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DISCUSSION PAPER SERIES

IZA DP No. 17940

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ABSTRACT

The Debt Burden of Job Loss in a Nordic Welfare State*

Using linked employer-employee data combined with administrative data on debt enforcement, we analyze the impact of job loss on debt problems in Finland, where even 50% of income may be subject to wage garnishment for up to 25 years. Our results show that job loss, defined by plant closures and mass layoffs, increases the incidence of enforced debt by approximately 10%, with the effect persisting for at least a decade. The impact is particularly large for unpaid taxes and various private debts, such as installment purchase payments. Moreover, the effects are stronger among individuals who were already burdened with excessive overall debt, such as mortgages, before displacement. We also document spillover effects on spouses and children, indicating that job loss can have far-reaching consequences for household indebtedness. However, we find no significant effect on filing for personal bankruptcy.

JEL Classification: D14, G51, J64, J65

Keywords: default, debt enforcement, involuntary job loss, employer-employee data, personal bankruptcy

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1. Introduction

Nordic countries are characterized by strong welfare states that emphasize social and economic equality, free education, universal social programs, and comprehensive safety nets. Given that welfare states bear idiosyncratic risks faced by households, there is often a justification for more stringent insolvency legislation and bankruptcy laws.[1] In Finland, individuals with enforced debts may experience garnishments of 30-50% of their future wages and recurring income for up to 25 years. According to calculations based on data from Statistics Finland, nearly 10% of the entire Finnish population – and 15% of individuals in their prime working age – had enforced debts in 2023 (Statistics Finland, 2024a). Figure 1 illustrates trends among individuals aged 25-63 undergoing enforcement, categorized by their main activity and age. The figure shows that the probability of having enforced debts peaks during the prime working years and decreases after the retirement age of 63. More importantly, individuals with a history of unemployment are significantly more likely to have enforced debts compared to those with stronger labor market attachment (approximately 25% versus 10%). This indicates that debt problems are more prevalent among those facing economic disadvantages.[2]

Previous empirical evidence highlights a clear link between unemployment and debt-related problems (e.g., Del-Rio and Young, 2005; Keese, 2009; Du Caju, Rycx and Tojerow, 2016; Kreiner, Leth-Petersen and Willerslev-Olsen, 2019). However, research employing identification strategies to estimate the causal effect of job loss remains relatively limited – especially with

[1] Conversely, the U.S. prioritizes a consumer-friendly and lenient bankruptcy system, driven by the less comprehensive social security it provides compared to, for example, Nordic countries.

[2] Isotalo et al. (2021) have reported that, depending on the age group, between 40 to 60% of individuals receiving basic income assistance were involved in debt enforcement proceedings at the end of 2018.

regard to longer-term financial health – and is predominantly focused on the U.S. context (e.g., Gerardi et al., 2018; Keys, 2018; Braxton, Herkenhoff and Phillips, 2024). We address this gap in the literature by examining the causal impact of job loss on the incidence of debt-related problems in a country with a comparatively strong social safety net and stringent debt enforcement process. The Nordic case provides a valuable point of comparison to the existing evidence, which is largely based on the U.S. experience.

[Add Figure 1 here]

We use a unique dataset comprising administrative records on debt enforcement for the entire Finnish population. The use of administrative data enhances the credibility and precision of our analysis by relying on authoritative sources, thereby minimizing biases and errors commonly associated with self-reported data. In addition to estimating the overall effect of job loss on debt-related problems, our data allow us to contribute to the literature by examining the primary causes of unpaid debts. These include factors such as alimony, unpaid taxes, social and healthcare payments, penal orders and fines, and other private debts. The debt enforcement records are matched to administrative population registers, providing linked data on employees and private-sector establishments. We examine the effect of involuntary job loss on debt problems, measured by the probability of having enforced debts or receiving debt relief through personal bankruptcy. Job losses are identified as displacements following plant closures or mass layoffs. Using an event-study framework, we analyze both short- and long-term impacts, dimensions that have been largely overlooked in previous studies on job loss and debt. By examining effects over a ten-year period, we capture the full extent of how job loss contributes to over-indebtedness and assess whether the transmission channel – primarily income loss – operates with a time lag. We also extend the analysis to explore spillover effects of job loss on

debt problems of a spouse, parent, or child. This broader perspective reveals the total household or intergenerational burden of job loss in a Nordic welfare state, offering a more comprehensive understanding of its implications for family dynamics.

Our study reveals five main results. First, job loss increases the likelihood of entering debt enforcement by approximately 10%, with event study results indicating a persistent effect lasting at least ten years. Second, we find no statistically significant impact on personal bankruptcies within the nine-year follow-up period. This contrasts sharply with previous studies from the U.S. (Keys, 2018; Braxton et al., 2024), where job loss has been linked to increased bankruptcy filings. Third, a detailed analysis by debt type reveals that job loss primarily increases debts related to unpaid taxes or other private liabilities – such as unpaid rent and instalment purchases – rather than obligations like alimony or social and healthcare payments. Fourth, the effect of job loss appears to be at least partially mediated by reduced income and pre-existing excessive debt, both of which exacerbate the post-displacement debt burden. However, the negative income effect is strongest in the initial years after job loss, declining from around 20% to just 4% by the end of the follow-up period. This suggests that rising income over time does not necessarily enable individuals to recover from over-indebtedness, which tends to accumulate gradually over several years. Fifth, we provide novel evidence of spillover effects within families. Specifically, job loss slightly increases the probability that a spouse or child will enter debt enforcement proceedings by approximately 4%. Together, these findings contribute to the broader literature on the economic consequences of job loss, particularly its long-term and intergenerational effects.

Our results relate to several strands of literature. This paper focuses on explaining the impact of job loss on debt-related issues, extending previous research in the area of job displacement. The

scarring effects of job loss have long been a central topic in labor economics. Extensive research shows that involuntary job loss not only has lasting effects on earnings and employment (for a seminal study, see Jacobson, LaLonde, and Sullivan, 1993) but also negatively affects health (Kuhn, Lalive and Zweimüller, 2009; Schaller and Stevens, 2015) and various social outcomes, such as crime (Rege et al., 2019) and divorce rates (Charles and Stephens, 2004). While these consequences may partially explain the observed link between job loss and debt problems, a few recent studies, primarily focused on the U.S., have examined this relationship more directly. This body of literature finds that in the U.S., job loss is associated with bankruptcy (Keys, 2018; Braxton et al., 2024), credit or mortgage delinquency (Gerardi et al., 2018; Aaronson et al., 2019), and, in some cases, increased debt (Aaronson et al., 2019; Braxton et al., 2024). These effects are typically short-lived. However, there is limited understanding of the long-term debt dynamics following exogenous job loss, particularly in a Nordic context, where access to bankruptcy protection is more limited. Our results contribute to this literature by showing larger and more persistent effects on debt-related problems compared to the U.S. context, without any statistically significant effect on the likelihood of personal bankruptcy.

