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IZA DP No. 11136

Economic Consequences of Political Persecution

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ABSTRACT

Economic Consequences of Political Persecution*

We analyze the effects of persecution and labor market discrimination during the communist regime in the former Czechoslovakia using a representative life history sample from the Survey of Health, Ageing and Retirement in Europe. We find strong effects of persecution and dispossession on subsequent earnings, with most severe implications of job loss due to persecution on earnings in subsequent jobs and on career degradation. Accumulated long-term effects in the form of initial retirement pensions paid during the communist regime are even greater. These pension penalties disappear by 2006 largely as a result of compensation schemes implemented by democratic governments after 1989. We use unique administrative data on political rehabilitation and prosecution to instrument for the endogenous variables. Finally, we survey transitional justice theory and document reparations programs in other countries.

JEL Classification: N34, J70, J31, C21

Keywords: economic history, labor discrimination, persecution, wage differentials, life histories, treatment effect models

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1 Introduction

In a country where the sole employer is the State, opposition means death by slow starvation. The old principle: who does not work shall not eat, has been replaced by a new one: who does not obey shall not eat.

Leon Trotsky (1937)

It was a well known anecdote in the 1980s that Prague had the most educated window cleaners in the world. Indeed, the first post-communist president of Czechoslovakia Václav Havel had been rolling barrels in a brewery, the Prime Minister Petr Pithart had worked as a stoker, a night watchman, and a forest worker, while the Secretary of State Jiří Dienstbier had been a tube cutter, a book packer, and a window cleaner. All had higher education, were active dissidents, imprisoned by the regime and fired from their original occupations. In this paper, we address the following questions: Do these well known case studies reflect the experience of ordinary individuals who were persecuted by the communist regime? In particular, what were the labor market consequences of political persecution in terms of career degradation, earnings losses as well as cumulated losses in the form of retirement benefits? And, is it possible to successfully compensate such victims of persecution? To our best knowledge our paper is the first to address these issues directly in a quantitative manner.

Over twenty five years after the "velvet" revolution in Czechoslovakia little is still known about the consequences of the communist regime's oppression on the well-being of the population. This applies both to the question of well-being at the time as well as to the long term consequences of the years spent under communism. Lack of quantitative studies also applies to evidence on the nature and functioning of the labor market, which under the communist regime was a subject to very tight state control through the process of wage determination, job allocation, and ability of the government to affect different aspects of quality of work. The workplace was often the area where the power of the state over the individual presented itself most clearly.

For the purpose of our analysis we use data from the Czech sample of the Survey of Health, Ageing and Retirement in Europe (SHARE) in the life history SHARELIFE module conducted in 2008.[1] Detailed information on the experience of persecution contained in this module is combined with a rich set of data on respondents' employ-

[1]The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multidisciplinary and cross-national representative panel of micro data on health, socio-economic status and social and family networks of more than 60,000 individuals aged 50+ and their partners in 20 European countries. The survey is harmonized with the Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). For more information about SHARE see www.share-project.org.

ment, earnings and pensions history. In a recent paper (Bohacek and Myck (2011)) we show that general outcomes such as health, career and life satisfaction correlate strongly with past experiences of persecution. This is despite the passage of time, the years lived under the new democratic regime and despite the fact that we can only examine these issues among those who survived at all or long enough to participate in the survey. These factors imply that any effects we find are most likely lower bounds of the true effects.

In the representative sample of the SHARELIFE survey in the Czech Republic we still find a significant proportion, more than 11 percent, of those who declare experiencing persecution. The data confirm the disproportional burden of persecution that fell on the higher educated people in the former Czechoslovakia. Among the persecuted individuals a third have higher education, compared to the overall average of 18 percent. Among those who experienced a persecution-related job loss, 67 percent have higher education. The structure of the SHARELIFE interview allows us to identify persecution in specific jobs and thus to analyze the effects of job-related persecution on earnings in the subsequent jobs and its long term consequences in terms of pensions. We show that earnings of individuals who had lost a job due to persecution were subsequently more than 30 percent lower (controlling for childhood and other individual characteristics). The accumulated long-term consequences in terms of retirement pensions were even greater: initial benefits assigned according to the rules set by the communist regime were reduced by more than 40 percent. The magnitude of these effects is remarkable given the otherwise egalitarian nature of the communist system. These results document the regime's high degree of control over people's daily lives and its power to punish dissenting individuals. Interestingly, these long-term consequences in terms of pensions disappear seventeen years after the fall of communism, largely as a result of effective compensation policies implemented after 1989.

Our results may be biased due to the potential endogeneity of persecution which may result, on the one hand, from self-selection into opposition during communism, and on the other, from trying to justify own failures in the labor market by blaming the old regime. To account for this we use unique data which reflect the intensity of persecution over time to instrument persecution declared at individual level in the SHARE data. Our instruments derive from a database of court decisions on rehabilitation of victims and on prosecution of former officials of the communist regime. The respondent's declaration of losing his or her job due to persecution at a specific point in time ought to be correlated with the severity of oppression in the same year,

which is represented by the number of rehabilitation and prosecution cases identified in that year. At the same time the overall intensity of persecution over time should not be related to other unobserved characteristics at individual level which could be the source of endogeneity bias in our simple OLS estimates.

Additionally, in the online Appendix we test the robustness of our estimates for the role of unobserved heterogeneity (Altonji et al. (2005)), omitted variables (Oster (2013)), and provide alternative estimates based on matching estimators (Blundell and Costa Dias (2009) and Imbens and Wooldridge (2009)). Finally, since our results rely on retrospective information and persecution may reflect recall or justification biases, we analyze earnings and pensions recall as well as placebo regressions. All these tests confirm the robustness of our results and the significant negative effects of job-related persecution on earnings in subsequent jobs and on initial pensions.

The contribution of this paper is threefold. First of all, we use micro data for documenting how the communist economic system, one of the most important socio-economic phenomena of the last century, affected the lives of millions of people. From a historical perspective, our paper is related to the recent literature on the long-term effects of World War II and the Holocaust. Acemoglu et al. (2011) find that Russian cities and regions that experienced the Holocaust most intensely have grown less, have lower wages and GDP per capita today as well as exhibit a higher vote share for communist candidates since the collapse of the Soviet Union. Voth and Voigtlander (2012) study the persistence of anti-semitism during World War II. Waldinger (2013) compares the destruction of human and physical capital of scientific departments in Germany during World War II and shows that in the short-run, the human capital shock lowered output by about four times more than the physical capital shock and that only the former persisted in the long-run.[2] However, all these papers use aggregate or regional information related to these historical events. The only exception is Smith et al. (2014) who, also using the information in the SHARELIFE dataset, find that childhood events related to World War II shocks, such as combat exposure and periods of hunger, significantly predict health and economic outcomes at older ages.

Second, we document the effects of discrimination in a politically controlled labor market. Economic theory suggests that in competitive labor markets wages should

[2]Davis and Weinstein (2002) show that the U.S. bombing of Japanese cities during World War II had no long run impact on the population of those cities relative to prewar levels. Brakman and Schramm (2004) find a similar result for West Germany but not for East Germany. This significant difference can be explained by the lack of private incentives for rebuilding (property was nationalized), government priority to rapid industrialisation as well as the regime's desire to destroy the remnants of the old Germany.

only reflect workers' marginal product of labor. Empirical research, however, consistently finds wage "penalties" related to various observable characteristics, primarily to race and gender. The reason for these penalties is frequently associated with labor market discrimination, namely a situation in which individuals of equal productivity are treated differently.[3] However, plain wage differentials are insufficient as proofs of discrimination. Shifting the question of discrimination to earlier stages of life, Heckman (1995), Neal and Johnson (1996), or Carneiro et al. (2005) show that the wage gap can be traced largely to a difference in basic skills that pre-dates entry into the labor market.[4] Another potential explanation for wage differentials stems from the employers' side who, given limited information about the skills and turnover propensity of applicants, can have incentives to use easily observable characteristics such as race or gender to statistically discriminate among workers if these characteristics are correlated with performance (Phelps (1972), Arrow (1973), Farber and Gibbons (1996) and Altonji and Pierret (2001)). A substantial part of wage differentials can also be explained by job characteristics, preferences for specific type of employment or institutional constraints (Becker (1957), Macpherson and Hirsch (1995), Goldin (1990), or Blau and Kahn (1997)). We relate our results on job losses due to persecution to the literature on displaced workers in the U.S. and Europe (Neal (1995), Jacobson et al. (1993), or Poletaev and Robinson (2008)) and provide one of the first insights on the long-term effects of displacement on retirement benefits.

Wage differentials can finally be seen as departures from competitive labor markets. Recent evidence by Black and Strahan (2001) confirms that employers operating in non-competitive product markets have much more scope to reward their employees along other criteria than productivity. Wage premia of union members have been estimated at about 12 percent in OECD countries and 18 percent in the United States (Card (1996), Card et al. (2004), and Blanchflower and Bryson (2002)). In the Chinese labor market, perhaps the closest institutional scenario to that in our paper, Appleton et al. (2009) find a substantial wage premium of about 10-14 percent from being a member of the Chinese Communist Party. We must remember though that, except perhaps for the last example, the labor environment during the communist rule had little in common with labor markets studied in the economic literature. Until the fall of the regime in 1989 the government had full control over the allocation of individuals to

[3]Ashenfelter (1972), Card and Krueger (1993), and Fryer (2010) document that the relative mean black-white earnings ratio in the United States has narrowed from 0.6 in 1960s to 0.75 in 1990s.

[4]We control for childhood characteristics and household conditions at age ten. Further details on economic theory and empirical results can be found in the surveys of Cain (1986), Darity and Mason (1998) or Altonji and Blank (1999).

jobs and the level of wages. The totalitarian nature of the regime gave the employer—i.e. the state—complete power to discriminate along the characteristics of its choosing. This feature of the labor market allows us to use unique historical data on intensity of oppression as instruments for job losses due to persecution to address the issue of potential endogeneity of the experience of persecution at individual level.

The third contribution of the paper is new evidence in the area of transitional justice, important for our understanding of successful compensation policies for political discrimination and oppression (Acemoglu and Robinson (2006), Carneiro et al. (2005), or Heckman (1998)). Our results show that while the effects on earnings and initial retirement benefits were substantial, the compensation policies introduced in the Czech Republic after 1989 have proven effective in nullifying the effect of persecution on the level of current pensions. The Czech Republic was one of the few countries that compensated victims of political persecution in the labor market. Conforming to the Development Through Justice theory, the adopted restorative and punitive transitional justice mechanisms have emphasized the rule of law even at the cost of delaying economic transformation (Elster (2006) and De Greiff (2006)). Olsen et al. (2011) also emphasize this approach to transitional justice for its role in economic transition and long-run development. Our results are important for future reparation policies in other countries as a large fraction of the world population still lives or had spent a substantial part of its life in countries with an authoritarian regime. We document in Section 6Transitional Justice and Compensation Policiessection.6 the growing domestic and international pressure on governments to provide similar reparations for harms inflicted in the past.

The paper is organized as follows. In Section 2A Brief Historical Backgroundsection.2 we briefly document periods of the most intensive deprivation of rights and freedoms in Czechoslovakia between the end of World War II and 1989 and describe the economic system. Section 3Documenting Persecution in SHARE Datasection.3 presents the structure of the SHARELIFE interview and describes the dataset. In Section 4Resultssection.4 we study the determinants of persecution and its effects on earnings, career degradation, and pensions. Instrumental variables estimation is presented in Section 5Instrumental Variables Estimationsection.5. Theory of transitional justice and compensation policies are described in Section 6Transitional Justice and Compensation Policiessection.6. Section 7Conclusionssection.7 concludes the paper. Finally, Online Appendices contain supplementary material on data, statistical analysis, and legislation. Data and the analyses of recall and justification bias are in Appendix

AData Description, Recall and Justification Biasappendix.A. Appendix BRobustness Testsappendix.B presents robustness tests for selection on unobservables, omitted variables, and results of matching estimators. Instrumental variables estimation is described in Appendix CInstrumental Variables Estimationappendix.C. Appendix DSHARELIFE Questionnaireappendix.D displays relevant sections of the SHARELIFE questionnaire while Appendix ELegislation 1948-2006appendix.E explains the pension system and important legislation related to persecution.

2 A Brief Historical Background

Respondents in the SHARE sample in the Czech Republic have spent most of their lives under the communist regime in Czechoslovakia between 1948 and 1989. The communist rule exerted significant pressure on the lives of not only those who actively opposed or questioned the legality of the regime but also of those the regime targeted for political reasons, class origin (former entrepreneurs, land owners, intelligentsia), religion, for having family members who had emigrated, or for any other characteristics the totalitarian regime found convenient. Importantly, as a rule, the whole family would suffer with its targeted member: children of persecuted parents could not attend high school or university, family members were denied access to jobs they were qualified for or even imprisoned. Persecution was a life changing experience with long-term consequences.

2.1 Persecution between 1948 and 1989

The intensity of the state oppression varied greatly over time. Table 1Persecution in Czechoslovakia 1948-1989table.1 presents conservative estimates of the worst cases of persecution. The most intense period of persecution occurred from 1948 till the end of 1950s with a large fraction of the population affected by imprisonment, political trials, dispossession, forced collectivization, resettlement, labor camps, and other acts of violence. During this period more than 15,000 people were murdered or died as a direct consequence of persecution (Kaplan (1992)).[5] Just within two years in 1950 and 1951, there were 48,485 prison and labor camp sentences (Kaplan (1994)). In the 1940s, 1950s and even 1960s, persecution was usually not the consequence of an individual's choice but rather of a chance of belonging to a particular social group,

[5]The numbers in the Table 1Persecution in Czechoslovakia 1948-1989table.1 are almost certainly lower than the real losses for the lack of preserved materials from the 1950s. The estimate of total deaths include those who died shortly after their release from prison or labor camps (see Courtois et al. (1999)).

practicing a religion, or being born into a household with certain characteristics. It was a matter of survival, long-term incarceration and hard persecution of close relatives. Milder forms of persecution included the loss of occupation, denied access to education, or deprivation of civil rights.

INSERT TABLE 1Persecution in Czechoslovakia 1948-1989table.1 AROUND HERE

After a brief interlude of relative freedom in 1967 and 1968 during the Prague Spring, the Soviet occupation of Czechoslovakia led to massive emigration and another wave of persecution that lasted till the fall of the regime in 1989. This last phase of persecution took less severe forms relative to the 1950s but affected a significant proportion of the population. It is estimated that around 280,000 individuals lost their jobs during 1970s and 1980s (Courtois et al. (1999)). In this late period of the post-Stalinist, more appeasing communist system, individuals were persecuted because they actively opposed or demonstratively boycotted the communist regime. Thus for most of the persecuted people in the 1970s and 1980s, the risk of persecution often became a choice: it was a question of risking to lose a job, to damage own professional career or to suffer other restriction including access to education which often affected the entire family. At all times, individuals had to conduct their lives with the overpowering state strongly limiting their freedoms and using various forms of direct and indirect oppression.[6]

2.2 The Economic System

Czechoslovakia belonged among the most industrialized countries before World War II. Figure 1Real GDP Per Capita (1990 International Dollars)figure.1 shows that GDP per capita in Czechoslovakia was comparable to that of Austria, a country with which it shared most of its modern history as well as its socio-economic conditions and institutions. From the end of World War II, Czechoslovakia and East European countries display a drastically different development compared to the West.

INSERT FIGURE 1Real GDP Per Capita (1990 International Dollars)figure.1 AROUND HERE

The Soviet-type economic system was characterized by central planning, full employment (not having a job was considered a crime) as well as centrally set wages,

[6]For a general overview of Czechoslovak history during the 20th century see Courtois et al. (1999), Naimark (1998), Snyder (2010), or Davies (2005).

prices and output targets for state-owned enterprises. The communist regime imposed nationalization of production, heavy industrialization, and collectivization of agriculture: virtually all private productive property, including land, was confiscated without retribution (see Kuklik (2010)). Central planning operated through 5-year output and investment plans, centralized financial flows, soft budget constraints and foreign trade integrated within the Soviet-bloc trading area, the COMECON. The totalitarian regime exerted full and exclusive control of job assignment, wages, pensions as well as allocation of investment, housing, education, and the supply of all goods and services. Due to centrally planned allocations and prices, the system displayed vast degree of shortages and inefficiency. Ray (1991) shows that the productivity in Central and Eastern European countries in mid-1980s ranged from around a third to half of that in OECD countries. There was virtually no association between wages and performance and there was substantial over-employment and labor hoarding estimated at 15-30 percent of the total working time (Nesporova (1999)). Income distribution was maintained at relatively egalitarian levels with the Gini coefficient of earnings estimated at around 0.2 in 1987 (Rutkowski (1996)). Incentives with respect to skills improvement and R&D investment were minimal and output growth typically reflected a more extensive use of inputs. In 1989, after forty years of the communist experiment, the ratio of Czechoslovak to Austrian real GDP per capita was 0.48 (see Figure 1Real GDP Per Capita (1990 International Dollars)figure.1).

Czechoslovakia became a democratic country with an open market economy in the fall of 1989. The Czech Republic separated from Slovakia in 1993 and joined the European Union in 2004.

3 Documenting Persecution in SHARE Data

In this Section we describe the data from the Czech sample of the Survey of Health, Ageing and Retirement in Europe (SHARE), a longitudinal survey of a representative sample of individuals aged 50+ years and their partners. We use the baseline SHARE survey in 2006 and the retrospective SHARELIFE life history interview collected on the same sample in 2008 (see Appendix DSHARELIFE Questionnaireappendix.D for further details).

3.1 Identification of Persecution

The principal sections of the SHARELIFE interview covered details of family, labor market and health history, childhood living conditions, and health care. The labor

market history module recorded several key characteristics of respondents' jobs, such as the year of starting and ending a job, the job's title and industry, and whether it was full-time or part-time employment. Additionally, individuals were asked to give the starting earnings in each of the jobs they had. On the basis of this information we can recreate the entire path of job spells. For pensioners the data also provide information on the value of the initial retirement pension and the year they retired.

In the final part of the interview, after details of job and life history had been recorded, respondents were asked a set of general questions concerning major life experiences, including a section focused on the experience of persecution:

There are times in which people are persecuted or discriminated against, for example because of their political beliefs, religion, nationality, ethnicity, sexual orientation or their background. People may also be persecuted or discriminated against because of political beliefs or the religion of their close relatives. Have you ever been the victim of such persecution or discrimination?

Conditional on a positive answer to this question followed a series of detailed items on the form and immediate consequences of persecution: whether the experience of persecution 1) ever forced the individual to stop working in a job, and whether it 2) resulted in an experience of denied promotions, assignment to a task with fewer responsibilities, working on tasks below one's qualifications, harassment by a boss or colleagues, or pay cuts. In a follow-up question respondents were asked to match the specific form of persecution they suffered with jobs they had previously listed in the labor market history section. Additionally, respondents were asked if they or their families were ever dispossessed of their property as a result of persecution and if so then in which year it happened.[7]

Building on the treatment effects literature (Blundell and Costa Dias (2009), Heckman et al. (1998), and Imbens and Wooldridge (2009)), we analyze the following six treatments:

1. "Persecution" — general experience of being persecuted;
2. "Dispossession" — being dispossessed of property as a result of persecution;
3. "Job loss due to persecution" — persecution-related job loss;
4. "Job discrimination" — persecution-related discrimination in the workplace;
5. "Layoff" — being laid-off for a reason other than persecution; and
6. "Displacement" — losing a job due to plant closure or downsizing.

The last two treatments are not related to persecution and serve as reference points

[7]We show in Bohacek and Myck (2011) that the distribution of dispossession over time closely reflects the main political developments in the country's history.

for the comparison of persecution effects with general labor market experiences and the literature on displaced workers (see Jacobson et al. (1993) and Gibbons and Katz (1991)).

As we are aware of the concern about the quality of recall data, we show in Appendix AData Description, Recall and Justification Biasappendix.A that there is no correlation between these treatments and the probability of recalling earnings or pensions.[8] Additionally, the structure of the interview limits the potential for endogeneity and justification bias. First, the identification of any job-related persecution is initially screened through the general persecution question and respondents answering this general question do not know that questions on job-related persecution will follow. Second, the persecution section is at the end of the interview, separated from the labor market and earnings history section by a significant number of questions on other issues. This means that respondents first provide details of their labor market history, earnings, and pensions, and only at the end of the interview identify jobs in which they experienced persecution and which they lost as a result. Finally, we deal with the issue of potential endogeneity of treatment by instrumenting declared experience of persecution with external information on the intensity of oppression over time (see Section 5Instrumental Variables Estimationsection.5). Additionally, we conduct several robustness tests which are presented in Appendix BRobustness Testsappendix.B where we use the methodology of Altonji et al. (2005) and Oster (2013). Our IV results as well as the robustness tests show that the main conclusions drawn in the paper using simple OLS regression are not strongly affected by self-selection into treatment and justification bias, and are robust to more general forms of unobserved heterogeneity.

3.2 Sample Statistics

In the SHARELIFE 2008 survey, a representative sample of 1,846 people aged 50+ was interviewed in the Czech Republic. This is the longitudinal part of the sample which took part in the first baseline SHARE survey in 2006 (Börsch-Supan et al. (2011)). In the sample selection for our analysis, we apply several criteria dictated by the nature of the problem we study. First of all, because we look at the oppressive nature of the communist regime, we only include individuals who started their working careers and received wages as employees before 1990.[9] We also keep only those respondents who gave valid information for all the variables we include in the analysis. This leaves us

[8] Smith (2009) documents that the quality of recall of salient events is usually very precise.

[9] In the fully nationalized economy, all persons received wages including those in agricultural sector as members of farm cooperatives.

with the total of 1,521 individuals.

INSERT TABLE 2Sample Statistics table.2 AROUND HERE

In Table 2Sample Statistics table.2 we present descriptive sample statistics for our full sample (column 1) and separately show statistics for the treated subsamples (columns 2-7) for which we indicate whether the computed mean for the treated group is statistically different from its respective non-treated, complementary sample. About 11.5 percent of respondents in the sample reported the experience of being subject to persecution. A slightly higher percentage, 13.4 percent, declared dispossession.[10] Over the course of respondents' labor market careers 3.1 percent experienced job loss due to persecution, while 6.1 percent endured other forms of discrimination at work such as denied promotions or harassment. Finally, 4.6 percent of the respondents were ever laid-off and 16.4 percent displaced. The overall sample is composed by 43 percent of males and 57 percent females, due to the higher longevity of the latter. About 18 percent of the whole sample have higher education, and more than 64 percent attained secondary education.[11]

We use several variables to reflect and document respondents' conditions at birth or in early childhood. These variables, which are important controls given the problem of potential self-selection into persecution, indicate the family background and childhood household conditions when respondents were aged 10. The first category of variables contains information on being born within the country's current borders (*"Born in country"*), in a village (*"Birthplace: village"*) or in a big city (*"Birthplace: big city"*) as well as whether the household in which the respondent was born owned their residence (*"Birthplace: owner"*). The childhood variables include the number of books at home at the age of 10 (*"Age 10: no books"*—no books or up to one shelf of books at home), while household conditions cover such information as lacking basic facilities (inside toilet, running water supply or central heating; *"Age 10: no facilities"*), and a low

[10]Nationalization (with compensation) of some firms with more than 50 employees, large industrial firms, banks, insurance, and of large landowners occurred already in 1946-1947 based on presidential decrees 100-104/1945. These acts might not have been perceived as persecution. A complete confiscation of all productive property and real estate without compensation took place between 1948-1956.

