AACSB ACCREDITED

WORKING PAPERS IN ECONOMICS AND STATISTICS

Report No 1 | 2025

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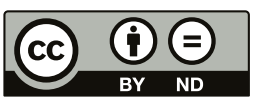
Series editor: Thomas Giebe

ISBN: 978-91-8082-410-1 (pdf)
DOI: https://doi.org/10.15626/ns.wp.2025.1

Report No 1, Department of Economics and Statistics, Linnaeus University, Växjö, 2025



How Early Career Choices Adjust to Economic Crises*

Julien Grenet† Hans Grönqvist‡ Edvin Hertegård§
Martin Nybom¶ Jan Stuhler‖

November 2025

Abstract

We study how students adjust their early career choices in response to economic crises and how these decisions affect their long-run labor market outcomes. Focusing on Sweden's deep recession in the early 1990s—which hit the manufacturing and construction sectors hardest—we first show that students whose fathers lost jobs in these sectors were more likely to choose career paths tied to less-affected industries. These students later experienced better labor market outcomes, including higher employment and earnings. Our findings suggest that informational frictions are a key obstacle to structural change and identify career choice as an important channel through which recessions reshape labor markets in the long run.

KEYWORDS: *High School Major*; *Recession*; *Information Frictions*; *Structural Change*
JEL CODES: I25; J24; J63; E32.

CORRESPONDING AUTHOR: HANS GRÖNQVIST; hans.gronqvist@ifn.se.

*We express our gratitude for the insightful comments provided by Per Johansson, Eva Mörk, Peter Nilsson, Mårten Palme, Helmut Rainer, and numerous seminar participants at ESPE 2023, EALE 2023, IFN, Uppsala University (Department of Economics), Stockholm University (SOFI), and Vienna University (INEQ). Funding from Handelsbankens forskningsstiftelser, the Swedish Research Council (Vetenskapsrådet), and Riksbankens Jubileumsfond is gratefully acknowledged. Julien Grenet acknowledges financial support from the Agence nationale de la recherche (ANR) under the EUR grant ANR-17-EURE-0001.

†Grenet: Paris School of Economics and CNRS. E-mail: julien.grenet@psemail.eu.

‡Grönqvist: Linnaeus University and the Research Institute of Industrial Economics (IFN). E-mail: hans.gronqvist@lnu.se.

§Hertegård: SOFI, Stockholm University. E-mail: edvin.hertegard@sofi.su.se.

¶Nybom: IFAU, Uppsala University. E-mail: martin.nybom@ifau.uu.se.

‖Stuhler: Department of Economics, Universidad Carlos III de Madrid. E-mail: jstuhler@eco.uc3m.es.

1 Introduction

Economic crises have the potential to profoundly reshape labor markets, and often affect some groups of workers disproportionately. For instance, while the Great Recession hit many Americans hard, workers in certain sectors or states experienced more severe employment losses (Hoynes et al., 2012). While previous work has documented the persistent nature of such labor-market scars (e.g., Yagan, 2019; Lachowska et al., 2020), less is known about the behavioral responses to economic crises, especially among the next generation of workers who are on the verge of choosing their career paths. Although they have the flexibility to adjust their choices, young workers may suffer from information frictions and a lack of networks to effectively navigate the career and job search process (Holzer, 1988; Gonzales and Shi, 2010). Such frictions could be especially important in turbulent times, when uncertainty about labor market conditions increases (Mackowiak et al., 2023).[1]

This paper studies how young individuals adapt to economic crises by changing their early career choices and examines the extent to which such behavioral responses influence their long-run labor market outcomes. Our study is situated in the Swedish context and focuses on compulsory school students about to select into high school educational programs. These programs, which closely map into industries and occupations through apprenticeship programs and occupational licensing, are strong predictors of long-run educational and labor market outcomes. The crisis we consider is the unexpected and massive economic recession that struck Sweden in the early 1990s. The recession, ranked among the five most severe financial crises in history (Reinhart and Rogoff, 2008), triggered a five-fold increase in the aggregate unemployment rate (Englund, 1999). Similarly to the Great Recession, the crisis disproportionately affected certain blue-collar sectors, such as manufacturing and construction, while leaving white-collar and other blue-collar sectors relatively unscathed. Many of the jobs in the severely affected industries were permanently lost, leading to enduring sectoral shifts in the Swedish economy.

Identifying behavioral responses to economic crises poses a challenge, as it requires individual-level data on behavior coupled with a research design that allows one to disentangle the effects stemming from *information about* and *exposure to* economic shocks, as well as unobservable characteristics correlated with these factors. Our novel empirical strategy addresses this challenge by leveraging the distinctive timing of high school program choices in Sweden, which are typically made when students turn 16, in conjunction with the timing of paternal job loss. Children who

[1] Consistent with this, empirical studies show that job seekers alter their search strategies in response to customized occupational information (Belot et al., 2019), and that individuals who become aware of a higher personal exposure to unemployment risk seek more information about the likelihood of a recession (Roth et al., 2022).

experience paternal job loss just *before* choosing a high school program may be discouraged from selecting a program linked to their fathers' sector, as the father's job loss signals the risks and prospects associated with certain career paths. On the other hand, children who experience paternal job loss just *after* making their program choices are otherwise comparable, and are similarly exposed to the crisis, but cannot alter their career choices as easily.[2]

In particular, our approach nets out differences in aggregate exposure to the economic crisis. A recession could affect students in many different ways, and both the demand and the supply of different educational programs may shift in response to such an event. Given that the timing of paternal job loss varies among students born in the same year, we can control for cohort-by-region fixed effects to account for any crisis-related shifts in demand or supply, even if their intensity varies across regions or cohorts.[3] Finally, we can net out the direct effects of paternal job loss by leveraging the variation in timing across student age and sector. As we partial out mechanisms related to paternal job loss in general (e.g., household resource loss or direct effects on compulsory school grades), we interpret our treatment as an *information signal* stemming from paternal job loss in the crisis-affected sectors. Fundamentally, our identification strategy relies on the assumption that students experiencing paternal job loss in the crisis-affected sectors before and after age 16 are comparable. In the analysis, we provide several pieces of evidence showing that this assumption holds empirically. However, our research design also accounts for concerns that the timing of childhood shocks could matter (Carneiro et al., 2023). By using students who experienced paternal job loss in less affected sectors, we can net out the main effect of paternal job loss timing (before vs. after age 16).

Our analysis draws on administrative data from Statistics Sweden covering the entire working-age population during the period 1985–2017, as well as the full population every five years from the censuses conducted between 1960 and 1990. These registers are linked at the individual, family, and firm levels, providing comprehensive information on educational and labor market outcomes, as well as demographics. The main sample consists of 176,000 students who experienced paternal job loss during the recession years 1991–1995, specifically around the time when they were making their high school program choices.

We start by showing that the economic crisis coincided with a decline in the proportion of students completing high school programs associated with the severely affected manufacturing and construction sectors. Notably, the share of students graduating from a manufacturing-linked

[2]Consistent with this, the impacts we document arise sharply at the expected age threshold.

[3]Focusing on paternal job loss as our measure of crisis exposure serves two primary purposes. First, it generates sharper variation in exposure across student ages compared to alternative measures of exposure at the industry or regional level. This allows us to better exploit the discontinuity of the age-16 threshold in program choice. Second, paternal job loss varies both over time and across student ages, allowing us to control for the aggregate effects of the crisis.

high school program decreased by more than 50% during the crisis period. We then proceed with the causal analysis, where we use within-cohort variation coupled with the relative timing of paternal job loss to disentangle the effect of information about the crisis from the direct exposure effects and correlated unobservables, as described above.

We show that experiencing paternal job loss in the manufacturing or construction sectors before making career choices (henceforth: *early paternal job loss*) reduces the probability of students graduating from high school programs linked to these sectors, but not the overall high school completion probability.[4] Specifically, early paternal job loss decreases the probability of completing high school programs associated with the crisis sectors (-11% relative to the control group mean), as compared to paternal job loss occurring after the age of 16. Students affected by early paternal job loss also exhibit higher early career earnings (with an increase of 2–3%) and are more likely to be employed during their early career (by 1.2%). Importantly, our results show that these students steer clear of the paternal crisis sectors in the very long run, with long-term enhancements in their career earnings. These effects are much stronger for men than for women, which aligns with the fact that the primary crisis sectors were male-dominated.

The finding that private signals have such a substantial influence on career choices is surprising, given that the economic downturn in the manufacturing and construction sectors was, at least in principle, easily observed. This may suggest that information frictions pose a significant barrier to structural adjustments in the labor market. Consistent with this hypothesis, we show that the effects of early paternal job loss are the largest at the onset of the crisis, when its full extent may not yet have been fully internalized, but diminish and become statistically insignificant in later years. Similarly, the effects are more pronounced in municipalities that were less exposed to the crisis, but small and insignificant in those experiencing the most severe downturns. This pattern suggests that the signaling value of paternal job loss diminishes when the recession's consequences become sufficiently salient to everyone.

In contrast, the loss of parental workplace and job connections (Kramarz and Skans, 2014; Staiger, 2023; Almgren et al., 2023) appears less important in explaining our results. To investigate the role of network disruptions, we examine whether the treatment effects are stronger if the father held a managerial position prior to the job loss or if the firm had a history of hiring children of their employees. Neither measure indicates differential treatment effects. We also test whether treatment effects vary by the number of pre-crisis years the father spent in the crisis sectors, or if experiencing paternal job loss before age 16 in any other sector has direct effects. The results indicate that neither network disruptions nor direct effects of early paternal job loss

[4]In Sweden, high-school students rarely switch programs. For instance, only 5% of students who began the construction program in 2006 switched to another program (Skolverket, 2011).

impact our main findings. Finally, we show that students' career choices are also influenced by job loss among other close family members. Taking stock of our findings on informational frictions and network effects, we interpret them as consistent with an information signal from paternal job loss triggering substantial behavioral responses in early career choices, above and beyond the aggregate effects of the crisis on labor demand.

Our findings relate to several strands of the literature. First, they contribute to a large body of work on the effects of recessions and job displacement on workers and their children; e.g., Lachowska et al. (2020), Yagan (2019) and Jacobson et al. (1993).[5] Unlike these studies, our research design allows us to isolate the role of information advantages about economic conditions in different sectors. This enables us to provide evidence on how the behavioral adjustments undertaken by children contribute to transforming labor markets in the long run. While prior work has found that early parental job loss affects children's human capital (Oreopoulos et al., 2008; Carneiro et al., 2023; Rege et al., 2011; Huttunen and Riukula, 2024; Schmidpeter, 2022), our study helps unpack the mechanisms underlying these effects. Consistent with an information channel, we show that students respond to parental job loss in sectors most severely hit by the crisis rather than to early job loss per se.[6]

Secondly, our study contributes to the literature on the effects of graduating during a recession. Several studies show that adverse macroeconomic conditions at labor market entry have a negative impact on short-term wages for high school students but that these effects tend to fade after a few years (Genda et al., 2010; Hershbein, 2012; Kawaguchi and Murao, 2014; Schwandt and Von Wachter, 2019; Engdahl et al., 2022).[7] For college students graduating during a recession, research has shown a modest reduction in employment but a larger and longer-lasting earnings loss (Oreopoulos et al., 2012; Altonji et al., 2016; Liu et al., 2016). A few studies specifically examine the role of cohort-level shocks on career choices. For instance, Blom et al. (2021) show that cohorts exposed to higher unemployment rates during typical schooling years select majors associated with higher wages, have better employment prospects, and lead to work in a related field.[8] Dauth et al. (2021) and Branco et al. (2025) show how young workers adjust their education choices (from vocational to college/university) and early career labor market choices

[5] In this large literature, several firm-level studies also examine how the Great Recession affected labor demand (e.g., Chodorow-Reich, 2014; Mian and Sufi, 2014; Giroud and Mueller, 2017; Bentolila et al., 2018; Huber, 2018; Greenstone et al., 2020). The literature on the effects of parental job displacement typically find that displacement has detrimental effects on the earnings, compulsory school performance, and mental health of their children (Oreopoulos et al., 2008; Coelli, 2011; Rege et al., 2011; Gregg et al., 2012; Mörk et al., 2020), and that affected children are less likely to enroll in college, and choose the same field of study as their parents, (Bingley et al., 2023; Fradkin et al., 2019; Huttunen and Riukula, 2024; Hilger, 2016).

[6] The research design used in these studies cannot fully account for the possibility that these events may coincide with critical childhood periods (Carneiro et al., 2023). Our research design addresses this limitation by leveraging cross-sectoral heterogeneity in crisis intensity to absorb the main effect of the timing of parental job loss.

[7] Raaum and Røed (2006) also document negative effects on employment.

[8] Another study is by Weinstein (2022).

in response to technological change. Instead of examining the overall impact of macroeconomic shocks on cohorts, we utilize individual-level variation in crisis exposure, which enables us to study information signaling about the economic environment in different industries.[9]

By highlighting information frictions as a potential obstacle to individual adaptation to structural change, our results also bear relevance for the literature on how students' college major choices respond to information about major-specific earnings differences. While most of these studies find relatively small responses (Altonji et al., 2012; Acton, 2021; Black et al., 2005; Patterson et al., 2023; Weinstein, 2020; Hastings et al., 2015; Wiswall and Zafar, 2015; Baker et al., 2018), the signal in our setting arises from paternal exposure to the crisis, which is potentially more salient to the students. Indeed, our results show that this family-level signal exerts strong effects on career choices, over and above the signal provided by local labor markets. However, we find that private signals interact with public signals in shaping career choices. Students' program choices respond little to paternal job loss exposure in the most heavily affected municipalities and during late crisis years, i.e., when structural changes in labor demand are sufficiently salient.

