

Formative Experiences and Portfolio Choice: Evidence from the Finnish Great Depression*

Samuli Knüpfer
BI Norwegian Business School and CEPR

Elias Rantapuska
Aalto University

Matti Sarvimäki
Aalto University and VATT

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Abstract

Formative experiences are a natural candidate for explaining heterogeneity in portfolio choice. However, identifying their impact is challenging because experiences can correlate with unobservables and they may lead to changes in wealth and other determinants of portfolio choice. We overcome these challenges by tracing the long-run impact of the Finnish Great Depression in the early 1990s on investment in risky assets. Plausibly exogenous variation in workers' exposure to the depression allows us to identify the effects, whereas a new estimation approach makes addressing wealth and income effects possible. We find that workers who experienced adverse labor market conditions during the depression are less likely to invest in risky assets. This result is robust to a number of control variables and it holds for individuals whose income, employment, and wealth accumulation were unaffected by the experiences. The consequences of experiences travel in social networks: individuals whose neighbors and family members experienced adverse circumstances also avoid risky investments.

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1. Introduction

The great heterogeneity in how individuals construct financial portfolios poses a challenge for theory and empirical work. Studies using twin data deepen the puzzle by revealing that genetically inherited traits or other factors related to family background cannot account for the large degree of variation in portfolio choice. Likewise, variation in observable characteristics, over and above genetic makeup and family environment, does little to explain heterogeneity.¹ These patterns suggest the answers to the heterogeneity puzzle may lie in the events and circumstances individuals experience during their lifetimes.

Experiences may influence portfolio choice through the formation of beliefs and preferences. Although psychologists and sociologists have long acknowledged the possibility that experiences can have a long-lasting impact on people (see Elder, 1998, for a review), economists have only recently started investigating the impact of such formative experiences on financial decision-making (Malmendier and Nagel, 2011, 2015). In this paper, we extend this line of research by investigating how formative experiences contribute to the great degree of heterogeneity in household portfolios.

The Finnish Great Depression of the early 1990s, combined with rich register-based data, allows us to solve the three challenges that plague any attempts to identify the impact of formative experiences on portfolio choice. First, the events and circumstances people experience should naturally relate to the formation of beliefs and preferences. We analyze how experiences

¹ Bertaut and Starr-McCluer (2002), Calvet et al. (2007), Curcuru et al. (2010), Guiso and Sodini (2013), Haliassos and Bertaut (1995), and Heaton and Lucas (2000) document portfolio heterogeneity. Barnea et al. (2010), Cesarini et al. (2010), and Calvet and Sodini (2013) use register-based twin data to analyze the determinants of portfolio choice.

of labor market distress influence long-run portfolio choice. Experiencing a job loss, having difficulties in job search, and seeing other workers laid off can make individuals hold more pessimistic beliefs, reduce their appetite for risk, or shatter trust in financial markets.²

Second, individuals may experience different events and circumstances because they are different in ways that are unobservable to the econometrician.³ The variation across local labor markets solves the identification problem. The depth of the Finnish Great Depression and its root causes—the collapse of the Soviet Union in 1991 and a twin currency-banking crisis⁴—meant many local labor markets experienced unexpected and severe disruptions. We show the exposure to adverse labor market conditions is plausibly exogenous to worker characteristics and thus allows us to identify the impact of labor market experiences on portfolio choice.

Third, experiences may not only influence portfolio choice through their effects on preferences and beliefs, but may also affect other determinants of financial decisions, such as income and wealth.⁵ Controlling for contemporaneous income and wealth does not necessarily solve this challenge, because income and wealth are potential outcomes of labor market conditions (Angrist and Pischke, 2009). We develop an alternative approach that leverages the great detail in the data and isolates instances of experiences that likely do not correlate with

² During the 2007–2009 Great Recession, about one in six workers in the U.S. labor force experienced a job loss (Farber, 2011). The labor market distress was not solely confined to job losers: more than a third of the workers expressed anxiety about layoffs, wage cuts, shorter hours, and difficulties in finding a good job (Davis and von Wachter, 2011).

³ For example, more risk-averse individuals may experience fewer adverse events because they choose a safer environment, but at the same time, their risk aversion makes them less likely to invest in risky assets. This behavior would generate a spurious positive correlation between adverse experiences and risky investment.

⁴ From 1991 to 1993, Finland’s real GDP fell by 10% and the unemployment rate rose quickly from 3% to 16%. The collapse of the Soviet Union in 1991 generated large output contraction in industries involved in the barter trade between Finland and the USSR (Gorodnichenko et al., 2012). The export shock was amplified by a twin currency-banking crisis that is typically attributed to financial deregulation and credit expansion in the 1980s and to attempts to defend the currency peg (Gulan et al., 2013; Honkapohja et al., 2009; Jonung et al., 2009).

⁵ These factors play a key role in determining risky investment in theories of household portfolio choice (see Campbell, 2006, and Guiso and Sodini, 2013, for reviews).

wealth, income, or other determinants of portfolio choice. These settings analyze the influence of secondhand experiences gained through the network of an individual's neighbors and family members.

Our measure of local labor market conditions stratifies the sample according to each worker's region and occupation, and calculates how the rate of unemployment in each region-occupation cell changed compared to years prior to the depression. We then relate labor market conditions to investment in risky assets measured nearly two decades after the depression. Importantly, the employment histories that feed into the calculation of labor market conditions and the asset holdings that determine our measure of investment in risky assets do not suffer from measurement error caused by recall biases in surveyed employment histories or by imprecise reporting of asset holdings.⁶

Our way of measuring labor market experiences captures local labor market conditions that are unrelated to worker characteristics. Conditional on fixed effects for regions and occupations, a number of observable worker characteristics measured prior to the depression do not correlate with labor market experiences during the depression. Most importantly, labor market conditions during the depression do not relate to investment in risky assets prior to the depression. This falsification exercise suggests omitted variables are unlikely explanation to our results.

We find that experiences of adverse labor market conditions are associated with less long-term investment in risky assets. The estimates suggest the stock market participation rate was, more than a decade later, 2.8 to 3.6 percentage points lower for workers who experienced a one-

⁶ The main survey used to assess job losses in the United States, the Displaced Workers Survey (DWS), suffers from recall bias due to its long recall period (five years in the early years of the survey, three in the later years). For example, the number of displaced workers in 1987 is dramatically different when estimated based on answers to the January 1988 wave (2.3 million) and to the January 1992 wave (1.3 million). See Appendix A in Congressional Budget Office (1993) and Evans and Leighton (1995).

standard-deviation worsening of labor market conditions. The t -values, clustered at the level of local labor markets, range from -5.9 to -6.0 . The effect is large given that the unconditional stock market participation rate in our sample is 22%. The reductions in risky investment also extend to other asset classes. Adverse labor market conditions are associated with less investment in fixed income funds, balanced funds, and derivatives. These effects suggest labor market disruptions affect the extensive margin of having any risky investments.⁷

Is the reduction in risky investment solely driven by changes in income, employment, and wealth accumulation? We examine this question by investigating experiences of neighbors and family members of an individual. Because these secondhand experiences do not predict the individual's labor income, employment, or wealth accumulation in the data, other factors must be driving any effects on risky investment.

The analyses of secondhand experiences suggest a reduction of 0.4-0.6 percentage points in risky investment for a one-standard-deviation increase in the neighbors', siblings', and parents' labor market conditions. Comparing these estimates to the magnitudes we obtain for firsthand experiences suggests at least 11% of the effect of labor market experiences on risky investment cannot be attributed to the wealth, income, and employment channels. We interpret this number as a lower bound because secondhand experiences likely exert less influence than personal firsthand experiences. Consistent with this conjecture, we find a reduction of 1.2 percentage points in regressions of firsthand experiences that explicitly control for post-depression labor market outcomes and wealth accumulation.

⁷ We do not find an effect on the intensive margin: portfolio volatility, beta, and idiosyncratic risk are not reliably related to labor market experiences. The impact of labor market conditions on the extensive margin might mask the true effect on the intensive margin.

Taken together, our findings lead us to conclude labor market experiences—just one dimension of the many different events and circumstances individuals may experience—generate portfolio heterogeneity that individual characteristics observable in a typical data set do not fully explain. More broadly, our results suggest experiences can have a long-term impact on the formation of beliefs and preferences. This result is related to four strands of research. First, we contribute to the literature that studies how personal experiences influence investment decisions. Chiang et al. (2011), Choi et al. (2009), Kaustia and Knüpfer (2008), and Odean et al. (2011) analyze the role prior investment experiences play in determining IPO subscriptions, retirement savings decisions, and stock purchases. These papers focus on relatively short-term experiences and do not address portfolio heterogeneity. In their analysis of cohort-specific macroeconomic experiences, Malmendier and Nagel (2011, 2015) find the history of experienced stock returns and inflation is associated with investment decisions and beliefs. Our focus is different because we study the permanent marks that labor market experiences leave in households' financial portfolios. These experiences are measured from the cross section of labor market conditions and thus vary within cohorts. This within-cohort variation can contribute to portfolio heterogeneity over and above any macroeconomic experiences captured by cohort effects. Nevertheless, when many workers share the same experiences, they can sideline large groups of individuals from participating in risky asset markets, and generate systematic patterns in aggregate demand for risky assets.