The results of this paper should also be contrasted with the fundamental differences in debt collection approaches across countries. The European method is often perceived as notably strict (Gerhardt, 2009; Livshits, MacGee, and Tertilt, 2007). Divergent insolvency and bankruptcy laws across various countries can be partly attributed to differing societal attitudes towards over-indebtedness. In the U.S., over-indebtedness is typically viewed as a market failure, whereas in many European countries, it is seen as a social and moral issue (Niemi-Kiesiläinen, 1999). Heuer (2013) classifies the insolvency frameworks of the U.S and Canada as the "market model", which emphasizes quick debt discharge for debtors. In contrast, Nordic countries adopt a "mercy model", characterized by stringent applicant screenings and a central role for debt settlement

officials in shaping the debt relief process. In Finland, debts may be subject to a strict enforcement procedure. In practice, the National Enforcement Agency primarily enforces monetary receivables through asset seizures and wage garnishments. Because access to bankruptcy and formal debt repayment processes is highly restricted, individuals with enforced debts may experience garnishments of 30-50% of their future wages and recurring income for up to 25 years. This stands in stark contrasts to the U.S., where Chapter 7 and Chapter 13 bankruptcy procedures offer more accessible and debtor-oriented forms of relief.[3] Our findings align well with the fundamental differences in debt collection approaches, showing long-term effects on debt-related challenges in Finland.

Our results also contribute to the growing literature on spillover effects within families. Gerardi et al. (2018) examined the impact of a spouse's exogenous unemployment on an individual's default risk and find no statistically significant effect. Similarly, Kreiner et al. (2019) explored intergenerational patterns in default behavior but do not find a significant link between a child's unemployment and a parent's likelihood of default. To our knowledge, no prior studies have examined intergenerational effects in the opposite direction, that is, from parent to child. Our findings provide novel evidence that an individual's job loss can modestly increase the risk of both a spouse and a child entering debt enforcement, with effect sizes of approximately 4%. These results highlight the broader household and intergenerational consequences of job displacement.

[3] Approximately 70% of all the consumer bankruptcies in the U.S. are filed under the Chapter 7, the so-called *Fresh Start*, where all unsecured debt is discharged in exchange for all non-collateralized assets above an exemption level, without no claims towards future income. In Chapter 13, the debtor retains their assets but commits to a structured repayment plan for 3-5 years (e.g., Keys, 2018; Exler and Tertilt, 2020).

Finally, our paper relates to studies that connect economic theories with household indebtedness and default behavior. Two prevailing theories help explain the motivations behind household defaults and the pursuit of bankruptcy protection: strategic behavior and adverse events (Fay, Hurst and White, 2002; Zhang, Sabarwal, and Gan, 2015). According to the strategic behavior theory, debtors choose bankruptcy when they expect financial gains from doing so. In contrast, the adverse events theory highlights the role of unexpected shocks, such as job loss, health crises, or divorce, that reduce the debtor's ability to meet financial obligations.[4] Given the limited and infrequent use of consumer bankruptcy in Finland, the adverse events theory is likely more applicable than the strategic behavior theory in explaining household defaults. Although we do not directly test which theory predominates, our findings align with the hypothesis showing that one of the most significant adverse life events – job loss – raises the probability of entering debt enforcement significantly.

The paper is structured as follows. Section 2 reviews relevant literature and outlines the institutional setting in Finland. Section 3 provides details on the administrative datasets, describes key variables, and delineates the control and treatment groups. In Section 4, we present our empirical model, conducting an econometric analysis to estimate the effect of involuntary job loss on the incidence of debt enforcement, supplemented by various robustness and heterogeneity tests. Finally, in Sections 5 and 6, we discuss and conclude the paper by contextualizing our findings within a broader framework.

[4] If a majority of bankruptcies arise from adverse events, adopting more lenient default or bankruptcy legislation during challenging times could function as a form of public insurance against unforeseen circumstances. Conversely, overly strict enforcement procedures might discourage payments (Livshits et al., 2007). If strategic behavior predominantly drives defaults, implementing stricter bankruptcy legislations for debtors could effectively disincentivize behaviors leading to default, thus addressing moral hazard issues.

2. Conceptual Framework

To gain initial insights into debt-related issues, we conducted a survey in collaboration with the Guarantee Foundation, a Finnish non-profit organization dedicated to preventing over-indebtedness and assisting individuals in managing financial difficulties. The survey, which included responses from 208 participants, focused on individuals' perspectives regarding the primary reason (with multiple choices allowed) behind their debt problems. The results of the responses are illustrated in Figure A1 of the Appendix. Notably, nearly 70% of the respondents identified job loss, coupled with small or decreasing income, as the primary factor contributing to their debt issues. This was followed by the influences of sickness or mental health problems, reckless spending, and easy access to quick loans. Previous Finnish survey study by Valkama (2011) documented that 40% of debtors (n=240) reported unemployment as a main source for their debt problems.

2.1. Previous Literature

The impact of job loss on debt-related problems is likely influenced by reduced income, although other potential mediators, such as diminished physical and mental health (Balmer et al., 2006; Mohanan, 2013), spouse separation (Oksanen, Aaltonen and Rantala, 2015), and crime (Oksanen et al., 2015) may also contribute. While some households tend to modify consumption rather than resort to increased borrowing after job loss (Sullivan, 2008; Baker, 2018; Hundtofte, Olafson, and Pagel, 2019), various studies consistently highlight a clear link between unemployment or decreased income with over-indebtedness (Del-Rio and Young, 2005; Keese, 2009; Du Caju et al., 2016), mortgage defaults (Deng, Quigley, and Order, 2000; Demyanyk and van Hemert, 2011; Gyourko and Tracy, 2014), the propensity to default some debt (Kreiner et

al., 2019) and the likelihood of filing for bankruptcy (Domowitz and Sartain, 1999; Fay et al., 2002). Conversely, Bauchet and Evans (2019) found no discernible association between unemployment and the probability of personal bankruptcy.

The relationship between debt problems and unemployment may be two-sided (Gerardi et al. 2018), coupled with confounders, underscoring the need for credible identification designs. Previous studies have frequently relied on region-level or survey data and potentially endogenous information on unemployment status. Despite a number of research, causal evidence concerning the association between plausibly exogenous job loss[5] and debt problems, especially when utilizing micro-level administrative data, remains scarce. The following selected studies are particularly relevant within the current research context.