[11]We divide education attainment into three levels according to information on the number of years of continuous full-time education from the SHARE survey in 2006, complemented by age when individuals left continuous full-time education from SHARELIFE survey in 2008. The three levels are: up to 9 years, 10-13 years, and more than 13 years, corresponding to primary, vocational/secondary, and tertiary levels across several changes of the education system during the time SHARE respondents attended school. Czechoslovakia had similar levels of educational attainment to the OECD countries at that time.

ratio of rooms over the number of people in the household (*"Age 10: low room"*—ratio lower than 0.5). Parental information at age 10 include living with both parents (*"Age 10: parents"*), and having a father in white-collar occupation (*"Age 10: white collar"*).[12]

3.3 Treatment in the Sample Statistics

Given the nature of the communist regime, the declared leading role of the working class, and the predominantly highly educated opposition to the regime in Czechoslovakia, one would expect a significant relationship between the experience of persecution and a respondent's level of education. This is indeed the case in the data. While there is about 18 percent of respondents with higher education in the whole sample, this proportion rises to 1/3 among those who experienced persecution and to 48.3 percent and 67 percent among those who were subject to discrimination on the job (column 4) and who lost a job due to persecution (column 5), respectively. The education level of those who were dispossessed (column 3) and who lost a job for a reason other than persecution (columns 6-7) does not differ significantly from the non-treated sample. The fact that losing a job for a reason other than persecution is unrelated to education shows the distinct nature of the communist labor market, where education was not valued in the same way as it is in free market economies.

The data also show a higher prevalence of the persecution-related treatments among older respondents (average year of birth in 1939-1941), while losing a job for a reason other than persecution was more likely to affect the younger cohorts with a lower socio-economic background. As dispossession affected wealthy families, respondents in this subsample were more likely to be born in households that owned the place of their residence, in a big city, and with the main breadwinner in a white-collar occupation.

These relationships square well with the historical development of Czechoslovakia during the second half of the 20th century. The highly educated individuals were the focus of oppression in Czechoslovakia and this group was most active in the opposition movement (Cerny (1992)). This was despite the fact that these individuals had much more to lose in the realities of the regime. While earnings differentiation by education level was relatively low, penalties which the state could inflict on those opposing the regime often took the form of significant professional degradation (see Section 4.3The Mechanism Behind Earnings Lossessubsection.4.3). Taking a non-conformist approach to the regime involved understanding of the regime's nature, courage and determina-

[12]Unfortunately, there is no information on parental education.

tion, features that are perhaps correlated with education but are not easily measured and controlled for. From the point of view of identifying the causal relationship between various forms of treatment and economic outcomes, this background calls for careful treatment of unobserved heterogeneity.

3.4 Jobs and Earnings

Analysis of consequences of persecution on earnings is conducted at the level of individual jobs. In the SHARELIFE data we have 2,920 employee jobs which started between 1953 and 1990.[13] We keep only those individuals who provided valid information on earnings and all other variables we use in the analysis. The first two columns in Table 3Sample Statistics: Jobs and Earnings table.3 describes the resulting sample of 2,319 individual jobs. Because we only have information on the level of *starting* earnings, we can analyze treatment effects that occurred in *subsequent* jobs. Our analysis thus focuses on earnings in the second and subsequent jobs these individuals had in their professional careers (1,220 jobs in the last two columns of Table 3Sample Statistics: Jobs and Earnings table.3).

INSERT TABLE 3Sample Statistics: Jobs and Earnings table.3 AROUND HERE

The top panel shows details on job characteristics, including the year in which they started and finished, whether they were full or part time positions, the employment sector and whether they were blue or white-collar jobs. Among those considered for the analysis, i.e. the second and subsequent jobs, 1.8 percent followed a job in which respondents experienced persecution-related discrimination, 1.6 percent followed a job separation due to persecution, while 2.4 percent followed a layoff, and 6.9 percent displacement. The distribution of jobs across sectors and occupations correspond to the historical structure of the economy and its gradual modernization (see Appendix AData Description, Recall and Justification Biasappendix.A for details).

The bottom panel of Table 3Sample Statistics: Jobs and Earnings table.3 presents descriptive sample statistics on (log) net earnings relative to the average net wages from the Czech Statistical Office in the year for which the earnings are reported, i.e. when the individual was starting that specific job. Because our job sample covers over forty years of data on initial earnings, this relative approach represents a form

[13] We use financial values from 1953 onwards. This is because official records on average incomes from different sources, which are used for indexation of reported information in the data, are not available before 1953 (source of the average incomes data is the Czechoslovak Statistical Office).

of indexation of earnings with respect to the average growth in nominal wages. The overall mean relative net earnings in the total sample of jobs is equal to 1.108, while in the sample including only second and subsequent jobs it stands at 1.261. Since we follow specific cohorts in time, record only starting earnings and compare them to official average wages in a particular year, these ratios seem reasonable.[14] As one could expect the ratio is higher for second and subsequent jobs and its distribution has a clear log-normal pattern (see Appendix AData Description, Recall and Justification Biasappendix.A for densities).

Earnings by age, education, sector and occupation presented in Table 3Sample Statistics: Jobs and Earnings table.3 reflect the evidence on the structure of wages in communist regimes.[15] The education premia are relatively low (14 and 29 percent for secondary and tertiary attainment, respectively) and we find a large gender penalty for women at about 50 percent despite the proclaimed earnings equality and high participation of women in the labor market.[16]

Finally, the mean relative earnings of those respondents who reported persecution are substantially lower than the mean with the exception of jobs following on-the-job discrimination. In particular, mean earnings in jobs following a job loss due to persecution are about 26 percent below the average. For the general experience of persecution and dispossession, the means are between 10 to 16 percent lower compared to the overall average, while there are no substantial differences for earnings in jobs after a layoff or displacement.

Figure 2Job Loss Due to Persecution and Initial Earningsfigure.2 illustrates graphically the descriptive statistics in Table 3Sample Statistics: Jobs and Earnings table.3. It presents average relative initial earnings on first, second, third and fourth jobs for different subgroups of respondents in an average year when these jobs started. The green line represents average relative initial earnings for respondents who never experienced a job loss due to persecution. The blue and the red lines show earnings for those who did. The blue line reflects average initial earnings of these respondents prior to

[14]The Czech Statistical Office does not provide any other data on individual incomes before 1989.

[15]Labor income was regulated by a system of wage rate scales for different occupations and industries (Adam (1984)). Differences between these scales reflect the importance of different industries (armament, heavy industry and mining) as well as the ideological importance of the working class. Our data match the wage ratio of non-manual to manual occupations at 1.11 found by Boeri and Keese (1992). These low returns to education partially reflected the low demand for high skills in an economy characterized by lack of incentives for innovation and the low total factor productivity growth.

[16]The official policy of equal treatment of men and women led to the latter's high educational attainment and labor market participation (around 80 percent, see Brainerd (2000)).

this experience, and the red line after they experienced a job loss due to persecution.

INSERT FIGURE 2Job Loss Due to Persecution and Initial Earningsfigure.2 AROUND HERE

As we can see those who would eventually lose a job due to persecution started their working careers with relative earnings higher than those who never experienced such a job loss. Prior to being persecuted, the slope of earnings among the persecuted subsample was parallel if not steeper than that of those who were never persecuted. However, after a job loss due to persecution, their relative earnings fall dramatically (the red line) and on average grow at a much lower rate. The causal relationships behind these descriptive findings will be analyzed in the following sections.[17]

3.5 Pensions

The second type of economic outcomes we analyze with the aim to examine the long term consequences of persecution are retirement pensions. For this purpose, we first study the consequences of persecution on the initial pensions assigned according to the rules of the communist regime.[18] Second, we look at the value of pensions received at the time of the SHARE survey in 2006 in order to analyze whether the compensation policies after the fall of the regime helped to nullify the negative implications of persecution. The sub-sample for the pensions analysis presented in Table 4Sample Statistics: Pensions table.4 consists of 614 observations on individuals for whom we have information on both initial and current pension benefits and other variables used in the analysis.[19] The average retirement age is 57.8 years with the average working career lasting about 39 years. Only 4.5 percent of retired respondents have no children and less than 8 percent were born outside of the current borders of the Czech Republic.

INSERT TABLE 4Sample Statistics: Pensions table.4 AROUND HERE

[17]The graph also confirms the findings in Table 2Sample Statistics table.2 that persecuted individuals, being born earlier on average, started their working careers earlier, and that their high relative earnings on the first job are primarily determined by higher education and gender. Finally, the graph also shows that individuals tended to stay very long on their jobs (namely the first job), with the average number of jobs per respondent being 1.9. There are very few observations for fifth and following jobs.

[18]For details on pension benefit calculation see Section 6Transitional Justice and Compensation Policiessection.6 and Appendix ELegislation 1948-2006appendix.E for details of the relevant legislation.

[19]These represent 83.3 percent of initial and 71.3 percent of current pensions in the sample.

The bottom panel of Table 4Sample Statistics: Pensions table.4 shows descriptive statistics on the values of pensions. Similarly to the approach taken to earnings, we index the values of initial pensions by computing relative initial pension values as ratios of declared amounts to the official mean pension in the year the initial pension was received. The corresponding approach to current pensions is the ratio of the declared pension in the 2006 interview to the mean pension in 2006. The average ratio of initial pensions to the official mean is 1.106 and the ratio for 2006 pensions is 0.959. These values seem reasonable since the ratio of initial to the average pension is likely to be above one and would be expected to fall over time with the inflow of new cohorts of pensioners. Two points to note are that, first, like in the case of earnings, both initial and 2006 pensions are lower among females than males (11 and 16 percent for initial and current pensions, respectively), and second, there is little differentiation of average pensions by education, in particular for initial pensions. Table 4Sample Statistics: Pensions table.4 shows important differences in the variation of average pensions among groups subject to a treatment. In particular, the initial pension of those respondents who ever lost a job due to persecution is 26 percent below average. The current 2006 pensions of treated retirees are much closer to the average pension benefits and there is little variation in the average level by treatment.

4 Results

The main set of results is divided into four separate categories. First, in Section 4.1Determinants of Persecutionsubsection.4.1 we examine the determinants of different forms of treatment. In Section 4.2Earningssubsection.4.2 we analyze the effects of treatment on earnings and in Section 4.3The Mechanism Behind Earnings Lossessubsection.4.3 examine the most likely mechanism behind our findings. Finally, we focus on the long-term consequences of treatments for the level of pensions in Section 4.4Pensionssubsection.4.4.

4.1 Determinants of Persecution

In order to understand the main determinants of being subjected to a treatment, we estimate the probability of each treatment conditional on individual characteristics. These probability models are also used in robustness checks in the analysis of the extent to which unobserved heterogeneity may bias the estimated treatment effects (see Appendix BRobustness Testsappendix.B).

The estimated models of the probability of being treated are of the following form:

$$P(T_i = 1) = \Phi(X_i\beta), \tag{1}$$

where $T_i = 1$ if a respondent i was ever subject to a treatment and $T_i = 0$ otherwise, and X_i are individual level characteristics.

Table 5Probit Marginal Effects: Determinants of Persecution table.5 shows estimation results for six forms of treatment: being ever persecuted, dispossessed, discriminated at work because of persecution, losing a job due to persecution, and finally being ever laid-off or displaced for a reason other than persecution. The analysis is conducted at the level of individuals on the overall sample presented in Table 2Sample Statistics table.2. The independent variables control for potential background determinants of the analyzed outcomes, including several indicators for living conditions and family situation at age 10, birth-place information, education controls, year of birth and gender. These right-hand side variables can be thought of as exogenous with respect to the treatment variables as they correspond to either fixed characteristics or the nature of lives of the respondents before they entered the labor market. We thus refer to the right hand side variables as "determinants" of persecution.

INSERT TABLE 5Probit Marginal Effects: Determinants of Persecution table.5 AROUND HERE

In the case of all four types of persecution there is a clear effect of time, with older individuals being more likely to experience persecution. The opposite is true for the case of losing a job for a reason other than persecution. Men and those born outside of the current borders of the Czech Republic were more likely to suffer persecution. The results confirm the education pattern observed in the descriptive statistics. Importantly, while higher education is strongly and significantly correlated with each of the four types of persecution, there is no effect of education on the probability of losing a job for a reason other than persecution.

In addition to education, the socio-economic status is also reflected by the number of books at home at the age of 10. Having no or few books at home during childhood increases the probability of being laid-off for a reason other than persecution, but it reduces the probability of being persecuted. As one would expect, dispossession is strongly related to household's ownership at birth and the size of the accommodation at the age of 10. These measures reflect the obvious fact that in order to be dispossessed

in the process of nationalization and collectivization the family of our respondents needed to own real estate property and land in the first place. The negative effect of the white-collar occupation of the head of household at the time when respondents were 10 years old is another likely reflection of farm collectivization and confiscation of land.[20]

A note of caution is perhaps necessary with regard to the effect of education on persecution, as it is the only variable where potential endogeneity might affect the value of the estimated coefficients. The reason behind this is that denied access to education was one of the main forms of persecution throughout the analyzed period. Many individuals could not go to university or even high school because of their family history, activities of their parents or background of relatives. Unfortunately, we do not have any information in the data whether and when the respondents faced any education restrictions. Although this effect might be partly picked up by childhood background variables, it is worth remembering that our estimates of the effect of education on persecution are most likely to be downward biased because of the negative correlation of unobservables related to persecution with the achieved level of education.

4.2 Earnings

The examination of the effect of the analyzed treatments on earnings takes into account the dynamic nature of treatment. The individual labor market histories in the SHARELIFE interview allow us to identify earnings after the following four labor market experiences: losing a job as a result of persecution (*"Job after persecution loss"*), being discriminated on a job (*"Job after discrimination"*), and two types of job loss for a reason other than persecution (*"Job after laid-off"* and *"Job after displaced"*). Since we are also able to specify when respondents experienced dispossession, we can additionally control for this experience in the regressions (*"Job after dispossession"*). The model is:

$$ln(rEarn_{it}) = T_{it}\alpha + X_i\gamma + J_{it}\delta + \epsilon_{it}, \tag{2}$$

where $rEarn_{it}$ are relative earnings at time t and J_{it} are job specific characteristics. The treatment dummy, T_{it} takes value 0 if a respondent was never subject to the treatment *or* was subjected to it at time $s > t$. $T_{it} = 1$ if a respondent was subject

[20]The SHARELIFE interview also collected information on the main reason for persecution: 65 percent of persecuted respondents were persecuted for political reasons, 27 percent for family background, and 14 percent for religious reasons. In all results we found no statistically significant differences between individuals persecuted for different reasons.

to the treatment at time $s < t$.[21] ϵ_{it} is a job specific error term. In all estimations we cluster standard errors at individual level as ϵ_{it} is likely to be correlated within i.

The analysis of starting earnings in second and subsequent jobs is conducted using pooled OLS regressions run on a sample of 1,220 jobs with log relative starting earnings as the dependent variable. Table 6OLS Regressions: Earnings table.6 displays the results of three treatment specifications with and without childhood controls. The first two specifications (column 1 and 2) estimate equation (2Earningsequation.4.2) controlling for all of the four types of labor-market treatment. In the next two (column 3 and 4) we extend the controls to include the potential effect of prior dispossession. Finally, the last two specifications (column 5 and 6) examine the consequences of being ever persecuted, which is a fixed effect across all jobs since we cannot determine whether persecution took place before or after a specific job. In all regressions we control for the following characteristics: gender, education, the full-time nature of the job, occupation and industry, residence in a big city when starting a job, experience prior to the job, job tenure of more than 5 years on the previous job, being out of the labor market for more than 3 years, the year of starting the job, being born in the country, being married and having children before the start of the job.

INSERT TABLE 6OLS Regressions: Earnings table.6 AROUND HERE

Our key finding is the large and robust effect of persecution-related job loss on subsequent earnings. Job loss due to persecution carries an earnings penalty of about 32-34 percent across all alternative OLS specifications. It also stands in sharp contrast to losing a job for a reason other than persecution and experiencing other, less severe forms of on-the-job discrimination. The latter would most likely translate to lower earnings and worse work conditions already on the job where these forms of discrimination occurred. Since the SHARELIFE survey only collected information on starting earnings, the effect of this form of discrimination cannot be identified. Earnings in jobs that followed such discrimination seem to be unaffected. The fact that losing a job for a reason other than persecution has no significant effect on subsequent earnings reflects the regime's full employment strategy, low earnings inequality as well as the weak relationship between wages and productivity. These results suggest that earnings losses of the identified magnitude in the case of persecution-related job loss must have required determined actions by the regime with the specific aim to punish dissenting individuals in the labor market.

[21] Since for each individual the time subscript also identifies a specific job, we omit the job-specific subscripts in the notation.

When we additionally control for being among the 13.4 percent respondents who were dispossessed by the communist regime, we find a lasting earnings scar of around 9-10 percent, on top of any specific job-related persecution. In this case persecution can be safely treated as exogenous with respect to earnings, since individuals could not have chosen the families they were born to and the dispossession dummy only takes value 1 if the loss of property happened prior to the receipt of analyzed earnings.

The earnings regressions further show premia of around 6 percent for secondary and 10 percent for tertiary education, respectively, both of which are statistically insignificant once we control for occupation and industry. There are also large effects of gender with the female earnings penalty of around 30 percent and a full time job premium of about 40 percent over the relatively rare part-time employment.

As we mentioned earlier, our results may be biased due to potential endogeneity of persecution. In our context endogeneity may be a result of self-selection into opposition during communism and to the justification bias in the survey. In the next section, we use instrumental variables analysis to account for the potential endogeneity of our treatment of key interest, namely job-loss due to persecution. In addition, the robustness of our estimates is examined in Appendix BRobustness Testsappendix.B along the lines proposed by Altonji et al. (2005). In terms of the potential role of unobserved heterogeneity in the case of persecution-related job loss we find that unobservable factors would have to be 1.39 times stronger than observables to explain away the full relationship between the treatment and the subsequent drop in earnings. Such a strong role of unobserved heterogeneity seems very unlikely. In the case of dispossession this ratio is lower at 0.86, but given the number of controls such a shift seems also unlikely. We also test for omitted variables (Oster (2013)) and provide estimates of the effect of treatment using matching estimators (Heckman et al. (1998), Abadie and Imbens (2006), Blundell and Costa Dias (2009), or Imbens and Wooldridge (2009)). All these tests confirm our baseline results.

Finally, to be sure that we are not merely capturing some unobserved fixed effect of persecuted individuals over their whole life, we run placebo regressions of first-job earnings on the same set of dependent variables. Table AData Description, Recall and Justification Biasappendix.A.5Placebo OLS Regression: Earnings on First Jobtable.5 in Appendix AData Description, Recall and Justification Biasappendix.A shows that there is no treatment effect on earnings in the first job. The only statistically significant variables in these regressions are age, gender, full-time job and tertiary education. The estimated effects of education are negative but this is more than compensated

by positive age effects, since people with higher education started their first jobs later. Initial earnings in the first job are also uncorrelated with all types of future job separations (see Gibbons and Katz (1991) for a comparison of laid-off and displaced workers). These placebo regressions confirm that persecution on the labor market expressed itself in the form of reduced earnings only through differential treatment of individuals during their subsequent professional career.

4.3 The Mechanism Behind Earnings Losses

The most common explanations of earnings losses following a job separation in market economies refer to the loss of job- or sector-specific human capital, worse quality of the employment match, loss of seniority and of industrial or union wage premiums. The literature based on US data finds consistent, sizeable and persistent negative consequences of displacement (Ruhm (1991), Jacobson et al. (1993), Fallick (1996), Wachter et al. (2007), Couch and Placzek (2010)), with scars of up to 30 percent immediately after a job separation and of around 10-15 percent for long-run effects (Farber (2011)). These losses increase in job tenure, age, employment gaps and the number of jobs following displacement. Gibbons and Katz (1991) find that among white-collar workers, reemployment earnings are more than 6 percent lower for those displaced by layoffs than for those displaced by plant closings. On the other hand, the evidence for Europe suggests small scarring effects for both laid-off and displaced workers, in particular if they reappear in employment after a short period of time.[22]

Wages under communism were not directly related to workers' productivity and there was generally little wage variation. Additionally, laid-off or displaced workers would normally be immediately re-employed given the obligation to work. These are the most likely reasons for the negligible effects of being laid-off or displaced on subsequent earnings in Table 6OLS Regressions: Earnings table.6.

It is therefore particularly interesting that the effect of persecution-related job loss is so strong and so consistent under different specifications. The fall in earnings cannot be related to time out of the labor market since all displaced workers had three days to report their availability for a new job.[23] Therefore, the fall in earnings must have been related to some form of punitive action taken against those who lost their jobs as a result of persecution. Since the government had full control over people's

[22]See for example Hijzen et al. (2010) for the U.K., Huttunen et al. (2011) for Norway, Burda and Mertens (2001) for Germany, or Leonard and Van Audenrode (1995) for Belgium, and Lehmann et al. (2005) or Lehmann et al. (2006) for transition countries.

[23]See Appendix ELegislation 1948-2006appendix.E for the legislation on "Duty to Work and Parasitism" and "Wage Determination and Job Assignment".

working careers it could punish those who opposed or dissented the regime by ordering terminations of jobs with subsequent assignments to low quality and low pay jobs, often far below people's qualification and with harsh working conditions (Nesporova (1999)).

The SHARELIFE data allow us to analyze the extent of job transitions in a multinomial probit model of the probability of moving between blue- and white-collar jobs conditional on treatment as well as individual and job characteristics. Our data provide information on four transition outcomes (S_i): staying in a blue-collar job ("B-B"), staying in a white-collar job ("W-W"), and moving between the two types of jobs ("B-W" and "W-B"). The probability of observing an individual i making a transition h following a job at time t is

$$P(S_{it} = h) = \Phi(X^*_{it}\pi), \tag{3}$$

where Φ is the multivariate normal distribution and $X^*_{it}\pi = T_{it}\alpha + X_i\gamma + J_{it}\delta$. The time indicator, t, defines a treatment and job characteristics *before* the transition. The treatment dummy, T_{it}, equals 1 if the respondent was subject to the treatment at time $s \leq t$, i.e. including the job he or she is transiting from. There are 1,237 recorded job transitions between 1953 and 1990 for which we have all sample information including the occupational characteristics (note that transitions from first jobs are included). We condition job transitions on the same variables used in column (4) of the earnings regression in Table 6OLS Regressions: Earnings table.6.

INSERT TABLE 7Predicted Probabilities of Transitions Between White- and Blue-Collar Jobs table.7 AROUND HERE

Conditional probabilities are presented in Table 7Predicted Probabilities of Transitions Between White- and Blue-Collar Jobs table.7. The first line shows that the overall sample predicted probability of a transition from a white- to a blue-collar job is 6.6 percent. As the data cover Czechoslovakia in its economic development and individuals are observed over their career paths, the predicted probability of a shift from a blue- to a white-collar job is higher at 12.6 percent. We find high probabilities of staying within the same occupational category, with 47.9 percent for the blue- and 32.9 percent for the white-collar jobs, respectively.

The rest of Table 7Predicted Probabilities of Transitions Between White- and Blue-Collar Jobs table.7 displays these probabilities conditional on setting the specific treatment variables to one. The most important result is the high predicted probability of 23.9 percent of switching from a white- to a blue-collar job after losing a job due to

persecution. Those who were discriminated on the job were more likely to move up to a white-collar occupation (with predicted probability of 25.2 percent). This might suggest that possible reasons for conflicts at work resulting in on-the-job discrimination include the poor quality of these job matches. Separation from such a job could have led to a position better fitted for people's skills and ambitions. Those who were laid-off for non-political reasons were most often persistent blue-collar workers (staying with 62.9 percent probability). While staying in a blue-collar occupation also has a high predicted probability among displaced workers, they also show a more pronounced transition from a white- to a blue-collar job.