Second, we share a theme with the few papers that use twin data to understand portfolio heterogeneity. Barnea et al. (2010) and Cesarini et al. (2010) show genetic factors or family environments can explain only a small share of the variation in household portfolios. These papers point to experiences as a catch-all explanation for the remaining variation, whereas our

paper measures specific experiences and investigates their impact on portfolio choice. The focus on labor market conditions and their long-term impact also sets our paper apart from Calvet and Sodini (2013), who use a twin design to estimate the relation between observable wealth and risky investment.

Third, we add to the literature that studies intergenerational transmission of beliefs and attitudes toward risk. Charles and Hurst (2003) document positive parent-child correlations in wealth accumulation and stock market participation, whereas Dohmen et al. (2012) report similar correlations in survey-based measures of risk attitudes and trust. Our results suggest personal formative experiences whose consequences carry over to future generations may partly drive intergenerational correlations. In addition, our analyses of family members and neighbors suggest the consequences of formative experiences may spread in the population through interpersonal information sharing or observational learning.

Finally, we contribute to the literature that studies the impact of labor market conditions on long-run earnings and unemployment (e.g., Couch and Placzek, 2010; Davis and von Wachter, 2011; Jacobson et al., 1993; Kahn, 2010; Oreopoulos et al., 2012; Oyer, 2008; von Wachter et al., 2011). Our paper adds a new dimension to the effects associated with living through adverse labor market conditions. The intergenerational results also relate to papers that study the impact of parents' job losses on children's long-term outcomes (Bratberg et al, 2008; Oreopoulos et al., 2008; Rege et al., 2011).

The remainder of this paper is organized as follows. Section 2 introduces the timeline of the events, the data sources, and the empirical strategy. Section 3 presents results on the impact of personally experienced labor market experiences on risky investment. Section 4 analyzes the impact of secondhand labor market experiences. Section 5 concludes.

2. Timeline, Data, and Empirical Strategy

2.1. Timeline

This section details the timing of the events and describes the measurement of the pre-depression control variables, the labor market conditions, and the post-depression outcomes. What were the main features of the depression? Its scale was unusual: no other OECD country had experienced such a severe economic contraction since the 1930s. Figure 1 depicts the real GDP and the unemployment rate from 1980 to 2005. Real GDP fell by 10%, and the unemployment rate increased from 3% to 16% between 1990 and 1993. Although GDP started recovering at the end of 1993, it reached its 1990 level only in 1996. The unemployment rate remained above 10% until 1999.

The causes of the depression were twofold. First, the collapse of the Soviet Union in 1991 generated large output contraction. Gorodnichenko et al. (2012) discuss why the collapse was so detrimental for Finland. Soviet trade accounted for about 20% of Finnish exports during the 1980s, with some industries, such as shipbuilding and railroad equipment manufacturing, exporting more than 80% of their goods to the USSR. The products exported to the USSR were often specialized and could not be sold easily to other countries (e.g., railroad equipment manufacturing using Russian track gauge). The overvalued terms of trade in the barter arrangements that exchanged the exported goods for oil and gas meant the effective price of Soviet imports was significantly lower than their market price, resulting in an up-hike in energy prices when the Soviet Union collapsed. The trade shock was also largely unexpected. The Soviet Union cancelled the trade arrangements on December 6, 1990, without a transitional period, and the Finnish firms did not seem to anticipate the shock.

The second factor contributing to the depression was a twin currency-banking crisis (Honkapohja et al., 2009; Jonung et al., 2009). A few years prior to the depression, regulation concerning domestic bank-lending rates was abolished, and foreign private borrowing was allowed. Finland's currency remained pegged, and foreign loans, which had significantly lower nominal interest rates, appeared attractive: 25% of new borrowing was in foreign currency. These policies led to a significant increase in capital inflows and bank lending, and while the economy was booming in the late 1980s, the financial sector became fragile.

Attempts to moderate the boom and to defend the currency peg against speculative attacks led to a sharp increase in real interest rates. The defense ultimately failed, and the currency was devalued and floated in November 1991 and September 1992, respectively. Increases in debt burdens denominated in foreign currency trumped benefits to exporting firms. Declines in asset prices and increases in credit losses contributed to a banking crisis, which likely further affected consumption and investment through the classic credit channel (Bernanke, 1983).

Figure 2 summarizes the timeline of the events and the time of measurement of the key variables. Our primary sample includes individuals born between 1950 and 1965. We measure pre-depression control variables at the end of 1990, the year prior to the beginning of the depression.⁸ We measure labor market conditions in 1991-93 and investigate their impact on portfolio choice we observe, based on asset holdings, in 2005. We also use data on labor income, unemployment incidence, and wealth accumulation in the 12-year post-depression period ranging from 1994 to 2005.

⁸ We have also experimented with assigning the local labor market and the control variables based on the years 1987 or 1989. The results, reported in Table IA1 in the Internet Appendix, show the effects inversely relate to the length of the period from measurement to the onset of the depression.

2.2. Data

The data originate from two official primary sources that include a personal identification number used to merge the data.

Statistics Finland (SF). The first source provides us with the population of individuals. For our main analyses, we use individuals born between January 1, 1950, and December 31, 1965. This restriction ensures the individuals are still in the labor force in 2005 when we measure their portfolio choice, and are not too young in 1990 when we measure pre-depression characteristics.⁹ To be included in the final sample, we further require that the subjects are in labor force and that we have full information on their employer available at the end of 1990. This restriction leaves us with 838,881 individuals out of the total 1,250,362 individuals in the cohorts we use in our sample.¹⁰

The data from Statistics Finland pool together information from a number of administrative registers held by different authorities. The unemployment data record the number of months a subject was unemployed in a given year. The Ministry of Labor collects these data from the Regional Employment Offices that register unemployed workers. The incentives to register as an unemployed worker are strong because registration is a requisite for claiming unemployment benefits. Other information from Statistics Finland includes field and level of education, sector and region of the subject's employer, occupation (326 professions aggregated into 71 occupations), year of birth, gender, marital status, and native language (Finland has two official

⁹ The individuals in our sample are old enough to have completed their studies by the age of 25 in 1990, and they also are below the mandatory retirement age of 65 in 2005. During our sample period, the early-retirement schemes the Finnish government provides only apply to individuals born before the year 1950.

¹⁰ An individual can only leave the sample due to death. Regressions of mortality on labor market conditions, reported in Panel A of Table IA2, shows labor market conditions are associated with mortality (in line with Sullivan and von Wachter 2009). However, Panel B of Table IA2 shows that assuming all the deceased workers had not participated in the stock market hardly changes the estimates in our baseline model.

languages, Finnish and Swedish), drawn from the records at the Finnish Tax Administration, the Ministry of Education, and the Population Register Center. The latter data source also gives us the family relationships that make linking each individual to their parents possible. It further includes the individual's place of residence, at the level of 3,096 zip codes and 12 regions. The regions correspond to the largest cities supplemented with their neighboring municipalities.

Finnish Tax Administration (FTA). The second data source records information on income, assets, and liabilities of the subjects in our sample. The FTA collects these data to calculate the taxes levied on income and wealth. We use the FTA's data on labor income and the taxable values of assets and outstanding liabilities. Euroclear Finland delivers stock ownership data to the FTA, and the data contain the year-end number and value of shares held by an individual in each stock listed on the Helsinki Stock Exchange. We link the stock ownership data with monthly stock returns from the Helsinki Stock Exchange in our calculation of portfolio characteristics. The mutual fund companies directly deliver the mutual fund ownership data to the FTA. These records indicate the mutual funds in which an individual has invested and the year-end market value of each holding. We supplement these data with information from the Mutual Fund Report (a monthly publication detailing fund characteristics) on the asset class in which a fund invests and monthly returns on each mutual fund. Grinblatt et al. (2015) provide additional details on the mutual fund data. The stock and mutual fund holdings are available for the year 2005. We also obtain a proxy for stock market participation from the FTA based on an individual reporting realized capital gains in any of the years 1987-1990.

2.3. Identification

Our definition of labor market conditions takes advantage of the data that record the region and the occupation for all workers prior to the depression. We define local labor markets using

12 regions and 71 occupations. For each of the 817 region-occupation cells (35 region-occupation cells have no workers), we calculate the share of months workers in these cells were unemployed during the 1987-90 pre-depression period and the 1991-93 depression period. Because we are interested in labor market shocks, we use the difference in the 1991-93 and 1987-90 unemployment shares as our main variable of interest. Intuitively, this variable captures the change in labor market conditions in the region-occupation cell caused by the depression.