Keys (2018) investigates the impact of job displacement on bankruptcy incidence using self-reported survey data from the U.S., employing an event study specification. Job loss information is derived from unemployment benefits data, which theoretically exclude individuals terminated for misconduct. Keys observes a tripling (men) or doubling (women) of respondents' probability to file for bankruptcy following a job loss. However, the sample size is deemed insufficient for conducting heterogeneity analysis. To address this limitation, Keys augments the study by using Bartik-style instruments and county-level data, reinforcing the positive relationship observed.

[5] Numerous studies in this field employ credible causal identification strategies and administrative data to estimate these effects on income (Ruhm, 1991; Jacobson et al., 1993; Stevens, 1997; Korkeamäki and Kyyrä 2014; Verho, 2020), and various health and social factors, such as crime (Rege et al., 2019), disability pension (Rege et al., 2009), mortality (Rege et al., 2009; Sullivan and von Wachter, 2009), self-assessed health and mental health (Kuhn et al., 2009; Schaller and Stevens, 2015) and likelihood of divorce (Charles and Stephens, 2004).

Braxton et al. (2024) use matched U.S. administrative data and credit rating agency data to examine the effect of job displacement, measured by mass layoffs, on various forms of default, including charge offs, foreclosures, bankruptcies and derogatory flags. Using an event study specification, the authors uncover notable but short-lived effects on each measure of default risk. The primary driving forces behind these effects are individuals already grappling credit constraints before job loss, with some displaced workers who maintain positive credit scores opting to increase their debts.

Gerardi et al. (2018) employ U.S. survey data to present reduced-form estimates, revealing a noteworthy impact of involuntary job displacement on default. Involuntary separation is defined as plant closures, strikes or layoffs, although some residual endogeneity bias may influence the results. Default is characterized as being at least 60 days delinquent on payments. They further note that the exogenous unemployment experience of one's spouse is not statistically significantly correlated with an individual's default risk.

Examining unemployment records from Georgia, Aaronson et al. (2019) find that job displacement is linked to deteriorating credit conditions and debt problems. This association is particularly strong among low earners, while the relationship proves insignificant among high earners. Despite the plausibly exogenous nature of information on job displacement, the authors acknowledge challenges arising from the short duration of the credit panel data. This limitation complicates the identification strategy, given that displaced individuals cannot be observed in the data before the treatment occurs.

In summary, previous literature has shown that in the U.S., job loss is associated with increased likelihood of bankruptcy (Keys, 2018; Braxton et al., 2024) and credit or mortgage delinquency (Gerardi et al., 2018; Aaronson et al., 2019). However, there is limited understanding of the long-term debt dynamics following exogenous job loss, particularly in a Nordic context, where access to bankruptcy is more constrained. An exception is the study by Kreiner et al. (2019), which uses data from the Danish population. They find that the default rate increases by 1.5 percentage points within two years following unemployment. However, their analysis does not rely on plant closures or mass layoffs to identify job displacement, implying that some of the unemployment events may have been anticipated by individuals.

2.2. Institutional Background and Debt Enforcement

Finland, alongside other Nordic countries, is considered a strong welfare state with emphasis on social and economic equality, universal social programs and an extensive social safety net. The country provides its citizens with comprehensive social benefits, active labor market policies, free education, and various support systems, including affordable childcare services. The welfare state is designed to ensure a high standard of living for residents and to alleviate social inequalities. For instance, a comprehensive healthcare system guarantees access to health services for everyone, regardless of their place of residence or financial means. Public healthcare is relatively affordable, with partial reimbursement for drug purchases, and nearly 90% of wage earners benefiting from coverage of occupational health (Social Insurance Institution of Finland, 2024). Following unemployment, individuals may qualify for various social security benefits. Those with a sufficient employment history are eligible for the basic unemployment allowance or a higher, earnings-related unemployment benefit (lasting 300-400 days, depending on age and employment history in 2025), for those affiliated with a voluntary unemployment fund.

Debt enforcement is considered a significant indicator of serious financial problems in Finland (Rantala and Tarkkala, 2009; Oksanen et al., 2015). When an individual becomes delinquent on debt, the creditor has the option to initiate debt enforcement, typically engaging a private collection agency for debt recovery.[6] If this proves unsuccessful, the enforcement process is set in motion, often instigated by a court order. Following the court decision, the National Enforcement Authority takes charge of the enforcement procedure.[7] While private debts require a court decision for enforcement, debts owed to the public sector, such as healthcare payments and unpaid taxes, can be enforced without a court order. The primary objective of the enforcement process is to ensure that creditors receive, at the very least, a portion of their outstanding claims. The enforcement process leaves a credit registry entry that complicates matters for the debtor, such as renting an apartment.

In cases where debts are enforceable, monetary receivables, including earnings, pensions, and various social security benefits, can be subjected to garnishment. However, only the net pay or income exceeding the protected portions, determined by the number of dependents, is eligible for garnishment. As of 2025, the protected portion per calendar month is 976.80 euros for a single debtor, with an additional 285.60 euros per dependent (National Enforcement Authority Finland, 2025a). Depending on the individual's protected portion level and income, approximately 30%

[6] If the private invoicing party has not received a payment by the due date, either the creditor or a collection agency may send a reminder after 14 days. If the invoice remains unpaid after another 14 days, a demand for payment, or a first collection letter, is issued. A second collection letter is dispatched 14 days thereafter. Upon receiving these collection letters, individuals have the option to negotiate a payment plan with the creditor.

[7] According to a recent survey, among the EU member states, Finland is one of the countries (together with, e.g., Sweden and Denmark) where the debt collection is highly regulated with low abusive non-judicial debt collection practices (Stánescu, 2021).

up to 50% of the net pay or income is garnished, following calculation rules established by the National Enforcement Authority. For example, a single debtor with a net monthly earning of 2000 euros would face a total garnishment amount of 677 euros (33%).[8] Garnishment also incurs a cost to the debtor for the first two years of approximately 10% of the garnished amount, functioning as a type of additional tax. Real property can also be seized and auctioned to settle debts, with permanent residences and assets essential for business production being seized last.

Enforcement actions conclude either when debts are fully repaid or when the debts under enforcement reach their expiration. The expiring time varies based on whether the debt is public or private, and on the creditor's efforts to collect the outstanding amount. Public debts, such as tax, alimony, daycare, and public hospital bill debts, expire five years from their due date. Conversely, the expiration period for private debts can extend up to 25 years. In cases where there is a court order regarding the debt, it will expire 15 years after the court's decision (or 20 years if the creditor is a private individual or the debt stems from a crime). Without a court decision, private debts expire in 25 years from the due date if the creditor is a private individual, and in 20 years in other cases. For both types of private debts, with or without a court ruling, expiration can occur if no payments are made, and the creditor does not issue reminders within intervals of either 3 or 5 years.