The fact that persecution-related job losses often resulted in transitions from white- to blue-collar jobs is confirmed by historical sources and case studies documenting the lives of individuals punished by the regime for political reasons who were demoted to blue-collar jobs below their qualification.[24] The substantial earnings scars following persecution-related job losses in Table 6OLS Regressions: Earnings table.6 are, therefore, most likely due to changes in industry or occupation. It is notable that our results are close to the approximately 30-percent wage reductions found for industry displacement in market economies by Neal (1995), Jacobson et al. (1993), or Poletaev and Robinson (2008).

4.4 Pensions

In order to assess whether the implications of treatments translated into long-term effects, we analyze two distinct values of initial and current (2006) pensions. The estimation of pensions is slightly different to that used for earnings because there is only one observation per individual:

$$ln(rPens_i) = \alpha T_i + \gamma' X_i + \lambda' W_i + \nu_i, \tag{4}$$

where $rPens_i$ is the relative pension (either initial or current) of person i. Treatment dummy takes value 1 or 0 conditional on whether the respondent was ever subject to a treatment or not, respectively. Besides individual characteristics X_i we also control for working career characteristics, W_i, such as total labor market experience, year of retirement as well as industry and occupation. Table 8OLS Regressions: Pensions table.8 shows these effects first, on the level of initial pensions (columns 1-3), and

[24]Many case studies have been recorded at the Memory of the Nation website (www.pametnaroda.cz) and have been reflected in Czech culture including Kundera (1992) novel *The Joke*.

second, for the same sample of respondents, on current pensions as recorded at the time of the 2006 SHARE survey (columns 4-6).

INSERT TABLE 8OLS Regressions: Pensions table.8 AROUND HERE

For the initially assigned pensions, we observe a large, statistically significant effect of experiencing job loss due to persecution. The magnitude of this effect is as high as 40 percent. Since we control for total labor market experience this is a pure consequence of the accumulated contribution of wages and of the rules governing the calculation of initial pensions, in particular allocation to lower pension categories (see Appendix ELegislation 1948-2006appendix.E for details of legal rules determining pension categories and initial pensions calculation). On the other hand, we find no effect of dispossession or of being ever persecuted on initial pensions. Interestingly, both non-political reasons for losing a job also result in negative initial pensions effects, although their magnitude is smaller: for initial pensions the penalties are around 17 and 8.5 percent for individuals who experienced being laid-off and displaced, respectively.

Estimation results for the current 2006 pensions are very different. We no longer identify any statistically significant effects of being laid-off or losing a job due to persecution. This seems to suggest that various compensation policies adopted by the Czech government after 1990 have been very effective in redressing the long-term scars related to job losses due to persecution and subsequent career degradation. The Acts On Judicial and Extrajudicial Rehabilitation (119/1990 and 87/1991) provided financial compensation for each month of detention, imprisonment, health damages, property losses as well as for the alleviation of grievances. Individuals who had lost their jobs for reasons listed in these Acts became entitled to returning to their former employment positions, and if retired, to pension benefits recalculated for wages and categories of pensions corresponding to their lost employment. Using the counterfactual approach to reparations (Posner and Vermeule (2003)), contributed earnings to the pension system were recalculated as if the individual continued to be employed at the same job and occupation before the job loss, detention or imprisonment. All discriminatory retirement categories and personal pensions for active supporters of the regime were abolished in 1992. In 2004 and 2005, Government Decrees on Pension Supplement to Partially Compensate Social Injustices Caused by the Communist Regime substantially increased the pension supplements to persecuted individuals and their survivors.[25]

[25]For our analysis, a pension was first assigned to a retiree according to the official administrative

Appendix BRobustness Testsappendix.B shows detailed results of robustness checks with respect to the role of unobserved heterogeneity. To explain away the identified effect of treatment on initial pensions, the unobservable factors would have to be 1.6 and 1.4 times stronger than observables, respectively, in the case of persecution-related job loss and being laid-off. Just as in the case of the earnings regressions such a strong role of unobservable factors is very unlikely. The magnitude of the estimated effects in OLS regressions is also supported by instrumental variable estimation in the next section.

5 Instrumental Variables Estimation

The previous sections document the large and lasting effect of losing a job due to persecution on earnings and initial pensions assigned during the Communist regime. These results, however, would only hold under the strong assumption of exogeneity of our measure of persecution with respect to our outcome variables and there are several reasons why this assumption may not be valid. First of all, in particular in the 1970s and 1980s, the risk of being persecuted was strongly related to individual choices of voicing opposition to the regime. If these choices related to unobservable characteristics which also determined wages, then the OLS estimates of the effect of persecution on earnings or pensions would be upward biased given the likely positive correlation between these unobservables and wages. On the other hand, respondents might tend to report being subjected to persecution to justify their—real or perceived—labor market failures. If this were the case the OLS estimates would be biased downward, given the resulting negative correlation between wages and declaration of persecution in the interview.

To correct for these potential sources of endogeneity we use two unique sources of administrative data available from judicial cases carried out after the fall of the communist regime. The first set of data derives from court cases related to rehabilitation of the victims of the regime. The second set comes from prosecution cases of the

records on employment history and earnings. Only after the pension was assigned, the pensioner could claim the compensation supplements. The processing of a claim to a supplemental pension took several months in which the pensioner had to carry the burden of proof to be verified by the pension system administration. If approved, pensions supplements were paid retroactively since the later year either of retirement or 1990. Therefore, all initial pensions in our data were assigned according to the rules set by the communist regime, while data on current pensions recorded in 2006 automatically contain the compensation payments included in the regular monthly pension benefits. In addition, there were lump-sum compensation schemes by a German trust fund for forced laborers during World War II and the compensation of holocaust victims and their survivors. Appendix ELegislation 1948-2006appendix.E provides a detailed overview of all important legislation and the description of the pension system.

regime's officials. These two independent sources give us information on the intensity of persecution under communism in different years, which can be matched with the timing of experiences of persecution reported in the Czech sample of SHARELIFE. To identify the causal effect of persecution on wages and pensions we thus rely on the correlation of our instruments with persecution reported in the SHARE data and on the assumption that our instruments are independent of reported wages.

5.1 Rehabilitation

The first instrument derives from court decisions on rehabilitation of victims of the communist regime according to the *Act on Judicial Rehabilitation* 119/1990. The Act lists all legal provisions the regime used to persecute and incriminate people between 1948 and 1989 and abolishes such sentences *ex lege*.[26] Information on all cases from the rehabilitation processes have been summarized in a statistical publication by the Institute of Contemporary History of the Czech Academy of Sciences (Gebauer et al. (1993)), which provides the number of classified sentences together with the year in which sentences were decided on. Overall, 195,672 individuals were rehabilitated according to the Act. Of this total, 95,247 sentences originated from Communist law punishing individuals for emigrating from Czechoslovakia. The remaining 100,425 cases relate to the overall prevalence of persecution and these are matched to the data from SHARELIFE by year of the declared experience of losing a job due to persecution.

5.2 Prosecution

While the rehabilitation instrument represents the effort of the new democratic governments to do justice to the victims of Communist persecution, the second instrument is based on court decisions aimed at punishing those who were responsible for these crimes. Since 1991, the prosecution of these wrongdoers has been administered by the Bureau for Investigation and Documentation of the Crimes of Communism (BIDCC, established by Act 283/1991). The instrument once again consists of the number of violations of human rights and other abuses that occurred in a particular year between 1948 and 1989 which have been identified with the prosecuted party leaders, secret police agents, police officers, prison and border guards, and other officials of the former regime.

As has been the case in other post-Communist countries, the number of prosecuted individuals is incomparably lower than the number of victims. We need to remember

[26]For details including financial compensation see Appendix ELegislation 1948-2006appendix.E and Kritz (1995).

that in order to be prosecuted, the perpetrator must have been identifiable and alive at the time of prosecution. Additionally the committed act had to be proven in court with sufficient evidence. As a result there have only been 189 cases of such prosecutions. Abuse of authority by the regime's secret service represents 119 of these cases, while the rest covers a vast range of crimes including 13 cases of murder and 33 cases of assault and battery. In 89 cases the wrongdoers were agents of the secret service.[27]

INSERT FIGURE 3Instrumental Variables: Rehabilitation and Prosecution Casesfigure.3 AROUND HERE

The variation in intensity of persecution in the former Czechoslovakia as reflected in our two instruments is shown in Figure 3Instrumental Variables: Rehabilitation and Prosecution Casesfigure.3 with the red line representing the number of rehabilitation cases and the blue line the number of prosecution cases. The number of rehabilitated political cases originating from the Stalinist period (1949-1955) is enormous with between eight and twelve thousand individuals sentenced per year. After 1960 the number of cases falls below 1,000 per year and declines further to very low levels during the Prague Spring in the late 1960s. After the Soviet occupation in 1968 the numbers rise sharply and then stabilizes at between 200-400 cases per year. The last wave of repression appears around 1977 and 1978 when the regime persecuted the newly emerged dissident groups.

The three peaks in the intensity of persecution around the year 1950, 1968 and late 1970s can also be detected in the information on prosecuted individuals (the blue line in Figure 3Instrumental Variables: Rehabilitation and Prosecution Casesfigure.3). Naturally, the prosecution instrument puts more weight on more recent cases given the practical difficulties of prosecuting cases from the more distant past.

5.3 Relevance of Instruments

Both of our instruments reflect the regime's degree of oppression in any given year and the peaks of rehabilitation and prosecution cases correspond to the geopolitical situation and historical evidence on severity of persecution by the Communist regime (see Kaplan (1994)). In addition to these two instruments we take advantage of residential variation which resulted from job losses and instrument persecution with being resident in a big city *at the time of ending a job*. Residence status could give us

[27]Besides the prosecuted perpetrators of criminal acts, many others, including collaborators of the secret service, were disqualified from public sector employment and political activity by the Lustration Act 451/1991.

additional identification as most of dissident activities occurred in Prague and other regional capitals, and forced residential displacement from cities to the countryside was an additional punishment(see Kaplan (1994) and Radosta (1993)). As we shall see below, we find that while our instruments are valid, their correlation with the endogenous variable is weak even in cases of overidentified estimations, with F-statistics in the range of about 3 to 4. Such weak nature of the instruments is perhaps not surprising given the complex phenomenon we model, and IV estimations with similar values of F-statistics have been used earlier in the literature (e.g. Levitt (1997)). However, to partly account for the weak instrument problem we follow Angrist, Imbens, and Krueger (1999) and apply the jackknife IV estimation method.

5.4 Instrumental Variables Estimation Results: Earnings

The potential endogeneity of a job loss due to persecution, T_{it}, in equation (2Earningsequation.4.2) is instrumented by the following equation:

$$T_{it} = Z_{it}\pi + \eta_{it}, \tag{5}$$

where Z_{it} is the vector of instrumental variables. In our preferred specification we combine each of the two indicators of intensity of persecution with information on residence in a big city at the time of job loss, but for robustness we perform separate estimations using each of the two variables separately as well as using both of the indicators together.

Table 9IV Estimation: Effect of Job Loss Due to Persecution on Earnings table.9 shows the instrumental variables estimation of the effect of a job loss due to persecution on initial relative earnings on the following jobs. The additional controls are the same as in Table 6OLS Regressions: Earnings table.6, column (4), with childhood and dispossession controls included.[28]

INSERT TABLE 9IV Estimation: Effect of Job Loss Due to Persecution on Earnings table.9 AROUND HERE

Hansen J statistics in the overidentified specifications in Table 9IV Estimation: Effect of Job Loss Due to Persecution on Earnings table.9 (i.e. columns 2, 4-6) suggest that we cannot reject the validity of our instruments. On the other hand, as noted

[28]The results without controlling for prior dispossession are very similar to the results in Tables 9IV Estimation: Effect of Job Loss Due to Persecution on Earnings table.9- 11IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions table.11 and are available upon request.

earlier, the first-stage F-statistics in the range of 2.7 - 3.5 indicate that our instruments are weak (see Kleibergen and Paap (2006) and Staiger and Stock (1997)). All results presented in Tables 9IV Estimation: Effect of Job Loss Due to Persecution on Earnings table.9-11IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions table.11 are thus based on the jackknife instrumental variables estimation proposed by Angrist, Imbens, and Krueger (1999).[29]

Our results presented in Table 9IV Estimation: Effect of Job Loss Due to Persecution on Earnings table.9 seem to be in line with what we find for the OLS in Table 6OLS Regressions: Earnings table.6. When persecution-related job loss is instrumented by our indicators for intensity of persecution in a given year (individually in columns (1) and (3) or jointly in column (5)) the results are nearly identical to the OLS specification, with the negative effects of persecution-related job loss on subsequent earnings of between 33%-35%. When we use the residence in a big city at the time of losing the job as an additional instrument (columns (2), (4), and (6)), the point estimates are substantially higher at between 53%-58%.The more negative effect of persecution found in the latter IV specifications could point towards self-selection into opposition of individuals with higher labor market potential and a selection induced bias of the OLS estimates. However, since the differences are not statistically significant and the F-statistics for the combined instruments are still very low such an interpretation requires caution.

5.5 Instrumental Variables Estimation Results: Pensions

The implementation of our instruments is less straightforward with regard to the estimation of the consequences of persecution on pensions. The level of pensions paid for the first time (initial) or in 2006 (current) was a result of the entire job history and specific regulations at the time. Thus the experience of ever losing a job due to persecution, or the lack of such experience, cannot be directly linked to a specific year in the earnings history to be matched with the instruments. In the IV estimations we therefore adopt two approaches to match the instruments. First, we identify the earliest (first) year when a job loss due to persecution occurred, and second, the last year in which such a job loss occurred. For people who never experienced a persecution-related job loss we take the year of ending the first or last job (prior to

[29]See Appendix CInstrumental Variables Estimationappendix.C for further description. For each model, the Kleibergen-Paap rank LM statistics rejects the null hypothesis that each of our models is underidentified at p-value< 0.01, and the LM test of redundancy confirms all instruments at χ^2 p-value< 0.01.

1990), respectively. In this way we match the instruments reflecting the intensity of persecution as well as the information on residence in a big city at the time of the declared first and last job loss. Such matching of the instruments necessarily implies a measurement error in the precision of the timing of "treatment" and its instrument. Given the decline in the overall intensity of persecution it is reasonable to suspect that this measurement error will be lower in the case of matching with first jobs losses.

The results presented in Table 10IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions table.10 use the first job loss timing for the instruments and those in Table 11IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions table.11 the timing for the last job loss. In both cases we estimate the effect of losing a job due to persecution on initial and current pensions for the same IV specifications as in the case of earnings with the same additional control variables used in Table 8OLS Regressions: Pensions table.8, columns (2) and (5).

INSERT TABLES 10IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions table.10 AND 11IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions table.11 AROUND HERE

Most of the results using the timing of the first job loss for matching of the instruments are greater but broadly in line with the estimates of the effect of persecution related job loss found in the OLS regressions given in Table 8OLS Regressions: Pensions table.8. A job loss due to persecution reduces initial pensions by about 42-52%. When we use both rehabilitation and prosecution instruments together (columns 5-6) the point estimates of the effects are higher at around 70%. As in the case of estimates for earnings the standard errors are too high for the differences across specifications to be statistically significant. The effects are lower, between 30-35%, for all six specifications when we use the timing of the last job loss for matching the instruments.

For both sets of IV estimations the differences with respect to the OLS specifications are relatively small and statistically insignificant. Importantly, the IV estimates confirm the results observed in the OLS estimates of the effects of persecution on pensions. Once again we find substantial and significant effects of the experience of persecution related job loss on initial pensions and no significant effects on pensions reported in the survey in 2006. The slightly higher values of the F-statistics in the case of matching our instruments using the timing of first job loss compared to the last job loss may reflect a better, more precise match of the instruments in the first case.

6 Transitional Justice and Compensation Policies

Transitional justice refers to "formal and informal procedures implemented by a group or institution of accepted legitimacy around the time of a transition out of an oppressive or violent social order, for rendering justice to perpetrators and their collaborators, as well as to their victims" (Elster (2006) in an excellent survey). While the last century provided many cases of transitional justice, from Western Europe and Japan after World War II, Southern Europe around 1975, Latin America in the 1980s, Eastern Europe after 1989, and Africa from 1979 to 1994, there has been no systematic comparative study of the long-term consequences on victims or wrongdoers themselves or on their children.

6.1 Theory of Transitional Justice

Compared to the research on remedial affirmative action programs and racial inequality, the existing work on transitional justice remains largely conceptual and theoretical.[30] There are two main theories: the Development Through Justice theory, where economic actors value the punitive and restorative transitional justice mechanisms that demonstrate government stability and respect for the rule of law, including measures for social integration of former victims (De Greiff (2006)). In this process, transitional justice has to compete for resources with other imminent and important tasks as economic reconstruction and transformation. The alternative Stability theory describes transformation processes where actors are averse to trials and retributions: this approach is characterized by amnesties, truth commissions, or the forgive-and-forget principle (Spain and Latin American countries, see Kritz (1995)).

The transition process in the Czech Republic overall emphasized the Development Through Justice theory even at the cost of delaying privatization and other market reforms (Elster (2006)). The relative success of the economic transformation in the Czech Republic is an example conforming to findings of Olsen et al. (2011) that transitional democracies experiencing economic growth are more likely to utilize the relatively expensive Development Through Justice theory.

[30]For the affirmative action studies, see Coate and Loury (1993), Carneiro et al. (2005), Heckman (1995), Heckman (1998), or Fryer (2010). For transitional justice, see Teitel (2006), Lavinia (2009), De Greiff (2006), or Elster (2006).

6.2 Reparations

Posner and Vermeule (2003) define reparations as large scale governmental transfers to individuals, groups or institutions, applying backward-looking justice through rectification of past wrongs committed under a previous legal regime. Reparations as legislative acts appeal to the moral norms held in society at large or as settlements of class action lawsuits.[31]

In order to redress past injustice, governments have used either ad-hoc schemes of lump-sum payments or a counterfactual method of compensations comparing what would have happened had the injustice not taken place (see Darity and Frank (2003)). Government-induced reparations often lead to annuity payments (pension supplements in the Czech Republic, Poland, Hungary, or Chile) and trust funds providing opportunities for self-development and advancement, access to health care or education. Class action lawsuits are usually settled in lump-sum cash compensations (Native American tribes in the U.S. or Canada).

The template for the modern international reparations has been the post-war German and European reparations for Jewish victims of Nazi persecution, unprecedented in their direct support to harmed individuals.[32] In the United States, the government apologized and disbursed more than $1.6 billion in reparations to 82,219 interned Japanese Americans and their heirs as well as settled claims with Indian tribes (1946), with victims of radiation exposure (1990), and in the case of Tuskegee study (1997).[33]

For a long time, these reparations had been among the few compensation programs implemented.[34] However, since 2000, the situation has began to rapidly change. Many past illegal practices and human rights violations have been recognized and compensated. The U.S. government has negotiated a series of new settlements with Native

[31]For the rights to these remedies, see The United Nations Basic Principles and Guidelines on the Rights to a Remedy and Reparation for Gross Violations of International Human Rights Law and Serious Violations of International Humanitarian Law, Article 8 of the Universal Declaration of Human Rights, or Article 10 of the American Convention on Human Rights.

[32]These compensation payments amounted to more than DM 100 billion up to the year 2000, payable to Holocaust survivors and their heirs, both individually and through the state of Israel, for loss of life or health, forced and slave labour, deportation, imprisonment, maltreatment and degradation, or property losses (including income, pensions, savings, or art). For a summary see http://www.yadvashem.org. These reparation schemes far outstrip anything that has been done for the more numerous victims of communism in the Soviet Union, China, and Eastern Europe.

[33]See the Civil Liberties Act of 1988, www.bia.gov of the Bureau of Indian Affairs at the U.S. Department of Interior. While the compensation of slavery in the United States is considered unfeasible on many grounds, discrimination based on the Jim Crow practices of restrictions on schooling, housing, medical services, or labor market discrimination, seems more plausible to redress (see Darity and Frank (2003)).

[34]Other major international compensation programs include the victims of military dictatorships in Latin America (Chile 1992, Argentina 1983), Korean comfort women by Japanese government in 1990s, and forced assimilation of Native Canadians in 1998.

Americans tribes.[35] After the Canadian Constitution had been amended to confirm Aboriginal rights, more than 350 class action suits have been settled by the government.[36]

There are two policies practiced in most countries during the 20th century that are currently open for wide-ranging settlements. The first is forced sterilization, recognized now as a crime against humanity within the jurisdiction of the International Criminal Court.[37] From 1907 through the 1970s, more than 60,000 U.S. citizens were forcibly sterilized (Stern (2005)). In many countries, victims of eugenistic legislation have been already compensated while in many countries including the United States the process has recently started.[38] The numbers are staggering: In Peru, the Minister of Health revealed that just between 1995 and 2000, around 330,000 women were sterilized (PRI (2002)). The official sterilization programs in India or China concern millions of individuals.

The second case is the policy of forced adoptions of children of single or young mothers. The Australian government is facing compensation claims to the Stolen Generations victims of forced removal of 25,000 Aboriginal and 250,000 non-Indigenous children from their young unmarried mothers (from the 1930s to 1982). Similarly, during the Baby Scoop Era that lasted from 1940s till early 1970s, it is estimated that up to 4 million mothers in the United States had newborns taken from them in the hospital for adoption purposes.[39]

In recent years, many countries have been on the brink of opening its historical black boxes. In Spain, the Historical Memory Law of 2007 finally recognized the

[35]In addition to the $554 million settlement with the Navajo Nation in 2014, the current U.S. administration has negotiated similar deals amounting to $2.61 billion with 80 Native Americans tribes for exploitation of tribal trust resources. In 2010, the Department of Interior settled for $3.4 billion with a class action lawsuit representing 500,000 American Indians for mismanagement of Individual Indian Money accounts, and a $760 million settlement was reached with Native American farmers for discrimination in federal farm loan processing by U.S. Department of Agriculture. Further, in 2012, the United States announced settlements with 41 tribes for about $1 billion. See www.bia.gov of the Bureau of Indian Affairs at the U.S. Department of Interior.

[36]Out of more than 750 claims the biggest case was the Indian Residential Schools Settlement Agreement of 2007 for $C1.9 billion to 80,000 Native Canadians from the government-financed forced school system. See Department of Aboriginal Affairs and Northern Development (AAND) at www.aadnc-aandc.gc.ca.

[37]By the end of World War II, over 400,000 individuals were sterilised under the Nazi regime (see Bashford and Levine (2010)).

[38]The first U.S. state that will compensate these wrongs is North Carolina in 2014. In Alberta, Canada, first victims of the Sexual Sterilization Act were already awarded C$142 million in damages.

[39]Approximately 80 percent of infants born to single mothers were taken for adoption in the late 1960s. Similar practices took place in many countries around the world, namely the United Kingdom, New Zealand, Ireland, Sweden, or Canada. For Australia, see www.nsdc.org.au and Cuthbert and Quartly (2013). For the U.S. see Stolley (1993), Brozinsky (1994), and related consequences in Donohue and Levitt (2001).

victims of political, religious and ideological violence on both sides of the Spanish Civil War and of the Franco regime. For the first time ever, compensation schemes are now available to victims of colonial powers. In 2012 Kenyans were given the right to sue the British government for abuses by colonial officials.[40] The Baltic countries and Poland are currently demanding compensations from Russia for around 1.5 million people deported to Soviet Gulags. Both sides in the Israeli-Palestinian conflict have agreed in principle on a compensation program to refugees but its implementation is stalled on the issue of the right of return.