With this definition of labor market conditions at hand, the baseline specification for estimating the effect of labor market experiences on risky investment in 2005 is

$$y_i = \alpha + \beta C_i + X_i \gamma + \mu_r + \mu_o + \varepsilon_i, \quad (1)$$

where i indexes individuals. The dependent variable y_i indicates workers who invest in risky assets (stocks in the baseline specification, bonds and other risky investments in robustness checks).¹¹ C_i measures the change in labor market conditions during the depression, and the vector of control variables X_i contains observables measured prior to the depression. These control variables contain indicators for the level and field of education,¹² native language, gender, marital status, and stock market participation, all measured prior to the depression in 1990. Cohort dummies control for the birth cohort and age effects, although they are not separately identifiable (Mankiw and Zeldes, 1991). Values of income, assets, and liabilities enter as a piecewise linear function that breaks down the continuous variable into decile dummies and

¹¹ To facilitate interpretation, we estimate all the regressions using linear probability models. Table IA3 in the Internet Appendix shows logit models produce estimates that are similar to the OLS approach.

¹² The nine fields are agriculture and forestry, business and economics, educational science, health and welfare, humanities and arts, natural sciences, services, social sciences, and technology and engineering.

then interacts the decile dummies with the continuous variable. This linear spline accounts for any within-decile variation.

The two sets of fixed effects are for the worker's region (μ_r) and occupation (μ_o). Our estimation strategy thus identifies the effect solely from variation between region-occupation cells while controlling for unobserved characteristics of workers in each region and each occupation. The parameter β measures the impact of labor market conditions on investment in risky assets if, conditional on control variables and fixed effects, selection into experiencing different labor market conditions is as good as randomly assigned. This conditional independence assumption (e.g., Angrist and Pischke, 2009; Imbens and Wooldridge, 2009) means we assume individuals identical along observable dimensions face the same propensity to experience adverse labor market conditions.

2.4. Assessing the Conditional Independence Assumption

The main advantage of using the depression of the early 1990s is that it likely brings about variation in labor market conditions that is unrelated to unobserved worker characteristics. We evaluate this conjecture using correlations of observable worker characteristics with labor market conditions.

Table 1 reports descriptive statistics of the sample and presents evidence that suggests our way of measuring labor market conditions captures variation that is unrelated to unobserved determinants of risky investment. The four leftmost columns calculate the mean and standard deviation of each characteristic in 1990 and 2005. The remaining columns report statistics that evaluate the correlation of labor market conditions with observable worker characteristics. We first calculate the average of each characteristic separately for local labor markets whose conditions are worse ("bad") or better ("good") than the median, and find meaningful differences

in many characteristics. However, the differences become much smaller when we condition on fixed effects for regions and occupations in the three rightmost columns in the table. This estimation regresses each characteristic in 1990 on our measure of labor market conditions during the 1991-93 depression and the fixed effects for the two dimensions of local labor markets. We evaluate the marginal effects at a one-standard-deviation worsening of labor market conditions.

The regressions suggest workers who experienced a one-standard-deviation worsening of labor market conditions during the depression had 66 euros less labor income, spent 0.05 months more in unemployment, and had accumulated 352 euros less wealth in 1990. These differences are small in magnitude and statistically insignificant (t -values -0.2 , -1.2 , and -1.7). Marital status, gender, and age also show insignificant correlations with labor market conditions during the depression. However, we find small but statistically significant differences for education. For example, the estimates suggest the share of workers with a graduate degree is 2.0 percentage points lower in the group of individuals who experienced adverse labor market conditions.

The most important analysis in Table 1 comes from regressing stock market participation prior to the depression on labor market conditions during the depression. If unobserved characteristics lead certain workers to shy away from risky assets and to simultaneously sort into adversely affected labor markets, we should see a negative correlation between pre-depression stock market participation and labor market conditions during the depression.

Because stock and mutual fund holdings are only observed in 2005, the pre-depression stock market participation proxy is based on tax reporting of capital gains. The proxy takes the value of 1 if a worker files a tax return containing realized capital gains in the years 1987-90, and zero

otherwise.¹³ The average participation rate using this variable equals 7.6% in 1990, which is in line with the 9.3% stock market participation rate in 1996 (Ilmanen and Keloharju, 1999).

The analysis shows labor market conditions during the depression do not significantly relate to pre-depression stock market participation. As a further illustration of this pattern, Figure 3 plots the average pre-depression stock market participation against labor market conditions in each of the region-occupation cells.¹⁴ Because each cell receives equal weight, the coefficients are not directly comparable to the estimates in Table 1. Nevertheless, the figure confirms that stock market participation prior to the depression does not correlate with labor market conditions during the depression. This falsification exercise supports the conjecture that the way we measure labor market conditions does not capture differences in omitted variables that make workers invest in risky assets.

Taken together, the results in this section show the depression generated a large degree of variation in labor market conditions, and this variation is likely not associated with unobserved worker characteristics that correlate with risky investment.

3. Labor Market Experiences and Investment in Risky Assets

This section evaluates how long-term investment in risky assets relates to labor market experiences. We estimate regressions that correlate post-depression risky investment with labor market conditions during the depression, and supplement them with a battery of robustness

¹³ Sales of stocks and mutual funds likely constitute the bulk of these gains because the sales of owner-occupied housing are exempt from capital gains taxation.

¹⁴ Figure IA1 in the Internet Appendix further shows the shocks to local labor markets do not relate to labor market conditions prior to the depression.

checks that add control variables and vary the definition of local labor markets. We also investigate alternative dependent variables and report alternative estimation approaches.

The main independent variable in all of the regressions measures the labor market conditions the individual experienced during the 1991-93 depression. The pre-depression controls come from 1990, one year prior to the beginning of the depression. These variables include the fixed effects we use to control for differences in unobserved characteristics that make workers sort into regions and occupations, and the observable worker characteristics detailed in section 2.3.

Because labor market conditions can influence wealth accumulation, labor income, and employment, which in turn may affect investment in risky assets,¹⁵ we also estimate regressions that add controls for these variables observed in the 1994-2005 period. These regressions do not have a straightforward causal interpretation, because they condition on factors that may be direct outcomes of labor market conditions (see Angrist and Pischke 2009). Nevertheless, they serve as a useful comparison for our later analyses that use settings where labor market conditions are unlikely to operate through wealth accumulation and labor market outcomes. They also help in comparing our alternative estimation approaches to previous studies.¹⁶

We base statistical inference on test statistics that assume two types of clustering in the data. The parentheses report t -values that assume clustering at the level of the region-occupation cell

¹⁵ Lower levels of wealth accumulation can curb risky investment if participation in stock market incurs fixed costs (Vissing-Jorgensen, 2003; Gomes and Michaelides, 2005), and leverage—often originating from having taken out a mortgage—can crowd out investment in risky assets (Chetty and Szeidl, 2010; Cocco, 2005; Yao and Zhang, 2005). Lower levels of permanent income and background risks related to income variability also predict less risky investment (Bodie, Merton, and Samuelson, 1992; Cocco et al., 2005; Heaton and Lucas, 1997; Merton, 1971; Viceira, 2001).

¹⁶ The studies that run regressions in which the main independent variable of interest is historically determined and the controls are measured contemporaneously to the dependent variable include Cronqvist et al. (2015), Grinblatt et al. (2011), and Malmendier and Nagel (2011).

we use to compute labor market conditions. The t -values in brackets report a more conservative approach that is robust to clustering at the level of occupations.

3.1. Baseline Regressions

The baseline regressions estimate the impact of labor market conditions on long-term investment in risky assets, using the year 2005 to measure stock market participation. The dependent variable takes the value of 1 if an individual owns equities either directly or through mutual funds, and 0 otherwise (we later investigate other variables related to risky investment). We calculate this variable from the comprehensive asset holdings reported by the Finnish Tax Administration.

The regressions in Table 2 show experiences of labor market disruptions are negatively associated with long-run stock market participation. In column 3, which includes the most exhaustive set of pre-depression controls, the coefficient on labor market conditions takes the value of -0.676 and has a t -value of -6.0 . The coefficient translates into a decrease of $0.676 \times 0.041 = 2.8$ percentage points in stock market participation for a one-standard-deviation worsening of labor market conditions during the depression. This effect is economically significant because the average stock market participation in our sample is 22.0%.