Finnish legislation permits the bankruptcy of private individuals, closely resembling the U.S. Chapter 13 bankruptcy. It involves dedicating a portion of future income beyond a specified threshold towards debt repayment for approximately 3-5 years, after which the remaining debts are forgiven. Unlike the U.S. system, entry into such a program is highly restricted; individuals

[8] Figure A2 of the Appendix depicts the net income after garnishment in each net income level from 0 to 8,000 euros per month.

with debts resulting from criminal activity, reckless behavior, or violations of business regulations are ineligible for bankruptcy. Moreover, the limited awareness among Finnish citizens about the possibility of filing for personal bankruptcy, coupled with stringent access restrictions, results in only between 3000-4000 programs being confirmed by the court annually (Statistics Finland, 2025), compared to around a half million individuals being in debt enforcement annually.

Approximately 10% of the total population have enforced debts, and this share has remained stable within the last 15 years. According to the annual statistics by the National Enforcement Authority of Finland (2025b), 51% of new individual debtors in the enforcement process managed to pay their debts during the same calendar year when they become a customer of the enforcement system. Approximately 35% of debtors during the calendar year had debts of 1,000 euros or less in enforcement. About 67% had debts of 10,000 euros or less, and only 10% had large debts exceeding 50,000 euros. The mean value of enforced debts is approximately 1,500 euros. Of all collected debts, the garnishment of recurring income, i.e. salary, pension and business income, corresponds around 49% of the collection result of the garnishment. Around 10% of collected debts were accumulated from the realization of assets. Finally, around one-third of all individuals in enforcement shorten debts through the wage garnishment.

3. Data

3.1. Data Sources

We use administrative data compiled by Statistics Finland. The FOLK-module provides comprehensive background information on the entire population, encompassing details on

wages, employment, other activities, and debts. The Business Register offers administrative information on firms and plants. These datasets are linked together through unique identification codes. Our analysis covers the years 2007-2017 to identify layoffs, with data beyond this period used to evaluate pre-trends and their impacts on indebtedness. We focus on the working-age population, specifically individuals aged 20-64.

The matched employee-employer data are further linked with information on enforcement information from the National Enforcement Agency. These register-based data provide monthly updates on outstanding debts, payments, and the specific type of debt undergoing enforcement. Debt types are categorized by legal classifications, though some nuanced debt types may not be explicitly identified. The debt types variable features 122 levels, which we aggregated into seven categories for our analysis. These categories encompass enforced debts related to taxes, social and healthcare payments, alimony, penal order and fines, loans and insurances, real property payments, and other private debts (see Table A1 in the Appendix for more details). While the full dataset from the National Enforcement Agency covers the years 2008-2019, precise information on debt types is available only for the years 2008-2015.

3.2. Dependent Variables: Debt Enforcement

Enforced data provide detailed information, enabling the construction of various outcomes to credibly measure debt problems. Our primary outcome is an indicator variable that takes a value of one if an individual has a positive number of enforced debts in a given year. Recognizing that not all individuals with a positive number of enforced debts face serious debt problems, we incorporate two additional outcome variables. The first is an indicator variable signaling whether an individual has more than 1,500 euros in enforcement, designed to identify more severe cases.

Threshold of 1,500 euros was chosen based on the mean enforced debt within Finnish people. To ensure comparability, the euro values are adjusted to 2019 prices using the cost-of-living index. Second, to discern the impact on long-term debt problems, we use an indicator variable that gets a value of one if an individual has undergone debt enforcement for at least two consecutive years.

3.3. Involuntary Job Loss and Sample Construction

We follow previous literature and identify displaced workers as individuals separated from their private-sector jobs following a plant closure or mass lay-off, where at least 30% of the employees have been laid off. To address potential endogeneity concerns related to firm restructuring, we adopt a nuanced approach. Specifically, a plant closure is not deemed authentic if a worker secures employment within the same firm after the closure, or if a substantial number (50%) of displaced workers from the same plant move to another firm the following year (Eriksson, Hane-Weijman and Henning, 2018). This distinction enables us to differentiate genuine plant closures from potential firm mergers, outsourcing, and other organizational changes.

The year of displacement is denoted by *b* (the base year). To refine the pre-displacement sample, we consider full-year (12 months of employment) wage earners who have worked in plants with at least 20 but fewer than 7,000 employees. The underlying assumption of the model is that displacement constitutes an exogenous labor market shock independent of the worker's own behavior. However, in very small plants, we acknowledge the possibility that workers themselves could influence the probability of displacement. We also impose an upper limit on

plant size at 7,000 employees, as larger plants may act as outliers, carrying disproportionate weight in our sample and often being a result of multiple plants misclassified as one. Accordingly, individuals included in our sample must have maintained continuous employment at the same plant for a minimum of four years preceding the base year, with positive earnings recorded in each of those years. This criterion ensures that our sample comprises individuals with a strong and stable attachment to the labor market and the employer, reducing potential noise from short-term contracts.

In our main analysis, we include job-to-job transitions in the sample, acknowledging that displaced workers may not necessarily become ultimately unemployed or otherwise non-employed. This consideration is vital as some individuals may find new employment immediately after displacement. Unless stated otherwise, all our estimates utilize this treatment definition.

Our control group comprises employees similar in all respects except for the displacement event, drawn from the broader pool of individuals not displaced due to plant closure or mass lay-off. To create this control group, we match three control units for each treated individual based on pre-treatment characteristics, employing Coarsened Exact Matching (CEM) to ensure similarity. Matching variables include the year of the shock/placebo shock, age (5 categories), and industry (coarsened). Industry classification follows Statistics Finland's Standard Industrial Classification TOL 2008. These variables are chosen for their predictive power regarding earnings trajectories and individual indebtedness, enhancing the suitability of the matched control group as a counterfactual to displaced workers. Using this matching methodology, we successfully found three controls for each treated individual.[9] Consequently, our estimation sample comprises

[9] The main results remain robust for using fewer, as well as larger number of matching variables.

84,227 treated individuals and 252,681 controls. We do not balance the panel in event time, implying that some individuals are not observed for the entire period utilized to estimate effects.