On their paths to democracy, other countries will face similar class action lawsuits or demands for reparations. For example, at the 18th Communist Party Congress in 2013, Chinese officials announced a plan to abolish the Re-education Through Labour system of detention for individuals who are not criminals but had committed only minor offenses. Laogai (2008) estimates the number of these prisoners at 500,000-2 million individuals in more than 1,000 detention camps. These numbers exclude political prisoners actually sentenced and imprisoned as well as the population of the penal labor camps. If and when transitional justice starts in China, compensation claims of persecuted individuals and their descendants might include millions of people.[41]

7 Conclusions

The evidence presented in this paper certainly does not do justice to the victims of the Czechoslovak communist regime between 1948 and 1989. Not only jobs, but lives were lost, dissenting people were imprisoned or sent to labor camps, and many individual careers and family lives were broken by the power of the communist state. Those who suffered most under the totalitarian regime have long died and many of those who survived the worst periods of persecution belonged to cohorts which could not have been expected to live through to the 2000s.

Our results document the extent of labor market persecution using a general representative sample of individuals who have lived through to see the system collapse. To appreciate the scale of the consequences of the communist rule we believe it is crucial to understand what happened to ordinary citizens just as it is to document the few case studies of well-known dissidents. We are not aware of any other study which

[40] The survivors of more than 70,000 Mau Mau interned without trial in concentration camps during the independence struggle in the 1950s sued the British government and, in 2013, Great Britain agreed to pay compensations. Similar abuses occurred during the national liberation struggles in Malaya, Aden, Cyprus and Northern Ireland. For Kenya, see http://www.khrc.or.ke.

[41] Courtois et al. (1999) estimate the total death toll of persecution in China since 1949 at around 60 million.

has addressed the issue of economic consequences of persecution in a quantitative manner using representative survey data. Persecution-related job loss implied a significant deterioration of professional career with substantially lower earnings and had long-term consequences which were reflected in drastically reduced pension benefits assigned during the communist regime. According to our OLS specifications, earnings in jobs following a persecution related job loss were reduced on average by about one third, while initial pensions assigned to those who suffered such a job loss were lower by about 40%. The IV analysis conducted using unique sources of information on the variation in intensity of persecution over time supports the OLS analysis. It seems that with regard to the experience of persecution in our case either endogeneity should not be much of a concern, or the two main sources of bias (self-selection to groups with a high risk of persecution and justification bias) cancel each other out.

A very important result of the analysis is that compensation policies implemented by the Czech government after 1989 seem to have successfully remedied the long-term scars of persecution in the labor market. The compensation policies applied to former Czechoslovakia represent a relatively easy case—recent and discrete instances of persecution with identifiable victims who could carry the burden of proof at a low cost in a small country with democratic traditions, immediately after the transition process started. Posner and Vermeule (2003) in their overview of transitional justice analyze in detail not only the legal and constitutional hurdles but also the formidable practical and valuation problems that often require counterfactual consideration of pain and suffering, lost employment and opportunities. The purpose of this paper is obviously not to advocate compensation policies across the world and history. However, the fact is that only a tiny fraction of victims of persecution has been compensated. The last century was a period of systematic human rights violation and authoritarian regimes with millions of direct persecution victims still alive. The Polity (2014) project estimates that even since 1991, more than 40 percent the world population has been ruled by nondemocratic regimes. Only scarce attention has been given to consequences of persecution and to the issue of redress and reparation to the victims. Our results as well as those in Dell (2010) or Acemoglu et al. (2011) show that discriminatory policies may have sizeable long-term effects on current economic outcomes even after decades and centuries have passed.[42] Political economy theory devoted to the mod-

[42]See Dell (2010) for the case of Peruvian forced mining mita labor system. Acemoglu et al. (2011) show that regions and cities that experienced extreme levels of violence and persecution are worse off even after 50 years. We analyze health and other effects of labor market discrimination in Bohacek and Myck (2011) with comparable results to Sullivan and Von Wachter (2009).

eling of democratic institutions might therefore miss a significant part of the world's public sector activity.

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Table 1: Persecution in Czechoslovakia 1948-1989

Population 1948	8,893,000
Arrests	205,000
Corrective Labor Camp	70,000
Penal Labor Camp	20,000
Military Penal Units	60,000
Clergy Detention Camps	10,300
Deaths	
Executed	248
Prison	4,500
Border	300
Total estimate*	15,000
Emigration	270,000
Job losses (1970s and 1980s)**	280,000

Notes: *Includes indirect deaths of individuals after their release from prison and labor camps, estimated at around 10,000. **Job losses before 1970 not documented. Population in 1948 only in the Czech lands. Sources: The Bureau for Investigation and Documentation of the Crimes of Communism The Institute for the Study of Totalitarian Regimes, Courtois et al. (1999), CSU (2010), Kaplan (1992), Kaplan and Palecek (2001), Naimark (1998).

Table 2: Sample Statistics

		Ever		Ever Job	Ever Job Loss		
	All	Persecuted	Dispossessed	Discr	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fraction	1.00	0.115	0.134	0.061	0.031	0.046	0.164
	—	(0.320)	(0.340)	(0.186)	(0.128)	(0.124)	(0.329)
Year of birth	1943.857	1941.522***	1942.807*	1940.569**	1939.762*	1947.952***	1946.070***
	(7.802)	(8.132)	(8.426)	(7.785)	(8.437)	(6.064)	(6.181)
Female	0.570	0.453**	0.541	0.293***	0.333*	0.542	0.662*
	(0.495)	(0.499)	(0.499)	(0.459)	(0.483)	(0.501)	(0.475)
Born in country	0.953	0.931	0.945	0.914	0.857	0.928	0.951
	(0.211)	(0.255)	(0.229)	(0.283)	(0.359)	(0.261)	(0.217)
Education <10 years	0.178	0.132	0.147	0.034***	0.048*	0.157	0.204
	(0.382)	(0.340)	(0.355)	(0.184)	(0.218)	(0.366)	(0.405)
Education 10-13 years	0.644	0.535**	0.651	0.483*	0.286**	0.687	0.592
	(0.479)	(0.500)	(0.478)	(0.504)	(0.463)	(0.467)	(0.493)
Education >13 years	0.179	0.333***	0.202	0.483***	0.667***	0.157	0.204
	(0.383)	(0.473)	(0.402)	(0.504)	(0.483)	(0.366)	(0.405)
Birthplace: owner	0.610	0.610	0.761***	0.534	0.667	0.675	0.542
	(0.488)	(0.489)	(0.427)	(0.503)	(0.483)	(0.471)	(0.500)
Birthplace: village	0.474	0.478	0.518	0.431	0.524	0.530	0.528
	(0.499)	(0.501)	(0.501)	(0.500)	(0.512)	(0.502)	(0.501)
Birthplace: small city	0.366	0.371	0.381	0.345	0.238	0.373	0.303
	(0.482)	(0.485)	(0.487)	(0.479)	(0.436)	(0.487)	(0.461)
Birthplace: big city	0.160	0.151	0.101**	0.224	0.238	0.096*	0.169
	(0.367)	(0.359)	(0.302)	(0.421)	(0.436)	(0.297)	(0.376)
Age 10: no books	0.470	0.386*	0.502	0.362	0.476	0.578*	0.381*
	(0.499)	(0.488)	(0.501)	(0.485)	(0.512)	(0.497)	(0.487)
Age 10: low room	0.566	0.516	0.500	0.534	0.476	0.386***	0.641
	(0.496)	(0.501)	(0.501)	(0.503)	(0.512)	(0.490)	(0.481)
Age 10: no facilities	0.171	0.215	0.208	0.276	0.143	0.157	0.179
	(0.377)	(0.412)	(0.407)	(0.451)	(0.359)	(0.366)	(0.384)
Age 10: parents	0.917	0.885	0.880	0.879	0.905	0.902	0.864
	(0.277)	(0.321)	(0.326)	(0.329)	(0.301)	(0.299)	(0.344)
Age 10: white collar	0.214	0.272	0.135***	0.309	0.286	0.273	0.245
	(0.410)	(0.446)	(0.342)	(0.466)	(0.463)	(0.448)	(0.431)

Source: Authors' calculations using SHARELIFE data. N=1,521. Robust standard errors in parentheses. In columns (2)-(7), mean and robust standard error of the treated group. *p <0.1, **p <0.05, and ***p <0.01 are the p-values from the two-group mean-comparison test between the treated and the corresponding non-treated group (i.e., in column (2) between those who were persecuted ever and those were never persecuted).

Table 3: Sample Statistics: Jobs and Earnings

Job characteristics	All jobs		All but first jobs	
	Mean	St.dev.	Mean	St.dev.
Year job start	1968.412	(10.205)	1973.012	(9.188)
Year job end	1983.127	(14.989)	1985.161	(12.446)
Full time job	0.969	(0.173)	0.952	(0.215)
Agriculture	0.062	(0.241)	0.049	(0.215)
Industry	0.461	(0.498)	0.431	(0.495)
Services	0.478	(0.500)	0.520	(0.500)
White collar	0.500	(0.500)	0.582	(0.493)
Blue collar	0.484	(0.500)	0.399	(0.490)
Relative net earnings				
All	1.108	(0.718)	1.261	(0.813)
Male	1.354	(0.841)	1.584	(0.946)
Female	0.926	(0.546)	1.035	(0.611)
Born in country	1.111	(0.732)	1.268	(0.832)
Education <9 years	1.035	(0.763)	1.082	(0.762)
Education 9-13 years	1.079	(0.702)	1.234	(0.810)
Education >13 years	1.205	(0.724)	1.409	(0.822)
Agriculture	0.960	(0.505)	1.044	(0.494)
Industry	1.146	(0.699)	1.310	(0.787)
Services	1.090	(0.754)	1.240	(0.853)
White collar	1.136	(0.720)	1.294	(0.790)
Blue collar	1.047	(0.681)	1.163	(0.794)
Job after persecution loss			0.930	(0.450)
Job after discrimination			1.334	(0.768)
Job after laid-off			1.243	(0.867)
Job after displaced			1.212	(0.842)
Job after dispossession	0.979	(0.551)	1.051	(0.571)
Persecuted ever	1.065	(0.639)	1.157	(0.683)

Source: Authors' calculations using SHARELIFE data. N=2,319 (all jobs), N=1,220 (all but first jobs). Weighted by individual sample weights.

Table 4: Sample Statistics: Pensions

Individual Characteristics	Mean	St.dev.
Year of birth	1936.992	(6.876)
Year of first employment	1955.492	(7.373)
Year of first pension	1994.888	(7.287)
Years of white-collar occupation	20.239	(17.639)
Years of blue-collar occupation	17.742	(18.298)
Female	0.666	(0.472)
Children ever	0.955	(0.208)
Born in country	0.923	(0.267)

Relative Pension

	Initial		Current	
	Mean	St.dev.	Mean	St.dev.
All	1.106	(0.498)	0.959	(0.156)
Male	1.184	(0.424)	1.056	(0.150)
Female	1.067	(0.527)	0.911	(0.135)
Born in country	1.125	(0.505)	0.961	(0.158)
Children ever	1.113	(0.502)	0.959	(0.157)
Education <9 years	1.086	(0.544)	0.897	(0.148)
Education 9-13 years	1.114	(0.551)	0.942	(0.142)
Education >13 years	1.103	(0.295)	1.043	(0.159)
Job loss persecution ever	0.819	(0.439)	1.032	(0.146)
Job discrimination ever	0.999	(0.295)	1.002	(0.173)
Job laid-off ever	0.877	(0.323)	0.958	(0.140)
Job displaced ever	0.939	(0.262)	0.943	(0.134)
Dispossessed ever	1.048	(0.392)	0.932	(0.153)
Persecuted ever	1.026	(0.317)	0.984	(0.184)

Source: Authors' calculations using SHARELIFE data. N=614. Weighted by individual sample weights. Current pension in 2006 SHARE interview.

Table 5: Probit Marginal Effects: Determinants of Persecution

	Ever		Ever Job	Ever Job Loss		
	Persecuted	Dispossessed	Discr.	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)
Year of birth	-0.003***	-0.002	-0.002***	-0.001**	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Female	-0.043***	-0.006	-0.033***	-0.006	-0.008	0.033**
	(0.015)	(0.018)	(0.010)	(0.006)	(0.011)	(0.015)
Born in country	-0.057*	-0.020	-0.032*	-0.019**	-0.021	0.001
	(0.031)	(0.039)	(0.018)	(0.009)	(0.023)	(0.036)
Children ever	-0.039	0.002	-0.024	0.001	0.001	-0.036
	(0.043)	(0.052)	(0.024)	(0.011)	(0.034)	(0.043)
Education 10-13 years	0.006	0.039	0.035*	0.008	0.003	-0.015
	(0.021)	(0.025)	(0.020)	(0.010)	(0.016)	(0.020)
Education >13 years	0.069***	0.075**	0.070***	0.036***	-0.009	0.012
	(0.026)	(0.032)	(0.022)	(0.012)	(0.021)	(0.025)
Birthplace: owner	0.010	0.094***	-0.003	0.005	0.006	-0.030*
	(0.016)	(0.020)	(0.010)	(0.006)	(0.012)	(0.016)
Birthplace: village	0.009	-0.025	0.003	0.010	0.008	0.047***
	(0.018)	(0.020)	(0.012)	(0.007)	(0.013)	(0.018)
Birthplace: big city	-0.026	-0.045	0.009	0.012	-0.016	0.014
	(0.023)	(0.028)	(0.013)	(0.009)	(0.018)	(0.022)
Age 10: low room	-0.014	-0.037**	-0.003	-0.004	-0.036***	0.031**
	(0.015)	(0.018)	(0.009)	(0.005)	(0.011)	(0.016)
Age 10: no books	-0.032*	-0.003	-0.013	0.007	0.026**	-0.029*
	(0.017)	(0.019)	(0.011)	(0.006)	(0.013)	(0.017)
Age 10: no facilities	0.025	0.010	0.028**	-0.007	0.007	0.006
	(0.020)	(0.024)	(0.013)	(0.008)	(0.015)	(0.021)
Age 10: parents	-0.020	-0.024	0.002	-0.005	0.001	-0.053**
	(0.026)	(0.030)	(0.017)	(0.008)	(0.019)	(0.024)
Age 10: white collar	0.023	-0.068***	0.007	-0.000	0.028*	0.002
	(0.019)	(0.025)	(0.011)	(0.007)	(0.015)	(0.019)
χ^2	60.059	43.563	62.113	61.539	46.924	42.492
Pseudo-R^2	0.057	0.043	0.135	0.181	0.079	0.048

Source: Probit marginal effects. Authors' calculations using SHARELIFE data. N=1,521. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01.

Table 6: OLS Regressions: Earnings

	(1)	(2)	(3)	(4)	(5)	(6)
Job after persecution loss	-0.341***	-0.338***	-0.319***	-0.316***		
	(0.079)	(0.086)	(0.077)	(0.084)		
Job after discrimination	-0.012	0.011	0.042	0.072		
	(0.143)	(0.146)	(0.149)	(0.153)		
Job after laid-off	0.237	0.227	0.236	0.226		
	(0.163)	(0.163)	(0.160)	(0.159)		
Job after displaced	0.024	0.026	0.025	0.026		
	(0.114)	(0.104)	(0.113)	(0.103)		
Job after dispossession			-0.087*	-0.098**		
			(0.049)	(0.046)		
Persecuted ever					-0.056	-0.040
					(0.042)	(0.044)
Full time job	0.404***	0.388***	0.405***	0.387***	0.378***	0.363***
	(0.107)	(0.103)	(0.108)	(0.104)	(0.105)	(0.102)
Experience	0.060***	0.058***	0.058***	0.057***	0.054***	0.054***
	(0.013)	(0.014)	(0.013)	(0.014)	(0.013)	(0.014)
Experience Sq.	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Job tenure 5+ years	0.014	0.005	0.013	0.003	0.018	0.008
	(0.040)	(0.041)	(0.040)	(0.040)	(0.041)	(0.041)
Out of LM 3 years	-0.138***	-0.145***	-0.136***	-0.144***	-0.136***	-0.143***
	(0.051)	(0.052)	(0.052)	(0.052)	(0.051)	(0.052)
Year job	-0.130***	-0.126***	-0.130***	-0.126***	-0.129***	-0.125***
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)
Year job Sq.	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education 10-13 years	0.062	0.069	0.057	0.062	0.059	0.067
	(0.061)	(0.060)	(0.059)	(0.058)	(0.061)	(0.060)
Education >13 years	0.097	0.116	0.089	0.108	0.083	0.100
	(0.074)	(0.076)	(0.073)	(0.075)	(0.074)	(0.076)
Born in country	0.053	0.050	0.048	0.044	0.037	0.035
	(0.054)	(0.056)	(0.053)	(0.057)	(0.058)	(0.060)
Female	-0.328***	-0.320***	-0.325***	-0.317***	-0.322***	-0.315***
	(0.052)	(0.051)	(0.051)	(0.050)	(0.052)	(0.052)
Age	-0.076**	-0.075**	-0.077***	-0.075**	-0.068**	-0.068**
	(0.029)	(0.030)	(0.030)	(0.031)	(0.030)	(0.031)
Age Sq.	0.001***	0.001**	0.001***	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.007	0.005	0.006	0.004	0.005	0.004
	(0.049)	(0.050)	(0.049)	(0.050)	(0.049)	(0.050)
Children	-0.033	-0.026	-0.025	-0.018	-0.030	-0.026
Childhood controls	No	Yes	No	Yes	No	Yes
R^2	0.360	0.369	0.363	0.373	0.352	0.361

Source: Authors' calculations using SHARELIFE data. N=1,220. Clustered standard errors in parenthesis. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. Dependent variable: ratio of starting earnings to average earnings on a particular year (in logs). Additional controls: job industry, occupation, residence in a big city when starting a job . Childhood controls: head of household birthplace owner, birthplace village, birthplace big city; At respondent age 10 household: no books, low room to person ratio, no facilities, both parents, head of household white-collar occupation.

Table 7: Predicted Probabilities of Transitions Between White- and Blue-Collar Jobs

	White-White (1)	White-Blue (2)	Blue-White (3)	Blue-Blue (4)
Sample	0.329***	0.066***	0.126***	0.479***
	(0.027)	(0.009)	(0.010)	(0.028)
Job after persecution loss	0.214*	0.239**	0.108	0.439**
	(0.115)	(0.121)	(0.081)	(0.185)
Job after discrimination	0.294***	0.107	0.252***	0.347**
	(0.112)	(0.081)	(0.087)	(0.149)
Job after laid-off	0.209	0.162	0.000***	0.629***
	(0.155)	(0.100)	(0.000)	(0.189)
Job after displaced	0.231**	0.188***	0.032	0.550***
	(0.102)	(0.070)	(0.031)	(0.117)
Job after dispossession	0.344***	0.114***	0.139***	0.402***
	(0.060)	(0.025)	(0.031)	(0.061)
Persecuted ever	0.376***	0.088***	0.128***	0.407***
	(0.067)	(0.023)	(0.029)	(0.074)

Source: Predicted values from multinomial probit. Authors' calculations using SHARELIFE data. N=1,237. Note: Transitions from first jobs included. Clustered standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Independent variables as in column (4) in Table 6OLS Regressions: Earnings table.6.

Table 8: OLS Regressions: Pensions

	Initial Pension			Current Pension in 2006		
	(1)	(2)	(3)	(4)	(5)	(6)
Job loss persecution ever	-0.402**	-0.405**		0.030	0.027	
	(0.187)	(0.186)		(0.066)	(0.066)	
Job discrimination ever	0.032	0.036		-0.021	-0.016	
	(0.049)	(0.051)		(0.036)	(0.037)	
Job laid-off ever	-0.169**	-0.170**		-0.005	-0.006	
	(0.086)	(0.086)		(0.033)	(0.033)	
Job displaced ever	-0.084*	-0.085*		-0.039*	-0.040*	
	(0.048)	(0.048)		(0.023)	(0.023)	
Dispossessed ever		-0.012			-0.011	
		(0.045)			(0.021)	
Persecuted ever			-0.030			-0.003
			(0.051)			(0.024)
Year of birth	1.002	0.993	1.531	0.487	0.478	0.425
	(1.372)	(1.371)	(1.401)	(0.842)	(0.839)	(0.815)
Year first pension	0.055	0.056	0.023	-0.078**	-0.078**	-0.073**
	(0.070)	(0.070)	(0.076)	(0.035)	(0.035)	(0.034)
Experience	0.019	0.019	0.009	0.020	0.020	0.020
	(0.039)	(0.039)	(0.041)	(0.019)	(0.019)	(0.019)
Female	-0.192***	-0.191***	-0.175***	-0.134***	-0.133***	-0.134***
	(0.051)	(0.052)	(0.052)	(0.024)	(0.024)	(0.024)
Children ever	0.103	0.103	0.162	0.011	0.011	0.016
	(0.084)	(0.084)	(0.121)	(0.038)	(0.038)	(0.037)
Education 10-13 years	-0.022	-0.022	-0.020	-0.034*	-0.034*	-0.034*
	(0.050)	(0.050)	(0.050)	(0.019)	(0.019)	(0.019)
Education >13 years	0.003	0.003	0.005	0.003	0.003	0.004
	(0.066)	(0.066)	(0.067)	(0.028)	(0.028)	(0.028)
Born in country	0.226***	0.226***	0.238***	0.013	0.012	0.012
	(0.075)	(0.076)	(0.081)	(0.027)	(0.027)	(0.027)
R^2	0.207	0.207	0.173	0.390	0.391	0.386

Source: Authors' calculations using SHARELIFE data. N=614. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Current pension in 2006 SHARE interview. Dependent variable: ratio of initial pension to average pension in a particular year (in logs, columns 1-3) and ratio of pension to average retirement pension in 2006 (in logs, columns 4-6). Additional controls: ever in job industry, ever in occupation. Childhood controls included. Squared effects of year of birth, year of first pension, and labor market experience negligible.

Table 9: IV Estimation: Effect of Job Loss Due to Persecution on Earnings

	Instrument					
	Prosecution		Rehabilitation		Prosecution and Rehabilitation	
	(1)	(2)	(3)	(4)	(5)	(6)
Earnings	-0.328***	-0.525**	-0.346***	-0.556***	-0.340***	-0.577**
	(0.110)	(0.224)	(0.096)	(0.207)	(0.114)	(0.224)
F-test	2.721	3.383	3.148	2.909	2.931	3.459
p-value	0.099	0.034	0.076	0.055	0.054	0.016
Hansen-J	—	0.426	—	0.638	0.940	0.990
p-value	—	0.514	—	0.425	0.332	0.610
Additional instrument						
Residence in Big City	No	Yes	No	Yes	No	Yes

Source: Authors' calculations using SHARELIFE data. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. N=1,220. Dependent variable: ratio of starting earnings to average earnings on a particular year (in logs). Additional controls as in Table 6OLS Regressions: Earnings table.6, childhood controls and dispossession included. Instruments: number of prosecution or rehabilitation cases in a year of starting a job, residence in a big city when the previous job ended. F-test is the Kleibergen and Paap (2006) rank Wald F statistics of the excluded instruments in the first-stage regression. Hansen-J statistics for the null hypothesis $J = 0$ that the overidentification restrictions are valid.