Finally, our study also adds to a substantial body of literature on the macroeconomic and long-run implications of economic crises. While recent evidence recessions can accelerate structural change (e.g., Autor, 2010; Hershbein and Kahn, 2018; Jaimovich and Siu, 2020) and increase skill mismatch (Zago, 2020), less is known about the behavioral responses that underlie these changes. Identifying such mechanisms is crucial for understanding why some workers are better able to cope during recessions (e.g., Yagan, 2019; Lachowska et al., 2020) and for guiding policy to mitigate the detrimental effects of economic downturns at the worker level. Our results also relate to the longstanding question in labor economics of whether recessions can generate persistent damage to an economy (referred to as "Hysteresis", see Bartik, 1991 or Hershbein and Stuart, 2024). We identify career choice as one particular mechanism through which recessions reshape labor markets in the very long run. Our findings indicate that much of this transformation occurs at the micro level: children respond strongly to job loss in their nuclear or extended family, even in settings where the downturn is pronounced.[10]

The remainder of the paper is as follows. Section 2 provides details on the 1990s crisis and the institutional context. Section 3 outlines the data sources and empirical strategy. Section 4

[9] Aalto et al. (2023) present evidence on how Swedish students adjusted their high school program choices in response to the COVID-19 pandemic.

[10] More loosely, our study connects with the literature on intergenerational mobility. It is well-established that career paths (e.g., occupations, employers) are passed down from parents to their children, sometimes spanning multiple generations (Erikson and Goldthorpe, 1992; Corak and Piraino, 2011; Modalsli, 2017).[11] This parent-child coupling contributes to the intergenerational persistence in labor market outcomes (Haeck and Laliberté, 2023), and understanding its underlying mechanisms can provide insights into the drivers of social mobility. Our study sheds light on the information advantages that are shared within families and underscores the important role that personal experiences in the family can play in disruptive times.

presents estimation results, and Section 5 discusses the findings. Section 6 concludes.

2 Background

This section outlines relevant details about the 1990s crisis and provides context regarding Sweden's education system and labor market.

2.1 The 1990s Crisis

In the late 1980s, the period leading up to the crisis, Sweden experienced economic expansion, marked by a remarkably low unemployment rate of 2%. Inflation was high, and the credit market saw significant growth. By 1990, the employment rate had soared to a record level of around 85% of the working-age population. Concurrently, the mid-1980s witnessed the deregulation of the credit market and the implementation of an expansive monetary policy regime, resulting in an appreciation of asset prices that peaked before the crisis. The expanding credit market led banks to engage in riskier lending practice and the increased household borrowing coincided with a rise in consumption. The strong economic growth during the late 1980s suggests that the ensuing crisis was not foreseen or expected, at least until the fall of 1989 (Englund, 1999).

The massive economic crisis that unexpectedly hit Sweden in late 1990 led to the most severe recession the country had seen since the Great Depression. GDP saw a continuous decline for three years, between 1991 and 1993, resulting in a total contraction of -5.1%. Originating in the banking sector after the burst of a housing bubble, the crisis quickly spread to other sectors. The stock market rapidly fell, with the construction and real estate market stock index dropping sharply (Englund, 1999). The crisis strained public finances, prompting austerity measures and extreme monetary policy reactions to defend the fixed exchange rate. The crisis also triggered a credit crunch which, coupled with the increased interest rates, adversely affected the operations of the most heavily indebted firms (Grenet et al., 2023). This resulted in a surge in bankruptcies and a decrease in investments (Englund, 1999).

The economic recovery started in late 1992, when the Swedish currency (SEK) was allowed to depreciate. This measure facilitated exports and provided assistance to the heavily affected manufacturing sector. Although the decline in output between 1990 and 1993 was substantial, it had been fully regained by 1995. However, due to a slower rebound in residential investments, which had plummeted by 72% during that period, the construction sector experienced a more gradual recovery compared to the manufacturing sector. It started to recover in 1994 and, by 1999, it had surpassed the previous peak output level recorded in 1990 (Perbo, 1999).[12]

[12]Residential construction, however, still remained 75% below its 1990 level in 1998.

2.2 The Swedish Labor Market in the 1990s

The Swedish labor market in the early 1990s was characterized by a large public sector, making up nearly one-third of total employment. Other major sectors included manufacturing and mining (19% of total employment), the private service sector (17%), retail and trade (12%), construction (8%), and transportation (6%). Men were the predominant workforce in blue-collar employment, particularly in sectors such as manufacturing, construction, and transportation, while they constituted a minority in the retail sector.[13] The general trend in the years leading up to the crisis involved a gradual shift away from manufacturing, mining, and agricultural work toward an increased share of workers in private services.

The economic crisis hit the labor market hard. Almost 500,000 jobs were lost during the first half of the 1990s, with roughly 60% of these losses concentrated in the manufacturing and construction sectors.[14] This constituted a massive decline in the aggregate employment rate, which dropped from 86% to 76% in just a few years (Perbo, 1999).[15]

2.3 High School Education in Sweden in the 1990s

Swedish high school education is voluntary, but almost 90% of the cohort graduating from compulsory school in 1988 started high school directly after graduation.[16] The high school system at the time consisted of many different programs belonging to one of two tracks (vocational and academic). The choice of high school program was made at the end of the Spring term of grade nine, which is usually the year in which students turn 16. The assignment of students to programs was based on their preferences and their compulsory school grades (Hall, 2012).

The high school system in Sweden underwent a reform in the early 1990s, which extended the duration of the vocational track from two to three years (aligning it with the length of the academic track) and granted all high school students eligibility to some university programs. The reform also implied some changes to the programs within each track. The previous system consisted of 27 different programs, many of which were closely linked to a specific occupation or sector of employment. Importantly for our study, there existed vocational programs tightly linked to the manufacturing sector or construction sector both before and after the reform of the Swedish high school system. However, this reform may have affected the popularity of different

[13] In 1990, men constituted approximately 72% of the workforce in the manufacturing sector and 78% in the construction sector.

[14] During this period, there were 200,000 job losses in the manufacturing sector, 100,000 in the construction sector, another 100,000 cuts in the public sector, and the remaining 100,000 losses occurred in the service sector.

[15] The decline in employment across different sectors is shown in Panel A of Figure A1 in the Appendix.

[16] Around 85% of the children in the cohort set to graduate from high school in 1990 did so. All students graduating from compulsory school are eligible for high school studies. However, students who start high school after age 20 must enter the adult education system instead of attending a regular high school.

high school programs. In our estimation strategy, we tackle this issue by incorporating cohort fixed effects. This approach allows us to rely only on the variation in crisis exposure within a given birth cohort.

3 Data and Empirical Strategy

3.1 Data

Our primary data source is an administrative register from Statistics Sweden covering the entire Swedish population aged 16 and above during the period 1985–2017.[17] We link this dataset to various other registers using anonymized identification codes at the personal, family, and firm levels. The main register is the employment register (RAMS), which contains information from the national taxation authorities, providing details on the sector of employment associated with the main source of earnings for all working-age individuals. A wide array of standard characteristics are added from other registers for all individuals: various income sources including earnings, educational attainment, schooling outcomes, demographics, and county or municipality of residence.[18] Parent-child linkages are retrieved from the Multi-Generation Register, which covers the universe of Swedish parents and children from 1932 to 2014. The analysis focuses on the approximately 232,500 students born between 1970 and 1988 who experienced paternal job loss around the time of the crisis, and were either about to make or had just made their high school education choices at age 16.[19] In the main empirical specification, we restrict the sample to those who experienced paternal job loss between the ages of 10 and 21.[20]

Information on the sector of employment is provided by the detailed industry code (SNI) that is associated with an individual's main employment. This information allows us to map a father's job loss with a specific sectoral-level industry (referred to as *sector* hereafter). We proxy for paternal job loss as the father being employed in the previous year but not in the current year. The employment information comes from the Swedish employment register, which measures if you were employed for at least an hour during a reference week in November. Thus, going from employment to non-employment means that you were employed during November the

[17]The register covers individuals up to age 65 until the year 2000 and individuals up to age 74 after that. We also use data on the full population every five years from the censuses 1960–1990 to gather information on the earnings and employment history of older workers.

[18]Municipalities are smaller geographic units within counties. Sweden comprises 21 counties, and during the period of study, there were a total of 284 municipalities.

[19]In Panel B of Figure A2 in the Appendix, we show that among students who completed compulsory school during the crisis, over 90% graduated in the year they turned 16, while approximately 3% graduated a year late at age 17.

[20]In Appendix Table A3 and Figure 2, we present results and graphical evidence using a narrower bandwidth for individuals who experienced paternal job loss around age 16, the time when high school program choices are made.

previous year, but not in the current year.[21] In Figure A2A. & A3, we show that the number of parental employment status changes spike during the crisis years, consistent with the job losses increasing then, along with ES figures that the workers slowly recover much of their employment probability and pre-crisis earnings. This pattern is consistent with demand-driven job losses during the major recession, rather than with voluntary job changes among prime working-age fathers. Missing employment information in combination with zero earnings for a given year is also coded as not being in employment. To link the job loss to a specific sector, we use the occupation sector in the year of the job loss, or the sector in the previous year if the father had stable employment in the previous year's sector (for the two preceding years). This approach ensures accurate employment information and minimizes the risk of mismatching sectors due to the father finding temporary or minor employment in another sector following the job loss. This approach provides us with a measure of job loss for the full working-age population assigned to a specific sector of the economy and well captures the spike in job losses observed during the economic crisis. If a student experiences multiple instances of paternal job loss during the crisis, we consider only the first event.

A student's completed high school program is inferred from the educational attainment codes around age 20, a point when most individuals in our sample would have graduated from high school without having yet obtained a higher education degree.[22] We group the detailed education codes into 17 program categories based on the sector of employment the program is designed for.[23] For example, the "Industry and Workshop Technician" education code is categorized as a manufacturing-linked program, while the "Broad and General Education" codes are classified as academic programs leading to university studies, and the "General Construction" code is classified as a construction-linked program. We use this classification to construct our main outcomes in the analysis of students' career choices. Importantly, the classification is effective in predicting future employment outcomes for students who completed programs linked to the manufacturing and construction sectors. For instance, by age 35, 53.6% of students born in 1980 who graduated from a construction-linked program were working in the construction sector, compared to 6.5% in the entire cohort.[24]

[21] This method means that we mostly capture substantial job losses not leading to re-employment within one year, which we believe helps with our identification. Using a measure of job loss based on employment transitioning into non-employment for two years provides results of highly similar magnitudes compared to using a one year.

[22] For the (very few) individuals with university credits from a free-standing course at age 20, the completed high school program is derived from the information on the highest education achieved at age 19. Similarly, for students who graduated late, we use the information on their high school education at age 21.

[23] The 238 detailed education codes encompass numerous smaller (specialized) programs within the same program category. Approximately 60% of all individuals fall under one of the seven largest education codes, while the remaining individuals are classified under one of the smaller 231 codes.

[24] Among students who graduated from a manufacturing-linked program, 41.8% were employed in the broad manufacturing sector by age 35, compared to 10% in the entire cohort. Evaluating the outcomes for other types of programs, such as academic ones, is more challenging due to the more dispersed employment opportunities across

In our exploration of the heterogeneous effects of paternal job loss on students' career choices, we investigate how these effects vary depending on the local severity of the economic crisis across the 284 Swedish municipalities. Specifically, we proxy for crisis severity using the municipality-level change in the employment rate between the pre-crisis peak (1990) and its lowest point (1993). To account for potential non-linearities in the effects of the local intensity of the crisis, we adopt a flexible specification by splitting our proxy into quartiles.

3.2 Summary Statistics

Summary statistics for the sample of students who experienced paternal job loss are provided in Table 1. While the average characteristics are generally similar, fathers who lost their jobs in the construction sector are, on average, a year younger than those who lost their jobs in the manufacturing or other sectors. A graphical representation of the number of children experiencing paternal job loss, sorted by the year of job loss, is shown in Panel A of Figure A2 in the Appendix. The figure shows a marked increase in the number of children experiencing paternal job loss during the crisis years.

3.3 Empirical Strategy

Our empirical strategy focuses on the sample of students whose fathers underwent job loss during the 1990s crisis. The estimation approach consists of comparing outcomes for students who faced paternal job loss before and after making their high school program choice around age 16. The emphasis is specifically on the differential effects of job loss in the sectors most heavily impacted by the economic crisis of the 1990s. Since all individuals in our sample have experienced paternal job loss, we do not leverage variation in its overall occurrence, which might be influenced by unobservable characteristics of parents and children. Instead, we exploit variation in the *timing* of the job loss in relation to the age of the student.

Fundamentally, we wish to compare the effects of paternal job loss in the *crisis sectors* (manufacturing or construction), before and after age 16, on outcomes defined for student i, from cohort j, and residing in county k. One potential concern with this approach, however, is that it could capture the differential effect of experiencing job loss before age 16 in general, rather than the effects specific to job loss in the heavily-hit sectors. Indeed, recent evidence has highlighted that experiencing paternal job loss at certain "sensitive ages", such as adolescence, can directly impact schooling outcomes and future earnings (Carneiro et al., 2023). An additional concern is the possibility that the timing of paternal job loss could be correlated with other

different sectors.

family characteristics that also influence career choice. To address these issues, we consider the following empirical specification:

$$y_{i,j,k} = \beta_0 + \beta_1 JL_i^{Cr} \times Early_i + \beta_2 JL_i^{Cr} + \beta_3 Early_i + \theta_{j,k} + \boldsymbol{X_i'\delta} + \varepsilon_{i,j,k}, \quad (1)$$

where JL_i^{Cr} is an indicator taking the value one if the student experienced paternal job loss in manufacturing or construction, and zero if the job loss occurred in any other sector (see Section 3.1 for details). $Early_i$ is an indicator taking the value one if the student experienced paternal job loss in any sector before age 16 (ages 10–15), and zero if the job loss occurred between ages 16–21. $\theta_{j,k}$ denotes cohort-by-county (of residence at age 16) fixed effects, while $\boldsymbol{X_i}$ is a vector of controls containing information on parental characteristics. These controls are included to test the robustness of our estimates and to potentially increase their precision.[25]

The coefficient β_2 captures the effect of having a father working in a crisis sector and experiencing paternal job loss in these sectors at or after age 16, as opposed to experiencing paternal job loss in any other sector. β_3 captures the effect of experiencing paternal job loss in any other sector before age 16. The differential effect of paternal job loss in the crisis sectors *before age 16* is then given by β_1, which is the main coefficient of interest. The cohort-by-county fixed effects control for the overall economic conditions of the local labor market when a cohort is making their educational track choices.[26] By focusing on within-county-cohort differences, this specification addresses the concern that supply-side shifts in the provision of different high school programs or shifts in (local) labor demand could affect the outcomes of interest.[27] Our identification strategy therefore isolates the effect of paternal job loss while abstracting from other channels through which the crisis may have affected career choices. We expand on the interpretation of our estimates below.