An alternative way to gain perspective on the magnitude of the effect is to consider a specification that decomposes the labor market conditions into quintiles, and indicates each quintile with a dummy variable (bottom quintile omitted). The estimates from this approach, reported in Table IA4 in the Internet Appendix, show the difference in stock market participation rates between the bottom and top quintile of labor market conditions equals -0.036 (t -value $-$

3.7). The coefficients on the other quintile dummies show the fourth and fifth quintiles are the primary drivers of the participation effect.¹⁷

The -0.870 and -0.696 estimates in the two other columns of Table 2 imply marginal effects of -3.6 and -2.9 percentage points. In section 2 in the Internet Appendix, we compare these estimates to assess how much omitted variables could potentially bias the results using the approaches of Altonji et al. (2005) and Oster (2015). These calculations indicate that, to qualitatively alter our conclusions, selection on omitted variables would have to be more than 6.9 times larger than selection on the set of controls included in Table 2.

The regressions in the three rightmost columns of Table 2 add controls for characteristics measured in the 1994-2005 post-depression period. Column 4 includes decile dummies for different dimensions of wealth accumulation. For the year 2005, we measure the values of total assets and total liabilities, as well as the values of holdings in real estate, forest, foreign assets (excluding equity), and private equity (usually a business). These asset-type variables separate the effect of asset composition from wealth accumulation (as in Grinblatt et al., 2011), and address the possibility that labor market experiences not only affect the level of wealth, but also background risks associated with holding different types of assets.

Column 5 adds the average, standard deviation, and growth rate of labor income, whereas column 6 includes the share of months spent in unemployment. We measure these variables over the post-depression years of 1994-2005.

In column 4, where we control for post-depression wealth accumulation, the coefficient estimate equals -0.292 (t -value -4.3). The marginal effect for a one-standard-deviation

¹⁷ This observation, combined with the evidence suggesting non-linearities in the impact of labor market conditions on labor market outcomes and wealth accumulation in Table IA5, motivates our piecewise-linear specification for wealth, income, and employment.

worsening of labor market conditions is 1.2 percentage points.¹⁸ Similar results obtain in the two remaining columns that add various dimensions of post-depression labor income and employment to the regression.

These results show that controlling for wealth accumulation and the path of labor market outcomes following the depression does not fully eliminate the association between labor market experiences and portfolio choice. However, these estimates should be interpreted with caution, because wealth accumulation and labor market outcomes are potential outcomes of labor market conditions. To illustrate this point, Table 3 regresses labor income, employment, and wealth accumulation following the depression on labor market conditions during the depression. Labor income is the average labor income, and months unemployed refers to the total number of months spent in unemployment, both measured in the 1994-2005 period, whereas net worth is the total value of assets less liabilities in 2005. Because these variables are not normally distributed, and they include a non-trivial number of zeros, we estimate the regressions with GLM using a logarithmic link function (see Nichols, 2010).

Table 3 shows that labor market conditions during the depression are statistically significantly associated with post-depression labor market outcomes and wealth accumulation. Labor income and net worth were 6.7% and 9.0% lower and unemployment was 13.5% higher per one-standard-deviation worsening of labor market conditions. In section 4, we return to settings that are likely immune to the wealth, employment, and income effects.

¹⁸ Table IA6 reports an alternative specification that aggregates the post-depression variables at the level of the local labor markets.

3.2. Robustness Checks

This section presents robustness checks that evaluate how much the estimates change when we control for variables that could introduce bias in the baseline specifications. Parameter stability across these alternative specifications would further alleviate concerns about having omitted a relevant control variable. We also discuss results from regressions that use alternative ways to construct the local labor markets and estimates from region-by-region regressions that address the agglomeration of occupations into regions.

Controlling for additional variables. Columns 1 and 3 in Table 4 report results from regressions that control for family fixed effects. This analysis identifies the effect of labor market experiences solely from variation within offspring of the same parents, while controlling for work ethics, prudence, employment opportunities, and other latent traits to the extent they are shared by the members of the same family. The exclusion of individuals who are the only child born to a mother decreases the sample size to 756,119 individuals.

Columns 2 and 4 in Table 4 use observable characteristics of the worker's parents in lieu of family fixed effects. In this specification, we have a sample size of 153,665 workers because the parental variables are not available for individuals whose parents are deceased or have retired from the labor force by 2005.

The results of these regressions show that omitted-variable bias is unlikely to drive our baseline estimates. The regressions that control for pre-depression variables yield marginal effects of -0.022 to -0.024 (t -values -5.7 and -5.1), whereas the inclusion of post-depression controls returns a marginal effect of -1.0 percentage points (t -values to -3.6 and -2.7). The stability of these estimates, compared to Table 2, reinforces the conclusion that our approach successfully identifies the effect of labor market experiences on portfolio choice.

Alternative labor market definitions. Although our definition of labor market conditions naturally relates to the nature of frictions that prevent mobility across local labor markets, we also study other definitions that vary the dimensions according to which we stratify the labor market. Columns 5-8 in Table 4 show results for groupings that use information on the worker's sector, type of occupation, and educational background as the source of labor market segmentation. The coefficients using the alternative labor market definitions are statistically significant and indicate the results are robust to alternative ways of defining the local labor markets.

Regional analyses. In Table IA7, we experiment with regressions run separately for each of the 12 regions. These analyses address the possibility that the agglomeration of occupations into particular regions makes the fixed effects ineffective in controlling for shared worker characteristics along the dimensions we use to stratify the labor markets. All coefficients from the region-by-region regressions are statistically significant and imply sizeable reductions in risky investment. These analyses indicate agglomeration patterns do not make the fixed effects ineffective in controlling for unobserved worker characteristics.

Matching methods. As an alternative to the regression-based approach, we also use propensity-score matching to study the impact of labor market experiences on risky investment. We divide the sample into workers for which the labor market conditions were above or below the median. For a treated worker in the worst half of labor market conditions, we find a control worker in the best half who was similar along all observable characteristics.

The characteristics we consider include the now familiar pre-depression and post-depression controls. We also estimate the effects by finding the control individual for a treated worker within the local labor market in 2005. This approach compares individuals who are in the same

local labor market currently, but whose labor market experiences differ because they moved from their local labor market in 1990.

Table 5 reports four matching estimates that vary the set of controls and the exact match by the current local labor market. Columns 1 and 2 report the treatment effect when matching on pre- or post-depression controls, but not requiring an exact match on the current labor market. The estimates suggest the workers in the bottom half of labor market conditions were 4.2 and 2.8 percentage points less likely to participate in the stock market. Requiring an exact match on current local labor market in columns 3 and 4 yields reductions of 0.6 and 0.3 percentage points (t -values -4.3 and -2.1).¹⁹ That the effects survive when we identify the effect within the group of workers who have moved to a given local labor market suggests the impact of experiences does not disappear even when workers face a new environment.

3.3. Other Measures of Risky Investment

In this section, we use additional dependent variables to evaluate how the effects extend to other margins in the data. These analyses help us understand whether the patterns arise from factors specific to the stock market or reflect general changes in worker perceptions. Malmendier and Nagel (2011) show individuals' participation decisions in a particular asset market relate to their return experiences in that market. Because labor market experiences do not naturally relate to any particular asset market, we expect to find effects that extend to different dimensions of risky investment.²⁰

¹⁹ The test statistics for the matching approach use the robust Abadie and Imbens (2006) standard errors.

²⁰ Barseghyan et al. (2011), Barsky et al. (1997), Cutler and Glaeser (2005), Dohmen et al. (2011), Einav et al. (2012), and Wolf and Pohlman (1983) investigate the consistency of decision-making across different contexts.

Table 6 replaces the stock-market-participation indicator with dummies for investment in fixed income funds, balanced funds, or derivatives. The latter two refer to mutual funds that invest in fixed income and equity (the typical asset allocation is 60% in fixed income and 40% in equities), and to options and warrants written on publicly listed stocks. The three leftmost columns, which include the pre-depression controls, show that adverse labor market conditions reduce investment in all categories of risky assets. The marginal effects equal -0.3 , -0.4 , and -0.5 percentage points (t -values -3.1 , -3.1 , and -3.8). These estimates appear reasonably large given the unconditional investment rates of 6.4%, 8.5%, and 1.0%.

The three rightmost columns in Table 6 add controls for wealth accumulation and labor market outcomes observed in the 1994-2005 period. These specifications return coefficient estimates that are statistically insignificant, with the exception of derivatives. This result may obtain because fixed income funds and balanced funds are less risky than the asset classes for which we find statistically significant effects (equities and equity-linked derivatives). However, we cannot give these results a straightforward causal interpretation, because they come from regressions that include control variables measured in the post-depression period.

Do the adversely affected workers who nonetheless choose to participate in the stock market shy away from riskier securities? Table IA8 investigates the impact of labor market experiences on the riskiness of the financial portfolios held by the stock market participants. We measure riskiness by calculating return volatilities and other measures from the time series of portfolio returns to circumvent any challenges that arise from categorizing securities into the least and most risky categories.²¹

²¹ Specifically, we use the euro-denominated MSCI Europe and MSCI World indices as the market portfolios and the 36 most recent monthly return observations in the estimation of portfolio-risk measures.