3.4. Descriptive Statistics

Table 1 presents descriptive statistics for our sample, demonstrating the comparability between our treatment and control groups in both matched and non-matched variables in the year *b-2*. While not mandated by the identification assumptions, this alignment strengthens our confidence that the control group serves as a credible counterfactual to the treatment group. The individuals in our sample have an average age of 44, with approximately 62% being males[10] and 60% being married. Almost 50% have only secondary education, and the average working tenure in the same establishment is seven years.

The pre-displacement earnings and total debts (such as mortgages) average 43-45 thousand euros annually, and the ratio of household indebtedness to income is between 160-180%, which is comparable with the statistics for the entire Finnish population, according to Statistics Finland (2024b). The proportion of workers who had their debt enforced is 6%, significantly below the Finnish average (10%). This suggests that most individuals with their debt enforced lack a stable and strong attachment to the labor market. The average amount subject to enforcement is 370 euros for the control group and 550 euros for the treatment group.

[Add Table 1 here]

[10] Approximately 50% of women in Finland are employed in the public sector, resulting in a higher representation of men in our sample of displaced and non-displaced workers in the private sector.

4. Empirical Analysis

4.1. Specification

We examine the effect of job displacement on the probability of entering debt enforcement as follows:

$$Y_{it} = \alpha_i + \sum_{j=-6, j\neq -2}^{9} \delta_j \times I(t = b + j) \times Treat_i + \sum_{j=-6, j\neq -2}^{9} \gamma_j \times I(t = b + j)$$

$$+\theta_t + \rho_{it} + \varepsilon_{it} \qquad (1)$$

where *i* denotes individual, and $Treat_i$ gets a value of one if individual *i* is in the treatment group, i.e. experienced job displacement in year *b,* and gets a value of zero for the control group. The coefficient of interest is the coefficient for event time *I* and the treatment status, δ_j. We follow individuals six years before displacement, and nine years after displacement. For different debt types, the follow-up period is shorter at seven years. We use event time $b - 2$ as reference period. In equation (1), α_i denotes individual fixed effects, θ_t calendar year fixed effects, and ρ_{it} age fixed effects. Under the assumption that the control group and treatment group would in absence of treatment develop in parallel (conditionally on time and individual fixed effects), the coefficient δ_j identifies the causal effect of the shock. Error term ε_{it} is clustered at the individual level. The panel is unbalanced in event time, as some individuals are not observed for the entire estimation period.

Accordingly, the basic difference-in-differences (DD) model is estimated as follows:

$$y_{it} = \alpha_i + \beta treat_i + \gamma post_{it} + \delta treat_i \times post_{it} + \theta_t + \rho_{it} + \varepsilon_{it} \quad (2)$$

In equation (2), $post_{it}$ is an indicator equal to 1 if individual unit observation belongs to the post-shock period, and parameter δ represents the average treatment effect over the years on the outcomes.

4.2. Main Results

In this section, we present our primary findings concerning indebtedness outcomes. All the effects in the figures are expressed as changes (%) from the pre-shock (period *b-2*) mean, although estimated in levels. Our event-study regression results are illustrated in Figure 2, and the average treatments effect on the treated over the post-displacement years are reported in Table 2. Notably, we observe significant effects on various measures of indebtedness following job displacement. As an additional outcome, we also report the impact of job displacement on subsequent earnings, which provides an important benchmark of broader economic costs of job loss. The absence of discernible pre-trends supports our assumption that control and treated groups would evolve in parallel without treatment. The effects are statistically significant for most follow-up years and hold economic significance as well.

Using an indicator variable for having enforced debts, we find that job displacement increases the probability by around 13% in year *b+4* compared to the control group. Strikingly, job displacement demonstrates long-lasting consequences on debt problems, with displaced workers still having approximately an 11% higher probability of having enforced debts compared to the control group in year *b+9*. The effect on the probability of having enforced debts of least 1,500 euros is also positive and statistically significant, peaking at approximately 18% two years after

displacement. These results remain robust for our third indicator outcome, indicating having enforced debts for two consecutive years. The average DD effects over the entire nine-year follow-up are reported in Table 2, suggesting an average effect on debt enforcement probability of about 10%.

We posit that a crucial factor mediating the impact of job displacement on debt problems is the loss of income. While we acknowledge the potential influence of health-related or social factors, we emphasize the significance of income loss as the primary channel. As illustrated in Figure 2, wage earnings undergo a substantial reduction of over 20% following a job loss, consistent with previous research (e.g., Korkeamäki and Kyyrä 2014; Verho, 2020; Braxton et al., 2024). Although the negative wage effect is statistically significant and persistent, it diminishes over time. Nine years after displacement, wages remain roughly 4% lower for displaced workers compared to the control group.

[Add Figure 2 and Table 2 here]

As robustness tests, we explore two additional definitions of treatment group. First, following Keys (2018) for potential insights into mechanisms, we estimate the model conditional on being non-employed in the year after displacement ($b+1$). As expected, the effects are more pronounced for each outcome, as depicted in Figure A3 of the Appendix. It is important to note that these findings do not provide direct evidence of the effect of poor labor market attachment on indebtedness. Instead, they demonstrate that this subgroup not only experiences a more substantial decline in earnings but also a more pronounced increase in the probability of indebtedness.

Secondly, as emphasized by Sullivan and von Wachter (2009), the quasi-random event is the firm-level shock, necessitating stronger assumptions for the displacement variable to be considered exogenous. Consequently, we also estimate the effect of firms laying off personnel without conditioning on the worker leaving the firm. These results are similar to those reported in Figure 2, but the effects are smaller in magnitude (see Figure A4 of the Appendix).

4.3. Type of debt

Figure 3 presents our event study regression results for each of the seven enforced debt types, while Table 3 reports the corresponding average treatment effects over the entire post-displacement period. Our data for detailed debt types covers the years from 2008 to 2015, and we track individuals for seven years after displacement. We find that displaced workers have a higher probability of incurring enforced debts due to unpaid taxes and other private debts, such as unpaid rents, installment purchase payments and evictions, compared to non-displaced workers (Panels C and G of Figure 3). The effect is particularly pronounced for unpaid taxes, showing a 9% increase one year after job displacement, peaking at 27% five years after displacement, and remaining around 20% six years post-displacement. Similarly, the probability of other private debt-related issues increases by 8-16% and persists for one to five years after displacement.

Job loss also influences debt problems related to penal order and fines, public loans and insurances, and alimony, with displaced workers facing a 10-20% higher likelihood of these debts compared to non-displaced workers. However, these effects are short-lived, diminishing over time, with the average treatment effects failing to reach statistical significance (see Table 3). Finally, we find no significant effects on unpaid debts related to social and healthcare costs

or real property payments (Panels A and E of Figure 3). The lack of an effect on healthcare-related debts is plausibly explained by Finland's generous and cost-effective healthcare system.