This augmented difference-in-differences (DiD) specification directly controls for unobservable differences between students who experience a father's job loss early (i.e., before age 16) or late.[28] This allows us to estimate the additional effect of experiencing paternal job loss before age 16 in

[25]The control variables include the student's gender and parental information from the 1990 census (year of birth, high school completion status, marital status, and labor market outcomes).

[26]In Table A4, we verify that using parental job loss year-by-county fixed effects to focus on students experiencing paternal job loss in the same year yields results highly similar to those obtained with the main cohort-by-county fixed effects. This means that any selection concerns related to parents experiencing job loss at different stages of the economic crisis do not impact our findings. We also confirm that including job loss year fixed effects in our main specification leaves the estimates unchanged. The latter results are available upon request.

[27]Additionally, as a robustness test, we present results where we replace the cohort-by-county fixed effects with more stringent cohort-by-municipality fixed effects (see Section 4.1). We do not use municipality-by-cohort effects as our baseline controls because municipalities are often much smaller than regions, which increases the risk of dampening the private information signal (treatment) from parental job loss if comparisons are restricted to students within the same municipality and cohort.

[28]The event-study estimates reported in Appendix Figure A3 indicate that the effects of job loss on employment and earnings are similar for job losses in the crisis sectors and in other sectors.

the crisis sectors (β_1). In Appendix Table A1, we provide evidence to support the claim that our proposed strategy nets out the main effect of job loss on students by showing that job loss in the crisis sectors does not have any differential effects on the earnings loss of the father or on the compulsory school grades of the student. Note that our empirical approach does not necessitate the adjustments recommended, e.g., by Callaway and Sant'Anna (2021), as it does not rely on staggered variation, and the outcome is measured at a single point in time. In all specifications, we cluster standard errors at the level of the students' municipality of residence at age 16.

Our identification strategy exploits the fact that the choice of high school program in Sweden takes place during the spring of the year when students turn 16.[29] This discontinuity, along with the timing of paternal job loss, is the main source of variation used in the paper. The strategy is based on the idea that an information shock resulting from paternal job loss should have a stronger effect in dissuading a student from selecting a career program associated with the father's previous sector of employment if this event occurs before age 16, when program choices have not yet been made. In contrast, students experiencing paternal job loss in the same sector but after turning 16 will closely resemble those who face this event at an earlier age and hence are constrained in adjusting their high school program choice in response to the shock. Experiencing such an event may deter students from entering crisis-affected sectors for several reasons. First, paternal job loss is expected to make the economic conditions and prospects of these sectors more salient to students ("information signal"). Second, job loss during a crisis can disrupt the co-worker and information network of the parent, which may otherwise assist in kickstarting their child's career. Third, it may alter the potential benefits of working with the father or following the same career path. Fourth, the household's loss of resources, when the usual primary provider loses their job, may directly impact compulsory school grades or shift the risk preferences of students (which can also be considered part of the "information signal"), prompting them to opt for a more stable career program.

In Section 4.6, we provide evidence consistent with the notion that the main mechanism behind the effects we observe is the information about the economic conditions and prospects of crisis-affected sectors and changing risk preferences, rather than factors related to parental networks or the desire of children and parents to work in the same sector. Since our preferred specification partials out the effect of paternal job loss in any sector on students' career choices, we can also rule out that our results are driven by the direct effects of job loss on household resources and student performance in compulsory school. Unlike identification strategies that rely on plant closures—where entire communities are affected simultaneously—our approach

[29]The share of students graduating from compulsory school at age 16 is reported in Panel B of Appendix Figure A2.

allows us to capture an important type of within-family information shock that is difficult to study using variation at a more aggregate level. In fact, our results suggest that using major plant closures, where the entire community experiences the shock, would likely fail to reveal meaningful treatment effects. We elaborate on this point in the next section.

4 Results

This section presents the results from our empirical analysis. After outlining general trends during the study period, we provide estimates of the effects of paternal job loss on high school program choice and early career earnings. We then proceed by estimating the effects on long-run labor market outcomes and testing the robustness of our findings. The section concludes with additional analyses aimed at shedding light on the underlying mechanisms.

4.1 The Effects of Paternal Job Loss on Early Career Choices

General trends in high school program choices. We start our analysis by documenting the general time trend in observed high school programs at age 20 for the cohorts born between 1964 and 1988 (see Figure 1). With this outcome definition, cohorts born before 1971 would not have had the opportunity to react to the economic crisis that started in 1990 by adjusting their educational choices. In contrast, subsequent cohorts could, to some extent, react to the information by either switching programs or choosing a different educational path. In particular, children born after 1975 made their high school program choices in the aftermath of the crisis, allowing them more leeway to opt for programs associated with sectors less affected by the economic downturn.

Figure 1 shows an overall increase in the share of high school students completing a general academic education program, making them eligible for university studies (see Panel A). For the smaller programs in the vocational track, there are observable shifts in program shares over time, particularly for individuals born in the mid-1970s (see Panel B). A notable trend is that the program share of manufacturing, a sector heavily affected by the crisis and the following labor market restructuring, was reduced by half in less than 10 years. While also crisis-affected, the construction program experienced a less pronounced decline and began to trend upward as the sector recovered. However, these national-level patterns reflect not only the specific impact of the economic crisis but also the influence of other secular trends and policy changes.[30]

[30] In particular, the sudden change for some of those programs for the 1976 cohort is due to the high school reform discussed in Section 2.3.

Effects on high school program choice. Next, we proceed with the causal analysis. As described in Section 3.3, our estimation strategy relies on within-cohort-county variation in the timing and sector of paternal job loss. This approach allows us to examine the effects of paternal job loss on students' likelihood of completing a crisis-linked high school program, i.e., a program in manufacturing or construction.

The results for completing a crisis sector-linked high school program are presented in Table 2 and Figure 2. The estimates based on our preferred specification (Equation 1), which compares paternal job losses before and after age 16 and also nets out the main effect of paternal job loss before age 16 in any other sector[31], show a statistically significant effect of early paternal job loss on the completion of a crisis-linked program (−0.012, s.e. 0.003). These estimates imply an 11% decrease in the probability of completing a high school program linked to the crisis sectors, relative to the mean for students who experienced paternal job loss in the crisis sectors at or after age 16. The graphical evidence in Panel A of Figure 2 confirms these results, indicating a clear discontinuity in the likelihood of completing a crisis-linked education when paternal job loss in the sector occurred before age 16.

When examining job losses and high school program choices in manufacturing and construction separately, we observe similar effects: both of our specifications yield negative and statistically significant effects for manufacturing programs (ranging from −0.005 to −0.008, s.e. 0.003) and construction programs (−0.011 to −0.012, s.e. 0.003). In columns 2, 4, and 6 in Table 2, we further show that the effects on completing crisis-linked high school programs are robust to controlling for background characteristics and to including cohort-by-municipality fixed effects (instead of cohort-by-county fixed effects). In sum, these results indicate that the experience of paternal job loss in the crisis sectors before age 16 is associated with students opting out of the corresponding career paths.

Substitution toward other programs. What types of programs did students choose to pursue when opting out of manufacturing- or construction-linked programs, and does paternal job loss affect the likelihood of completing high school overall? To answer this question, we estimate the effects of paternal job loss in the sectors heavily affected by the crisis on students' selection of alternative career programs and high school completion status. The results, reported in Table 3, show that the reduced likelihoods of choosing manufacturing programs (−0.008, s.e. 0.002) and construction programs (−0.005, s.e. 0.002) did not translate into a statistically significant increase in either the probability of completing academic programs (−0.003, s.e. 0.005)

[31]The MDV of the control groups entering a crisis-linked education is roughly 5%, which gives ample room for them to react to the crisis.

or not completing high school education (−0.000, s.e. 0.004) by age 20. Instead, the findings indicate that students switched to other vocational programs less impacted by the crisis, such as transportation (0.004, s.e. 0.002), hotel and restaurants (0.005, s.e. 0.002), and agriculture (0.004, s.e. 0.001).[32]

In a more refined analysis presented in Table 4, we explore the characteristics of the high school programs that the students shifted to. Specifically, we consider the early career outcomes (ages 22–25) of students who graduated from these programs before the crisis, considering both the mean and variance of their earnings. We examine outcomes for either older cohorts born in 1964/65 or slightly younger cohorts born in 1968/69. The early career outcomes of the older cohorts are measured before the economic crisis ("pre-crisis"), while those of the younger cohorts are measured during the economic downturn ("during crisis"). We then map these program-level outcomes to our main sample of cohorts who made their high school program choices just a few years later. The earnings outcomes are standardized to have a mean of zero and a standard deviation (σ) of one across all programs.

Our results indicate that experiencing early paternal job loss in the crisis sectors shifted students to programs with lower earnings variance (-0.021σ, s.e. 0.010), but not to programs with higher earnings pre-crisis (Table 4, column 1 and 3). However, they did opt for programs that exhibited more favorable labor market outcomes *during* the crisis (columns 2 and 4), characterized by higher standardized earnings (0.027σ, s.e. 0.012) and lower earnings variance (-0.045σ, s.e. 0.010). When combining measures of earnings levels and variance (columns 5 and 6), we find that students who experienced early paternal job loss in crisis sectors chose more stable career paths in terms of risk-adjusted earnings (0.045σ, s.e. 0.011). Moreover, they opted for program-based career paths associated with a higher post-graduation employment rate during the crisis (column 7), albeit to a lesser extent (0.002, s.e. 0.001) compared to the corresponding gain in earnings. Overall, our findings indicate that students exposed to paternal job loss at a time when they could still adapt their career choices shifted towards high school programs associated with better labor market outcomes during the crisis.

4.2 The Effects of Paternal Job Loss on Early Career Earnings

Next, we investigate the consequences of paternal job loss on early labor market outcomes by examining measures of cumulative earnings. Using the panel dimension of our data, we define two measures: cumulative earnings between the ages of 20 and 30 and log cumulative earnings between the ages of 20 and 30 to capture the early career earnings profile. The results are

[32]The students also appear to steer away from the arts program (−0.004, s.e. 0.002).

reported in Table 5 and Panel B of Figure 2.

The effects on cumulative earnings between ages 20–30 (SEK 43,787, s.e. 9,934) and log cumulative earnings between ages 20–30 (0.027, s.e. 0.011) in Table 5 are consistently positive and statistically significant for the main DiD specification (Equation 1). When adding further controls, the estimates show a slight decrease in magnitude but remain statistically significant. These results indicate that the students affected by early paternal job loss in the crisis sectors achieved better labor market outcomes compared to their peers who experienced paternal job loss at age 16 or later. The treatment effect estimates are sizable, amounting to approximately a 2–3% increase in cumulative earnings between the ages 20 and 30. The event-study estimates reported in Panel B of Figure 2, which show how the treatment effect varies over student age at paternal job loss, confirm a marked increase at the age-16 cutoff.

4.3 The Effects of Paternal Job Loss on Students' Long-Run Outcomes

It is not obvious whether career choices at an early age have lasting effects on labor market outcomes in the very long run or if these effects diminish over time. Figure 3 presents evidence on how the effects on earnings, employment, and geographic mobility of experiencing early paternal job loss in the crisis sectors evolve over the life cycle. The results show that the treatment effects on log earnings and the employment rate are more pronounced in the early career, although the point estimates remain positive in the mid-30s. The effect on the probability of being employed in the manufacturing or construction sector is negative over the entire age range but is most pronounced around age 30. The point estimates on moving to a new municipality (after age 16) are negative but generally not statistically significant. Overall, early paternal job loss appears to have positive effects on early career outcomes for individuals between the ages of 20 and 30, and these benefits partially continue into later stages of their careers.

To investigate these long-term effects further, we consider cumulative career employment and cumulative career earnings until 2017, and various outcomes measured in 2015, i.e., 20 years after the economic crisis ended. These outcomes include the sector of employment, having a university education, employment status, and divorce status. The results, reported in Tables 6 and 7, show that experiencing early paternal job loss in the crisis sectors positively affected the students' average career employment rate (0.008, s.e. 0.002) and career cumulative earnings (SEK 84,779, s.e. 24,613). A similar pattern is observed for earnings in logs. With added controls, the estimates tend to decrease in magnitude but remain statistically significant. These findings indicate that the positive labor market effects are concentrated in the early career years at ages 20–30, although some effects appear to persist throughout the career.

For the long-term outcomes in 2015, early paternal job loss had negative effects on the students' probability of completing university studies (−0.010, s.e. 0.005), but it increased their long-term employment probability (0.008, s.e. 0.003). Furthermore, these individuals were less likely to be employed in the specific crisis sector in the long run, whether their father lost his job in manufacturing (−0.010, s.e. 0.004) or in construction (−0.006, s.e. 0.004), with the caveat that the effects of job loss in the construction sector are not statistically significant.[33] These findings indicate that the effects persist throughout the individual's career, with a more pronounced impact at early ages.

4.4 Effects by Student Gender

Up to this point, our analysis has examined the effects of paternal job loss for male and female students jointly. However, given the large gender imbalance among vocational high school students, particularly in manufacturing and construction programs, we present gender-specific treatment effects in Table 8.

The rate of completing a crisis-linked education (mean of the dependent variable) almost doubles when restricting the sample to men, which confirms a low share of female students completing programs linked to the crisis sectors. Most of our estimates exhibit significant gender disparities, with weaker effects for female students, consistent with their lower baseline completion rates. Conversely, the estimates for male students become more pronounced when we differentiate the effects by gender, in line with their much higher baseline completion rates. The effect of paternal job loss on the likelihood of male students opting for crisis-sector programs shows a marked increase in absolute value (−0.024, s.e. 0.005), as does the effect on their career earnings (SEK 130,318, s.e. 35,816). However, when these effects are considered in relation to the mean, the increase appears moderate, as the average outcomes for male students are generally higher.