Table 10: IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions

	Instrument Based on First Job					
	Prosecution		Rehabilitation		Prosecution and Rehabilitation	
Pension	(1)	(2)	(3)	(4)	(5)	(6)
Initial	-0.437**	-0.523**	-0.472**	-0.415*	-0.696**	-0.701**
	(0.185)	(0.249)	(0.194)	(0.220)	(0.238)	(0.272)
Current	-0.029	-0.114	-0.029	-0.057	-0.093	-0.150*
	(0.067)	(0.082)	(0.070)	(0.077)	(0.077)	(0.091)
F-test	1.765	4.523	2.686	3.032	3.000	3.642
p-value	0.185	0.011	0.102	0.049	0.051	0.013
Hansen-J	—	1.507	—	2.607	—	2.900
p-value	—	0.220	—	0.106	—	0.235
Additional instrument						
Residence in Big City	No	Yes	No	Yes	No	Yes

Source: Authors' calculations using SHARELIFE data. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. N=614. Dependent variables: Initial pension: ratio of initial pension to average pension in a particular year (in logs); Current pension: ratio of pension to average pension in 2006 (in logs). Additional controls as in Table 8OLS Regressions: Pensions table.8, childhood controls and dispossession included. Instruments: number of prosecution or rehabilitation cases and/or residence in a big city in a year when the first job lost due to persecution ended (or in a year when the first job ended for those who never experienced persecution). F-test is the Kleibergen and Paap (2006) rank Wald F statistics of the excluded instruments in the first-stage regression. Hansen-J statistics for the null hypothesis $J = 0$ that the overidentification restrictions are valid.

Table 11: IV Estimation: Effect of Ever Losing a Job Due to Persecution on Pensions

	Instrument Based on Last Job					
	Prosecution		Rehabilitation		Prosecution and Rehabilitation	
Pension	(1)	(2)	(3)	(4)	(5)	(6)
Initial	-0.319*	-0.340	-0.351**	-0.295	-0.345**	-0.303
	(0.163)	(0.210)	(0.168)	(0.215)	(0.166)	(0.227)
Current	0.008	-0.039	-0.001	-0.033	-0.001	-0.031
	(0.065)	(0.074)	(0.065)	(0.074)	(0.065)	(0.073)
F-test	1.611	2.796	1.729	2.854	1.779	3.393
p-value	0.205	0.062	0.189	0.058	0.170	0.018
Hansen-J	—	0.972	—	4.000	—	4.522
p-value	—	0.324	—	0.045	—	0.104
Additional instrument						
Residence in Big City	No	Yes	No	Yes	No	Yes

Source: Authors' calculations using SHARELIFE data. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. N=614. Dependent variables: Initial pension: ratio of initial pension to average pension in a particular year (in logs); Current pension: ratio of pension to average pension in 2006 (in logs). Additional controls as in Table 8OLS Regressions: Pensions table.8, childhood controls and dispossession included. Instruments: number of prosecution or rehabilitation cases and/or residence in a big city in a year when the last job lost due to persecution ended (or in a year when the last job ended for those who never experienced persecution). F-test is the Kleibergen and Paap (2006) rank Wald F statistics of the excluded instruments in the first-stage regression. Hansen-J statistics for the null hypothesis $J = 0$ that the overidentification restrictions are valid.

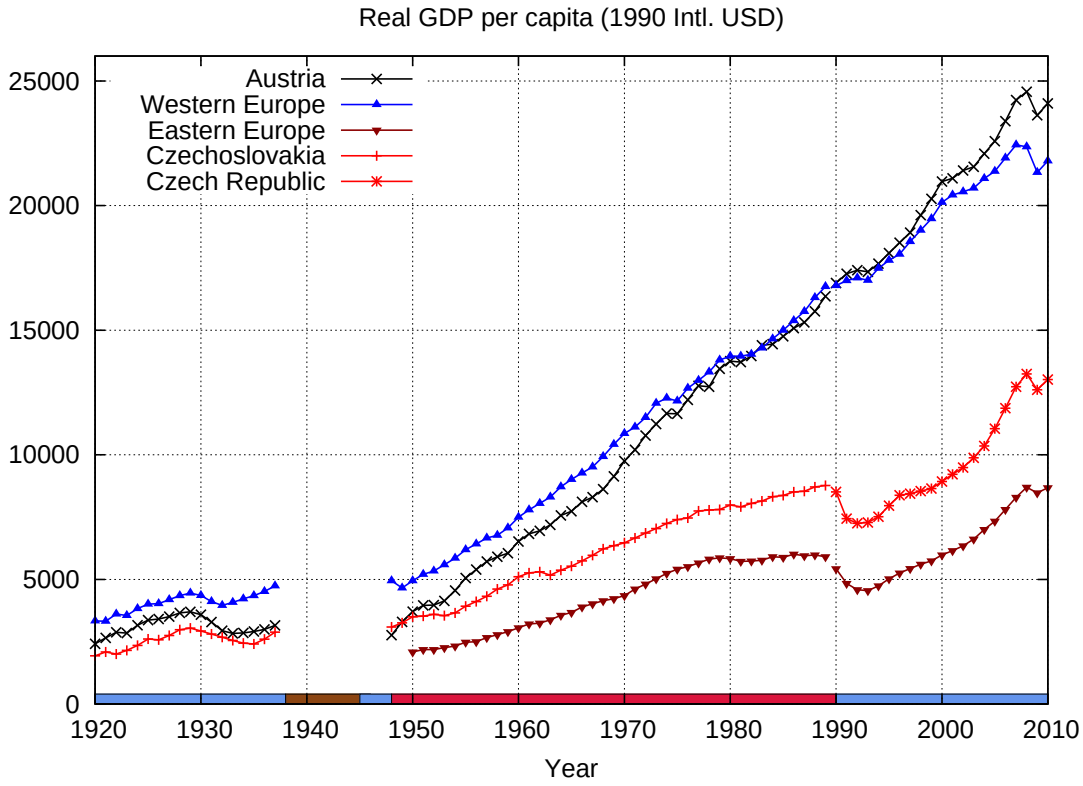

Figure 1: Real GDP Per Capita (1990 International Dollars)

Source: Maddison tables, Bolt and van Zanden (2013). Notes: Western Europe: Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom. Eastern Europe: Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia.

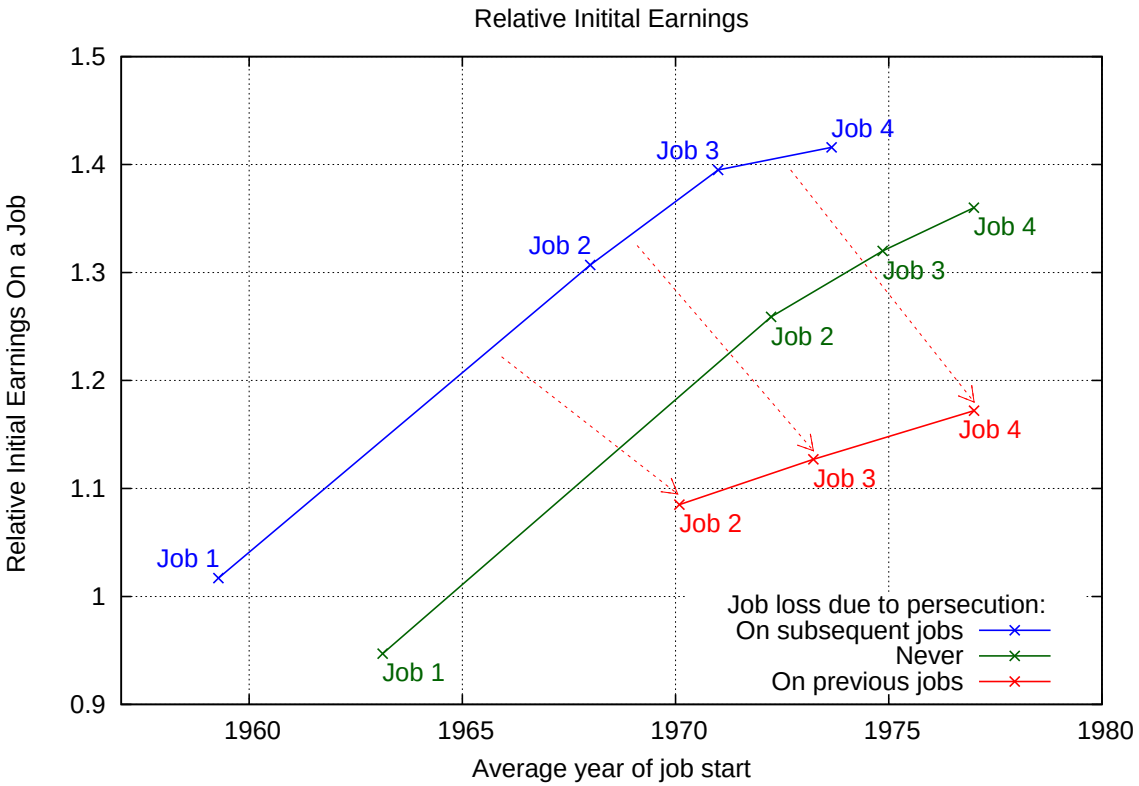

Figure 2: Job Loss Due to Persecution and Initial Earnings

Source: Authors' calculations using SHARELIFE data. Average relative initial earnings with indicated average starting years on the first, second, third, and fourth job.

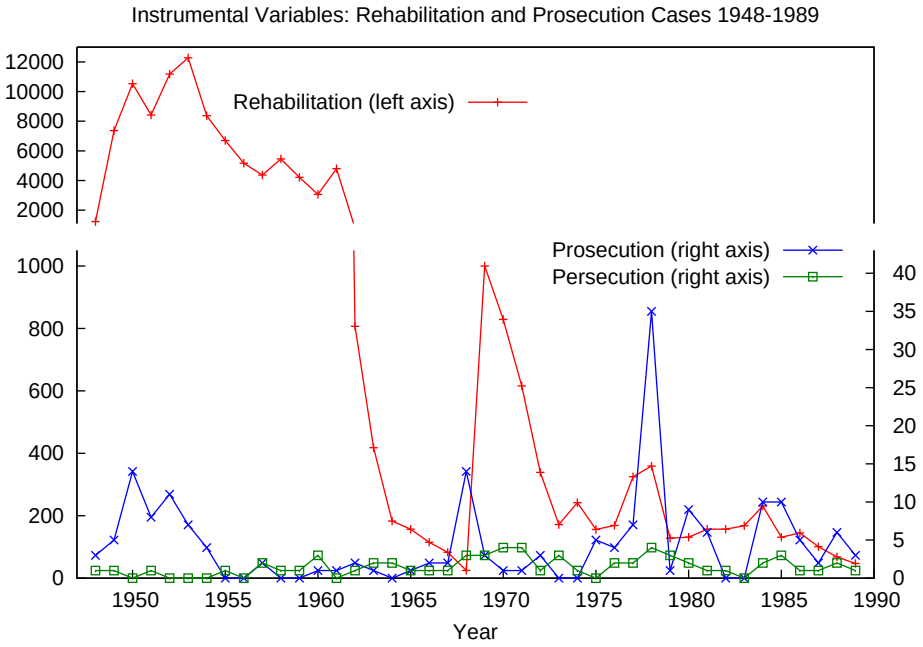

Figure 3: Instrumental Variables: Rehabilitation and Prosecution Cases

Source: Authors' calculations using Gebauer et al. (1993) statistics on the Judicial Rehabilitation Act 119/1990, the Bureau for Investigation and Documentation of the Crimes of Communism (BIDCC) of the Police of the Czech Republic, and SHARELIFE data. Rehabilitation (left axis): number of cases rehabilitated per year when sentence given, excluding emigration. Prosecution (right axis): number of prosecuted individuals per year when wrongdoing occurred. Persecution (right axis): job losses due to persecution from the SHARELIFE data in a given year.

For Online Publication: Appendix

A Data Description, Recall and Justification Bias

In this Appendix we describe the data in more detail and the process of data cleaning. Since our results rely on retrospective information, persecution may reflect recall or justification bias (declarations of persecution used to justify poorer past labor market outcomes), we analyze earnings and pensions recall as well as placebo regressions.

A.1 Data Cleaning

The SHARELIFE data are cleaned for internal consistency by the provider of the data, the Munich Center for the Economics of Aging (MEA) at the Max Planck Institute for Social Law and Social Policy. Besides checking and correcting for errors due to language and currency issues, we do not clean the data further except for eliminating outliers in the 0.05-centile (that is half a percentile) at the top and at the bottom of the distribution of relative earnings and relative pensions. The densities of (log) net relative earnings and (log) relative initial and 2006 pensions are shown in Figures AData Description, Recall and Justification Biasappendix.A.1Density of Log Relative Earnings: All Jobsfigure.1, AData Description, Recall and Justification Biasappendix.A.2Density of Log Relative Earnings: All But First Jobsfigure.2, AData Description, Recall and Justification Biasappendix.A.3Density of Log Relative Initial Pensionsfigure.3, and AData Description, Recall and Justification Biasappendix.A.4Density of Log Relative Current Pensions in 2006figure.4.

Unlike many other countries of the Soviet block, Czechoslovakia was a relatively stable country that did not experience any episode of hyperinflation and maintained a relatively stable price level after the monetary reform of 1953.[43] This relative stability should alleviate the potentially important source of measurement error given the retrospective nature of the survey. Unfortunately, hyperinflation, repeated periods of high inflation, and currency denomination preclude any reliable use of the SHARELIFE data on Polish earnings and pensions.

A.2 Job Industry and Occupation Categories

Table AData Description, Recall and Justification Biasappendix.A.1Job Industry and Occupation Categoriestable.1 shows the distribution of jobs across industries and occupations, for all jobs and for all but first jobs. In the SHARELIFE survey respondents could choose from 14 industries: agriculture, mining, manufacturing, utilities, construction, trade, hotel and restaurants, transport, finance, real estate, public, education, and health services. There were 10 occupation categories: official/manager, professional, technician, clerk, sales worker, agriculture, crafts worker, operative, elementary, and army.

A.3 Recall

As we noted in Section 3.4Jobs and Earningssubsection.3.4, 20% of individual-job observations cannot be used due to missing earnings information. The same applies to 24.9% of initial pensions for which respondents do not provide a value. This form of item non-response has been found to be non-random and may be related to the number of years passed between the job and the interview, occupation, education and gender of the respondents. Evans and Leighton (1995) find an underreporting bias in job loss reporting, especially for white-collar workers. On the other hand, Oyer (2004) shows that respondents were very accurate in identifying the reason for job loss and Smith (2009) document that the quality of recall of events during childhood is better than for other periods of life, especially if the events are very salient. Besides the life-changing experience of persecution or dispossession, plant closures and layoffs in general were rare and salient events in Czechoslovakia (on average, an individual had only 1.96 jobs during his or her job career).

[43]The 1953 reform cut the values of all currency in circulation and savings accounts by 20; additionally, new administrative prices were set to replace the post-war rationing system. This reform and the fact that the Czechoslovak Statistical Office does not provide any information on earnings and pensions between 1948 and 1953 are the main reasons our analysis is limited to earnings and pensions from 1953 onwards.

The probit marginal effects for earnings recall are presented in Table AData Description, Recall and Justification Biasappendix.A.2Probit Marginal Effects: Recall of Earningstable.2 with the same dependent variables as in Table 6OLS Regressions: Earnings table.6. Jobs following a discrimination on the previous job, job loss due to persecution or layoff have a positive probability of earnings recall but not statistically significant. On the other hand, recall after plant closure and dispossession have negative but statistically insignificant marginal effects. Recall increases in shorter time elapsed since the job and in educational attainment (the latter not statistically significant when controlling for childhood characteristics).

The probit marginal effects for recalling the first pension is shown in Table AData Description, Recall and Justification Biasappendix.A.3Probit Marginal Effects: Recall of First Pensiontable.3. The probability of recall is positive and statistically significant for the year the pension was assigned, females, and higher education. For the current pension in 2006 in shown Table AData Description, Recall and Justification Biasappendix.A.4Probit Marginal Effects: Recall of Current Pensiontable.4, only year of birth and gender are important for recall. For both pensions, only the experience of being laid-off for a reason other than persecution is related to the probability of pension recall.

We conclude that recall bias is most likely not a significant issue for our analysis as no persecution-related treatment seems to be systematically related to earnings or pension recall.

A.4 Placebo Regression

In order to rule out the possibility that our results are driven by a permanent scar of persecuted individuals, we run a placebo regression of first-job earnings on being ever subject to treatments and the same set of remaining dependent variables as in Table 6OLS Regressions: Earnings table.6.

In theory, the initial earnings on the first job should not differ by future causes of displacement (as in Gibbons and Katz (1991) for laid-off and displaced workers). On the other hand, it is possible that the authoritarian regime punished individuals of certain personal or family characteristics during their whole life. This scenario would be reflected in lower earnings already on the first job.

Table AData Description, Recall and Justification Biasappendix.A.5Placebo OLS Regression: Earnings on First Jobtable.5 shows that there is no treatment effect on earnings on the first job. The only statistically significant variables are age, gender, full time characteristics of the first job, and a negative effect of secondary and tertiary education. The placebo regressions confirm that persecution in the labor market expressed itself only by differential treatment of individuals during their subsequent job career.

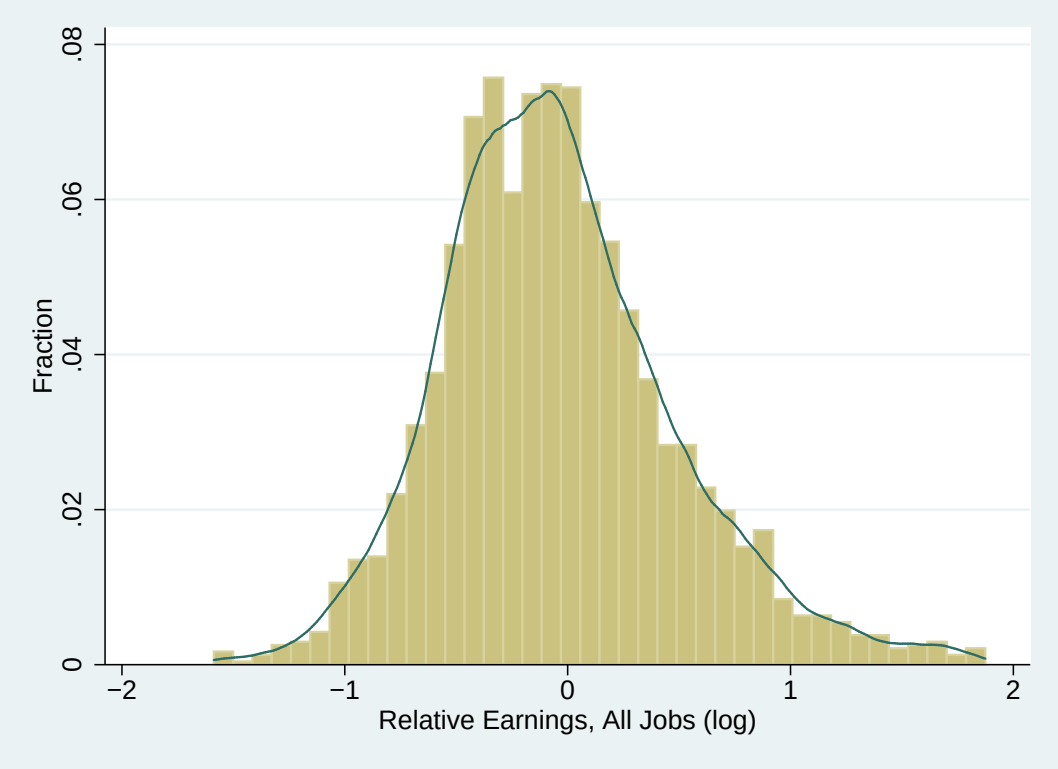

Figure AData Description, Recall and Justification Biasappendix.A.1: Density of Log Relative Earnings: All Jobs

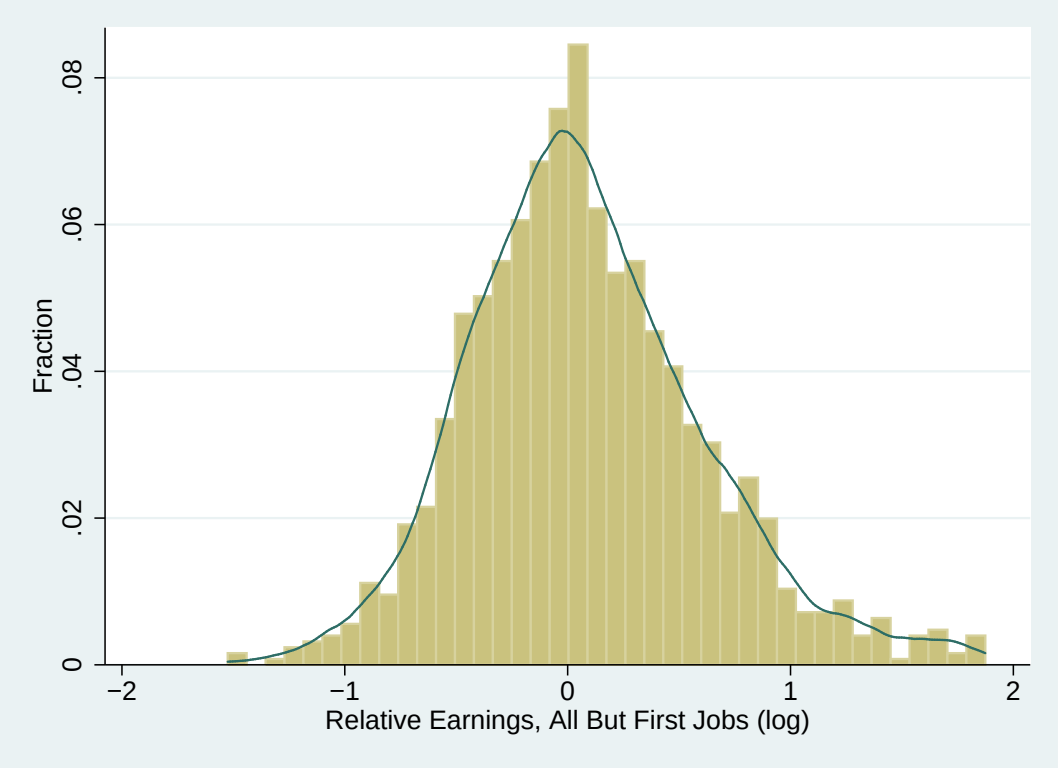

Figure AData Description, Recall and Justification Biasappendix.A.2: Density of Log Relative Earnings: All But First Jobs

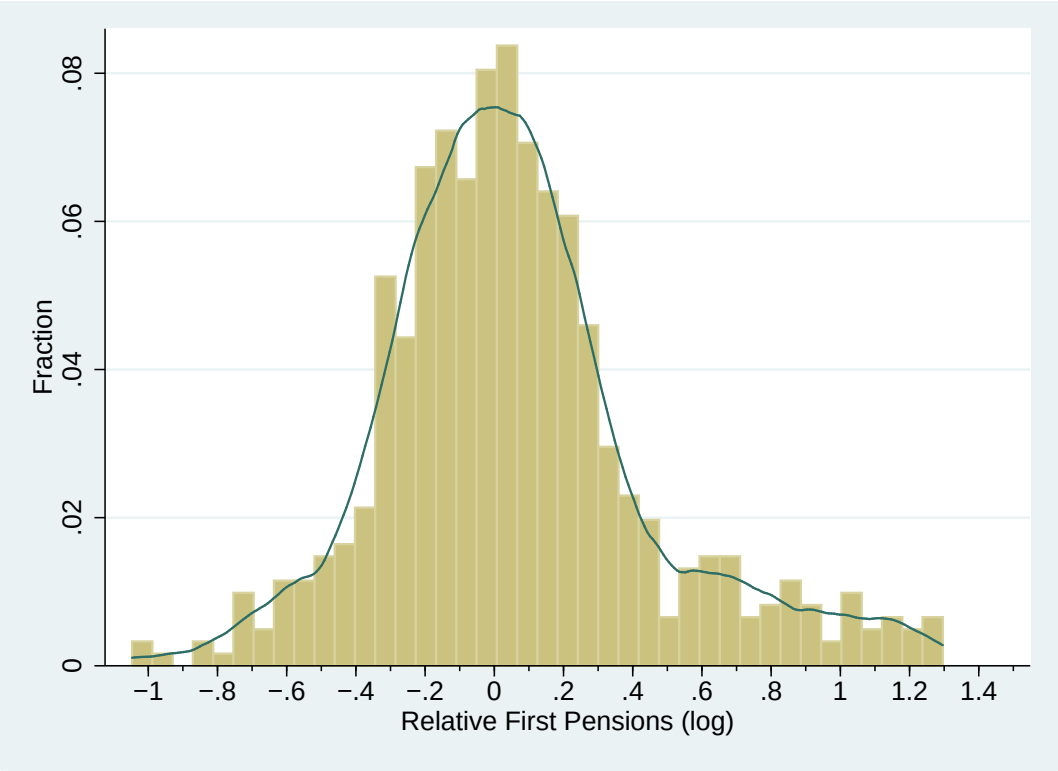

Figure AData Description, Recall and Justification Biasappendix.A.3: Density of Log Relative Initial Pensions