The regressions in Panel A of Table IA8 show that, if anything, portfolio volatility and market beta is higher for workers who experienced adverse labor market conditions. However, the association of labor market experiences with the extensive margin of stock market participation might mask the true effect. For example, the adversely affected workers who nevertheless participate in the stock market are likely more willing to take on risk than the adversely affected workers who stay away from the stock market.

4. Using Secondhand Experiences to Understand Channels

This section presents results from estimation approaches that are likely immune to the concern that the impact of labor market conditions on risky investment operates solely through wealth, income, and employment. The common theme in these analyses is the notion that individuals may be affected by experiences of others through their social networks. Yet, such secondhand experiences are unlikely to lead to changes in the individual's wealth accumulation and labor market outcomes.

4.1. Secondhand Experiences in the Neighborhood

Our first analysis of secondhand experiences studies social networks based on geography. We link individuals to their immediate neighborhood and study how the experiences of neighbors affect risky investment. Because similar people tend to cluster in neighborhoods, the challenge is to find individuals who were not directly affected by the shocks their neighbors experienced.

We analyze a subsample of workers whose profession provided them with job security during the depression.²² We aggregate workers into 326 professions provided by Statistics Finland, and rank the professions according to their average length of unemployment. The lowest decile of unemployment serves as our group of workers whose labor market prospects the depression did not materially affect. These safe professions include physicians, pharmacists, nurses, teachers, priests, judges, prosecutors, auditors, claims adjusters, maritime pilots, air traffic controllers, railroad engineers, correctional officers, and customs officers. They had on average 0.6 months of unemployment, and only 8.4% of them experienced at least one month of unemployment during the 1991-93 depression (the corresponding numbers for the full sample are 2.8 months and 25.7%, respectively). Although the depression had little direct effect on the safe professions, the shocks experienced in their immediate neighborhood might have made them less willing to take risk in financial markets.

Just like the baseline approach, the neighborhood approach should return an insignificant relation in the falsification exercise that regresses pre-depression stock market participation on labor market conditions during the depression. To be able to isolate the effect that does not work through income, employment, and wealth, the approach should further show an insignificant correlation of these variables with labor market conditions. We report these regressions in Table 7, where the dependent variables are the pre-depression stock market participation (as in Table 1) and the income, employment, and wealth variables (as in Table 3). The last column reports the effect of neighbors' labor market conditions on the main variable of interest, namely, post-depression stock market participation (as in Table 2).

²² Previous studies show labor market distress affects different types of workers in different ways (Couch and Placzek, 2010; Jacobson et al., 1993; Oreopoulos et al., 2012; von Wachter et al., 2011).

Columns 1-4 in Table 7 show the labor market conditions experienced in the individual's neighborhood do not relate to the individual's pre-depression stock market participation, labor market prospects, or wealth accumulation. The latter result casts doubt on wealth effects arising from the housing market. Areas whose residents suffer from poor economic conditions likely see the value of the housing stock decline and may accumulate less wealth over time. However, the long-term effects on the housing stock should show up in post-depression wealth accumulation that contains the value of housing held by an individual. Column 4 finds no evidence in favor of the housing channel, or any other wealth effects.

Yet, column 5 in Table 7 does show a statistically significant reduction in stock market participation following the depression. The coefficient implies a reduction of 0.6 percentage points in stock market participation for a one-standard-deviation worsening of labor market conditions in the neighborhood. This result suggests the workers in professions shielded from the wealth, employment, and income effects of the depression reduced their risky investment in response to their neighbors' adverse experiences.

Table IA9 reports the neighborhood regressions in the full sample without imposing the restriction on the safe professions. It also finds a reduction in risky investment, but in contrast to the safe professions, labor market conditions now strongly associate with post-depression labor market outcomes and wealth accumulation. This analysis underscores the need to focus on the safe professions whose labor market outcomes and wealth accumulation were not affected by adverse labor market conditions.

4.2. Secondhand Experiences in the Family

Family networks provide another useful setting for understanding the channels through which labor market experiences influence risky investment. We first analyze how the adverse

labor market conditions experienced by an individual's siblings influence her risky investment. Table 8 Panel A reports results from regressions that mirror our baseline approach, but add to the regression the labor market conditions a randomly chosen sibling experienced. We randomize the choice of the sibling to ensure families of varying size do not confound the estimates (larger families are more likely to have at least one sibling with adverse labor market experiences). The regressions also include controls for the sibling's characteristics measured prior to the depression.

Table 8 Panel A regresses labor market outcomes, wealth accumulation, and stock market participation of a worker on the labor market conditions of her randomly chosen sibling. The falsification exercise in column 1 reports that the sibling's labor market experiences do not correlate with the individual's pre-depression stock market participation. In columns 2-4, insignificant correlations obtain for the individual's labor income and months unemployed, whereas the coefficient for wealth accumulation is significant only at the 10% level. These patterns suggest a sibling's labor market conditions do not materially affect an individual's labor market outcomes and wealth accumulation, and allows us interpret them as experiences that largely work through other channels. For example, they are not in line with a story according to which a worker's occupational choice correlates with that of her sibling's, and therefore generates a relation between the sibling's labor market outcomes and the individual's stock market participation.

The last column in Panel A of Table 8 documents that the sibling's experience of adverse labor market conditions is significantly related to the individual's risky investment. The coefficient of -0.134 (t -value -2.5) translates into a decrease of 0.6 percentage points in stock market participation per one-standard-deviation worsening of labor market conditions. A natural

interpretation of these patterns is that word-of-mouth communication with or observational learning from siblings affects an individual's decision to invest in risky assets.

Panel B considers an intergenerational setting in which we ask how the labor market experiences of one's parents affect her investment decisions. Here, we examine a sample of individuals who were born between 1972 and 1982 and were thus 8 to 18 years old in 1990. Because of their young age, these individuals had little firsthand experience of labor markets during the depression. Given these young individuals were not in the labor force in 1990, we define the pre-depression control variables now for the individual's parents.

Panel B of Table 8 reports the falsification exercise and the regressions of income, employment, and wealth in the intergenerational setting. Because the individuals in this sample are so young at the time of the depression and only a few of them hold stocks, column 1 performs the falsification exercise by regressing the father's stock market participation prior to the depression on his labor market conditions during the depression. This falsification exercise generates an insignificant relation. Columns 2-4 report that the father's experiences of labor market distress do not significantly correlate with the individual's labor income, months spent in unemployment, and wealth accumulation.²³

Column 5 in Panel B of Table 8 yields a statistically significant reduction in stock market participation for individuals whose fathers experienced adverse labor market conditions. The

²³ Financial assistance from parents to children might generate a relation with wealth accumulation. Gifts and bequests of directly held stock are, however, an unlikely explanation. Euroclear Finland's data on gifts and bequests suggest 0.34 percentage points of the cohorts born 1972-1982 became stock market participants through gifts and bequests from 1995 through 2005. Under the extreme assumption that all the transfers came from parents who did not experience adverse labor market conditions, gifts and bequests would generate a 0.34-percentage-point effect of parents' labor market experiences on children's stock market participation.

coefficient implies a marginal effect of 0.4 percentage points. This finding is consistent with parents passing on the effects of adverse labor market conditions to their offspring.

Tables IA10 and IA11 perform robustness checks on the family influences. Table IA10 estimates the effect of a sibling's adverse labor market conditions by dividing the sample into siblings that are younger or older than the individual. Older siblings may be more likely to serve as role models, and their experiences thus have a larger impact. The coefficients and marginal effects for younger and older siblings are, however, comparable. Table IA11 separately estimates the impact of the father's labor market experiences on younger and older children to account for the possibility that children in different developmental stages are differentially susceptible to the influence of adverse labor market conditions. The regressions yield reductions of 1.3 and 0.7 percentage points in stock market participation for children who were 8-12 and 13-18 years old in 1990, respectively (t -values -4.6 and -2.3). This finding suggests the father's experiences affect younger children more than older ones. We also investigate the impact of the mother's labor market experiences and find an insignificant effect of -0.2 percentage points (t -value -0.8).

Taken together, these results are consistent with the hypothesis that people pass on the consequences of labor market experiences to their family members, most likely through observational learning or word-of-mouth communication.

4.3. Comparing Secondhand Experiences to Firsthand Experiences

The analyses on siblings, parents, and neighbors indicate experiencing labor market distress leads to a reduction in risky investment even in the absence of the impact of labor market conditions on income and wealth. The magnitudes of these effects are useful for understanding how much wealth accumulation and labor market outcomes drive the effects in Table 2.

The effect sizes, evaluated for a one-standard-deviation worsening of labor market conditions, vary from -0.4 to -0.6 percentage points in the analyses of secondhand experiences in Tables 7 and 8. The corresponding magnitudes range between -2.8 and -3.6 percentage points in Table 2, which investigates personal firsthand experiences. These numbers suggest at least $-0.4 / -3.6 = 11.1\%$ of the total personal effect cannot be attributed to the wealth, employment, and income channel.