4.5 Robustness Tests

Predicted program choices and earnings. A key robustness test relates to potential selection effects induced by the timing of paternal job loss. If families experiencing early versus late paternal job loss exhibit different characteristics, this selection may affect our findings and lead to biased estimates. To address this concern, we have already taken steps by controlling for the main effect of "early" paternal job loss in any sector (see Equation 1) and by presenting detailed event-study evidence, showing that the effect of paternal job loss arises sharply at the age-16 threshold (see Figure 2). We examine this concern more directly by predicting our main

[33] See Panel C of Figure 3 for a graphical representation of the treatment effects on the likelihood of working in the crisis sectors over the life cycle.

outcomes of interest – educational choices and career earnings between the ages of 20 and 30 – using observable background characteristics and then studying if we can replicate our findings. These tests provide insight into whether the variability in child outcomes, based on the age at which paternal job loss occurs, could be due to systematic differences in family background.

Figure A4 in the Appendix provides a graphical representation of the results. The predetermined characteristics that we use to predict the two main outcomes of interest include parents' year of birth, high school completion status, marital status, number of children, as well as the student's birth order, gender, cohort-by-county fixed effects, and indicators for missing values of these characteristics. While individual-level choices are difficult to predict, the R-squared of the predictions are reasonably high, ranging between 0.073 and 0.101, depending on the specific outcome. The graphical results show no systematic pattern. Reassuringly, an F-test of joint significance fails to reject the null of no differences in the effects of graduating from high school with an education linked to the crisis sectors (p-value of 0.817). This is also true for the predicted cumulative earnings at ages 20–30, where the F-test shows no significant difference in effects (p-value of 0.221). Moreover, the effects on predicted outcomes are much smaller in absolute terms compared to the treatment effect estimates that we presented earlier.[34]

Sibling fixed effects. As an additional robustness check, we estimate treatment effects on the main outcomes conditional on sibling fixed effects (see Appendix Table A2). This approach allows us to compare siblings who experienced paternal job loss before and after the age of 16. While being a demanding specification, it controls for all unobservable family characteristics and influences, including those from the mother.[35] In general, the estimates are robust to the inclusion of sibling fixed effects. The estimate for the effect of paternal job loss on having an education linked to the crisis sectors is negative and statistically significant (-0.015, s.e. 0.008), albeit with a much larger standard error than in the baseline specification. The estimates for cumulative earnings between ages 20–30 and cumulative career earnings until 2017 also mirror those of the baseline specification in terms of magnitude. However, due to the reduced effective sample size, they are not statistically significant.

Alternative age bandwidths for paternal job loss. We further test the robustness of our estimates to using narrower age bandwidths for when paternal job loss occurs. We already showed in Figure 2 that the effects of paternal job loss on high school program choice and early

[34]Consistent with these findings, the estimated treatment effects on program choice (Table 2) and cumulative earnings (Table 5) are not very sensitive to these controls.

[35]The number of observations in the sample with any siblings in the relevant age range is just over 104,000, compared to 176,000 in the DiD specification.

career earnings exhibit a clear discontinuity at the age-16 threshold, and then widen slightly when measured relatively to students who experienced this event at older ages. In line with this graphical evidence, Table A3 in the Appendix shows that the estimates decrease slightly when we apply a more restricted age range for paternal job loss. For instance, focusing on job losses that occur between the ages of 12 and 19, we find an effect on the likelihood of having a crisis-linked education of −1.2 pp. (−0.012, s.e. 0.003), which is statistically significant. A narrower comparison within the ages of 14 and 17 also yields a negative and statistically significant effect (−0.009, s.e. 0.004). A similar pattern is observed for early career earnings at ages 20–30: restricting the analysis to the age range 14–17 leads to a statistically significant effect (SEK 35,825, s.e. 15,512) that is only slightly smaller than our main estimate.

4.6 Mechanisms

This subsection delves into the mechanisms that could explain our main findings. The aim is to offer suggestive evidence that connects the information channel to the observed treatment effects. First, we investigate if the information shock resulting from paternal job loss is muted by other information signals within the local municipality. If local shocks disseminate similar information more broadly to the public, we would expect to see this kind of pattern. Second, we analyze whether the treatment effects are more pronounced during the years of the economic crisis. This could suggest that individuals are more inclined to perceive a job loss as an indicator of poor long-term employment prospects when it occurs in the context of an economic downturn. Third, we test if the job loss of other (close) family members also discourages students from completing educational programs linked to the crisis-affected sectors, which would support the idea that information signals received from family members play a role in shaping students' early career decisions. Fourth, we provide suggestive evidence that the effects of paternal job loss on educational choices are not primarily driven by the disruption of parental networks. Finally, we present the main effects of experiencing paternal job loss in sectors other than the crisis-linked ones. This is to ascertain that the information derived from job loss in itself does not influence the likelihood of completing a crisis-linked high school program.[36]

Variation in local exposure to the crisis. We start by investigating whether the effects of early paternal job loss on high school program choices vary depending on the severity of the

[36] An alternative explanation is that fathers in crisis-affected sectors become more pessimistic about future labor market prospects and adjust their expectations accordingly, particularly given the slow recovery in these sectors (Kuchler and Zafar, 2019). As a result, they may encourage their children to pursue safer career paths with shorter study durations or lower educational costs, leading them to enter the labor market earlier and initially earn higher wages. While such shifts in school sorting remain part of the broader information channel we identify, it is less relevant as the Swedish government fully funds all types of high school education.

economic crisis in the municipality where the student resides at age 16. We hypothesize that intense local exposure to the crisis could disseminate information about crisis-affected sectors not only to students who experience paternal job loss but also to those whose fathers remained employed. Such widespread dissemination of information would level the informational disparities between these groups of students and hence would be expected to mitigate the specific effects of early paternal job loss.[37] To investigate the impact of broader economic shocks on individual-level information advantages, we use the municipality-level change in the employment rate in 1993 relative to 1990 as a proxy for the local severity of the crisis, which we group into quartiles.[38]

Table 9 shows how the treatment effects of early paternal job loss vary across different quartiles of the municipal crisis exposure. The estimates in columns 1 and 2 show a high degree of heterogeneity in the effects of paternal job loss according to local crisis exposure. In municipalities less impacted by the crisis, early paternal job loss reduces the probability of attending a high school program linked to the manufacturing or construction sectors (-0.022, s.e. 0.008), while this effect is weaker in more exposed municipalities. In the most affected quartile (Q4 interaction: 0.019, s.e. 0.009), the overall treatment effect (baseline Q1 effect plus Q4 effect) on educational choices of early paternal job loss is close to zero. The point estimates for quartiles 2 and 3 of crisis severity are also positive, albeit not statistically significant. These results suggest that the information signal from experiencing paternal job loss is attenuated in municipalities that have undergone a severe economic downturn. For early career earnings, the general pattern is less clear-cut. Although the point estimates for the baseline Q1 and quartile-specific effects of crisis severity have the opposite sign, the latter are not statistically significant.

Triple differences. In our main empirical analysis, we focus on the timing of paternal job loss during the peak years of the economic crisis that impacted Sweden in the early 1990s. In Table 10 and Appendix Figure A5, we investigate the extent to which the observed effects on educational program choices are specifically associated with experiencing paternal job loss during the crisis years. We do so by estimating a triple-difference model, which extends the main DiD specification (Equation 1) by also accounting for the effects of experiencing paternal job loss in the crisis sectors post-crisis, i.e., during 1996–1999. This approach is motivated by findings indicating that individuals more exposed to macroeconomic risks, such as those working in more

[37] This hypothesis is consistent with theories of rational inattention, which suggest that individuals generally do not pay close attention to the aggregate state of the economy except during times of turbulence, when understanding macroeconomic conditions becomes more important (Mackowiak et al., 2023). Using a field experiment, Roth et al. (2022) show that respondents who become aware of a higher personal unemployment risk during recessions are more likely to seek expert forecasts about the likelihood of a recession. These results highlight that there are frictions in how households perceive the personal relevance of certain types of information.

[38] These splits pick up substantial spatial heterogeneity in exposure to the crisis, with the employment rate dropping by 7 pp. more in the most affected quartile compared to the least affected quartile.

cyclical industries, are more likely to update their expectations about personal unemployment risk (Roth and Wohlfart, 2020). The regression model we estimate is as follows:

$$y_{i,j,k} = \psi_0 + \psi_1 JL_i^{Cr} \times Early_i \times Crisis_i + \psi_2 JL_i^{Cr} \times Early_i + \psi_3 JL_i^{Cr} \times Crisis_i + \psi_4 Early_i \times Crisis_i + \psi_5 Early_i + \psi_6 JL_i^{Cr} + \psi_7 Crisis_i + \theta_{j,k} + \boldsymbol{X_i'\delta} + \varepsilon_{i,j,k}, \quad (2)$$

where $Crisis_i$ is an indicator that takes the value one if the paternal job loss occurred between 1991 and 1995, and zero if it occurred between 1996 and 1999, when the economy was recovering. The coefficient of interest, ψ_1, on the triple interaction term captures the triple difference effect of early paternal job loss on educational choices during the economic crisis of 1991–1995, compared against the DiD job loss effect of 1996–1999. The graphical results of experiencing post-crisis job loss on the main outcomes are displayed in Panel B of Appendix Figures A6, A7, and A8.

In general, the triple-difference estimates are similar to those derived from the the baseline DiD specification (see Table 10). Although the more demanding triple-difference specification inevitably entails a loss in statistical precision, the estimates for the probability of graduating from a high school program linked to the crisis sectors are only marginally smaller, by 0.1 to 0.3 pp., compared to the DiD specification. This finding indicates that our results concerning the effect of paternal job loss on high school program choice are largely limited to the crisis years when there was increased uncertainty about labor market conditions. Figure A5 in the Appendix further supports this conclusion by graphically displaying the treatment effects based on the year when paternal job loss occurred. This figure shows that the treatment effects are more pronounced during the crisis years of 1991–1995, especially at the onset of the crisis. Conversely, the effects are generally weaker for individuals who experienced early paternal job loss in the crisis sectors either before or after the economic downturn. Such patterns suggest that the information signal from parental job loss may be more important during the early stages of an economic crisis.

Job loss of other family members in the crisis sectors before age 16. Given that the treatment effects are specifically related to job losses in the crisis sectors and not just to a general loss of economic resources, we extend our analysis to include other information channels beyond paternal job loss. In particular, the data allow us also to estimate the treatment effects associated with early job loss among other family members. The results of this expanded analysis are shown in Table 11. We use the same empirical framework as for analyzing paternal job loss, but now we shift our focus to different family members. Specifically, we assess the impact of job loss experienced by the mother, paternal uncle, maternal uncle, or an older brother of the student.

We investigate how these job losses in the crisis sectors, occurring before and after the student reaches the age of 16, influence educational choices.

Experiencing maternal job loss in the crisis sectors before the student turns 16 is found to reduce the likelihood of completing a crisis-linked high school education. The estimate is −0.9 pp. (s.e. 0.004), which, while slightly smaller, is comparable in magnitude to the effect of early paternal job loss and is statistically significant.[39] For job loss experienced by paternal uncles, we find no significant treatment effect. This holds true when considering all paternal uncles (0.001, s.e. 0.003) and when focusing on those residing in the same municipality as the student (−0.003, s.e. 0.006). On the other hand, job loss among maternal uncles shows statistically significant negative effects for both the specification including all maternal uncles (−0.005, s.e. 0.003) and when restricting the sample to those residing in the same municipality as the student (−0.009, s.e. 0.005), with this latter effect being very similar to that of maternal job loss. With some speculation, the more pronounced effect from a maternal uncle's job loss could be due to stronger family ties to the mother's family.[40] For (the few) job losses experienced by older brothers, we find a strongly negative effect. However, due to the small sample size, the estimate is imprecise and not statistically significant (−0.021, s.e. 0.027). Overall, these findings suggest that job losses among other family members, especially those in close geographic proximity, also affect early career choices.

Effects by paternal attachment to the crisis sectors. Existing parental networks could play a role in affecting students' decisions to pursue educational programs linked to the sector of employment of the father (Almgren et al., 2023; Staiger, 2023), and paternal job loss could potentially influence students' career choices by disrupting these career paths and networks. We explore this possibility by allowing the estimated treatment effects on educational program choice to vary by the number of years the father worked in the crisis sector prior to the recession (between 1985 and 1990). The number of paternal years in the sector is meant to proxy for stronger attachment and networks within the given sector.

The results, reported in Table 12, show no significant differential effect on students' career choices by the number of pre-crisis paternal years in the sector. This holds true both when pooling the crisis sectors and when splitting the results by the individual sectors. This pattern indicates that stronger paternal attachment to this sector does not significantly influence career choices. Furthermore, the findings imply that the disruption of networks may not be the primary driver behind our results on educational program choice.

[39] Instances of maternal job loss in the crisis sectors are less frequent than paternal job losses, affecting the precision of our estimates for this specification.

[40] However, the differences between the estimates for paternal and maternal uncles are not statistically significant.

Effects by hiring probability of the father's firm. We further investigate the role of network disruptions and loss of workplace connections in explaining the treatment effects by testing for heterogeneous treatment effects by proxies for increased likelihood of the father's firm hiring the student (see Table 13). First, we examine whether the treatment effects are significantly stronger if the father was among the top 25% highest-paid employees in the firm during the year prior to the job loss event. Second, we test for differential treatment effects if there was an existing father-child pair in the firm, while also controlling for firm size in the specification. Both measures collectively show no evidence of differential treatment effects based on the father's firm's hiring likelihood. This indicates that the disruption of networks and loss of workplace connections are not driving the results.

Main effect of paternal job loss in other sectors. In Figure 4, we present graphical evidence to explore the impact of the loss of family economic resources, resulting from paternal job loss, on students' educational choices. This figure examines the main effects of early job loss in sectors other than those heavily affected by the crisis.[41] The estimates measure the extent to which paternal job loss, in general, affects the likelihood of students completing a crisis-linked high school program and how these effects vary depending on the age of the student. Moreover, these estimates capture any selection effects associated with the timing of paternal job loss. For instance, families experiencing this event while their children are younger may differ from those where the job loss occurs when the children are older (see the discussion in Section 3.3).

Panel A of Figure 4 shows that there is no clear discontinuity in the probability of having completed a crisis-linked education based on the age at which the student experienced paternal job loss in sectors other than those heavily affected by the crisis. If anything, there is a slight tendency for those experiencing paternal job loss before the age of 16 to be more more likely to pursue such education, although this effect is not statistically significant. These findings suggest that job loss in general, and the consequent loss of economic resources in the family, does not significantly deter students from completing crisis-linked high school programs.

