274	0.274
Municipal controls	None	Lasso	Baseline	Baseline	Muni fe	Muni fe + flexible	None	Lasso	Baseline	Baseline	Muni fe	Muni fe + flexible

Panel B

	White-collar						Executive					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
bartik_standardized_old	0.021***	0.008***	0.012***	0.005**			0.011***	0.004*	0.005*	0.002		
	(0.002)	(0.002)	(0.004)	(0.002)			(0.002)	(0.002)	(0.003)	(0.002)		
bartik_standardized_young	0.041***	0.021***	0.022***	0.022***	0.017***	0.012***	0.031***	0.013***	0.013***	0.013***	0.019***	0.009***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.002)	(0.002)
N	142475	141845	124542	168369	142475	141845	142475	141845	125058	168369	142475	141845
Sample	11-45	11-45	11-40	11-60	11-45	11-45	11-45	11-45	11-40	11-60	11-45	11-45
Y mean	0.138	0.138	0.138	0.138	0.138	0.138	0.060	0.060	0.060	0.060	0.060	0.060
Municipal controls	None	Lasso	Baseline	Baseline	Muni fe	Muni fe + Baseline	None	Lasso	Baseline	Baseline	Muni fe	Muni fe + Baseline

Panel C

	Years of Schooling						Uni Degree					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
bartik_standardized_old	0.177***	0.057*	0.074	0.065*			0.008***	0.001	0.001	0.003		
	(0.027)	(0.030)	(0.031)	(0.034)			(0.002)	(0.002)	(0.004)	(0.003)		
bartik_standardized_young	0.420***	0.230***	0.215***	0.215***	0.245***	0.154***	0.022***	0.022***	0.012***	0.011***	0.011***	0.015***
	(0.045)	(0.055)	(0.056)	(0.056)	(0.026)	(0.040)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
N	142475	141845	124542	168369	142475	141845	142475	141845	124542	168369	142475	141845
Sample	11-45	11-45	11-40	11-60	11-45	11-45	11-45	11-45	11-40	11-60	11-45	11-45
Y mean	7.353	7.353	7.353	7.353	7.353	7.353	0.047	0.047	0.047	0.047	0.047	0.047
Municipal controls	None	Lasso	Baseline	Baseline	Muni fe	Muni fe + flexible	None	Lasso	Baseline	Baseline	Muni fe	Muni fe + flexible

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. Degree indicates that the person had a post-secondary degree. Uni degree indicates that the person had at least an undergraduate degree. Years of education is imputed measure from the census. Bartik is a municipality-level measure of the reparations shock assigned to the person's municipality in 1939. The baseline municipal-level controls of the agricultural share and the manufacturing share in 1940, 11 region fixed effects, and urban fixed effects interacted with age fixed effects. All regressions also include sex fixed effects. In baseline groups, agricultural share and the manufacturing share in 1940 are divided into 4 equal size groups. Lasso controls are agricultural labor share in 1940, share in services in 1940, manufacturing labor share in 1940, and the share of people who payed income taxes in 1938 interacted with age fixed effects. Robust standard errors are in parentheses, clustered at the municipality of 1939 level. *** 1%, ** 5%, * 10% significance levels.

Table B.3. Robustness of Table 4

Panel A

	Income Rank				
	(1)	(2)	(3)	(4)	(5)
Standardized values of bartik	3.390***	1.966***	2.508***		2.055***
	(0.316)	(0.353)	(0.369)		(0.407)
Bartik q2				2.100***	
				(0.686)	
Bartik q3				3.264***	
				(0.713)	
Bartik q4				6.493***	
				(0.976)	
N	19169	19146	19169	19146	42237
Sample	No education	No education	No education	No education	Primary or less
Y mean	45.410	45.410	45.410	45.410	50.207
Municipal controls	None	Lasso	Groups	Baseline	Baseline

Panel B

	Years of Schooling				
	(1)	(2)	(3)	(4)	(5)
Standardized values of bartik	0.352***	0.169***	0.226***		0.233***
	(0.055)	(0.060)	(0.058)		(0.062)
Bartik q2				0.033	
				(0.073)	
Bartik q3				0.122	
				(0.080)	
Bartik q4				0.260**	
				(0.125)	
N	19169	19146	19169	19146	42237
Sample	No education	No education	No education	No education	Primary or less
Y mean	7.163	7.163	7.163	7.163	7.892
Municipal controls	None	Lasso	Groups	Baseline	Baseline

Panel C

	White Collar or Executive				
	(1)	(2)	(3)	(4)	(5)
Standardized values of bartik	0.054***	0.028***	0.038***		0.037***
	(0.007)	(0.008)	(0.008)		(0.008)
Bartik q2				0.025**	
				(0.010)	
Bartik q3				0.041***	
				(0.011)	
Bartik q4				0.084***	
				(0.019)	
N	19169	19146	19169	19146	42237
Sample	No education	No education	No education	No education	Primary or less
Y mean	0.190	0.190	0.190	0.190	0.292
Municipal controls	None	Lasso	Groups	Baseline	Baseline

Notes: The unit of observation is an individual. The sample equals individuals aged 11-30 in 1950 linked to their Father within household. 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, 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 B.4. 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 B.5. 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 B.6. Impact of the Reparations, by Industry Shocks

	Agriculture 1950		Ln income		Years of Education		Income Rank	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bartik	-0.111***	-0.078***	0.109***	0.094***	0.226***	0.175***	1.957***	1.714***
	(0.032)	(0.011)	(0.035)	(0.018)	(0.059)	(0.029)	(0.533)	(0.289)
Sample	All	Agriculture 1939	All	Agriculture 1939	All	Father no edu	All	Father no edu
AKM	[-0.148, -0.067]	[0.098, -0.055]	[0.051, 0.156]	[0.059, 0.131]	[0.085, 0.333]	[0.091, 0.253]	[0.980, 2.754]	[1.093, 2.386]
AKM0	[-0.177, -0.04]	[-0.156, -0.017]	[0.021, 0.203]	[0.042, 0.325]	[-0.056, 0.439]	[-0.075, 0.289]	[0.095, 3.610]	[0.529, 3.273]
N	53	53	53	53	53	53	53	53

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. AKM and AKM0 present confidence intervals estimated using the methods introduced in Adão et al. (2018).