This number, however, is likely to be conservative. Learning from others introduces an additional layer of noise. Parents might conceal true experiences from their children in an attempt to safeguard them from adverse effects. Reputational concerns might lead siblings and neighbors to refrain from disclosing their poor economic conditions. Personal firsthand experiences, by contrast, are impossible to ignore, and the affected individual will fully bear their impact. In line with this argument, Table 2 finds a larger reduction of 1.2 percentage points in stock market participation for the firsthand effect in regressions that control for the individual's post-depression wealth accumulation and labor market outcomes.

5. Conclusion

We show labor market experiences have a long-lasting impact on investment in stocks and other risky assets. We establish this result by taking advantage of the Finnish Great Depression in the early 1990s and rich register-based data spanning almost two decades. The severity and suddenness of the depression make it a useful source of plausibly exogenous variation in local labor market conditions, and therefore alleviates concerns about omitted correlates of investment in risky assets and of exposure to labor market disruptions. Furthermore, estimation approaches that take advantage of secondhand experiences enable us to examine the effect of labor market

experiences that does not operate through the impact of labor market distress on long-term labor market outcomes and wealth accumulation.

We find an economically and statistically significant reduction in risky investment for the workers who were most adversely affected by the depression. The estimates are remarkably similar in specifications with many different sets of control variables. Parameter stability is not surprising, because a falsification exercise and other tests indicate worker characteristics do not strongly correlate with our measure of labor market conditions. Assessing omitted-variable bias by the degree of selection on observable worker characteristics also supports the conclusion that any remaining omitted-variable bias is an unlikely explanation for our results.

The explanatory power of labor market experiences does not come solely from their impact on wealth accumulation, income, and employment. Secondhand experiences gained through social networks affect neither wealth accumulation nor labor market outcomes, yet they do influence investment in risky investment. Given that the behavioral changes we document are not confined to a particular risky asset class, the candidate explanations for them are permanent changes in risk preferences, beliefs, or trust in financial markets.

Our paper speaks to the importance of formative experiences in generating heterogeneity in household portfolios. We corroborate earlier findings on the role of personal experiences by showing labor market experiences are an important determinant of portfolio choice. We also uncover an interpersonal channel through which the consequences of formative experiences travel in social networks. These effects have implications for understanding belief and preference formation. For example, the rate of learning from publicly available data may be slower in an economy in which personal experiences affect belief and preference formation. The interpersonal

correlations further suggest the heterogeneity caused by personal experiences can spread in the population through social networks and be persistent.

Formative experiences relating to other areas of life, such as health and family, can also influence how individuals construct their financial portfolios. Our results suggest that isolating the behavioral impact of these experiences from the impacts working through wealth and income effects might be challenging. The same challenge applies to any studies that investigate the impact of historically determined variables on current financial decisions and, more broadly, to any studies that attempt to differentiate between alternative causal mechanisms. Our approach of using secondhand experiences to exclude some of the possible causal mechanisms provides avenues for overcoming this challenge.

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Table 1**Falsification exercise and descriptive statistics**

This table reports descriptive statistics of the individuals in the sample. Income and wealth variables are inflation adjusted using the Consumer Price Index from Statistics Finland using 2005 as the base year. Months unemployed calculates the annual number of months a worker spent in unemployment. Taxable net worth is the difference between total taxable assets and total liabilities. Pre-depression stock market participation takes the value of 1 if an individual reports any capital gains in 1987-90, and 0 otherwise. The four leftmost columns show the mean and standard deviation of each characteristic in 1990-2005. The remaining columns stratify the sample according to labor market conditions, which are measured as the mean share of months spent in unemployment in a region-occupation cell. Unconditional means report the average values of the characteristics in local labor markets where the labor market conditions were worse and better than the median. The conditional means are based on regressing each characteristic in 1990 on labor market conditions during the 1991-93 depression and on fixed effects for regions and occupations. The *t*-values are based on clustering at the region-occupation level. The marginal effect is the coefficient multiplied by the standard deviation of labor market conditions.

	Full sample				Stratified by labor market conditions				
	1990		2005		Unconditional means in 1990		Regression-based conditional differences in 1990		
	Mean	Standard deviation	Mean	Standard deviation	Bad conditions	Good conditions	Marginal effect	Coeff.	<i>t</i> -value
<i>Income and wealth</i>									
Labor income (euros)	20,921	9,836	30,640	24,502	20,872	20,970	-66	-1,598	(-0.16)
Months unemployed	0.25	0.85	0.77	2.45	0.29	0.21	-0.05	-1.15	(-1.18)
Net worth (euros)	6,344	70,513	21,286	230,681	5,968	6,715	-352	-8,549	(-1.70)
Stock market part. (%)	7.0	25.4	22.0	41.4	6.7	7.2	-0.5	-12.9	(-1.69)
<i>Education (%)</i>									
Basic or vocational	79.9	40.1	79.1	40.7	87.7	72.2	3.1	76.2	(2.92)
High school	6.0	23.8	3.6	18.6	4.9	7.2	-1.3	-31.5	(-2.33)
Bachelor	6.2	24.2	7.2	25.9	4.6	7.9	0.1	2.8	(0.24)
Graduate	7.8	26.9	10.1	30.2	2.8	12.8	-2.0	-47.5	(-2.83)
<i>Other characteristics</i>									
Married (%)	57.4	49.4	59.7	49.0	53.9	61.0	0.5	12.9	(0.73)
Cohabits (%)	17.1	37.6	13.7	34.4	19.1	15.0	0.3	8.3	(1.37)
Female (%)	49.3	50.0			31.2	67.2	0.7	16.0	(0.52)
Swedish-speaking (%)	4.8	21.4			4.0	5.7	-0.8	-18.9	(-2.68)
Birth year	1957	4.6			1957	1957	0.0	-1.0	(-1.02)
Number of individuals = 838,881									

Table 2

Effect of labor market experiences on stock market participation

This table reports coefficient estimates and their associated *t*-values from regressions that explain an individual's stock-market-participation decision. The dependent variable takes the value of 1 if an individual holds stocks directly or through mutual funds, and 0 otherwise. In column 1-3, the pre-depression controls are measured in 1990, one year prior to the onset of the 1991-93 depression. Specification 1 controls for 12 region dummies and 71 occupation dummies. Specification 2 adds decile dummies for labor income (using average income from 1987-89), for wealth (0 omitted category), and for liabilities (0 omitted). It further includes dummies for four levels of education and nine fields of education. Specification 3 adds an indicator for pre-depression stock market participation, 16 cohort dummies, and dummies for females, for native language, and for marital status. Columns 4-6 add controls measured in the 1994-2005 post-depression period. Specification 4 includes values of assets and liabilities from 2005, as well as four asset-type variables for the values of real estate, forest, foreign assets (excluding equity), and private equity (typically a business). Specification 5 adds the mean and standard deviation of income, and average income growth, calculated from the annual observations in 1994-2005. Specification 6 includes the share of months spent in unemployment, measured in 1994-2005. Each continuous post-depression control variable is broken down into decile dummies that are interacted with the continuous variable to account for non-linearities within deciles. The *t*-values reported are robust to clustering at the level of the local labor markets (in parentheses) or at the level of occupations (in brackets). The marginal effect is the coefficient multiplied by the standard deviation of the labor-market-conditions variable.

Dependent variable	Stock market participation					
	Pre-depression controls			Post-depression controls		
Specification	1	2	3	4	5	6
Labor market conditions	-0.870 (-6.04) [-4.34]	-0.696 (-5.93) [-5.02]	-0.676 (-5.97) [-5.02]	-0.292 (-4.29) [-3.79]	-0.290 (-4.25) [-3.78]	-0.294 (-4.32) [-3.84]
Pre-depression controls						
Region, occupation	Yes	Yes	Yes	Yes	Yes	Yes
Assets, liabilities, income	No	Yes	Yes	Yes	Yes	Yes
Level and field of education	No	Yes	Yes	Yes	Yes	Yes
Demographics	No	No	Yes	Yes	Yes	Yes
Stock market participation	No	No	Yes	Yes	Yes	Yes
Post-depression controls						
Assets, liabilities	No	No	No	Yes	Yes	Yes
Income	No	No	No	No	Yes	Yes
Months unemployed	No	No	No	No	No	Yes
Sd of labor market conditions	0.041	0.041	0.041	0.041	0.041	0.041
Mean participation rate	0.220	0.220	0.220	0.220	0.220	0.220
Marginal effect	-0.036	-0.029	-0.028	-0.012	-0.012	-0.012
Adjusted <i>R</i> ²	0.075	0.129	0.133	0.287	0.287	0.287
Number of labor market cells = 817						
Number of individuals = 838,881						

Table 3**Effect of labor market conditions on labor market outcomes and wealth accumulation**

This table reports coefficients and their associated t -values from regressions that explain labor income and months spent in unemployment in the 1994-2005 period, and net worth in 2005. The set of pre-depression controls for each dependent variable corresponds to columns 1-3 in Table 3. The models are estimated using GLM with a logarithmic link function to account for the non-normal distributions of and the zeros in the dependent variables (see Nichols 2010). The bootstrapped t -values reported in parentheses are robust to clustering at the level of the local labor markets. The marginal effect is the coefficient multiplied by the standard deviation of the labor-market-conditions variable, and it returns the log change in the dependent variable per a one-standard-deviation change in the independent variable.