5 Discussion

Our results reveal that individuals' responses to economic crises and sectoral downturns in terms of early career choices can be both rapid and economically meaningful, contributing to structural change on the labor supply side. The empirical approach and the analysis of related mechanisms lead us to interpret our findings as responses to an information signal derived from paternal job

[41] This refers to the main effect, dissaggregated by the age of the child at the time of the job loss, which we obtain using the DiD specification described in Equation (1).

loss, which provides insights into the economic prospects of and risks of entering sectors affected by the crisis.

A key challenge is to disentangle the effects of informational frictions about a sector's economic prospects from the student's preferences for entering the same sector as their father. It is plausible that students may have an inherent desire to follow in the father's professional footsteps, and paternal job loss could diminish the perceived value or utility of pursuing this path. However, three key observations lend weight to the argument that the "information shock" regarding the economic prospects of certain sectors is the primary driver of the behavioral responses that we uncover. First, we note that the treatment effects of early paternal job loss on career choice are significantly larger during the recession, especially at its onset, compared to non-crisis years. This pattern suggests that children are capable of discerning whether their parent's job loss is an idiosyncratic event or indicative of broader sectoral trends. Second, we observe only weak treatment effects in municipalities that were heavily affected by the crisis, where labor market prospects were likely more salient. This finding is consistent with the notion that the information shock within the family is less important in situations where the downturn becomes sufficiently apparent to the wider community. Third, while students' career choices in high school are affected, we find no effect on overall high school completion probability. Moreover, our findings do not indicate that a disruption of family resources or the loss of the father's existing job networks are driving the effects.

We interpret the magnitude of the estimated treatment effect on having a crisis-linked high school education (-11%) as large, since it occurs alongside a general trend of students moving away from these programs. Given that the baseline probability to choose such a career path is higher among students whose fathers work in the crisis-affected sectors, this effect indicates a partial alignment of these students' career choices towards those of the broader student population. The effect on cumulative career earnings, which are in the range of 2–3% as a result of experiencing early paternal job loss in the crisis sectors, is also substantial when considered in relation to the effect on students' educational choices.

In terms of policy implications, our findings highlight the potential benefits of addressing informational frictions in early-career decision-making, particularly for young labor market entrants affected by recessions. One way to reduce these frictions could be to provide more guidance for students about the prospects of various sectors. This may involve initiatives such as career counseling or other strategies aimed at making the economic consequences of early career choices more salient. Such policies could be especially beneficial for younger individuals, who have more flexibility to modify their career paths.[42] Perhaps less intuitively, our findings suggest

[42]Providing additional information and career counseling might also be useful for other groups beyond students

that the provision of information has stronger behavioral impacts during the initial stages of a crisis and in geographical areas that are less directly affected by it.

6 Conclusion

In this paper, we investigate how economic crises affect the early career choices of the next generation of workers. Leveraging the timing of paternal job loss during the severe economic crisis that struck Sweden in the early 1990s, we estimate causal effects and explore mechanisms related to information shocks experienced by students prior to entering the labor market. Specifically, our identification strategy relies on individual-level variation in paternal job loss in the heavily affected manufacturing and construction sectors before and after high school program choices are made at the age of 16. These program choices are critical in shaping early career trajectories, as many programs are closely associated with specific occupations and industry sectors.

Our results show a substantial decline in the likelihood of students choosing career paths in manufacturing or construction during and following the economic crisis. Above and beyond this general trend, we find that students who experienced paternal job loss in the crisis-affected sectors before making their educational decisions shifted away from programs linked to these sectors, opting instead for other vocational programs, but with no effect on their overall high school completion probability. In the long run, these students are more likely to work in sectors other than those affected by the crisis. They have higher earnings at the early stages of their careers and a higher probability of being employed. In turn, this contributes to a weakening of the intergenerational link between the career choices of fathers and their children, ultimately resulting in more favorable labor market outcomes for the children.

Delving deeper into the results, we find that students affected by early paternal job loss in the crisis sectors tended to shift toward educational programs characterized by lower expected earnings volatility. These students thus responded to the crisis by making less risky career choices early on, which had a positive impact on their career earnings. Furthermore, our results suggest that the effects of information signals during an economic crisis – in this case paternal job loss – vary throughout the recession and are influenced by local conditions, such as the degree of crisis exposure in the student's municipality.

In conclusion, our study highlights the existence of significant opportunities for enhancing individuals' ability to navigate informational frictions during economic crises. One promising approach to address these challenges is to combat the informational gaps related to the prevailing

on the verge of choosing their career paths. However, for these groups, it may be necessary to couple such initiatives with measures aimed at enhancing career flexibility, such as the implementation of retraining programs.

economic conditions and the future prospects of various sectors through targeted interventions. In particular, the combination of flexible educational options and improved access to relevant information at the onset of a downturn could play an important role in mitigating the adverse individual consequences of economic crises.

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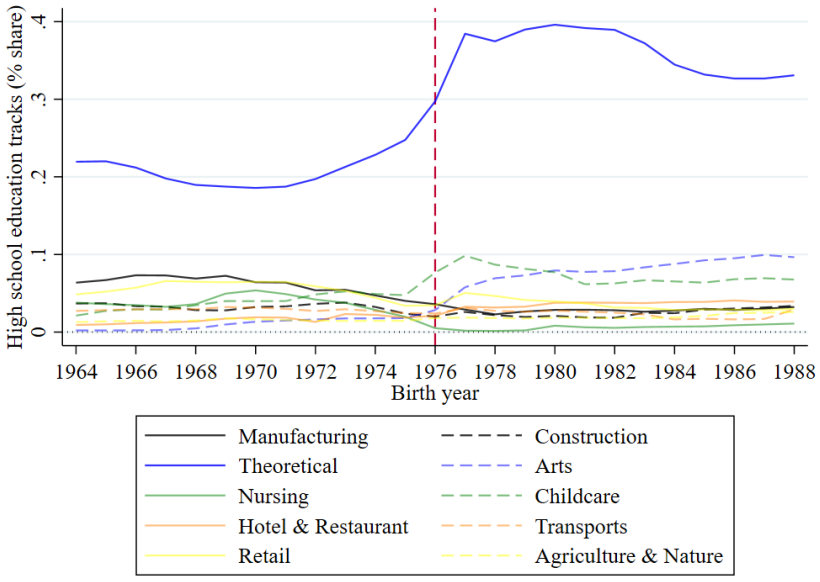
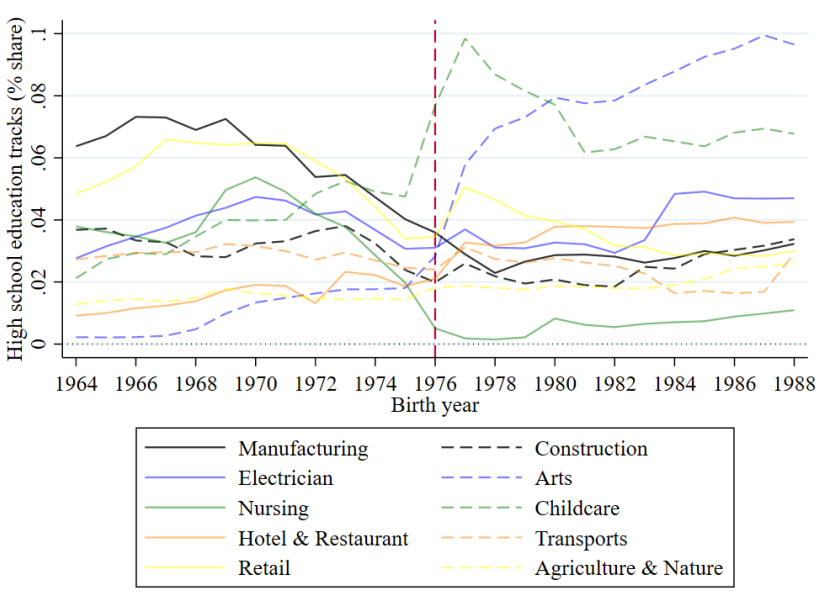


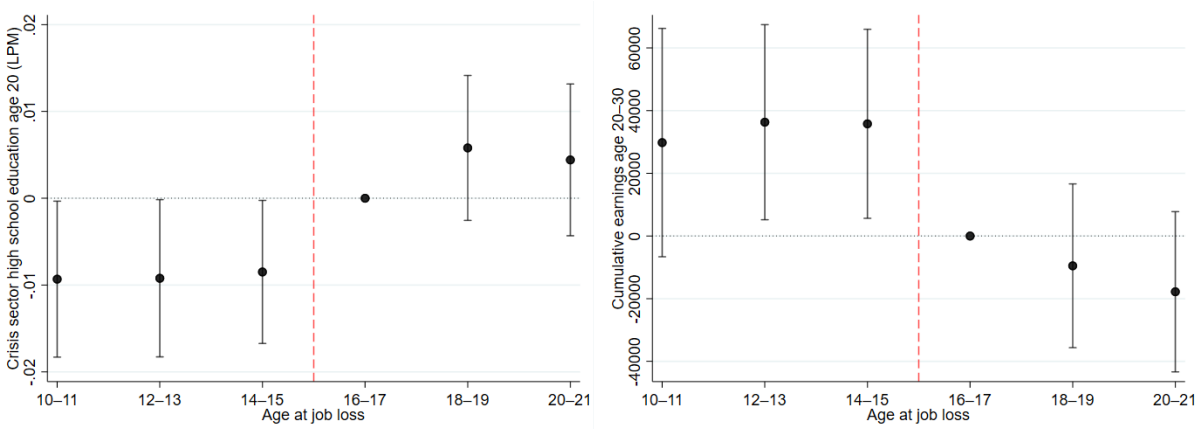
A. All programs



B. Vocational programs

Figure 1 – Distribution of Students across High School Programs, by Year of Birth

Notes: Panel A shows the general trend in high school programs completed by age 20, separately by birth cohort. Panel B focuses on the subset of vocational programs. We exclude individuals who had not completed high school by age 21 (14.4%) and those who had a university education already at age 19 (4.5%). Additionally, certain minor programs, programs that could not be identified, and programs that were largely phased out with the high school reform of 1993/94 (17.3%) are excluded. The dashed vertical red line marks the approximate first cohort that was affected by the high school reform of 1993/94.

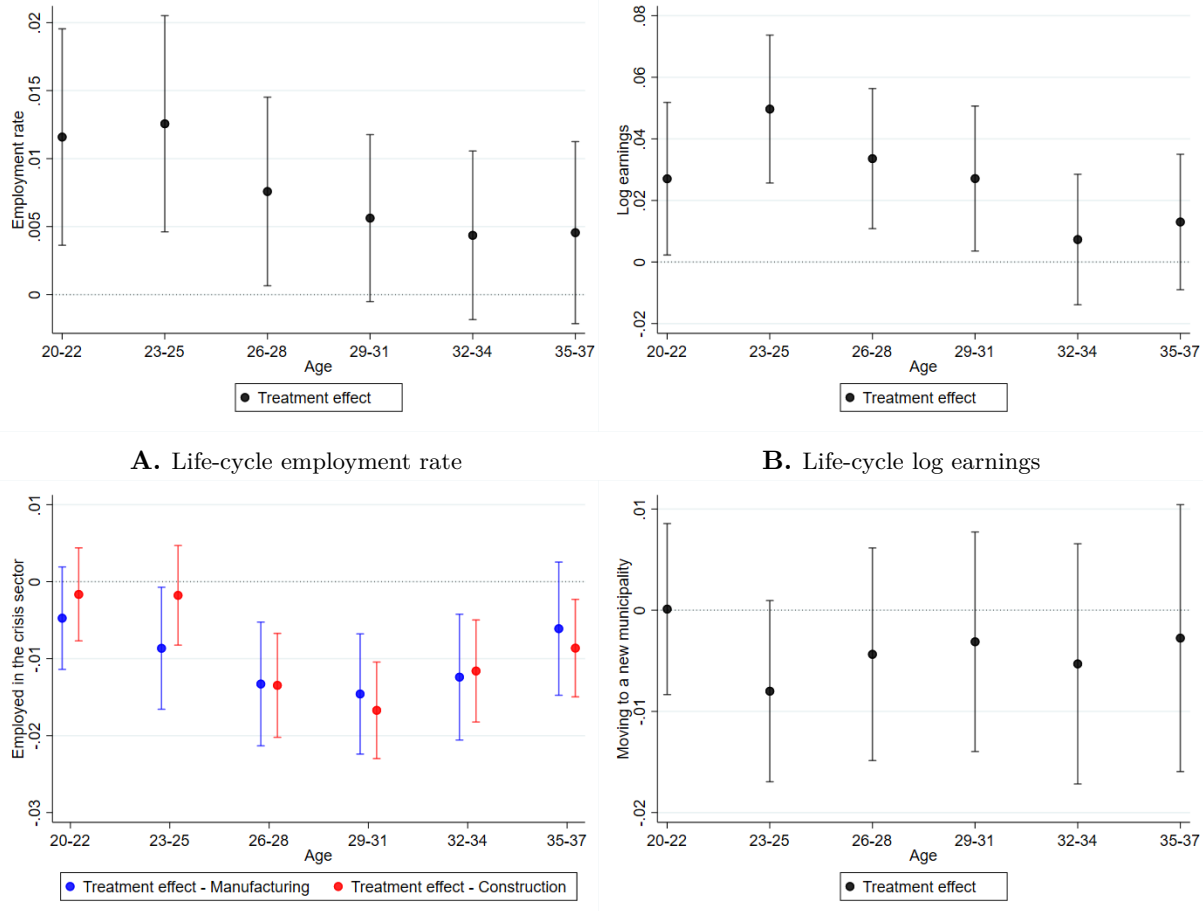


A. Crisis-linked education

B. Cumulative earnings between ages 20 and 30

Figure 2 – Effects of Paternal Job Loss on the Probability of Completing a Crisis-Linked Education and Earnings between the Ages of 20 and 30, by age at Job Loss

Notes: The figure shows the difference-in-differences estimates of the effect of experiencing paternal job loss in a sector heavily affected by the crisis on students' probability of having completed a crisis-linked high school education around age 20 (Panel A) and on their cumulative earnings between the ages of 20 and 30 (Panel B), by the student's age at paternal job loss. The estimates net out the main effect of experiencing paternal job loss in any other sector at the same age, and are normalized to zero at age 16-17. The outcome "Crisis-linked education" refers to having a manufacturing or construction-linked high school education at age 20. All regressions include cohort-by-county fixed effects. Standard errors are clustered at the level of the student's municipality of residence at age 16. The vertical T-bars show the 95% confidence intervals around the point estimates.