[Add Figure 3 and Table 3 here]

4.4. Heterogeneity Analyses

We conduct several heterogeneity analyses to examine how the effects vary across different individual groups. To this end, we add an interaction between a characteristic indicator (e.g., male versus female) and the treatment, using both Equation (2) and Equation (3). The heterogeneity analyses are performed based on gender, education level (higher education versus other), marital status, and age group (20-44 versus 45-64 years of age). Accordingly, we investigate the influence of pre-displacement debt on the outcomes. Building on the findings reported in Keys (2018) – which suggests that the anticipated benefits of filing for bankruptcy correlate with a higher probability of bankruptcy after unemployment - we employ two alternative variables: total debt in euros and the debt-to-income ratio. Both variables are measured prior to the treatment. We then analyze disparities in the effects across two subgroups: individuals with total debt in euros or a debt-to-income ratio above the median, and those with values below the median. The event study estimation results, presented as %-changes in probabilities in Figure 4, illustrate the estimated differences in the effects of job displacement on debt enforcement across worker groups. In Table 4, we report both the baseline and interaction estimates for each specification.

The first column of Table 4 presents the heterogeneity analysis by gender, indicating no statistically significant difference in the effect between males and females. Column 2 displays

the results by education level. Based on the highest completed degree, individuals were categorized into one of two educational groups: low education (primary or secondary education, ISCED levels 1-4) and high education (some tertiary education, ISCED levels 5A, 5B and 6). Our baseline DD estimate suggests that job displacement increases the incidence of enforced debts by approximately 11% over the post-treatment period for individuals with lower education levels. However, the effect size of the interaction term is nearly equal in magnitude and opposite in sign to the baseline estimate, indicating that highly educated individuals are scarcely affected by the job loss.

Column 2 of Table 4 examines marital status. While we find no significant difference in the effect of job displacement on the likelihood of having enforced debts between married and unmarries individuals, the effect is nearly twice as large for younger individuals compared to the older individuals, as shown in Column 4. The latter finding is consistent with the notion that the accumulation of other assets among older individuals may help maintain solvency after job loss.

Finally, our findings provide important insights into the mechanisms linking job displacement and debt problems. Specifically, they suggest that individuals with a heavy pre-existing debt burden - such as mortgages – are more likely to experience enforced debts following job loss. For individuals with lower debt levels, job loss has either a statistically insignificant or modest (~3%) effect on enforced debts (Column 5-6 of Table 4). In contrast, the interaction terms reveal effects that are three to four times larger for individuals with higher levels of debt. All heterogeneity findings align with the event-study estimates shown in Figure 4.

[Add Table 4 and Figure 4 here]

4.5. Extensions: Spillover effects and bankruptcy procedure

We further explore the overall debt burden of job displacement by analyzing spillover effects within a family. First, we examine whether an individual's job displacement increases the probability of their spouse entering debt enforcement, following Gerardi et al. (2018). Second, we study inter-generational effects by investigating the impact on an individual's parents and children. The event-study regression estimates are illustrated in Figure 5, while the average DD effects are reported in Table 5.

Panel A of Figure 5 illustrates the results of the spillover effects on a spouse. The findings suggest that job displacement increases a spouse's risk of debt enforcement by around 5% a few years after displacement, although the average treatment effect over the entire post-displacement period does not reach statistical significance (Column 1 of Table 5). Figure also illustrates the spillover effects on parents (Panel B) and on children (Panel C). Two important findings stand out. First, we do not observe any inter-generational effects on parents, indicating that an individual's job displacement does not increase (or decrease) their parent's probability of entering debt enforcement. Second, we find some inter-generational effects on individuals' children. Although the event study estimates are statistically insignificant for most of the years, the average DD effect over post-displacement period yields a statistically significant yet small estimate, suggesting that job displacement increases the probability of at least one child entering debt enforcement by on average 4% (Column 3 of Table 5).

Finally, we link our results more closely to current literature primarily conducted from the U.S., where job displacement is associated with a bankruptcy incidence (Keys 2018; Braxton, et al., 2024). We therefore examine the effect of job displacement on the probability of entering debt

restructuring process, which is an indicator for the bankruptcy of private individuals. These results, that are documented in Figure 5 (Panel D) and Table 5 (Column 4), indicate that although job displacement increases the likelihood of severe debt problems, individuals do not adjust to these shocks through bankruptcies.

[Add Table 5 and Figure 5 here]

5. Discussion

Around 15% of prime working-age individuals in Finland are subject to debt enforcement, making it a significant public issue. We find that a negative shock, in the form of exogenous job loss, increases the likelihood of entering debt enforcement by on average 10% over the entire ten-year window. The effect follows roughly an inverse U-shape, peaking around the fourth year, and is slightly larger considering more serious debt problems, such as having at least 1,500 euros in enforcement. Thus, following a displacement shock, over-indebtedness takes multiple years to fully accumulate, with some reversal in a nine-year follow-up. This contrasts with the earnings effect, which is greatest in the first year following job loss and gradually diminishes towards the end of the nine-year follow-up period. We contrast these findings with previous comparable studies. In the U.S., Aaronson et al. (2019) show that job loss following a mass layoff increases credit card delinquency and overdrafts by 7% in the second and third years.

In contrast, we find an increase of up to 16% in the debt enforcement of private debts, a group most closely related to credit card delinquency and overdrafts. Since there are several steps from credit card overdrafts to debt enforcement (see Section 2.2.), the effect on over-indebtedness in Finland is clearly larger than in the U.S. Aaronson et al. (2019) and Braxton et al. (2024) find that some individuals who face job loss in a mass layoff take on more debt. Braxton et al. (2024)

show that around one-third of individuals borrow, while another one-third deleverage or default. These diverging behaviors could explain the increase in debt enforcement. When we examine the effect of displacement on bankruptcy incidence, we find statistically insignificant effects in the Finnish context. This result stands in stark contrast to the systematic finding of a steep and immediate increase in bankruptcies following job loss in the U.S. (Keys 2018; Braxton et al. 2024).

Three key factors may explain the larger effects observed in our study compared to those in the U.S. First, we measure over-indebtedness differently that most U.S. studies. We use an administrative dataset on debt enforcement, while previous studies have often focused on credit card debt delinquencies. Second, the Finnish institutional setting - characterized by generous social security, affordable public healthcare, and stringent debt enforcement processes - differs significantly from the U.S. context. While the Nordic welfare state provides substantial income transfers to the unemployed, potentially alleviating financial distress, it is relatively strict in allowing for bankruptcy. DeFusco, Enriquex and Yellen (2024) show that less than 1% of workers aged 16–64 are in wage garnishment in the U.S, while the corresponding share in Finland is substantially higher. Our finding of no increase in bankruptcies after job loss suggests that a quick transition to bankruptcy is not an option available to most individuals under the Nordic model. The possibility of defaulting without fulfilling the entire debt obligation operates as a form of social insurance and could substitute for other social insurance policies (Braxton et al., 2024).