Regression	GLM with a logarithmic link function								
Dependent variable	Labor income			Months unemployed			Net worth		
Specification	1	2	3	4	5	6	7	8	9
Labor market conditions	-2.086 (-4.77)	-1.589 (-6.78)	-1.632 (-7.04)	3.686 (6.20)	3.253 (6.72)	3.269 (6.69)	-3.610 (-4.82)	-2.241 (-5.69)	-2.191 (-5.60)
Pre-depression controls									
Region, occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Assets, liabilities, income	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Level and field of education	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Demographics	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Stock market participation	No	No	Yes	No	No	Yes	No	No	Yes
Sd of labor market conditions	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041
Marginal effect	-0.086	-0.065	-0.067	0.152	0.134	0.135	-0.149	-0.092	-0.090
Pseudo- R^2	0.254	0.509	0.525	0.097	0.193	0.215	0.044	0.246	0.248
Number of labor market cells = 817									
Number of individuals = 838,881									

Table 4**Additional controls and alternative labor market definitions**

This table reports regressions similar to Table 2 with additional control variables and alternative definitions of local labor markets. Family fixed effects in columns 1 and 3 indicate siblings that belong to the same family. Parental variables in columns 2 and 4 are the pre-depression controls defined for an individual's mother and father. Columns 5 and 7 define the local labor market as a combination of 12 regions, 10 sectors, and 4 types of occupations (blue collar, pink collar, white collar, self-employed). Columns 6 and 8 report a combination of 12 regions, 4 levels of education, and 9 fields of education. The t -values reported in parentheses are robust to clustering at the level of local labor markets. The marginal effect is the coefficient multiplied by the standard deviation of the labor-market-conditions variable.

Dependent variable	Stock market participation							
	Additional controls				Alternative labor markets			
Specification	Pre-depression controls		Post-depression controls		Pre-depression controls		Post-depression controls	
	Family fixed effects	Parental variables	Family fixed effects	Parental variables	Region-sector-occupation	Region-field of education-level of education	Region-sector-occupation	Region-field of education-level of education
	1	2	3	4	5	6	7	8
Labor market conditions	-0.538 (-5.66)	-0.606 (-5.05)	-0.228 (-3.57)	-0.273 (-2.74)	-0.585 (-5.17)	-1.486 (-5.26)	-0.205 (-2.96)	-0.722 (-5.21)
Pre-depression controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post-depression controls	No	No	Yes	Yes	No	No	Yes	Yes
Sd of labor market cond.	0.042	0.039	0.042	0.039	0.045	0.027	0.045	0.027
Mean participation rate	0.213	0.235	0.213	0.235	0.220	0.220	0.220	0.220
Marginal effect	-0.022	-0.024	-0.009	-0.011	-0.026	-0.041	-0.009	-0.020
Adjusted R^2	0.240	0.128	0.358	0.268	0.134	0.133	0.287	0.287
Number of labor m. cells	817	785	817	785	476	343	476	343
Number of individuals	756,119	153,665	756,119	153,665	838,881	838,881	838,881	838,881

Table 5**Matching adversely affected individuals to less affected workers**

This table matches the workers in the top half of adverse labor market conditions with workers in the bottom half. The full set of pre-depression controls defines the match in columns 1 and 3. Post-depression controls supplement the match in columns 2 and 4. Columns 3 and 4 further require an exact match on the region-occupation cell in 2005, identifying the effect from workers who moved from their 1990 local labor market. The table reports the treatment effect based on the propensity-score method. The test statistic for the matching estimates uses the robust Abadie and Imbens (2006) standard errors.

Outcome	Stock market participation			
Treatment	Labor market conditions above median			
	No controls for local labor market in 2005		Controls for local labor market in 2005	
Specification	1	2	3	4
Propensity-score matching	-0.042 (-34.61)	-0.028 (-24.13)	-0.006 (-4.26)	-0.003 (-2.14)
Pre-depression controls	Yes	Yes	Yes	Yes
Post-depression controls	No	Yes	No	Yes
Number of individuals	838,881	838,881	838,881	838,881

Table 6**Effect of labor market experiences on alternative measures of risky investment**

This table explains alternative measures of risky investment with labor market conditions. The sets of pre-depression and post-depression controls employed correspond to columns 3 and 6 in Table 2. The dependent variables indicate workers who hold fixed income mutual funds, balanced funds that combine fixed income with equity investments, or derivatives written on publicly listed stocks. The *t*-values reported in parentheses are robust to clustering at the level of the local labor markets. The marginal effect is the coefficient multiplied by the standard deviation of the labor-market-conditions variable.

Controls Dependent variable	Pre-depression controls			Post-depression controls		
	Fixed income funds	Balanced funds	Deri- vatives	Fixed income funds	Balanced funds	Deri- vatives
Specification	1	2	3	4	5	6
Labor market conditions	-0.084 (-3.12)	-0.092 (-3.09)	-0.131 (-3.81)	0.033 (1.41)	0.048 (1.79)	-0.064 (-2.49)
Pre-depression controls	Yes	Yes	Yes	Yes	Yes	Yes
Post-depression controls	No	No	No	Yes	Yes	Yes
Sd of labor market conditions	0.041	0.041	0.041	0.041	0.041	0.041
Mean dependent variable	0.064	0.085	0.010	0.064	0.085	0.010
Marginal effect	-0.003	-0.004	-0.005	0.001	0.002	-0.003
Adjusted R^2	0.018	0.018	0.041	0.121	0.088	0.092
Number of labor market cells = 817						
Number of individuals = 838,881						

Table 7

Labor market experiences in an individual's neighborhood

This table explains an individual's stock-market-participation decision with the labor market experiences of her neighbors. The sample includes individuals who were in a safe profession in 1990. These professions are in the bottom decile of unemployment during the 1991-93 depression. The dependent variable is the stock-market-participation indicator, and the independent variable measures the labor market conditions in the zip code in which a worker lives in 1990. Column 1 reports the falsification exercise from Table 1, whereas columns 2-4 report the effects on labor market outcomes and wealth accumulation from Table 4. Column 5 reports the effect on stock market participation from Table 2. All the specifications include the full set of pre-depression controls, defined for the individual and for the average worker in the zip code. Columns 1 and 5 are estimated using ordinary least squares, whereas columns 2-4 are based on GLM with a logarithmic link function. The means of labor income and net worth are reported in thousand euros. The *t*-values reported in parentheses are robust to clustering at the level of neighborhoods. The marginal effect is the coefficient multiplied by the standard deviation of labor market conditions.

Analysis	Falsifi- cation exercise	Post-depression labor market outcomes and wealth accumulation			Risky invest- ment
		Stock market part.	Labor income	Months unemp- loyed	Net worth
Dependent variable					
Specification	1	2	3	4	5
Neighbor's labor market conditions	-0.081 (-0.60)	0.036 (0.29)	2.087 (1.31)	0.099 (0.18)	-0.432 (-2.18)
Mean dependent variable	0.081	33.858	2.924	20.077	0.290
Sd of labor market conditions	0.013	0.013	0.013	0.013	0.013
Marginal effect	-0.001	0.0005	0.027	0.001	-0.006
Pseudo- R^2 / Adjusted R^2	0.042	0.594	0.166	0.212	0.099
Number of neighborhoods = 3,095					
Number of individuals = 84,409					

Table 8

Labor market experiences in an individual's family

This table explains an individual's stock-market-participation decision with the labor market experiences of her siblings and father. The sample for siblings in Panel A includes individuals who have at least one sibling in labor force in 1990. The sample for fathers in Panel B consists of individuals born in 1972-82. The dependent variable is the stock-market-participation indicator, and the independent variable measures the labor market conditions the individual's siblings or father experienced during the depression. The sibling's labor market experience is calculated for a randomly drawn sibling to account for the confounding effects of family size. Column 1 reports the falsification exercise from Table 1, whereas columns 2-4 report the effects on labor market outcomes and wealth accumulation from Table 4. Column 5 reports the effect on stock market participation from Table 2. All the specifications include the full set of pre-depression controls. These controls are defined for the individual and the randomly chosen sibling in Panel A, whereas they are calculated for the father of an individual in Panel B. Stock market participation in column 1 in Panel B is the individual's father's pre-depression stock market participation. Columns 1 and 5 are estimated with ordinary least squares, whereas columns 2-4 are based on GLM with a log link. The means of labor income and net worth are reported in thousand euros. The *t*-values reported in parentheses are robust to clustering at the level of the local labor markets. The marginal effect is the coefficient multiplied by the standard deviation of labor market conditions.