A. Life-cycle employment rate

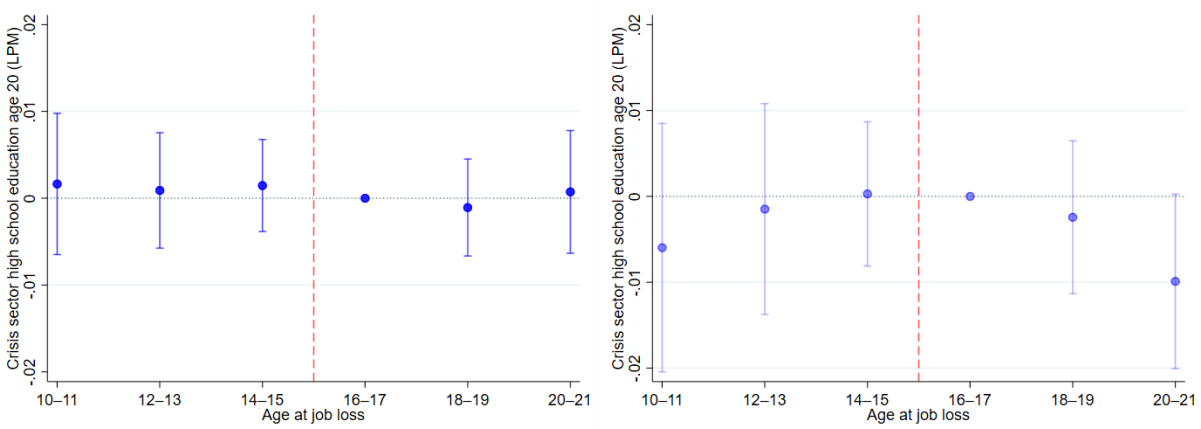
B. Life-cycle log earnings

C. Being employed in the paternal crisis sector

D. Moving to a new municipality

Figure 3 – Treatment Effects on Employment, Log Earnings, Crisis-Sector Employment, and Geographic Mobility

Notes: The figure shows the difference-in-differences treatment effects estimates of experiencing paternal job loss in the crisis sectors before age 16 on life-cycle average employment rate (Panel A), life-cyle log earnings (Panel B), being employed in the paternal crisis sector (Panel C), and geographic mobility (Panel D), separately by 3-year age groups. In Panel C, the treatment effects split by the individual manufacturing and construction sectors restrict attention to paternal job losses taking place in the specific sector. All regressions include cohort-by-county fixed effects. Standard errors are clustered at the level of the student's municipality of residence at age 16. The vertical T-bars show the 95% confidence intervals around the point estimates.



A. Main effect of paternal job loss, 1991–1995 **B.** Main effect of paternal job loss, 1996–1999

Figure 4 – Main Effects on Completing a Crisis-Linked Education, by Age at Paternal Job Loss

Notes: The figure shows the main effect of experiencing paternal job loss in sectors other than the crisis-linked ones on the student's probability of having completed a crisis sector-linked high school education around age 20. The outcome is having a crisis sector-linked high school education at age 20 (pooling manufacturing and construction). All regressions include cohort-by-county fixed effects. Standard errors are clustered at the level of the student's municipality of residence at age 16. The vertical T-bars show the 95% confidence intervals around the point estimates.

Table 1 – Summary Statistics for the Main Sample of Students Experiencing Paternal Job Loss

	Father's job loss: sector		
	Any sector	Manufacturing	Construction
	(1)	(2)	(3)
Individual			
Year of birth	1977.9	1977.6	1977.7
(Std. deviation)	(4.061)	(4.013)	(3.935)
Female	0.485	0.482	0.484
Father			
Year of birth	1946.9	1946.5	1947.8
(Std. deviation)	(6.905)	(7.125)	(6.386)
Completed high school	0.547	0.483	0.503
Married	0.722	0.730	0.707
Employed (in 1990)	0.976	0.990	0.994
Earnings (100s SEK in 1990)	1665.9	1683.3	1809.3
(Std. deviation)	(917.2)	(782.1)	(631.0)
Mother			
Year of birth	1950.4	1950.2	1950.9
(Std. deviation)	(6.293)	(6.479)	(5.952)
Completed high school	0.623	0.557	0.610
Married	0.722	0.738	0.712
Employed (in 1990)	0.853	0.841	0.876
Earnings (100s SEK in 1990)	1032.3	994.7	1019.5
(Std. deviation)	(604.2)	(569.1)	(530.6)
Birth cohorts	1970–88	1970–88	1970–88
Paternal job loss years	1991–99	1991–99	1991–99
Obs.	232,566	54,146	37,564

Notes: The table shows descriptive statistics for the main sample from the 1990 census, separately for students experiencing paternal job loss in any sector, in the manufacturing sector, and in the construction sector during the period 1991–1999.

Table 2 – Effects of Paternal Job Loss in the Crisis Sectors on the Probability of Completing a Crisis-Linked High School Program by Age 20

Paternal job loss sector:	Crisis sector		Manufacturing sector		Construction sector	
Child outcome:	Crisis sector education		Manufacturing education		Construction education	
Specification:	DiD	DiD	DiD	DiD	DiD	DiD
	(1)	(2)	(3)	(4)	(5)	(6)
Paternal job loss in crisis sector before age 16	−0.012***	−0.011***	−0.008***	−0.005*	−0.011***	−0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Cohort × county FEs	✓		✓		✓	
Cohort × municipality FEs		✓		✓		✓
Controls		✓		✓		✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dependent variable	0.107	0.107	0.072	0.072	0.060	0.060
Obs.	176,658	176,658	176,658	176,658	176,658	176,658

Notes: "DiD" refers to the difference-in-differences specification where we further net out the effect of experiencing paternal job loss before age 16 in any other sector (Equation 1 in the main text). "Controls" refers to including control variables for the student's gender and parental information from the 1990 census (year of birth, high school completion status, marital status, and labor market outcomes). "Crisis sector education" refers to combining the manufacturing and construction high school programs into a single category. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 3 – Effects of Paternal Job Loss in the Crisis Sectors on the Probability of Completing Different High School Programs or Not Completing High School

High school program:	Crisis sector ed.	Manufacturing	Construction		
Paternal job loss in crisis sector before age 16	−0.012***	−0.008***	−0.005**		
	(0.003)	(0.002)	(0.002)		
Mean dep. var.	0.107	0.067	0.041		
Obs.	176,658	176,658	176,658		
High school program:	Academic	Nursing	Electrician	Retail	No HS degree
Paternal job loss in crisis sector before age 16	−0.003	−0.001	0.002	0.003	−0.000
	(0.005)	(0.001)	(0.002)	(0.002)	(0.004)
Mean dep. var.	0.188	0.030	0.042	0.057	0.179
Obs.	176,658	176,658	176,658	176,658	176,658
High school program:	Transportation	Arts	Childcare	Hotel & Rest.	Agriculture
Paternal job loss in crisis sector before age 16	0.004**	−0.004*	0.004	0.005***	0.004***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)
Mean dep. var.	0.034	0.026	0.067	0.024	0.017
Obs.	176,658	176,658	176,658	176,658	176,658
Cohort × county FEs	✓	✓	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. "Crisis sector education" refers to combining the manufacturing and construction high school programs into a single category. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 4 – Effect of Paternal Job Loss in the Crisis Sectors on Substitution to More Stable Career Programs

Outcome:	Standardized earnings in selected program		Standardized earnings variance		Standardized risk-adjusted earnings		Employment rate
Observation years:	Pre-crisis	During crisis	Pre-crisis	During crisis	Pre-crisis	During crisis	During crisis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Paternal job loss in crisis sector before age 16	−0.002	0.027**	−0.021**	−0.045***	0.016	0.045***	0.002*
	(0.012)	(0.012)	(0.010)	(0.010)	(0.012)	(0.011)	(0.001)
Cohort × county FEs	✓	✓	✓	✓	✓	✓	✓
Mean dep. var.	0.102	0.103	−0.002	0.060	0.085	0.059	0.570
Observation years	1986–1990	1990–1994	1986–1990	1990–1994	1986–1990	1990–1994	1991–1993
Obs.	176,658	176,658	176,658	176,658	176,658	176,658	176,658

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. The outcomes are defined as the program-specific mean outcome for cohorts who made their high school program choices before the 1990s crisis. Specifically, "Standardized earnings" denotes the standardized (mean zero and unit standard deviation, standardized by cohort) cumulative earnings outcome at ages 22–25 for individuals born in 1964/65 (observed pre-crisis) or 1968/69 (during the crisis), who chose the same program as the students affected by paternal job loss during the crisis. "Standardized earnings variance" and "Standardized risk-adjusted earnings" denote the variance of the cumulative earnings outcome for the same cohorts and the quotient of the earnings divided by the variance for the same definition, respectively. "Employment rate" denotes the program's average employment rate at age 20 during the early crisis years 1991–1993. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 5 – Effects of Paternal Job Loss in the Crisis Sectors on Early Career Earnings

Outcome:	Cumulative earnings between ages 20–30		Log cumulative earnings between ages 20–30	
	(1)	(2)	(3)	(4)
Paternal job loss in crisis sector before age 16	43,787***	36,557***	0.027**	0.021*
	(9,934)	(9,509)	(0.011)	(0.011)
Cohort × county FEs	✓		✓	
Cohort × municipality FEs		✓		✓
Controls		✓		✓
Job loss years	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	1,510,000	1,510,000	13.949	13.949
Obs.	176,658	176,658	172,769	172,769

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. Earnings are expressed in SEK. "Controls" refers to including control variables for the student's gender and parental information from the 1990 census (year of birth, high school completion status, marital status, and labor market outcomes). Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6 – Effects of Paternal Job Loss in the Crisis Sectors on Employment and Earnings during the Career

Outcome:	Career employment rate		Cumulative career earnings		Log cumulative career earnings	
	(1)	(2)	(3)	(4)	(5)	(6)
Paternal job loss in crisis sector before age 16	0.008***	0.007***	84,779***	58,029**	0.027**	0.020*
	(0.002)	(0.002)	(24,613)	(24,523)	(0.011)	(0.012)
Cohort × county FEs	✓		✓		✓	
Cohort × municipality FEs		✓		✓		✓
Controls		✓		✓		✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.662	0.662	5,210,000	5,210,000	15.158	15.158
Obs.	176,658	176,658	176,658	176,658	174,825	174,825

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. "Cumulative career earnings" refers to cumulative earnings during the career (up until the final year of our earnings panel in 2017) and are measured in SEK. "Controls" refers to including control variables for the student's gender and parental information from the 1990 census (year of birth, high school completion status, marital status, and labor market outcomes). Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 7 – Effects of Paternal Job Loss in the Crisis Sectors on Long-Run Outcomes in 2015

Paternal job loss sector:	Crisis sector				Manufacturing sector		Construction sector	
Child outcome:	Employed in crisis sector	University education	Employed	Divorced	Employed in manuf. sector	Employed in constr. sector	Employed in constr. sector	Employed in manuf. sector
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Paternal job loss in crisis sector before age 16	−0.005	−0.010*	0.008**	0.002	−0.010**	0.003	−0.006	0.006
	(0.004)	(0.005)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Cohort × county FEs	✓	✓	✓	✓	✓	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.237	0.312	0.881	0.101	0.140	0.096	0.080	0.147
Obs.	151,110	166,417	167,293	167,293	151,110	151,110	151,110	151,110

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. In column 1, "Employed in crisis sector" refers to being employed in the manufacturing or construction sector in 2015. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 8 – Effects of Paternal Job Loss in the Crisis Sectors on Students' Outcomes, by Student Gender

Outcome:	Crisis sector education (1)	Career earnings (2)	Earnings ages 20–30 (3)	Log earnings ages 20–30 (4)	Employed (5)	University education (6)	Divorced (7)
Paternal job loss in crisis sector before age 16	−0.024***	130,318***	62,464***	0.046***	0.011***	−0.009	−0.003
	(0.005)	(35,816)	(14,926)	(0.014)	(0.004)	(0.007)	(0.003)
Paternal job loss in crisis sector before age 16 × female	0.024***	−96,264**	−42,101**	−0.039*	−0.007	−0.001	0.009*
	(0.006)	(43,645)	(17,748)	(0.021)	(0.006)	(0.011)	(0.005)
Cohort × county FEs	✓	✓	✓	✓	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.193	6,030,000	1,770,000	14.125	0.885	0.284	0.085
Obs.	176,658	176,658	176,658	172,769	167,293	166,417	167,293

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. "Crisis sector education" refers to having a manufacturing or construction-linked high school education at age 20. "Career earnings" (in SEK) refers to cumulative earnings during the lifetime (up until the final year of our earnings panel in 2017). Earnings are expressed in SEK. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 9 – Effect of Paternal Job Loss in the Crisis Sectors, by Quartile of Exposure to the Crisis at the Municipal Level

Outcome:	Crisis sector education (1)	Career earnings (2)
Paternal job loss in crisis sector before age 16	−0.022**	144,275*
× municipal Δ employment - Reference (Q1)	(0.008)	(80,156)
Paternal job loss in crisis sector before age 16	0.005	−50,107
× municipal Δ employment - Quartile 2	(0.009)	(90,429)
Paternal job loss in crisis sector before age 16	0.013	−90,181
× municipal Δ employment - Quartile 3	(0.009)	(90,192)
Paternal job loss in crisis sector before age 16	0.019**	−91,128
× municipal Δ employment - Quartile 4	(0.009)	(91,551)
Cohort × county FEs	✓	✓
Job loss years	1991–95	1991–95
Mean dependent variable	0.107	5,210,000
Obs.	175,428	175,428