Third, our longer follow-up period provides valuable insight into long-term debt dynamics. Unfortunately, we do not currently have similar evidence from other countries for comparison. Another key distinction between the U.S. and Finland is the source of debts. In the U.S., medical

debt is a significant component of household debt (Domowitz and Sartain 1999; Dobkin et al. 2018). Our study indicates that job loss does not have any impact on debt problems related to social or healthcare payments in Finland. This difference may be attributed to the widespread coverage of occupational healthcare (nearly 90%) and the affordability of public healthcare, including partial reimbursement for drug purchases and an annual expense cap of 600 euros. Instead, the effects are more pronounced for unpaid taxes, and various sources of private debts.

We also contribute to the literature by providing novel evidence on spillover effects within families. Gerardi et al. (2018) find no significant correlation between a spouse's exogenous unemployment and an individual's default risk. In contrast, we find that an individual's job loss increases their spouse's risk of entering debt enforcement within two to five years after displacement, yet the effect is modest at around 4%. Kreiner et al. (2019) document a strong inter-generational relationship in default propensities but do not find a statistically significant link between a child's unemployment experience and a parent's likelihood of default. To our knowledge, no prior studies of job displacement have examined intergenerational effects in the opposite direction. Our results show that an individual's job displacement can increase the risk of a child entering debt enforcement by approximately 4% on average. Whether this is driven by reduced financial transfers from parents, leading to a decline in the child's income, remains an open question for future research.

6. Conclusions

This study contributes to the literature by examining the impact of involuntary job loss on the incidence of debt enforcement, utilizing comprehensive administrative data covering the entire Finnish population, and employing reliable methodological approaches to detect causal

relationships. Finland provides a unique context as a Nordic welfare state with a stringent debt enforcement process, where 30-50% of future earnings can be garnished for up to 25 years. Gaining a better understanding of long-term debt dynamics in the face of exogenous job loss within this Nordic context, using rich administrative data, can offer valuable insights for developing more effective policies.

Our findings reveal that job displacement exerts substantial adverse effects on indebtedness. While we find no effect on the probability of bankruptcies, there is some evidence of spillover effects on spouses and children. Our analysis highlights that displaced workers face enduring and pronounced adverse effects, partly due to reduced income and the burden from existing debt.

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Figures and tables

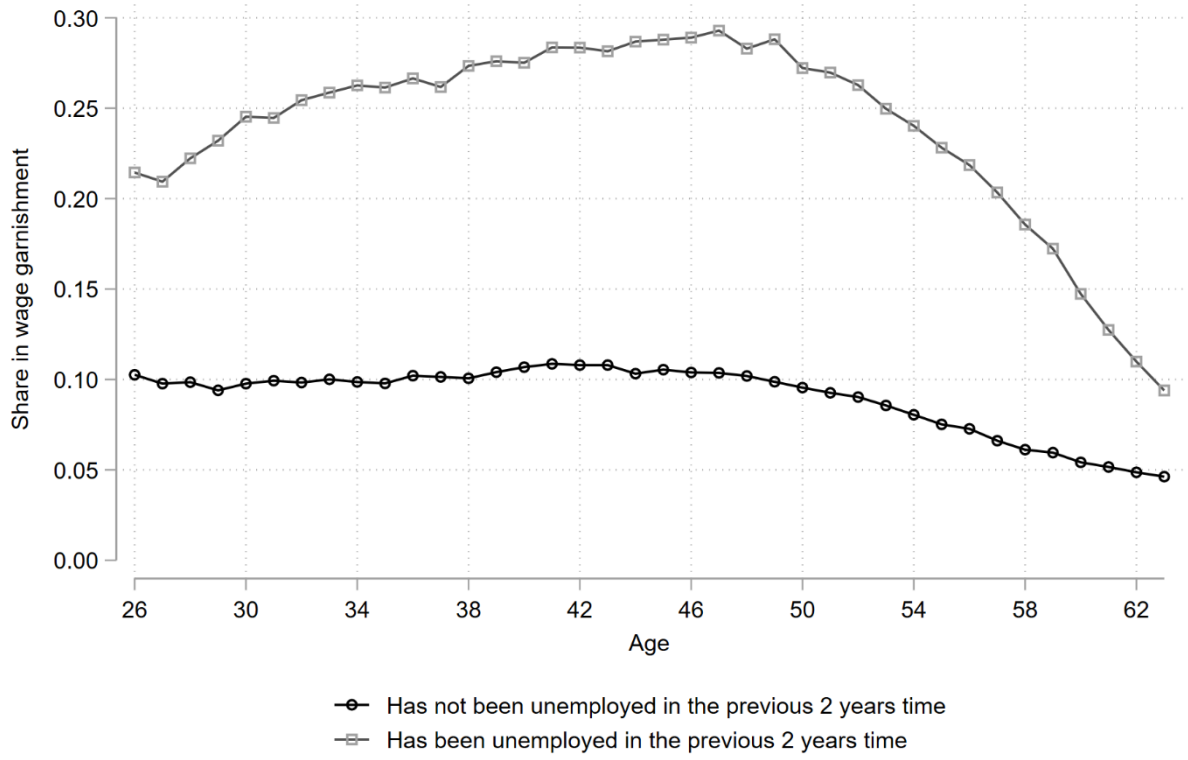

Figure 1: Previous unemployment and the unconditional probability of debt enforcement by age in 2016 (Source: Statistics Finland)