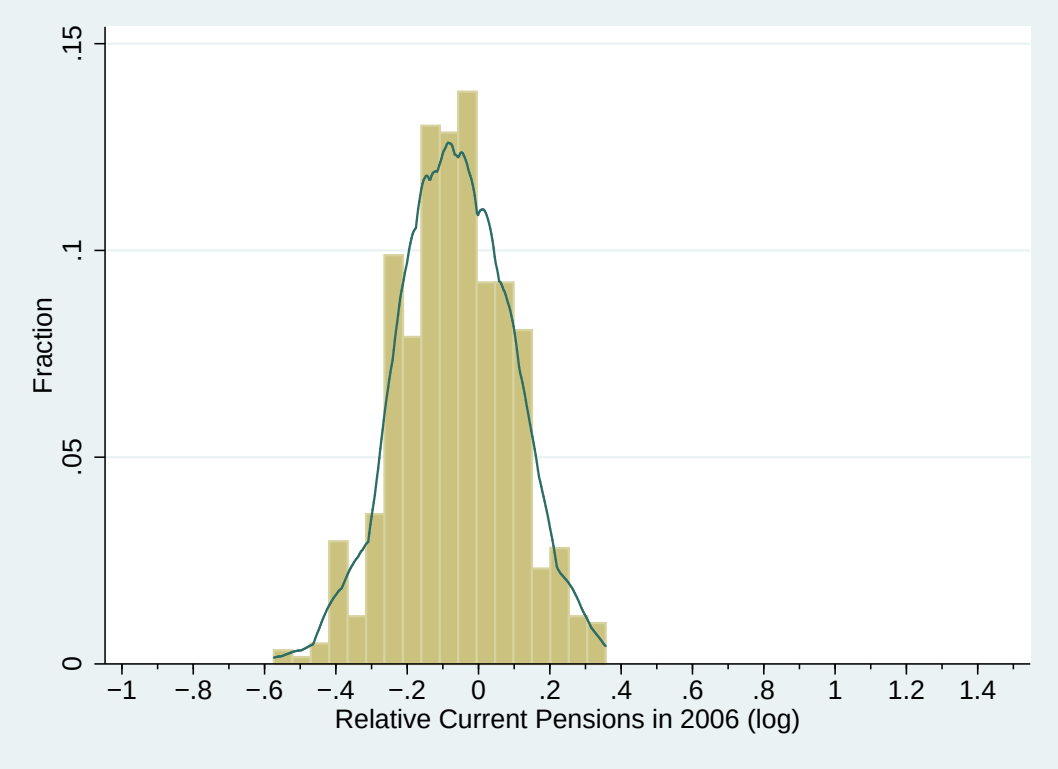

Figure AData Description, Recall and Justification Biasappendix.A.4: Density of Log Relative Current Pensions in 2006

Table AData Description, Recall and Justification Biasappendix.A.1: Job Industry and Occupation Categories

	All jobs		All but first jobs	
Category	Mean	St.dev.	Mean	St.dev.
Job industry				
Agriculture	0.056	(0.229)	0.049	(0.215)
Mining	0.022	(0.148)	0.027	(0.163)
Manufacturing	0.307	(0.462)	0.291	(0.455)
Utilities	0.040	(0.197)	0.043	(0.203)
Construction	0.078	(0.269)	0.070	(0.256)
Trade	0.094	(0.292)	0.086	(0.280)
Transport	0.061	(0.240)	0.056	(0.231)
Administration	0.082	(0.274)	0.108	(0.311)
Education	0.058	(0.234)	0.057	(0.232)
Health services	0.053	(0.224)	0.043	(0.204)
Occupation				
Official/Manager	0.020	(0.138)	0.033	(0.179)
Professional	0.128	(0.334)	0.143	(0.350)
Technician	0.202	(0.402)	0.207	(0.405)
Clerk	0.176	(0.381)	0.200	(0.400)
Sales worker	0.096	(0.294)	0.082	(0.274)
Agriculture	0.025	(0.155)	0.020	(0.139)
Crafts worker	0.190	(0.392)	0.127	(0.333)
Operative	0.078	(0.269)	0.090	(0.286)
Elementary	0.071	(0.257)	0.080	(0.271)
Army	0.014	(0.119)	0.019	(0.137)

Source: Authors' calculations using SHARELIFE data. N=2,319 (all jobs), N=1,220 (all but first jobs). Weighted by individual sample weights.

Table AData Description, Recall and Justification Biasappendix.A.2: Probit Marginal Effects: Recall of Earnings

	(1)	(2)	(3)	(4)	(5)	(6)
Job after persecution loss	0.085	0.079	0.092	0.086		
	(0.104)	(0.103)	(0.104)	(0.104)		
Job after discrimination	0.057	0.068	0.072	0.082		
	(0.088)	(0.081)	(0.086)	(0.079)		
Job after laid-off	0.087	0.084	0.087	0.084		
	(0.084)	(0.084)	(0.084)	(0.085)		
Job after displaced	-0.066	-0.080	-0.066	-0.079		
	(0.062)	(0.058)	(0.063)	(0.059)		
Job after dispossession			-0.034	-0.033		
			(0.035)	(0.034)		
Persecuted ever					-0.012	-0.024
					(0.039)	(0.038)
Full time job	0.019	0.018	0.015	0.014	0.017	0.014
	(0.062)	(0.061)	(0.061)	(0.061)	(0.062)	(0.061)
Experience	0.010	0.015	0.010	0.014	0.010	0.015
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Job tenure 5+ years	0.000	0.003	0.000	0.003	-0.001	0.002
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Out of LM 3 years	0.033	0.029	0.032	0.027	0.033	0.028
	(0.034)	(0.033)	(0.034)	(0.033)	(0.034)	(0.033)
Year job	0.086***	0.083***	0.086***	0.084***	0.086***	0.084***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Education 10-13 years	0.044	0.033	0.042	0.031	0.045	0.034
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
Education >13 years	0.116**	0.079	0.112**	0.077	0.120**	0.084
	(0.049)	(0.051)	(0.049)	(0.051)	(0.049)	(0.051)
Born in country	-0.008	-0.009	-0.006	-0.008	-0.012	-0.014
	(0.047)	(0.047)	(0.047)	(0.047)	(0.046)	(0.047)
Female	0.028	0.019	0.028	0.019	0.026	0.016
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Age	-0.002	-0.007	-0.001	-0.006	0.000	-0.004
	(0.023)	(0.022)	(0.023)	(0.022)	(0.023)	(0.023)
Married	0.038	0.030	0.037	0.029	0.034	0.024
	(0.038)	(0.037)	(0.037)	(0.036)	(0.037)	(0.036)
Children	-0.059	-0.050	-0.057	-0.048	-0.057	-0.047
	(0.039)	(0.037)	(0.038)	(0.037)	(0.039)	(0.037)
Childhood controls	No	Yes	No	Yes	No	Yes
χ^2	96.160	119.078	96.552	121.253	92.707	113.492
Pseudo-R2	0.077	0.095	0.079	0.096	0.076	0.093

Source: Authors' calculations using SHARELIFE data. N=1,527. Probit marginal effects. Robust clustered standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Dependent variable: reported initial earnings on a particular job (0/1). Childhood controls: head of household birthplace owner, birthplace village, birthplace big city; At respondent age 10 household: no books, low room to person ratio, no facilities, both parents, head of household white-collar occupation. Additional controls: job industry, occupation. Squared effects of year of job, experience, and age negligible.

Table AData Description, Recall and Justification Biasappendix.A.3: Probit Marginal Effects: Recall of First Pension

	Ever		Ever Job	Ever Job Loss		
	Persecuted	Dispossessed	Discr.	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.002	-0.005	0.015	-0.119	0.185**	0.055
	(0.043)	(0.040)	(0.065)	(0.107)	(0.093)	(0.057)
Year of birth	-0.003	-0.003	-0.003	-0.003	-0.003	-0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Year first pension	0.067*	0.067*	0.068*	0.066*	0.069**	0.069*
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Experience	0.061***	0.061***	0.061***	0.060***	0.059**	0.060***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Female	0.108***	0.108***	0.109***	0.107***	0.110***	0.107***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.037)
Children ever	0.038	0.038	0.038	0.037	0.046	0.037
	(0.073)	(0.073)	(0.073)	(0.073)	(0.074)	(0.073)
Education 10-13 years	0.003	0.003	0.003	0.005	0.005	0.002
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Education >13 years	0.104*	0.104*	0.103*	0.115**	0.102*	0.101*
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)
Born in country	-0.112	-0.111	-0.110	-0.115*	-0.108	-0.112
	(0.068)	(0.068)	(0.068)	(0.067)	(0.068)	(0.068)
Birthplace: owner	0.059*	0.060*	0.059*	0.061**	0.060*	0.061**
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
Birthplace: village	0.018	0.018	0.018	0.018	0.018	0.018
	(0.033)	(0.033)	(0.033)	(0.033)	(0.032)	(0.033)
Birthplace: big city	0.060	0.060	0.060	0.060	0.062	0.061
	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
Age 10: no books	-0.007	-0.007	-0.006	-0.006	-0.005	-0.006
	(0.032)	(0.032)	(0.032)	(0.031)	(0.032)	(0.032)
Age 10: low room	0.020	0.020	0.020	0.019	0.022	0.019
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Age 10: no facilities	-0.015	-0.015	-0.016	-0.017	-0.015	-0.017
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Age 10: parents	0.006	0.006	0.006	0.006	0.007	0.009
	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
Age 10: white collar	-0.044	-0.044	-0.044	-0.045	-0.048	-0.044
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)
χ^2	89.700	89.933	89.467	97.737	91.863	91.649
Pseudo-R^2	0.109	0.109	0.109	0.110	0.112	0.110

Source: Authors' calculations using SHARELIFE data. N=983. Probit marginal effects. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Dependent variable: reported initial pension (0/1). Additional controls: ever in job industry, ever in occupation. Squared effects of year of birth, year of first pension, and experience negligible.

Table AData Description, Recall and Justification Biasappendix.A.4: Probit Marginal Effects: Recall of Current Pension

	Ever		Ever Job	Ever Job Loss		
	Persecuted	Dispossessed	Discr.	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.007	0.042	0.028	-0.066	0.140**	0.034
	(0.035)	(0.036)	(0.054)	(0.067)	(0.071)	(0.042)
Year of birth	-0.018***	-0.017***	-0.018***	-0.018***	-0.018***	-0.018***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year first pension	0.011	0.011	0.011	0.011	0.014	0.012
	(0.027)	(0.025)	(0.026)	(0.026)	(0.027)	(0.027)
Experience	-0.017	-0.015	-0.017	-0.017	-0.015	-0.017
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Female	0.172***	0.176***	0.173***	0.172***	0.173***	0.172***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Children ever	-0.075	-0.080	-0.075	-0.076	-0.073	-0.075
	(0.082)	(0.083)	(0.082)	(0.083)	(0.083)	(0.083)
Education 10-13 years	0.035	0.034	0.035	0.036	0.036	0.035
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Education >13 years	0.078	0.076	0.076	0.084*	0.079*	0.077
	(0.048)	(0.048)	(0.048)	(0.048)	(0.047)	(0.048)
Born in country	-0.068	-0.072	-0.067	-0.068	-0.066	-0.068
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)
Birthplace: owner	0.018	0.010	0.018	0.020	0.019	0.020
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Birthplace: village	0.004	0.007	0.004	0.004	0.004	0.003
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Birthplace: big city	0.042	0.044	0.043	0.043	0.045	0.043
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Age 10: no books	-0.012	-0.012	-0.012	-0.013	-0.010	-0.012
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Age 10: low room	0.035	0.038	0.035	0.035	0.036	0.035
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Age 10: no facilities	0.007	0.006	0.007	0.006	0.006	0.006
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Age 10: parents	-0.050	-0.045	-0.050	-0.050	-0.044	-0.047
	(0.037)	(0.037)	(0.037)	(0.036)	(0.036)	(0.037)
Age 10: white collar	-0.021	-0.017	-0.021	-0.021	-0.026	-0.020
	(0.031)	(0.032)	(0.031)	(0.031)	(0.031)	(0.031)
χ^2	139.217	138.904	139.345	136.836	138.241	136.205
Pseudo-R^2	0.213	0.217	0.213	0.213	0.218	0.213

Source: Authors' calculations using SHARELIFE data. N=983. Probit marginal effects. Robust standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Current pension in 2006 SHARE interview. Dependent variable: reported pension in 2006 (0/1). Additional controls: ever in job industry, ever in occupation. Squared effects of year of birth, year of first pension, and experience negligible.

Table AData Description, Recall and Justification Biasappendix.A.5: Placebo OLS Regression: Earnings on First Job

	(1)	(2)	(3)	(4)	(5)	(6)
Job loss persecution ever	0.058	0.019	0.062	0.024		
	(0.226)	(0.230)	(0.225)	(0.230)		
Job discrimination ever	0.021	0.047	0.024	0.051		
	(0.064)	(0.063)	(0.065)	(0.063)		
Job laid-off ever	0.088	0.083	0.089	0.084		
	(0.081)	(0.076)	(0.081)	(0.076)		
Job displaced ever	-0.076	-0.040	-0.076	-0.040		
	(0.055)	(0.053)	(0.055)	(0.053)		
Dispossessed ever			-0.023	-0.032		
			(0.048)	(0.048)		
Persecuted ever					-0.035	-0.021
					(0.066)	(0.065)
Age	0.190***	0.195***	0.190***	0.195***	0.190***	0.195***
	(0.065)	(0.065)	(0.065)	(0.064)	(0.065)	(0.064)
Age Sq.	-0.004**	-0.004**	-0.004**	-0.004**	-0.004**	-0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Female	-0.226***	-0.214***	-0.225***	-0.212***	-0.236***	-0.221***
	(0.040)	(0.040)	(0.040)	(0.040)	(0.042)	(0.041)
Married	-0.107	-0.138*	-0.104	-0.135	-0.099	-0.130
	(0.082)	(0.083)	(0.082)	(0.083)	(0.082)	(0.083)
Children	0.049	0.066	0.048	0.065	0.045	0.056
	(0.107)	(0.105)	(0.107)	(0.105)	(0.107)	(0.106)
Education 10-13 years	-0.090*	-0.091*	-0.089*	-0.089*	-0.080	-0.083
	(0.054)	(0.052)	(0.054)	(0.052)	(0.053)	(0.052)
Education >13 years	-0.128*	-0.120*	-0.127*	-0.118*	-0.120*	-0.111*
	(0.070)	(0.069)	(0.070)	(0.069)	(0.069)	(0.067)
Year job	-0.063	-0.065	-0.064	-0.066	-0.069	-0.068
	(0.043)	(0.042)	(0.043)	(0.042)	(0.044)	(0.043)
Full time job	0.267***	0.257***	0.272***	0.264***	0.287***	0.269***
	(0.083)	(0.079)	(0.084)	(0.080)	(0.090)	(0.082)
Born in country	0.039	0.032	0.039	0.031	0.023	0.020
	(0.071)	(0.069)	(0.071)	(0.070)	(0.064)	(0.062)
Childhood controls	No	Yes	No	Yes	No	Yes
R^2	0.234	0.258	0.234	0.259	0.229	0.255

Source: Authors' calculations using SHARELIFE data. N=1,096. OLS regressions. Robust clustered standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Dependent variable: ratio of starting earnings on the first job to average earnings in a particular year (in logs). Childhood controls: head of household birthplace owner, birthplace village, birthplace big city; At respondent age 10 household: no books, low room to person ratio, no facilities, both parents, head of household white-collar occupation. Additional controls: job industry, occupation. Squared effects of year of job negligible.

B Robustness Tests

Evaluating the causal effect of persecution is subject to the well know problem of treatment exclusivity and lack of a clean experimental counterfactual. As a result there are several reasons why OLS estimates of the effect of persecution on earnings and pensions could not be given a causal interpretation. On the one hand, these relate to potential differences in observable characteristics of the treated (persecuted) and non-treated individuals. On the other hand, there are two main reasons for endogeneity of treatment in the analyzed cases. First of all it is likely that some specific individual characteristics, which are unobserved in the data, made some more likely to oppose the system and thus be more prone to the persecution treatment. Secondly, since we rely on retrospective data, even the careful questionnaire design which we described in Section 3Documenting Persecution in SHARE Datasection.3 may be insufficient to prevent response endogeneity. This would be the case if individuals in the latter part of the SHARELIFE interview, because of some unobservable characteristics, associated their labor market difficulties and failures to persecution without there being any in reality.

To address the importance of unobservable characteristics, we follow Altonji et al. (2005) and assume that selection on unobservable covariates is the same as selection on observables, which allows us to find bounds on the estimates of the effects of persecution on the outcomes of interest. Using this method we calculate the degree of selection on unobservables required to attribute the entire OLS effect to selection bias. Next, following Oster (2013) we compute the direct bias as if we were able to control for unobservables and calculate a "bounding argument" reflecting how important the unobservables would need to be relative to the observables to eliminate the estimated effect. Assuming equal proportionality (with the bounding argument $\delta = 1$) and postulating that observed and unobserved heterogeneity is of equal importance, it calculates the value of maximum R^2 (R^2max) potentially achieved if we could observe all non-random characteristics.[44] The second assumes a given R^2max and calculates the bounding argument δ that would produce a treatment effect of zero. Finally, alternative analysis is carried out using matching estimators (Blundell and Costa Dias (2009), Imbens and Wooldridge (2009), Heckman et al. (1997), Heckman et al. (1998), and Dehejia and Wahba (1999)). The approach adjusts the treatment and control groups for differences in observed pre-treatment characteristics and, assuming unconfoundedness, provides the most direct evaluation of the average treatment effect for the treated (persecuted) individuals, measured as a difference in the outcomes of two sample means. Following Abadie and Imbens (2006), we adopt the nearest neighbors method matching without replacement.

These three methods are used to test the analyzed sensitivity of our baseline results in the OLS regressions. In each case we examine the role of one of the six treatments: being ever persecuted, dispossessed, discriminated on a job due to persecution, losing a job due to persecution, being laid-off and displaced. The control variables are the determinants of persecution from Table 5Probit Marginal Effects: Determinants of Persecution table.5.

B.1 Selection Bias in Earnings

We illustrate the role of unobservables on the case of earnings. For each treatment we first estimate the following equation,

$$ln(rEarn_{it}) = \alpha T_{it} + \gamma' X_i + \epsilon_{it}, \qquad \text{(BRobustness Testsappendix.B.6)}$$

where $rEarn_{it}$ are the relative earnings of individual i at time t, T_{it} is the treatment dummy, and X_i are individual level characteristics prior to labor market entry as in the analysis of treatment determinants in Table 5Probit Marginal Effects: Determinants of Persecution table.5.

Since all methods on selection controls in the treatment literature allow for a single treatment only, first in the top panel of Table BRobustness Testsappendix.B.1Earnings: Tests of Robustnesstable.1 we show the version of OLS results in six specifications with six separate treatment variables and with the determinants of persecution from Table 5Probit Marginal Effects: Determinants of Persecution table.5 as other control variables. In these single treatment estimations, persecution-related job loss carries the highest earnings penalty of 26.3 percentage points, while being ever fired for any other reason than persecution is not reflected in any earnings loss. Being ever dispossessed is associated

[44] Oster (2013) suggests computing it as the sum of R^2 from a regression on treatment alone and a regression on treatment and observables.

with an average loss of 14.2 percentage points. These OLS results are compared with three selection tests in the lower three panels. The average treatment effect identified in the matching estimator is 15.9 p.p. for dispossession and 25.9 p.p. for job loss due to persecution. All three of these effects are similar in magnitude to the OLS estimates. The mean bias after matching is greatly reduced but still about 15 percent for job loss due to persecution.

In order to examine the potential role of unobserved heterogeneity, we follow Altonji et al. (2005) and compute the degree of selection on unobservables necessary to attribute the entire identified effect to selection bias. Altonji et al. (2005) propose the following condition to examine the role of unobservables in the analysis of treatment effects (in the equations below we drop the subscripts for clarity):

$$\frac{E(\epsilon|T=1)-E(\epsilon|T=0)}{Var(\epsilon)}=\frac{E(X'\gamma|T=1)-E(X'\gamma|T=0)}{Var(X'\gamma)}, \quad \text{(BRobustness Testsappendix.B.7)}$$

where $X'\gamma$ and ϵ are the explanatory variables in the earnings equation and its error term, respectively, as in equation (BRobustness Testsappendix.B.6Selection Bias in Earningsequation.B.6). This condition imposes equality of the means of the distributions of observable and unobservable characteristics (adjusted for their respective variances) which determine treatment. Estimation of the right-hand side of this condition allows us to estimate the magnitude of $E(\epsilon|T=1)-E(\epsilon|T=0)$, and therefore the selection bias.[45] Under the null hypothesis of no treatment effect, we can consistently estimate γ, and thus $[E(X'\gamma|T)$, from a separate model imposing $\alpha=0$.

Let the binary treatment variable, T, be the following function of X:

$$T=1(X'\beta+u>0). \quad \text{(BRobustness Testsappendix.B.8)}$$

Then if we let $X'\hat{\beta}$ and $\tilde{T}$ be the predicted value and residuals from estimating equation of a regression of T on X, so that $T=X'\hat{\beta}+\tilde{T}$, we have

$$\log(y)=\alpha\tilde{T}+X'[\gamma+\alpha\hat{\beta}]+\epsilon. \quad \text{(BRobustness Testsappendix.B.9)}$$

As Altonji et al. (2005) demonstrate, this implies that

$$\operatorname{plim}\hat{\alpha}\simeq\alpha+\frac{Var(T)}{Var(\tilde{T})}[E(\epsilon|T=1)-E(\epsilon|T=0)]. \quad \text{(BRobustness Testsappendix.B.10)}$$

Thus to determine the degree of bias resulting from unobservable characteristics we can use the condition from equation (BRobustness Testsappendix.B.7Selection Bias in Earningsequation.B.7) and replace $[E(\epsilon|T=1)-E(\epsilon|T=0)]$ in equation (BRobustness Testsappendix.B.10Selection Bias in Earningsequation.B.10) with $E(X'\gamma|T=1)-E(X'\gamma|T=0)$.