Notes: This table shows estimates of the treatment effects of experiencing paternal job loss in the crisis sectors before the age of 16 on the student's probability of completing a crisis sector-linked education (column 1) and career earnings (column 2), separately by quartile of crisis severity in the municipality of residence (proxied by the employment drop in 1993 relative to 1990 for the full economy). The estimates are derived from our baseline difference-in-differences specification (Equation 1 in the main text), as described in Table 2. "Career earnings" refers to cumulative earnings (in SEK) during the career (up until the final year of our earnings panel in 2017). Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 10 – Effect of Paternal Job Loss in the Crisis Sectors on Career Choice, Including Additional Controls and Using a Triple Difference Estimator to Net out the Effects of Job Loss in the Specific Sector during the Post-Crisis Years

Paternal job loss sector:	Crisis sector			Manufacturing sector			Construction sector		
Child outcome:	Crisis sector education			Manufacturing education			Construction education		
Specification:	DiD Post	3x Diff.	3x Diff.	DiD Post	3x Diff.	3x Diff.	DiD Post	3x Diff.	3x Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Paternal job in crisis sector before age 16	−0.003	−0.009	−0.010	−0.003	−0.006	−0.004	−0.002	−0.011*	−0.010*
	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Cohort × county FEs		✓			✓			✓	
Cohort × municipality FEs	✓		✓	✓		✓	✓		✓
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Job loss years	1996–99	1991–99	1991–99	1996–99	1991–99	1991–99	1996–99	1991–99	1991–99
Mean dep. var.	0.107	0.107	0.107	0.072	0.072	0.072	0.060	0.060	0.060
Obs.	54,856	231,514	231,514	54,856	231,514	231,514	54,856	231,514	231,514

Notes: "DiD Post" refers to the difference-in-differences specification (Equation 1 in the main text) where we compare the outcome for those experiencing paternal job loss before and after age 16, after netting out the effect of paternal job loss in any other sector before age 16 for the post-crisis years 1996–1999. "3x Diff." refers to the triple difference specification (Equation 2 in the main text) where we further net out the same DiD effect during the years after the crisis (1996–1999). "Controls" refers to including control variables for the student's gender and parental information from the 1990 census (year of birth, high school completion status, marital status, and labor market outcomes). "Crisis sector education" refers to combining the manufacturing and construction high school programs into a single category, while the results under the headers "Manufacturing education" and "Construction education" are reported separately for the two career programs. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 11 – Effect of Job Loss Experienced by Other Family Members on Career Choice

Outcome:	Crisis sector education					
Family member experiencing job loss:	Mother	Paternal uncle		Maternal uncle		Older brother
	(1)	(2)	(3)	(4)	(5)	(6)
Paternal job loss in crisis sector before age 16	−0.009**	0.001	−0.003	−0.005*	−0.009*	−0.021
	(0.004)	(0.003)	(0.006)	(0.003)	(0.005)	(0.027)
Cohort × county FEs	✓	✓	✓	✓	✓	✓
Family member in same municipality			✓		✓	
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.112	0.102	0.110	0.104	0.114	0.121
Obs.	156,135	144,038	43,547	142,174	39,559	3,843

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2, where the job loss considered is that of the family member specified in each column. "Crisis sector education" refers to combining the manufacturing and construction high school programs into a single category. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 12 – Effects of Paternal Job Loss in the Crisis Sectors on Career Choice by the Number of Years in the Sector

Sector of paternal job loss:	Crisis sector	Manuf. sector	Constr. sector
Child outcome:	Crisis education (1)	Manuf. education (2)	Constr. education (3)
Paternal job loss in crisis sector before age 16	−0.012**	−0.004	−0.009**
	(0.005)	(0.004)	(0.005)
Paternal job loss in crisis sector before age 16 × years in sector	0.000	−0.001	−0.000
	(0.001)	(0.001)	(0.001)
Cohort × county FEs	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95
Mean dep. var.	0.107	0.072	0.060
Obs.	176,658	176,658	176,658

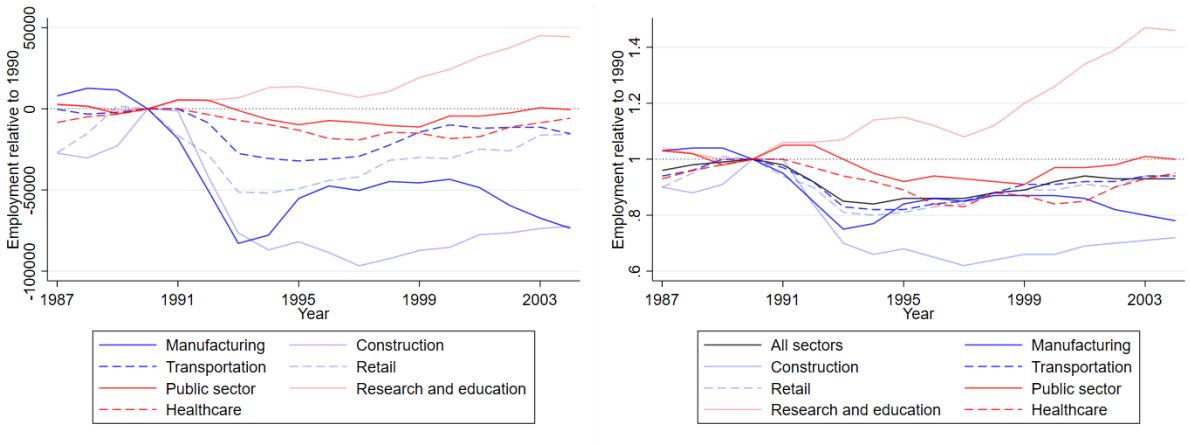
Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. "Crisis education" refers to combining the manufacturing and construction high school programs into a single category, while "Manuf. education" and "Constr. education" consider these programs separately. "Years in sector" denotes the number of years that the father has spent in the sector of job loss between 1985 and 1990. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 13 – Effects of Paternal Job Loss in the Crisis Sectors by Hiring Likelihood of the Father's Firm

Hiring likelihood definition:	Father top 25% earnings rank in firm			Father-child pair in firm		
Outcome:	Crisis education	Log career earnings	Log earn. age 20–30	Crisis education	Log career earnings	Log earn. age 20–30
	(1)	(2)	(3)	(4)	(5)	(6)
Paternal job loss in crisis sector before age 16	–0.014***	0.035**	0.034**	–0.011**	0.025	0.017
	(0.003)	(0.014)	(0.014)	(0.005)	(0.018)	(0.019)
Paternal job loss in crisis sector before age 16 × Hiring likelihood	0.006	–0.023	–0.016	–0.002	0.015	0.022
	(0.005)	(0.023)	(0.024)	(0.006)	(0.024)	(0.026)
Cohort × county FEs	✓	✓	✓	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.107	15.158	13.949	0.107	15.158	13.949
Obs.	156,976	155,347	153,530	148,670	147,108	145,380

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. The hiring likelihood measures are defined relative to the father's firm of employment in the year preceding his job loss during the economic crisis. The earnings rank measure sorts all workers within a given firm and year to create the earnings rank. Father-child pair denotes an indicator capturing if a father and his child are working at the firm. The latter measure also includes a control variable capturing the number of workers at the firm to account for the fact that larger firms are more likely to have father-child pairs working there. "Crisis education" refers to combining the manufacturing and construction high school programs into a single category. "Career earnings" refers to cumulative earnings during the career (up until the final year of our earnings panel in 2017) and are measured in SEK. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Appendix

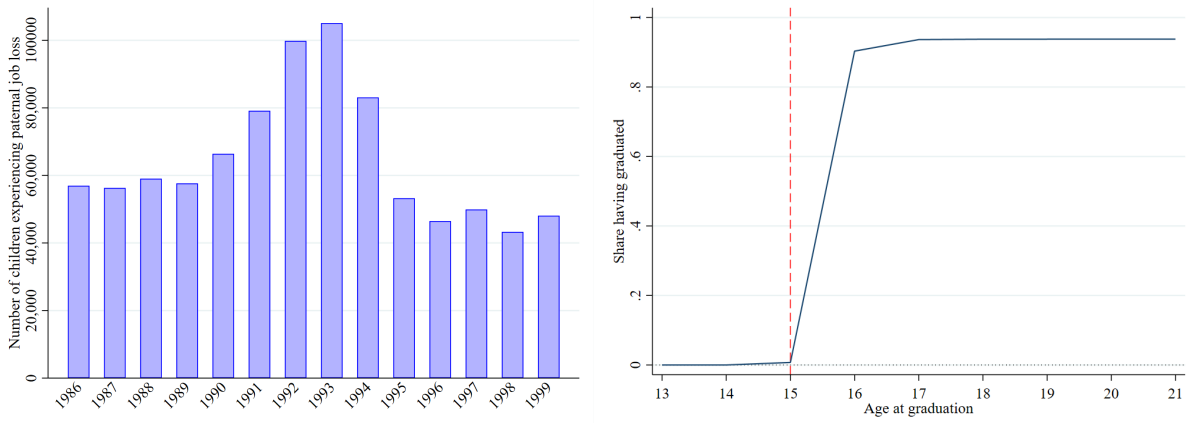


A. Employment: absolute change

B. Employment: relative change

Figure A1 – Absolute and Relative Changes in Employment for Men by Sector of Occupation, Compared to 1990 Levels

Notes: The figure shows the absolute (Panel A) and relative (Panel B) changes in employment for men across various occupational sectors, compared to levels in the last year before the onset of the economic crisis in Sweden.
Source: Statistics Sweden.

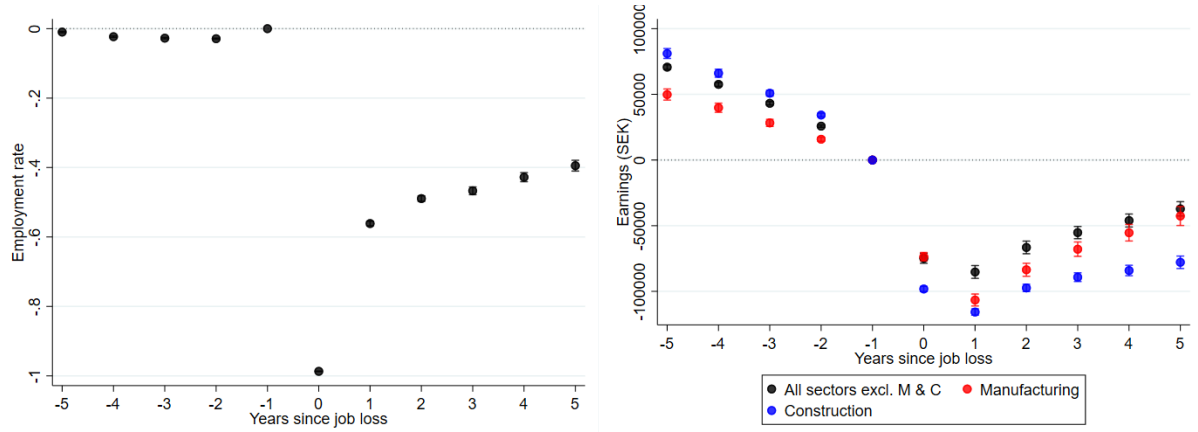


A. Number of children experiencing paternal job loss each year in Sweden between 1986 and 1999

B. Age at graduation from compulsory school for students born between 1975 and 1979

Figure A2 – Number of Children Experiencing Paternal Job Loss and Age at Graduation from Compulsory School

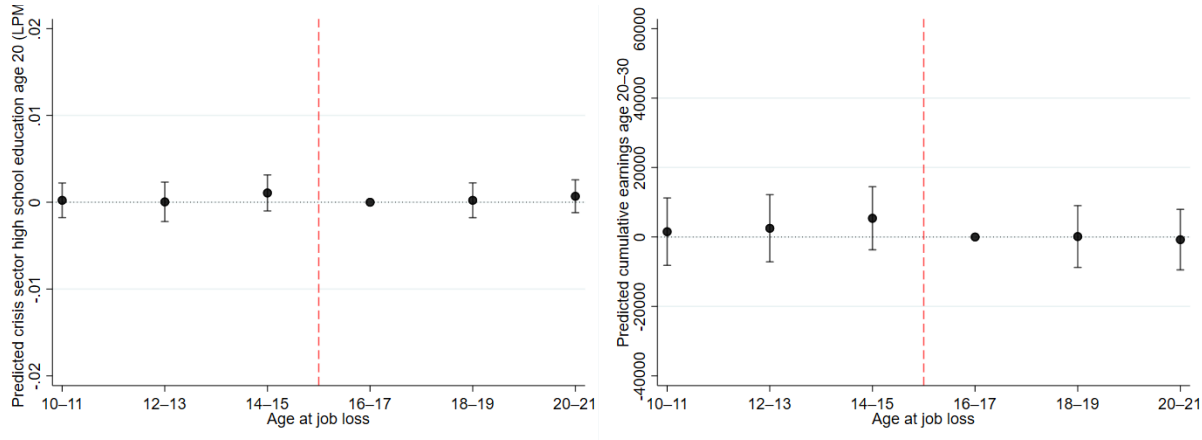
Notes: The figure shows the number of children experiencing job loss each year in Sweden between 1986 and1999 (Panel A), and the share of students born between 1975 and 1979 who completed compulsory school between the ages of 13 and 21 (Panel B).