Panel A: Siblings' labor market experiences					
Analysis	Falsification exercise	Post-depression labor market outcomes and wealth accumulation			Risky investment
Dependent variable	Stock market part.	Labor income	Months unemployed	Net worth	Stock market part.
Specification	1	2	3	4	5
Personal labor market conditions	-0.022 (-0.45)	-1.570 (-6.33)	3.348 (5.16)	-2.004 (-5.16)	-0.682 (-6.14)
Siblings' labor market conditions	0.020 (0.61)	-0.109 (-1.50)	-0.037 (-0.14)	-0.306 (-1.93)	-0.134 (-2.53)
Mean dependent variable	0.069	27.209	10.623	15.693	0.219
Sd of personal labor market conditions	0.041	0.041	0.041	0.041	0.041
Sd of siblings' labor market conditions	0.042	0.042	0.042	0.042	0.042
Marginal effect for personal cond.	-0.001	-0.065	0.138	-0.083	-0.028
Marginal effect for siblings' cond.	0.001	-0.005	-0.002	-0.013	-0.006
Pseudo- R^2 / Adjusted R^2	0.040	0.532	0.214	0.252	0.135
Number of labor market cells = 811					
Number of individuals = 469,491					

Panel B: Father's labor market experiences					
Analysis	Falsification exercise	Post-depression labor market outcomes and wealth accumulation			Risky investment
Dependent variable	Father's stock market part.	Labor income	Months unemployed	Net worth	Stock market part.
Specification	1	2	3	4	5
Father's labor market conditions	0.066 (0.81)	0.041 (0.45)	0.215 (0.86)	-0.266 (-1.61)	-0.085 (-2.17)
Mean dependent variable	0.107	10.513	10.381	1.894	0.154
Sd of labor market conditions	0.046	0.046	0.046	0.046	0.046
Marginal effect	0.003	0.002	0.010	-0.012	-0.004
Pseudo- R^2 / Adjusted R^2	0.036	0.506	0.187	0.198	0.386
Number of labor market cells = 801					
Number of individuals = 405,532					

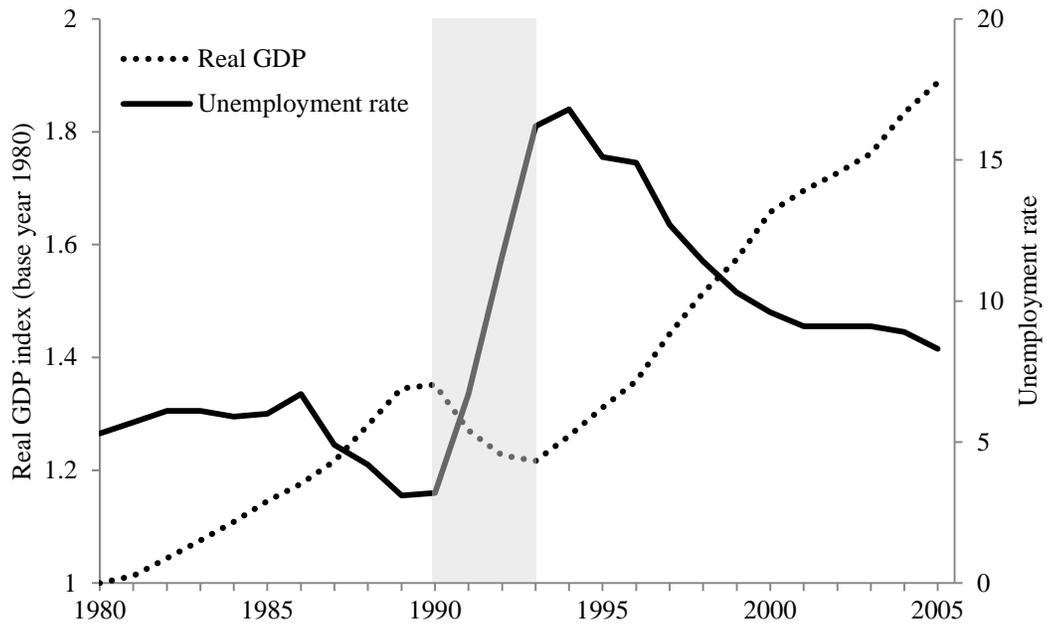


Figure 1. Unemployment rate and real GDP growth around the Finnish Great Depression

The graph depicts the annual rate of unemployment and annual real GDP in Finland from 1980 to 2005. The shaded area highlights the Finnish Great Depression from 1991 to 1993.

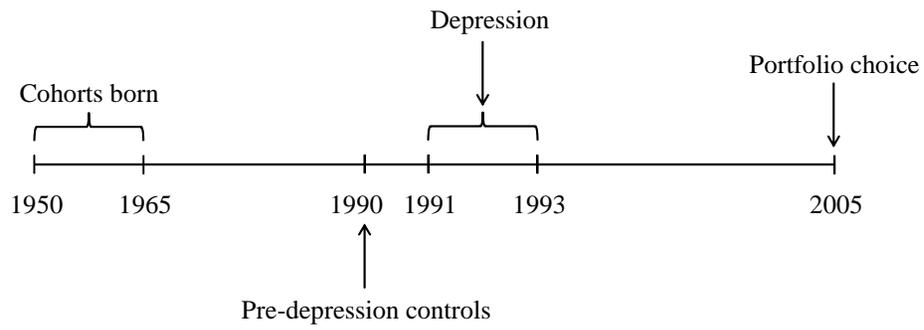


Figure 2. Timeline of events and measurement

The sample consists of subjects born between 1950 and 1965 who are employed at the end of 1990 when the pre-depression controls are measured. Labor market conditions are measured during the 1991-93 depression, and the portfolio choice variable comes from 2005.

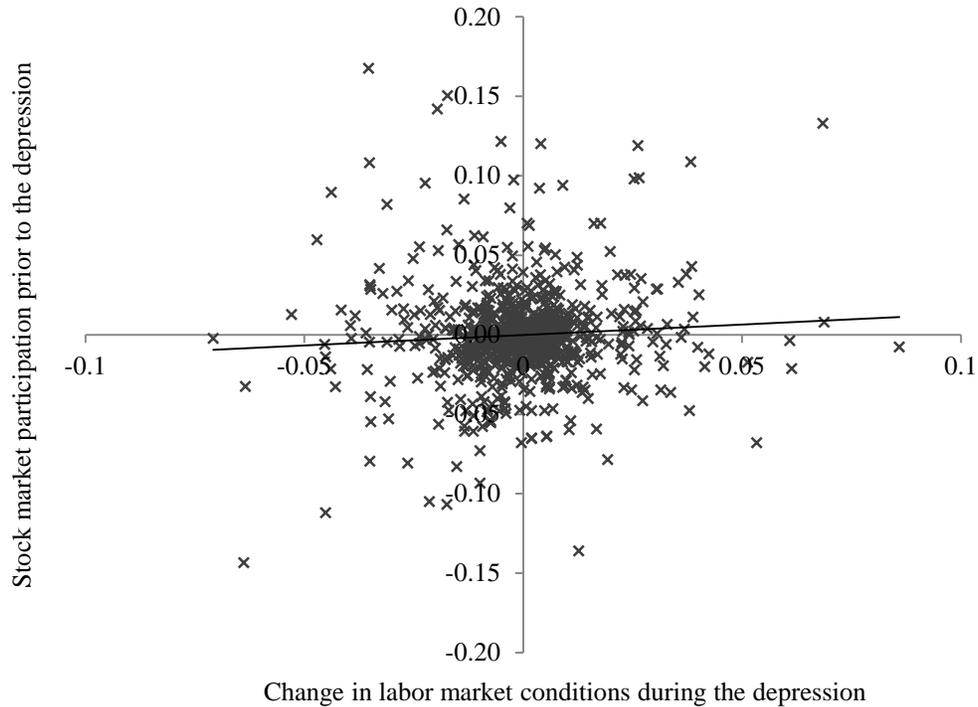


Figure 3. Stock market participation prior to the depression as a function of labor market conditions during the depression

For each local labor market, the graph plots stock market participation in 1990 against the change in labor market conditions in 1991-93 and 1987-90. Pre-depression stock market participation is the average of an indicator that takes the value of 1 if an individual reports any capital gains in 1987-90, and 0 otherwise. Labor market conditions are the mean share of months that workers spent in unemployment in each local labor market. The variables are demeaned by taking the residuals from a regression of labor market conditions on the region and occupation fixed effects. The line plots the fitted values from a regression of the demeaned stock market participation against the demeaned change in labor market conditions. The slope coefficient equals 0.117 (t -value 1.07), and the R^2 of the regression is 0.0003.