In the middle panel of Table BRobustness Testsappendix.B.1Earnings: Tests of Robustnesstable.1 we present the specific elements of this approach for each of the treatments we analyze. For the statistically significant effect of job loss due to persecution (column (4)), the estimate of $[E(X'\gamma|T=1)-E(X'\gamma|T=0)]/Var(X'\gamma)$ is 3.612. This value implies that the mean/variance of independent variables that determine earnings is 3.612 higher for those who were ever treated than for those who were not. Since the variance of ϵ is equal to 0.233, the implied estimate of $E(\epsilon|T=1)-E(\epsilon|T=0)$ is 0.841, provided the above condition holds. Multiplying this by $Var(T)/Var(\tilde{T})$ yields a bias of –0.189. Given the unconstrained OLS benchmark estimates of α and the estimated values of the bias under the condition from equation (BRobustness Testsappendix.B.7Selection Bias in Earningsequation.B.7), we can calculate the ratio of the OLS coefficients to the bias, which is given in the last row of this panel ($\hat{\alpha}$/Bias Ratio). For the case of persecution-related job loss the value of this ratio is 1.386. This means that the normalized shift in the distribution of the unobservables would have to be 1.4 times as large as the shift in the observables to explain away the entire effects of persecution estimated by OLS. This seems to be very unlikely.

We find a small role of a potential bias on unobservables in dispossession (column (2)). The implied ratio is still high but below one, so that selection on unobservables would need to be only 0.86 times as strong as selection on observables to explain away the entire effect in the OLS regression. Given the assumptions made, the implied shift in $E(\epsilon|T=1)-E(\epsilon|T=0)$ is 0.125, a small and

[45] As noted by Altonji et al. (2005), when $Var(\epsilon)$ is very large relative to $Var(X'\gamma)$, even a small shift in $E(\epsilon|T=1)-E(\epsilon|T=0)/Var(\epsilon)$ is consistent with a large bias in α, with minimal inference possible.

positive selection on unobservables that influence these outcomes without taking account of dispossession. Thus although the variance ratio $Var(\epsilon)/Var(X'\gamma)$ is relatively large, we cannot rule out that a part of the dispossession effect is due to selection bias. This result may reflect the fact that this form of persecution was most likely to be determined by unobserved childhood circumstances and characteristics of parents and relatives of the respondents rather than by their observable personal characteristics and their choices made in adult lives. While we control for childhood information, we clearly miss a substantial part of relevant characteristics which may have determined dispossession (especially parental education and wealth). The estimated ratio of the OLS coefficient to the implied bias is smallest in the case of being fired for other reason than persecution (column (5) of Table BRobustness Testsappendix.B.1Earnings: Tests of Robustnesstable.1). Thus the only substantial bias due to unobserved heterogeneity seems to be for the experience of losing a job for reasons other than persecution.

Next, we examine the effect of treatment using the Oster (2013) test for omitted variables. In this approach we first make the assumption of equal proportionality, implying equal importance of observed and unobserved heterogeneity. Under this scenario the so-called bounding argument δ is assumed to be one. Following Oster (2013) and making the further assumption that the maximum R^2max be equal to the sum of the R^2 from a regression on treatment alone and the R^2 from a regression on treatment and observables, we find that coefficients on all treatments are greater in magnitude compared to the OLS estimates. The bias-adjusted effect of a persecution-related job loss increases to as much as 40.7 percentage points. Second, we also calculate bounding values for δ, i.e. the degree of proportionality which would be necessary to produce a treatment effect of zero. Except for displaced workers, all treatments lead to a negative bounding value of δ, indicating that unobservables in the case of the analyzed treatments are less important than observables.

Finally, we turn to the alternative estimate of earnings losses using the matching estimator. The top panel of Table BRobustness Testsappendix.B.1Earnings: Tests of Robustnesstable.1 shows the benchmark OLS estimates based on determinants of persecution with the same independent variables as in Table 5Probit Marginal Effects: Determinants of Persecution table.5. As the determinants do not control for previous job history, effects of being ever persecuted and dispossessed are larger and effects of job-related treatments are smaller than in Table 6OLS Regressions: Earnings table.6. Naturally, without controlling for industry and occupation, tertiary education increases earnings by 21-24 percentage points. Matching estimators in the following panel produce very similar results in the average treatment effect on the treated individuals, with mean bias significantly reduced for most treatments. The only outcomes that differ from the OLS single treatment estimates (top of the panel) are laid-off and displaced workers.

B.2 Selection Bias in Pensions

In Tables BRobustness Testsappendix.B.2Initial Pensions: Tests of Robustnesstable.2 and BRobustness Testsappendix.B.3Current Pensions: Tests of Robustnesstable.3 we report results from the analysis of selection bias for the values of initial and 2006 retirement pensions, respectively. As in Table BRobustness Testsappendix.B.1Earnings: Tests of Robustnesstable.1 in top panels we show the OLS coefficients for specifications with a single treatment. Similarly, the lower panels show the average treatment effects from the matching estimator, and the results along the lines of Altonji et al. (2005) and Oster (2013).

As far as the effects on initial pensions are concerned (Table BRobustness Testsappendix.B.2Initial Pensions: Tests of Robustnesstable.2), the OLS regressions suggest that only job loss due to persecution and to layoff carried sizeable (46.1 and 24.7 percentage points, respectively) and statistically significant penalties on initial pensions. However, once we correct for differences in observable characteristics using the matching estimators, we find negative and statistically significant effects also from general persecution (9.5 p.p.), on-the-job discrimination (11.7 p.p.), and displacement (8.7 p.p.).

Examining the role of selection on unobservables following the Altonji et al. (2005) method, it is clear that the most reliable of the OLS and matching estimates is the effect of persecution-related job loss. In this case the normalized shift in the distribution of the unobservables would have to be 1.613 times as large as the shift in the observables to explain away the effects of persecution-related job loss estimated by OLS. The treatment effects on initial pensions under the Oster test of proportional selection are similar to the OLS estimates (38.6 percentage points), and similar to the OLS the estimates of other types of treatment turn statistically insignificant except for displaced workers.

The OLS estimates of treatment effects on current 2006 pensions in Table BRobustness Testsappendix.B.3Current

Pensions: Tests of Robustnesstable.3 mirror the findings from Table 8OLS Regressions: Pensions table.8 in that the negative long term consequences of persecution under the communist regime disappear seventeen years after its collapse. We find a small statistical significance of displacement on the level of pensions in 2006 when we match individuals on observable characteristics. Treatments' effects are negative for displacement and persecution job-loss but with a negative sign of delta.

As one could expect the Oster test and the Altonji et al. (2005) method show a less important role of unobservable characteristics in the identification of the effect of treatment on pensions. For both initial and current pensions, the size of the normalized shift in the distribution of the unobservables relative to the shift in observables which would be required to explain away the OLS effects in the case of job loss due to persecution is greater than one (1.613 for initial pensions and 1.614 for 2006 pensions). With some treatments the normalized shift in the distribution of the unobservables would have to be smaller than the shift in the observables to explain away the effect of treatment on either measure of pensions, although the coefficients in such cases are anyhow statistically insignificant.

Table BRobustness Testsappendix.B.1: Earnings: Tests of Robustness

	Ever		Ever Job	Ever Job Loss		
	Persecuted	Dispossessed	Discr.	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)
Single Treatment Estimates, OLS						
Treatment	-0.087	-0.142***	-0.095	-0.263**	0.015	0.049
	(0.055)	(0.054)	(0.093)	(0.104)	(0.085)	(0.071)
Year of birth	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Female	-0.380***	-0.377***	-0.384***	-0.381***	-0.381***	-0.385***
	(0.051)	(0.050)	(0.051)	(0.051)	(0.051)	(0.050)
Born in country	0.012	0.018	0.011	0.006	0.034	0.028
	(0.061)	(0.064)	(0.066)	(0.062)	(0.061)	(0.061)
Children ever	0.177**	0.190**	0.169**	0.109	0.183**	0.188**
	(0.074)	(0.074)	(0.075)	(0.093)	(0.072)	(0.075)
Education 10-13 years	0.097	0.090	0.102*	0.101*	0.099*	0.106*
	(0.060)	(0.057)	(0.059)	(0.059)	(0.059)	(0.062)
Education >13 years	0.223***	0.208***	0.229***	0.244***	0.216***	0.218***
	(0.072)	(0.069)	(0.073)	(0.073)	(0.072)	(0.073)
R^2	0.220	0.225	0.219	0.225	0.217	0.218
Matching Estimator: Average Treatment Effect for the Treated, OLS						
ATT	-0.058	-0.159***	-0.031	-0.259***	0.085	-0.070*
	(0.046)	(0.042)	(0.061)	(0.084)	(0.077)	(0.037)
Mean Bias Before	19.101	13.134	36.081	48.995	18.636	11.773
Mean Bias After	5.136	3.249	7.569	15.689	5.493	4.713
Selection on unobservables (Altonji et al. (2005)), OLS						
$[\hat{E}(X'\hat{\gamma}\|T{=}1){-}\hat{E}(X'\hat{\gamma}\|T{=}0)]/\widehat{Var}(X'\hat{\gamma})$	1.356	0.380	2.978	3.612	-1.349	-1.021
$\widehat{Var}(X'\hat{\gamma})$	0.060	0.060	0.060	0.060	0.060	0.060
$\widehat{Var}(\hat{\epsilon})$	0.233	0.233	0.233	0.233	0.233	0.233
$E(\epsilon\|T=1) - E(\epsilon\|T=0)$	0.316	0.088	0.693	0.841	-0.314	-0.238
$Cov(\epsilon, \tilde{T})/Var(\tilde{T})$	-0.040	-0.166	-0.017	-0.189	0.085	-0.073
$\hat{\alpha}$/Bias Ratio	2.187	0.857	5.545	1.386	0.179	-0.662
Oster Test of Proportional Selection, OLS						
Beta	-0.148***	-0.171***	-0.193***	-0.407***	0.051	-0.039
	(0.051)	(0.047)	(0.070)	(0.097)	(0.078)	(0.042)
Delta	-0.380	-5.950	-0.053	-0.376	-3.635	2.135
R^2max	0.384	0.396	0.378	0.390	0.385	0.384

Source: Authors' calculations using SHARELIFE data. N=1,220. Clustered standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Dependent variable: ratio of starting earnings to average earnings on a particular year (in logs). Childhood controls: head of household birthplace owner, birthplace village, birthplace big city; At respondent age 10 household: no books, low room to person ratio, no facilities, both parents, head of household white collar.

Table BRobustness Testsappendix.B.2: Initial Pensions: Tests of Robustness

	Ever		Ever Job	Ever Job Loss		
	Persecuted	Dispossessed	Discr.	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)
Single Treatment Estimates, OLS						
Treatment	-0.050	0.000	-0.083	-0.461**	-0.247**	-0.064
	(0.051)	(0.044)	(0.084)	(0.206)	(0.105)	(0.049)
Year of birth	-0.003	-0.002	-0.003	-0.003	-0.003	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Female	-0.132***	-0.127***	-0.134***	-0.147***	-0.135***	-0.126***
	(0.035)	(0.036)	(0.035)	(0.033)	(0.034)	(0.036)
Born in country	0.242***	0.252**	0.241**	0.234***	0.234***	0.255**
	(0.090)	(0.100)	(0.093)	(0.082)	(0.090)	(0.099)
Children ever	0.187	0.185	0.182	0.145*	0.175	0.175
	(0.130)	(0.132)	(0.124)	(0.087)	(0.111)	(0.135)
Education 10-13 years	0.001	0.003	0.002	0.001	0.002	0.002
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)
Education $>$ 13 years	0.036	0.036	0.039	0.050	0.027	0.036
	(0.056)	(0.056)	(0.055)	(0.054)	(0.056)	(0.055)
R^2	0.101	0.099	0.102	0.125	0.119	0.102
Matching Estimator: Average Treatment Effect for the Treated, OLS						
ATT	-0.095**	-0.080	-0.117**	-0.294*	-0.099	-0.087**
	(0.045)	(0.051)	(0.059)	(0.164)	(0.068)	(0.044)
Mean Bias Before	18.111	16.143	29.190	38.865	12.156	15.555
Mean Bias After	2.932	3.486	7.186	8.755	3.533	3.736
Selection on unobservables (Altonji et al. (2005)), OLS						
$[\hat{E}(X'\hat{\gamma}\|T{=}1){-}\hat{E}(X'\hat{\gamma}\|T{=}0)]/\widehat{Var}(X'\hat{\gamma})$	0.837	-0.150	1.678	6.177	-1.903	-2.443
$\widehat{Var}(X'\hat{\gamma})$	0.013	0.013	0.013	0.013	0.013	0.013
$\widehat{Var}(\hat{\epsilon})$	0.150	0.150	0.150	0.150	0.150	0.150
$E(\epsilon\|T=1) - E(\epsilon\|T=0)$	0.125	-0.022	0.251	0.925	-0.285	-0.366
$Cov(\epsilon, \tilde{T})/Var(\tilde{T})$	-0.063	-0.062	-0.087	-0.286	-0.173	-0.107
$\hat{\alpha}$/Bias Ratio	0.785	-0.001	0.948	1.613	1.434	0.598
Oster Test of Proportional Selection, OLS						
Beta	-0.107**	-0.065	-0.100	-0.386***	-0.134*	-0.065
	(0.049)	(0.049)	(0.065)	(0.141)	(0.075)	(0.051)
Delta	-0.879	-8.234	-1.720	-0.008	3.961	2.470
R^2max	0.189	0.188	0.187	0.196	0.189	0.186

Source: Authors' calculations using SHARELIFE data. N=614. Robust and bootstrapped standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Dependent variable: ratio of initial retirement pension to average initial retirement pension in a particular year (in logs). Childhood controls: head of household birthplace owner, birthplace village, birthplace big city; At respondent age 10 household: no books, low room to person ratio, no facilities, both parents, head of household white collar.

Table BRobustness Testsappendix.B.3: Current Pensions: Tests of Robustness

	Ever		Ever Job	Ever Job Loss		
	Persecuted	Dispossessed	Discr.	Persecution	Laid-Off	Displaced
	(1)	(2)	(3)	(4)	(5)	(6)
Single Treatment Estimates, OLS						
Treatment	-0.001	-0.007	-0.004	-0.009	-0.016	-0.029
	(0.028)	(0.024)	(0.027)	(0.039)	(0.032)	(0.025)
Year of birth	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.142***	-0.142***	-0.142***	-0.142***	-0.142***	-0.142***
	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Born in country	0.038	0.037	0.038	0.038	0.037	0.039
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Children ever	0.019	0.018	0.019	0.018	0.018	0.014
	(0.035)	(0.035)	(0.035)	(0.036)	(0.036)	(0.036)
Education 10-13 years	0.002	0.002	0.002	0.002	0.002	0.002
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Education >13 years	0.063**	0.063**	0.063**	0.063**	0.062**	0.063**
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
R^2	0.302	0.302	0.302	0.302	0.302	0.304
Matching Estimator: Average Treatment Effect for the Treated, OLS						
ATT	0.005	-0.008	0.013	0.015	0.019	-0.041*
	(0.022)	(0.020)	(0.031)	(0.056)	(0.034)	(0.022)
Mean Bias Before	18.111	16.143	29.190	38.865	12.156	15.555
Mean Bias After	2.932	3.486	7.186	8.755	3.533	3.736
Selection on unobservables (Altonji et al. (2005)), OLS						
$[\hat{E}(X'\hat{\gamma}\|T{=}1){-}\hat{E}(X'\hat{\gamma}\|T{=}0)]/\widehat{Var}(X'\hat{\gamma})$	2.805	-1.601	4.842	10.732	0.691	-0.212
$\widehat{Var}(X'\hat{\gamma})$	0.008	0.008	0.008	0.008	0.008	0.008
$\widehat{Var}(\hat{\epsilon})$	0.020	0.020	0.020	0.020	0.020	0.020
$E(\epsilon\|T=1) - E(\epsilon\|T=0)$	0.057	-0.032	0.098	0.216	0.014	-0.004
$Cov(\epsilon, \tilde{T})/Var(\tilde{T})$	-0.014	-0.015	0.001	-0.006	0.002	-0.057
$\hat{\alpha}$/Bias Ratio	0.084	0.448	-3.533	1.614	-9.889	0.500
Oster Test of Proportional Selection, OLS						
Beta	-0.032	-0.002	-0.030	-0.085*	-0.008	-0.066**
	(0.024)	(0.021)	(0.036)	(0.050)	(0.038)	(0.029)
Delta	-0.670	1.148	0.030	-0.023	0.227	-6.853
R^2max	0.506	0.503	0.503	0.500	0.504	0.516

Source: Authors' calculations using SHARELIFE data. N=614. Robust and bootstrapped standard errors in parentheses. *p <0.1, **p <0.05, ***p <0.01. Current pension in 2006 SHARE interview. Dependent variable: ratio of retirement pension to average retirement pension in 2006 (in logs). Childhood controls: head of household birthplace owner, birthplace village, birthplace big city; At respondent age 10 household: no books, low room to person ratio, no facilities, both parents, head of household white collar.

C Instrumental Variables Estimation

Angrist, Imbens, and Krueger (1999), Blomquist and Dahlberg (1999), and Hansen and Kozbur (2014) propose the jackknife instrumental variables estimators (JIVEs) in an attempt to eliminate the finite-sample bias of 2SLS compounded by instruments that are only weakly correlated with the endogenous regressors.

In the standard instrumental variables notation, write equations (2Earningsequation.4.2) and (5Instrumental Variables Estimation Results: Earningsequation.5.5) as

$$\begin{aligned} Y_i &= \mathbf{X}_i\beta + \epsilon_i \\ \mathbf{X}_i &= \mathbf{Z}_i\pi + \eta_i, \end{aligned}$$

where $\mathbf{X}_i$ and η_i are L dimensional vectors, and $\mathbf{Z}_i$ is a K dimensional vector. The number of overidentification restrictions is $K - L$. By assumption all elements of $\mathbf{Z}_i$ are uncorrelated with η_i. Denote the vector of Y_i as $\mathbf{Y}$ for $i = 1, \ldots, N$, where N is the sample size. In a standard matrix notation, the 2SLS instrumental variables estimator is, using the instrument $\mathbf{Z}\hat{\pi}$, where $\hat{\pi} = (\mathbf{Z}'\mathbf{Z})^{-1}\mathbf{Z}'\mathbf{X}$,

$$\hat{\beta}_{2SLS} = (\mathbf{Z}'\hat{\pi}'\mathbf{X})^{-1}\mathbf{Z}'\hat{\pi}'\mathbf{Y} = \left\{\mathbf{X}'\mathbf{Z}(\mathbf{Z}'\mathbf{Z})^{-1}\mathbf{Z}'\mathbf{X}\right\}^{-1}\mathbf{X}'\mathbf{Z}(\mathbf{Z}'\mathbf{Z})^{-1}\mathbf{Z}'\mathbf{Y}.$$

The bias of the 2SLS estimator arises from the correlation between the OLS estimate of the optimal instrument matrix $\mathbf{Z}_i\hat{\pi}$ and the residual ϵ_i. Angrist, Imbens, and Krueger (1999) suggest using all observations except observation i to estimate the parameter matrix π and then using this estimate with $\mathbf{Z}_i$ to compute the fitted value of the instrument for observation $i = 1, ..., N$. The estimate of π is

$$\hat{\pi}_{-i} = (\mathbf{Z}'_{-i}\mathbf{Z}_{-i})^{-1}\mathbf{Z}'_{-i}\mathbf{X}_{-i},$$

where $-i$ denotes all rows of matrix except the ith row. The estimate of the optimal instrument is

$$\mathbf{Z}_i\hat{\pi}_{-i} = \mathbf{Z}_i(\mathbf{Z}'_{-i}\mathbf{Z}_{-i})^{-1}\mathbf{Z}'_{-i}\mathbf{X}_{-i}.$$

Define $\hat{\mathbf{X}}$ as an $N \times L$ matrix with ith row $\mathbf{Z}_i\hat{\pi}_{-i}$. As observations are independent, $E(\hat{\pi}_{-i}\mathbf{Z}'_i\epsilon_i) = 0$,

$$\hat{\beta}_{JIVE} = (\hat{\mathbf{X}}'\mathbf{X})^{-1}\hat{\mathbf{X}}'\mathbf{Y}.$$

As $\hat{\pi}_{-i}$ is a consistent estimator of π, $\hat{\beta}_{JIVE}$ is a consistent estimator β. A heteroskedasticity-robust estimator of the covariance matrix is

$$\widehat{Var}(\hat{\beta}_{JIVE}) = (\hat{\mathbf{X}}'\mathbf{X})^{-1}\sum_i \hat{\epsilon}_i^2\hat{\mathbf{X}}_i\hat{\mathbf{X}}'_i(\mathbf{X}'\hat{\mathbf{X}})^{-1}$$

where

$$\hat{\epsilon}_i^2 = \left(Y_i - \mathbf{X}_i\hat{\beta}_{JIVE}\right)^2.$$

Angrist, Imbens, and Krueger (1999) show that the jackknife estimators are first-order equivalent to 2SLS estimators and superior to 2SLS and LIML with finite samples and weakly correlated instruments with the endogenous regressor. The probability limit of the estimators is identical to that of 2SLS even under general misspecification. The bias of jackknife estimators does not increase with the number of overidentifying restrictions.

D SHARELIFE Questionnaire

In the SHARELIFE 2008 survey, the module on General Life Experiences was placed at the end of the questionnaire.

Persecution and Dispossession

GL022 (DISCRIMINATED AGAINST) There are times, in which people are persecuted or discriminated against, for example because of their political beliefs, religion, nationality, ethnicity, sexual orientation or their background. People may also be persecuted or discriminated against because of the political beliefs or the religion of their close relatives. Have you ever been the victim of such persecution or discrimination?

If the answer is affirmative, Question GL023 identifies the main reason.

GL023 (MAIN REASON OF PERSECUTION) What was the main reason you were persecuted or discriminated against? 1. Your political beliefs; 2. Your religion; 3. Your ethnicity or nationality; 4. Your sexual orientation; 5. Your background; 6. Political beliefs or religion of your close relatives; 97. Other reasons.

GL031 DISPOSSESSED BECAUSE OF REASON FOR PERSECUTION There may be cases when individuals and their families are dispossessed of their property as a result of war or persecution. Were you or your family ever dispossessed of any property as a result of war or persecution?

Questions GL032 and GL033 determine the type of property and the year of dispossession.

On-the-job persecution

GL024 (FORCED TO STOP WORKING) Did persecution or discrimination because of [main reason of persecution] ever force you to stop working in a job?

GL026 (EXPERIENCES IN JOB) As a consequence of persecution or discrimination because of [main reason of persecution], did you ever experience any of the following during your working life? 1. Denied promotions; 2. Assignment to a task with fewer responsibilities; 3. Working on tasks below your qualifications; 4. Harassment by your boss or colleagues; 5. Pay cuts; 96. None of these.

Questions GL025 and GL027 identify the jobs the particular jobs.

Job characteristics and starting salary

Questions RE004-026 provide further details on jobs (that lasted at least 6 months), namely starting and ending years, title, industry, full time characteristics, and currency.

RE021 (FIRST MONTHLY WAGE IN JOB) Can you tell me, approximately, how much you were paid monthly after taxes when you started doing this job as [occupation]? If you worked part-time, please tell me the actual amount that you were paid, not the full-time equivalent.

Pensions

Questions RE031-37 determine the currency, the year and the way of retirement.

RE036 PENSION BENEFIT WHEN RETIRED Approximately, how much was your first total monthly benefit after taxes from social security or pensions? [Interviewer instruction:Enter sum of all pensions (public, occupational or private)].

EP078 TYPICAL PAYMENT OF PENSION IN LAST YEAR (2006 SHARE survey) After taxes, about how large was a typical payment of your public old age pension in [previous year]?

the period of income payment, the length of receiving the benefits in the previous year, excluding any extras, such as bonuses, 13th month payments, and currency.