A. Employment probability ± 5 years **B.** Earnings ± 5 years

Figure A3 – Event Study of Employment Probability and Earnings around the Job Loss Event

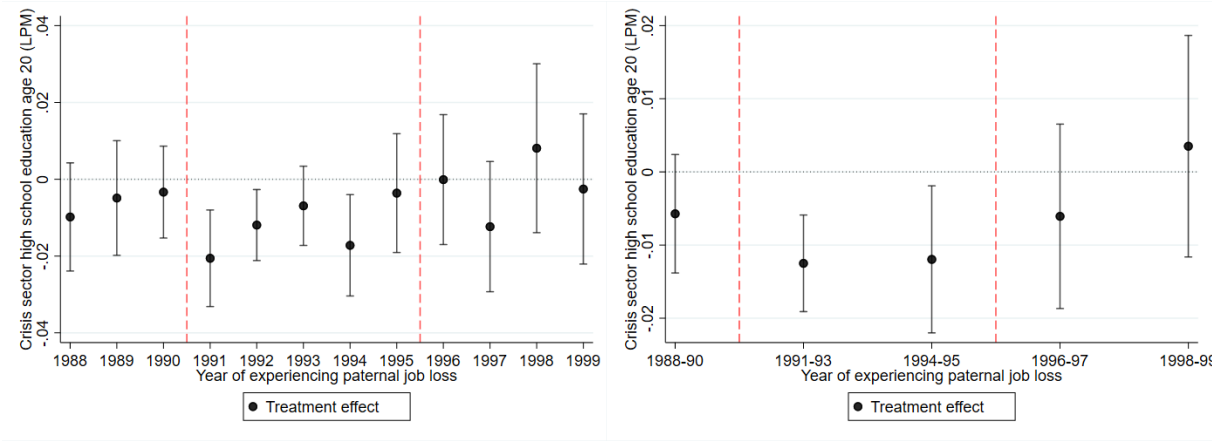
Notes: The figure shows the evolution of the employment probability (Panel A) and earnings in levels (Panel B) relative to the job loss event for all individuals who experienced job loss between the ages of 20 and 59 during the period 1991–1995. The estimates are obtained from a specification that controls for year fixed effects. The average earnings in 1990 for individuals experiencing job loss in 1991 is approximately SEK 128,000. The vertical T-bars show the 95% confidence intervals around the point estimates.



A. Predicted crisis sector-linked education **B.** Predicted cumulative earnings, age 20–30

Figure A4 – Treatment Effects on Predicted Outcomes, by Age at Paternal Job Loss

Notes: The figure shows the difference-in-differences estimates of the effect of paternal job loss in the crisis sectors on the student's probability of graduating from high school with a crisis sector-linked education (Panel A) and predicted cumulative earnings between the ages of 20 and 30 (Panel B), separately by the student's age at job loss. The predetermined characteristics that we use to predict the two main outcomes are drawn from the 1990 census and the Multi-Generation Register. They include the parents' year of birth, high school completion status, marital status, number of children, as well as the student's birth order, gender, cohort-by-county fixed effects, and indicators for missing values of these characteristics. The adjusted R-squared for the predictions varies between 0.075 and 0.102. The estimates net out the main effect of experiencing paternal job loss in sectors other than those heavily affected by the crisis at the same age. Standard errors are clustered at the level of the student's municipality of residence at age 16. The vertical T-bars show the 95% confidence intervals around the point estimates.

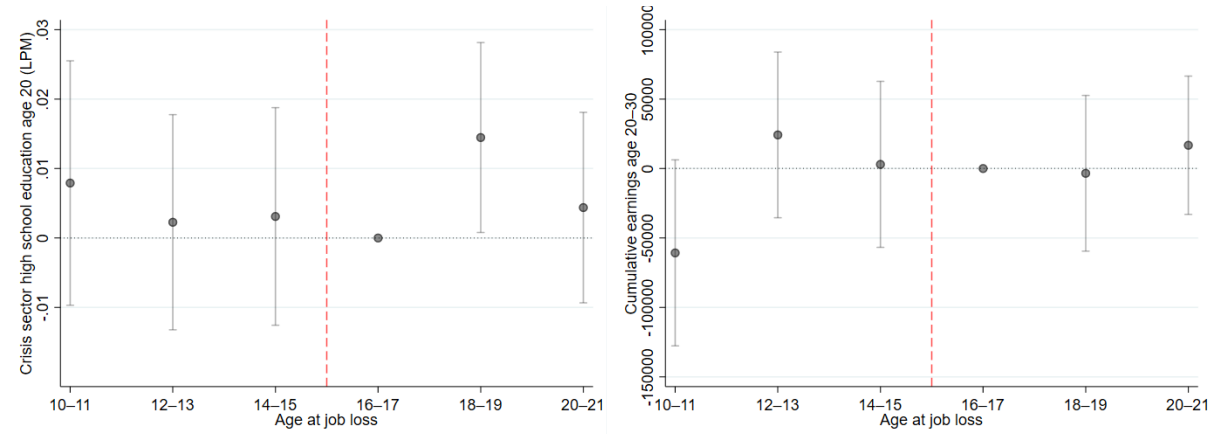


A. By year of paternal job loss

B. By year of paternal job loss, grouped in intervals of 2-3 years

Figure A5 – Treatment Effects on Having a Crisis-Linked Education, by Year of Paternal Job Loss

Notes: The figure shows the difference-in-differences estimates of the effect of paternal job loss in a crisis sector on the student's probability of graduating from high school with a crisis sector-linked education, by year of job loss (Panel A) and year of job loss grouped in intervals of 2–3 years (Panel B). Standard errors are clustered at the level of the student's municipality of residence at age 16. All regressions include cohort-by-county fixed effects. The vertical T-bars show the 95% confidence intervals around the point estimates.

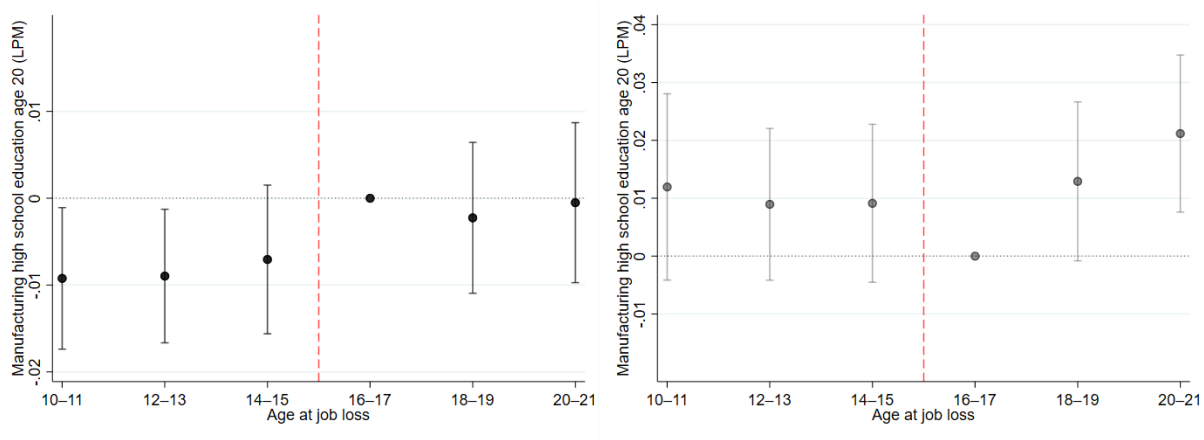


A. Crisis sector-linked education, job loss years 1996–1999

B. Earnings ages 20–30, job loss years 1996–1999

Figure A6 – Treatment Effects on Completing a Crisis Sector-Linked Education and Cumulative Earnings between Ages 20 and 30, by Age at Paternal Job Loss in the Post-Crisis Years

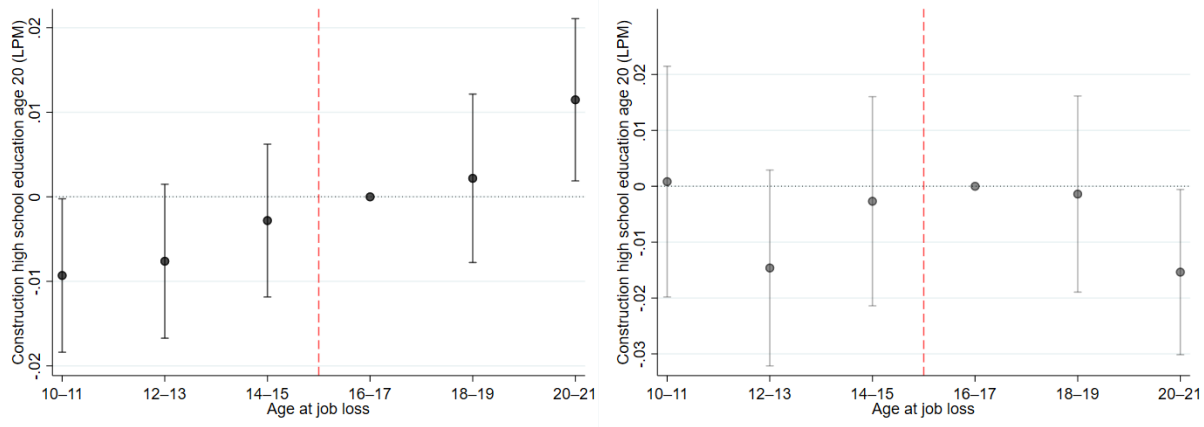
Notes: The figure shows the difference-in-differences estimates of the effect of paternal job loss in the crisis sectors on the student's probability of graduating from high school with a crisis sector-linked education (Panel A) and cumulative earnings between ages 20 and 30, by age at job loss in the post-crisis years (1996–1999). The estimates net out the main effect of experiencing paternal job loss in sectors other than those heavily affected by the crisis at the same age. Standard errors are clustered at the level of the student's municipality of residence at age 16. All regressions include cohort-by-county fixed effects. The vertical T-bars show the 95% confidence intervals around the point estimates.



A. Job loss in manufacturing sector, 1991–1995 **B.** Job loss in manufacturing sector, 1996–1999

Figure A7 – Treatment Effects on Completing a Manufacturing-Linked Education, by Age at Paternal Job Loss

Notes: The figure shows the difference-in-differences estimates of the effect of paternal job loss in the manufacturing sector on the student's probability of completing a manufacturing-linked high school program around age 20, separately by age at job loss in the crisis years 1991–1995 (Panel A) and the post-crisis years 1996–1999 (Panel B). The estimates net out the main effect of experiencing paternal job loss in sectors other than those heavily affected by the crisis at the same age. Standard errors are clustered at the level of the student's municipality of residence at age 16. All regressions include cohort-by-county fixed effects. The vertical T-bars show the 95% confidence intervals around the point estimates.



A. Job loss in construction sector 1991–1995 **B.** Job loss in construction job loss 1996–1999

Figure A8 – Treatment Effects on Completing a Construction-Linked Education, by Age at Paternal Job Loss

Notes: The figure shows the difference-in-differences estimates of the effect of paternal job loss in the construction sector on the student's probability of completing a construction-linked high school program around age 20, separately by age at job loss in the crisis years 1991–1995 (Panel A) and the post-crisis years 1996–1999 (Panel B). The estimates net out the main effect of experiencing paternal job loss in sectors other than those heavily affected by the crisis at the same age. Standard errors are clustered at the level of the student's municipality of residence at age 16. All regressions include cohort-by-county fixed effects. The vertical T-bars show the 95% confidence intervals around the point estimates.

Table A1 – Validation Tests: Effect of Paternal Job Loss in the Crisis Sectors on Student Performance in Grade 9 and Paternal Earnings

Outcome:	Standardized grades in school year 9 (1)	Paternal earnings in the year of job loss (2)
Paternal job loss in crisis sector before age 16	−0.004	−1,447
	(0.013)	(1,527)
Cohort × county FEs	✓	✓
Job loss years	1991–95	1991–95
Mean dep. var.	−0.230	90,825
Obs.	161,256	176,658

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. This table shows two validation tests of our empirical specification. "Standardized grades in school year 9" denotes average grades at the end of compulsory school (year 9), which are standardized to have mean zero and unit standard deviation by graduation year. "Paternal earnings in the year of job loss" denotes the father's earnings (in SEK) in the year of the job loss event. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table A2 – Effect of Paternal Job Loss in the Crisis Sectors on Main Outcomes: Controlling for Sibling Fixed Effects

Outcome:	Crisis sector education (1)	Earnings ages 20–30 (2)	Log earnings ages 20–30 (3)	Career earnings (4)	Log career earnings (5)
Paternal job loss in crisis sector before age 16	−0.015*	28,941	0.012	73,766	0.018
	(0.008)	(25,871)	(0.032)	(72,432)	(0.030)
Sibling FEs	✓	✓	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.107	1,510,000	13.949	5,210,000	15.158
Obs.	176,045	176,045	172,214	176,045	174,244
Obs. with siblings	104,522	104,522	102,228	104,522	103,480

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. "Crisis sector education" denotes having a manufacturing or construction-linked high school education at age 20. "Career earnings" refers to cumulative earnings (in SEK) during the lifetime (up until the final year of our earnings panel in 2017). Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table A3 – Effect of Paternal Job Loss in the Crisis Sectors on Career Choice and Early Career Earnings: Using Alternative Bandwidths for the Student's Age at Job Loss

Outcome:	Crisis sector education			Earnings ages 20–30		
	(1)	(2)	(3)	(4)	(5)	(6)
Paternal job loss in crisis sector before age 16	−0.012***	−0.012***	−0.009**	43,789***	39,897***	35,825**
	(0.003)	(0.003)	(0.004)	(9934)	(10,740)	(15,512)
Cohort × county FEs	✓	✓	✓	✓	✓	✓
Students' age at paternal job loss	10–21	12–19	14–17	10–21	12–19	14–17
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.107	0.107	0.107	1,510,000	1,510,000	1,510,000
Obs.	176,658	115,753	56,826	176,658	115,753	56,826

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. "Crisis sector education" refers to combining the manufacturing and construction high school programs into a single category. Cumulative earnings between the ages of 20 and 30 are measured in SEK. Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table A4 – Effects of Paternal Job Loss in the Crisis Sectors on Completing a Crisis-Linked High school program and Early Career Earnings, Controlling for Year of Paternal Job Loss

Outcome:	Crisis sector education age 20	Earnings ages 20–30	Log earnings ages 20–30	Lifetime earnings	Log lifetime earnings
	(1)	(2)	(3)	(4)	(5)
Paternal job loss in crisis sector before age 16	−0.015***	47,197***	0.029***	84,101***	0.025**
	(0.003)	(9,517)	(0.011)	(25,054)	(0.011)
Job loss year × county FEs	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
Job loss years	1991–95	1991–95	1991–95	1991–95	1991–95
Mean dep. var.	0.107	1,510,000	13.949	5,210,000	15.158
Obs.	176,658	176,658	172,769	176,658	174,825

Notes: The estimates reported in this table are derived from our baseline DiD specification (Equation 1 in the main text), as described in Table 2. Earnings are expressed in SEK. "Controls" refers to including control variables for the student's gender and parental information from the 1990 census (year of birth, high school completion status, marital status, and labor market outcomes). Standard errors (in parentheses) are clustered at the level of the student's municipality of residence at age 16. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.