Distinct Period of Financial Hardship

GL011 PERIOD OF FINANCIAL HARDSHIP Looking back on your life, was there a distinct period of financial hardship?

Questions GL012 and GL013 determine the years when this period started and ended.

E Legislation 1948-2006

In the following text, 'Decree' represents a Decree of the Government of the former Czechoslovak Socialist Republic (1948-1989), Czechoslovakia (1990-1992), and the Czech Republic (after 1993), and 'Act' represents an Act of the Federal Assembly (1948-1992) or of the Parliament of the Czech Republic (after 1993). The number refers to the particular Decree or Act and the year it was enacted.[46]

E.1 Pension System

Social policy in Czechoslovakia (1948-1989) was characterized by full (compulsory) employment controlled by the government. Social benefits were advantageous for workers in lower manual occupations and collectivized agriculture and dependent on individual characteristics and loyalty towards the regime. Additionally, army, police and special forces were entitled to pensions set by different legislation (not covered in this paper). The pension system was remarkably stable from 1956 till the early 1990s. Table ELegislation 1948-2006appendix.E.1Pension System from 1948 to 2006table.1 describes the evolution of its main parameters during the communist regime (columns 1-5), the main reform changes institutionalized by Act 155/1995 (column 6), and the pension system in 2006 (last column) at the time respondents provided pension data in the SHARE survey.

Universal and compulsory national insurance system (pensions, health insurance, maternity and invalidity benefits) provided solely by the government was enacted by Act 99/1948. All insurance companies and institutions were nationalized. Implemented gradually, the system was codified by Act 55/1956 which became the foundation for all following Acts and Decrees.[47].

From 1956 till 1992, pensions were differentiated according to three categories of occupations: I (miners, pilots, heavy and chemical industries), II (jobs with hard working conditions), and III (other occupations). A pension base was calculated from average annual earnings during the base years (the last ten years before retirement age, or five if advantageous to a retiree). From 1956 till 1964 (column 1 of Table B), the pension base was the sum of average monthly earnings up to CZK 2,000 accounted for at 100%, above that amount at 1/3, and above CZK 5,000 at zero. A pension equalled 60% of the pension base in Category I, 55% in Category II, and 50% in Category III, plus an amount of 2%, 1.5%, or 1% of the pension base in each Category, respectively, for each additional year of employment after 20 required years of employment (25 years in Category III after 1964). There was a universal minimal pension and a widow/er pension. Required years of employment for a pension entitlement was 20 years and the retirement age was set at 60 years for males (55 years for in Category I) and 55 years for females. In all Acts, military, police and other special pensions were determined by separate provisions. Decrees also determined additional benefits for years worked on certain occupations. Since the first reevaluation of the system in Act 101/1964 on Social Insurance, each Category had a specified maximum pension and females' retirement age was lowered by one year per each child up to 53 years. Act 103/1964 also unified retirement benefits of workers in agriculture (at collective farms) with the system of social insurance.[48] The new calculation of pension benefits in Acts 155/1995 and 109/2006 guaranteed each pensioner the pension paid according to the previous rules if it was higher than the new pension calculated according to the new pension Acts.

Positive Discrimination in Pensions

From 1956 till 1991, individuals actively supporting the regime received personal pensions provided by Act 55/1956 for "especially merited workers in the economy, science, culture, administration and other public service and for their survivors". Personal pensions were received by members of

[46]All legal documents can be found at http://ftp.aspi.cz/aspi/opispdf/ and the most relevant legislation at http://www.ustrcr.cz/en/relevant-legislation.

[47]For an overview of the national insurance system see Tomkova, Milada (2009), *S*ocialni zabezpeceni in *K*omunisticke pravo v Ceskoslovensku: Kapitoly z dejin bezpravi. Mezinarodni politologicky ustav Masarykova univerzita, Brno

[48]Other relevant legislation include: From 1953, contributions to national insurance were included in tax on earnings (Act 76/1952), and the employer's contribution was set at 10 (later 15) percent (Decree 84/1953). Retirement benefits were taxed from 1965 till 1975 (by Act 101/1964, progressive tax at 1-12,5%). Acts on Social Insurance were implemented, namely their nominal provisions for minimal and maximal pensions and other details, by Decrees 49/1952, 89/1953, 18/1954, 54/1954, 53/1956, 17/1959, 116/1968, 71/1970, 106/1971, 128/1975, 130/1975, 136/1975, 74/1982, 142/1983, 117/1988, and 149/1988. Since the Act 100/1988 on Social Insurance, annual Decrees regularly increase retirement benefits according to growth in earnings (Par. 160).

the Communist Party, administration, Peoples' Militia and those who "contributed to building of socialism". Implemented by decrees, these pensions were allocated by the Party administration at the county level and approved by the Central Committee of the Communist Party. In 1968, its maximum amount was 3,500 CZK. From 1971, these pensions were also given to people employed in the administration after 15 years of service in the supplementary amount of 300-500 CZK per month (there were more than 9,000 of such pensions in the 1980s).

E.2 Legislation Related to Persecution

This subsection describes official legislation enacted by the legislative bodies of the Czechoslovak communist regime. With respect to social benefits, legalized persecution consisted of a) direct punishment by the government in the form of reduced benefits for former entrepreneurs, employers, and people antagonistic to the regime; b) time in detention or prison was not included in calculation of average earnings if the person was not working; c) wages in prison were set at the minimal level, further reduced by the prison administration; d) assignment of prisoners as well released prisoners to the lowest retirement category; e) withdrawal or reduction of benefits to prisoners, released prisoners, their dependants or survivors; f) assignment to occupations with lower wages that were often set at minimal levels; and g) confiscation of individual pension plans.

Besides these categories described in detail below, it is important to remember that persecution was not only implemented by police and the secret service through wide interpretation of this legislation and also by acts that were as a matter of fact against the existing legislation and even against the written constitution.

Dispossession Confiscation of property of the expelled German population was based on presidential decree 12/1945 and 108/1945. During the Communist regime, confiscation of property without compensation was based on laws 46/1948 and 114-126/1948. (The expulsion of the German population is not the subject of this paper.)

Protection of the Peoples' Democratic Republic The coverage of Act 231/1948 from October 1948 on the Protection of the Peoples' Democratic Republic was so wide that majority of political persecution was implemented through this Act. It defines treason, association and incitement against it, defamation of, espionage, sabotage, abuse of clerical office, illegal possession of arms, spreading of alarming news, approval of criminal activity, jeopardizing of economic plan, illegal leaving of the country, and many other crimes against the peoples' democratic system. Punishments include the most severe penalties (death, life imprisonment), confiscation of property, loss of civic rights, and assignment of a person to penal labor after serving a sentence in prison (up to five years), and many others. In a brief period of liberalization in 1967-68, the first organizations defending the rights of political prisoners was named "K-231".

Forced Labor Camps The purpose of the Act 247/1948 (Act on Forced Labor Camps, also Act 86/1950 and 88/1950) was to "educate people about their working duty and to use people for the benefit of the whole" (Par 1). The Ministry of Interior established 104 labor camps to which were assigned "men of age 18 to 60 who are physically and mentally able but who intentionally avoid work or threaten the construction of the people-democratic order or the economic system, and also persons who facilitate such activity" (Par 2) and also those who committed a crime or offence which displayed "antagonistic attitude against people's democracy order or against the building of socialism" (Act 231/48). The decision on the assignment of a person to a labor camp and the length of forced labor (up to 2 years) is made by a three-member committee chosen by a local administration (Par 3). According to International Committee against Concentration Camp Regimes (CICRC) and Radosta (1993), around 220,000 individuals passed through the labor camps between 1948 and 1960. Many of those camps were uranium mines in Jachymov and Pribram regions.

Duty to Work and Parasitism The general duty to work was established by Act 175/1948. Act 88/1950 punishes a person who is "intentionally avoiding work or who in any other way impairs the right to work, [...] will be fined up to 100,000 CZK or imprisoned up to 3 months". Act 63/1956 introduces parasitism: "A person who earns his or her living unfairly or avoids a dutiful work, will be imprisoned from three months up to two years."

Wage Determination and Job Assignment The system of centrally determined wages was institutionalized by Act 244/1948, allowing the government to determine wages not only in state firms but also in the private firms. Act 27/1951 set up the Central Wage Commission. The government directly assigned people to individual jobs (Act 20/1952, already in 87/1947 Act on National Mobilization of Labor, also Decree 156/1947, 20/1952, 43/1952 and 109/1954). Individuals who

finished their education, lost or were changing jobs, or were released from prison, had a duty to report within three days at a local administration or deliver a proof a new employment (acts above, also Acts 60/1961 and 121/1970). A failure to do so was a punishable offence. The Employment Act 65/1965 gave the state and employers a right to transfer any worker to a new job or assignment according to economic needs and state's interest (Par 37). As a consequence of the above acts, there was no unemployment in Czechoslovakia between 1948 and 1989.

Confiscation of Private Pensions Private pensions and other individual old-age insurance was confiscated by Act 101/1952.

Social Benefits for Entrepreneurs and Representative of the Former Regime By the Act 55/1956, "Social Benefit Committees at the county level are entitled to reduce retirement benefits of individuals who:

Article III: ... were former entrepreneurs or employers of other people [...] and who participated in the national insurance for fewer than 20 years. Their retirement benefits can be reduced so that it constitutes only 50% of the average contributions to the social insurance [...].[49]

Article IV: ... were representatives of the former political and economic order and their survivors by an amount corresponding to the time period for which they were such representatives [...]."

Social Benefits of Antagonistic Individuals "Decree 22/1953 on Adjustment of Pensions and Social Benefits to Individuals Antagonistic to the System of People's Democracy:

Par. 1: Individuals who were sentenced for losing civic rights because they committed a crime that revealed their antagonism against the people's democratic order, are not entitled to pension benefits [...] for the period they are deprived of civic rights [...]; during this period, their dependents are entitled to benefits in the amount of one half of the pension of the sentenced individual [...].

Par. 2: Based on a decision of the county administration, retirement pensions, invalidity benefits, and widow pensions will be reduced according to each individual case in consideration up to the minimum social benefit [...] for: a) representatives of the former political and economic order and/or their survivors, b) those who eagerly served the former capitalist order and/or their survivors if these are expressing antagonistic behavior against the people's democratic order.

Par 3: In individual cases, the regional administration is entitled to completely withdraw retirement benefits if these individuals and their family relatives are deemed to have resources of their own."

This Decree was implemented by a Decree 119/1953 of the State Committee for Old-Age Security, which declared that "[...] due to their previous power, these elements receive unjustly high retirement benefits compared to those who had been mercilessly exploited and who now contribute by their work to building of socialism. This is why the Party and the Government will implement all measures to end these residues of capitalism [...]. We will put an end to hidden and open enemies' parasitism on our old-age security by completely taking away or substantially reducing their pensions". Decisions of country administration (consisting of three people) could not be appealed against. All people sentenced for crimes against the new system (Act 231/1948) were deprived of civic rights that lasted even after their release from prison until it was revoked by a people's court. The Supreme Court itself ruled that "according to the principles of our people's democratic regime and its social interests, people sentenced for so heavy crimes should be also affected in their social rights and entitlements to which they are otherwise entitled to" (SC 56/1953).

Withdrawal of Benefits Act 40/1958 was a tool for lowering and withdrawing retirement benefits from those who were sentenced for more than two years "for intentional crimes against the Republic [...], against the economic system [...], against the property in socialist ownership [...], against the socialist property [...], or against the Act for Protection of Peace [...]" (Par 1.1). A Social Insurance Committee at the county administration can "reduce and in some cases completely withdraw benefits from the social insurance system" (that is retirement benefits, health insurance, social benefits etc.) to a sentenced individual as well as to survivors and dependants (Par 1.2).

Reduction of Benefits Decree 120/1964 confirmed the power of county authorities to implement the Article IV of Acts 55/1956, 40/1958 and 41/1958:

"Par 1: County Administrations are entitled to reduce retirement benefits it considers excessive of those individuals a) who held important public or economic positions under the former political and economic order [...] and who used their position to uphold the capitalist order [...] and actively contributed to exploitation and persecution of the working class; b) who as former entrepreneurs exploited workers; c) who held important positions in the administration under the former political

[49] This provision put retirement benefits of virtually all self-employed and private employers to the minimum because their contributions to the national insurance started only in 1948 when the system was created. They could not fulfill the required 20 years of social contributions. Wording from amendments by Acts 40/1958 and 41/1958.

and economic order [...] and who were active against the working class, enhancing its exploitation and persecution; d) who are survivors of individuals listed above.

Par 2: The retirement pensions are reduced according to the political and economic importance of these individuals, the length of their activity in such positions, and the harmfulness of their acts against the working class."

These acts and decrees were widely used in practice and were revoked only by the Act 51/1994.

Emigrants Emigration was considered a crime whose consequences were a dispossession of property and persecution of close relatives. Returning emigrants faced criminal charges, imprisonment, and other persecution. Pensions of all emigrants who left Czechoslovakia in 1968 were reduced by the Decree 161/1969 which declared that time spent working abroad counts towards retirement benefits only if the stay abroad is authorized by the Czechoslovak government.

Time Spent in Prison Remuneration of prison work was determined by Decrees. This remuneration was reduced by prisoners' expenses and costs of living in prison and further reduced by a prison administration (par. 29 Act 59/1965). Time spent in detention and time in prison when a prisoner was not working were not counted towards the calculation of retirement benefits. Implementation by Decree 30/1971 specifies that time spent in prison is classified in category III (from 1953).

E.3 Rehabilitation, Compensation, and Property Restitution for Persecuted Individuals and Their Families After 1989

As innocent people were sentenced for criminal acts against the people's republic, the purpose of the amnesty and judicial and extrajudicial rehabilitation acts was to alleviate grievances to such individuals, provide for moral satisfaction and also financial compensation for inflicted losses.

Act On Lawlessness of the Communist Regime and Resistance Against It (198/1993).

The Act declares that "the Communist system denied expression of free political will, systematically and permanently violated basic human rights, violated the rule of law in a democratic political system, and used persecution against the population to maintain its power. Among the main persecution activities, the regime a) murdered and imprisoned people in jails and forced labor camps, b) deprived them of property, c) denied them access to jobs, occupations, careers, and education, d) did not allow them to travel, e) assigned them to penitary military units for unlimited period of time, [...]. To achieve its goals, the regime used criminal deeds, provided benefits to those who committed these crimes, and collaborated with a foreign powers to achieve its goals."

The Act declares the Communist Party a criminal organization. Anyone persecuted by the regime between 1948 and 1989 has a right to be compensated and legally rehabilitated according to the following acts:

Judicial Rehabilitation The Act 119/1990 On Judicial Rehabilitation (implemented by Decree 47/1991 and Act 633/1992) lists all legal provisions the Communist regime used to persecute and incriminate people and abolished such sentences ex lege and provided financial compensation. Par. 23 compensates each month of detention or imprisonment by 2,500 CZK plus other compensation for health damage, fines, property losses and other costs. Par 25.1 states that earnings as contribution to the pension system be calculated as if the individual continued to be employed at the same job and occupation before detention or imprisonment. Par 25.2 assigns proper categories to work during imprisonment (Category I to work in mines). Par 25.3 applies provisions of Par 25.1 and 25.2 also to time period after a person was released from prison if he or she was denied access to the former occupation or deprived of civic rights. All time spent in detention and prison is to be counted as employment time for calculation of retirement benefits. Par 25.7 specifies a monthly payment per each month of detention or imprisonment in the amount a) 20 CZK for work in prison category I and II, b) 15 CZK for other work. This supplement is paid retroactively from 1990. Par 25.7-8 assign these annuities also to survivors of persecuted individuals (60% for widows).

The Act on Judicial Rehabilitation 119/1990 provided for *ex lege* judicial rehabilitation for individuals sentenced according to enumerated sections of Acts misused by the Communist regime for political persecution: Act 50/1923 (total of 3,889 cases mostly in 1948-1949), Act 231/1948 (20,961 cases), Act 86/1950 (78,247 cases), Act 140/1961 (89553 cases), and Act 150/1969 (441 cases). The time period for filing a rehabilitation was two years. In total, there were 195,672 rehabilitated cases including 95,247 sentences for emigration from the former Czechoslovakia (two massive waves in the 1950s and 1968-1969). Subtracting the emigration cases, there remain 100,425 sentences rehabilitated for individuals who continued to reside in the former Czechoslovakia. Further details

can be found in a statistical publication by the Institute of Contemporary History of the Czech Academy of Sciences (Gebauer et al. (1993)).

Extrajudicial Rehabilitation Act 87/1991 On Extrajudicial Rehabilitation provided for alleviation of grievances not related to criminal convictions but for other harms like denied access to education or job losses due to persecution. Individuals who lost their jobs for reasons listed in Act 119/1990 and for reasons listed in Acts 65/1965, 99/1969, 153/1969 (On Public Order), are entitled to return to their former employment positions, and if retired to pension benefits that correspond to wages and categories of pensions in their lost employment. Those imprisoned (Act 119/1990, 47/1991) are further entitled to pensions benefits that correspond to pensions of members of national resistance (Act 100/1988). All benefits, indexed for inflation and wage differentials, belong also to widow/ers and descendants of persecuted individuals. Further compensation of pension benefits was implemented by Decrees 622/2004 and 405/2005 (see below).

Restitution of Property Restitution of property to individuals was implemented ex lege by Acts 298/1990, 403/1990, 172/1991, 229/1991, 126/1992, and 212/2000, for property and land nationalized between 1948 and 1989. Restitution of property for institutions was implemented by Acts 173/1990 (sport institutions), 298/1990 (religious institutions, church property, religious orders), 172/1992 (municipalities), or 126/1992 (health institutions). Several acts returned the property used by the institutions of the communist regime, namely Act 496/1990 On Restitution of Property of the Communist Party of Czechoslovakia, and Act 497/1990 On Restitution of Property of the Communist Youth Movement of Czechoslovakia.

Additional Financial Compensation In addition to Acts on Judicial and Extrajudicial Rehabilitation, several acts compensated groups of individuals that were not included in the main rehabilitation acts by lump-sum payments Act 217/1994 On Financial Compensation to Victims of Nazi Persecution; Act 39/2000 and 357/2005 On Financial Compensation to Members of Czechoslovak Foreign and Allied Armies between 1939 and 1945; Act 261/2001 On Financial Compensation to Members of National Fight for Liberation, Political Prisoners, and Individuals Imprisoned in Military Labor Camps; or Act 172/2002 On Financial Compensation to Individuals Imprisoned in Soviet Gulag Labor Camps or to Camps Established by USSR in Other Countries (around 1,000 Czechoslovak citizens).

Prosecution In 1991, the Czechoslovak government established a Bureau for Investigation and Documentation of the Crimes of Communism (BIDCC) by Act 283/1991. The Bureau has been responsible for collecting evidence and administering prosecution of representatives of the Communist regime that violated human rights and/or committed crimes during the politically motivated persecution of individuals between 1948 and 1989. The perpetrators consist of party leaders, secret police agents, policemen, prisoner guards, border guards, and other officials. Overall, there have been 189 prosecutions for crimes committed between 1948 and 1989. In 89 cases the wrongdoers were agents of the secret service (StB). Abuse of authority represents 119 of these cases, while the rest covers a vast range of crimes including 13 cases of murder and 33 cases of assault and battery. Besides the prosecuted perpetrators of criminal acts, many others, including collaborators of the secret service, were disqualified from public sector employment and political activity by the lustration act 451/1991.

Pension Categories Personal pensions to individuals supporting the regime were canceled by Act 110/1991, pension categories were abolished by Act 235/1992.

Pension Supplements to Persecuted Individuals and Their Families According to Decrees 622/2004 and 405/2005 (Pension Supplement to Partially Compensate Social Injustices Caused by the Communist Regime), individuals who were imprisoned or detained between 1948 and 1989 and were rehabilitated for crimes listed in Acts 119/1990, 633/1992, and 198/1993, are entitled to a supplement to their pension in the amount of 50 CZK for each month they were imprisoned or detained. Widows are entitled to 25 CZK for each month, children younger than 18 years at the time of a parent's imprisonment or death are entitled to 20 CZK for each month. Act 357/2005 further specifies the compensation for individuals rehabilitated according to Act 119/1990 for monthly compensation at 2,500 CZK (1,250 CZK for survivors and widows), if this amount is higher than the compensation according to Decree 622/2004. Survivors (children, widowers) of those individuals who were executed, died in prison, detention, or during border crossing are entitled to a monthly supplement to their pension: widows/widowers in the amount of 3,000 CZK (2,400 CZK in the case of death at the border), if this amount is higher than supplements described above. The burden of proof rests with the claimant.

These supplements were included in the regular pension payments received as a single monthly

payment after 2005. Together, the pension compensation schemes imply a minimal supplement of 2,500 CZK or 50 CZK per month of detention or imprisonment (1,250 CZK or 25 CZK per month for survivors; 3,000 CZK in case of death). In practice, a person who spent 10 years in prison or forced labor camp in the 1950s, received an additional 6,000 CZK monthly pension supplement in 2006, when the average pension was 8,747 CZK.

Table ELegislation 1948-2006appendix.E.1: Pension System from 1948 to 2006

	Year of Legislation					Year
	1956	1964	1975	1988	1995	2006
Brackets for calculation of the pension base (at which average earnings evaluated)						
at 100%	≤2,000	≤2,000	≤2,000	≤2,500	≤5,000*	≤9,100*
at 33%	≤5,000	>2,000	>2,000	≤6,000	≤10,000*	≤21,800*
(up to amount)		(1,000)	(1,000)			
at 10%	—	—	—	≤10,000	>10,000*	>21,800*
at 0%	>5,000	—	—	>10,000	—	—
Pension	Category				No categories	
Category I	60% of Base + 2%/year after 20 years of empl.				1.5% of pension base for	
Category II	55% of Base + 1.5%/year after 25 years of empl.				each year of empl.	
Category III	50% of Base + 1%/year after 25 years of empl.				+ 1%/year after ret. age	
Maximum pension						
Category I	—	2,200	3,000	3,800	—	—
Category II	—	1,800	2,500	2,900	—	—
Category III	—	1,600	2,150	2,800	—	—
Minimal pension	400	400	400	550	1,450*	2,240*
Widow pension	70 %	60%	60 %	60 %	50%	50%
Base years	10 (5)	10 (5)	10 (5)	10 (5)	30	30
Required years	20 (20)	25 (20)	25 (20)	25 (20)	25	25
Retirement age	60/55	60/57	60/57	60/57	60/57	62/61
Proportional pension	Yes	Yes	Yes	Yes	No	No
Average pension	605	743	1,077	1,639	4,626	8,747
First average pension		780	1,252	1,994	4,842	9,958
Personal pension	Yes	Yes	Yes	Yes	No	No
Persecution	Yes	Yes	Yes	Yes	No	No

Sources: See text. Notes: Nominal amounts in CZK. For pensions Czech Statistical Office. First average pension is the newly assigned first pension based on the legislation. Calculations of pension in Act 30/1983 equals those in Act 121/1975, and similarly for Act 140/1994 with respect to Act 100/1988. Base years are years before retirement in which the average earnings are calculated. Required years are years of employment after which a person qualifies for retirement benefits (20 years for Category I and II). Retirement age for males/females (5 years lower in Category I and II). From 1964, females' retirement age reduced by one year for each child up to five children. Proportional pension: for those above 65 years who were employed for fewer than the required years at 2% of 1/2 of the pension base for each year of employment. Personal pension: see text. Persecution: legislation persecuting persons as in the text. Categories of pensions were canceled by Act 235/1992.
*Set every year by a Decree, reflecting changes in average earnings. Pension benefits calculated with coefficients relating individual base to the average base provided by the Czech Statistical Office.