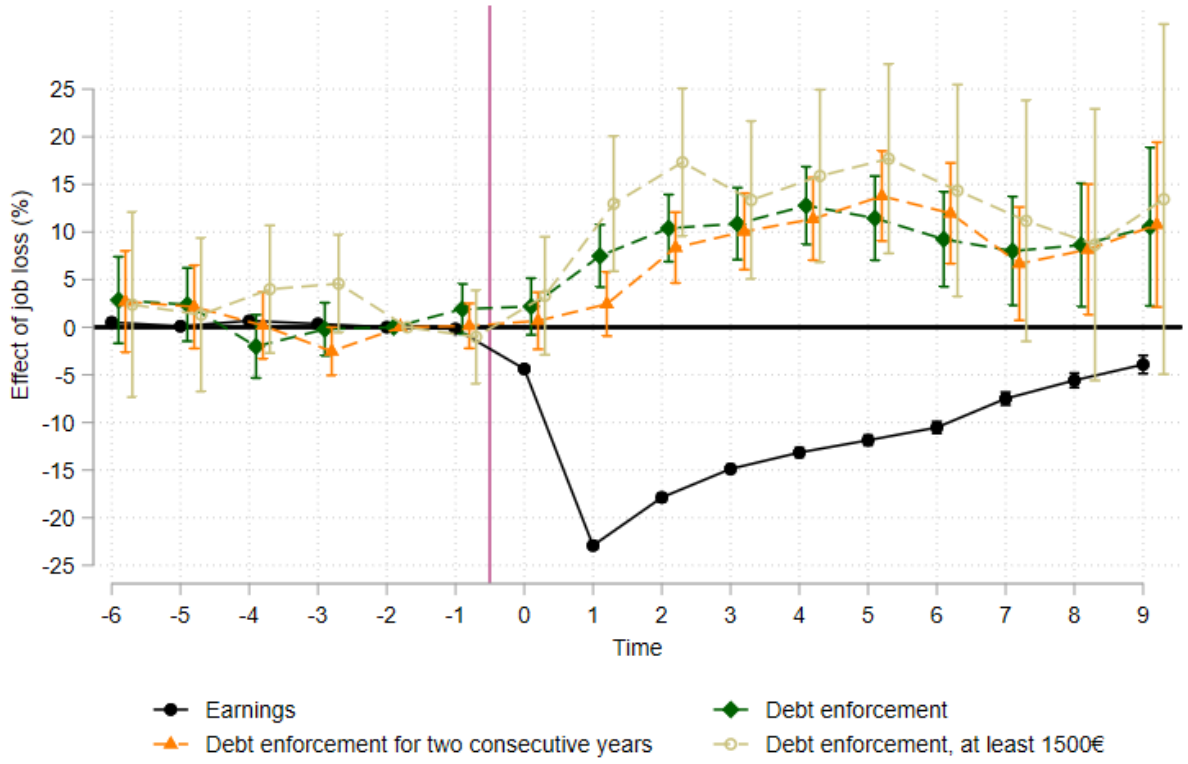

Figure 2: The effect of job loss on earnings and three measures of debt enforcement with 95% significance levels. Effects are scaled in % changes from the pre-shock (b-2) mean.

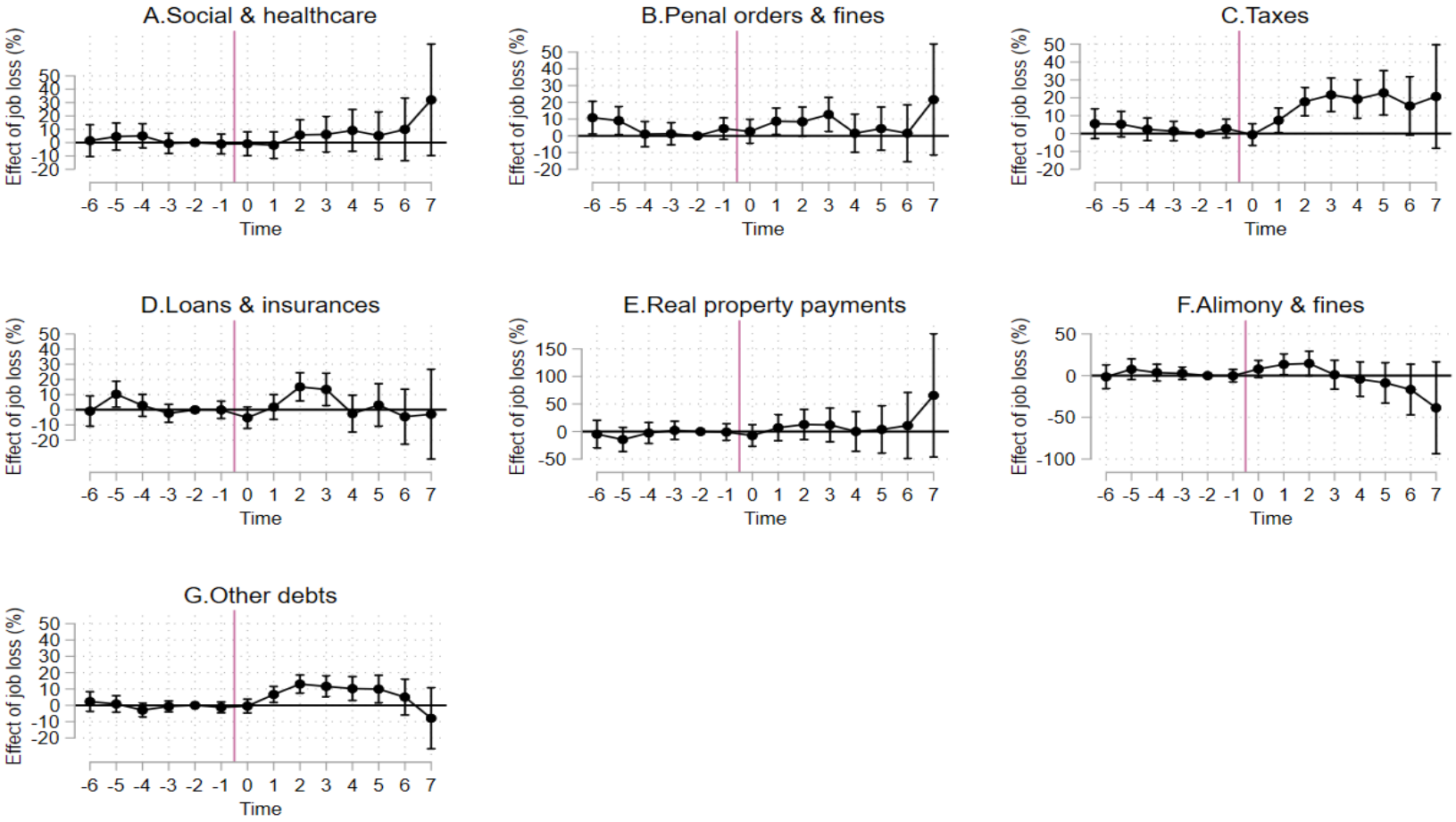

Figure 3: The effect of job loss on earnings by debt type with 95% significance levels. Effects are scaled in %-changes from the pre-shock (*b-2*) mean. Note: x-axis (time) is constrained to seven years after the job loss because the data on reasons related to debt enforcement are not available for the whole study period.

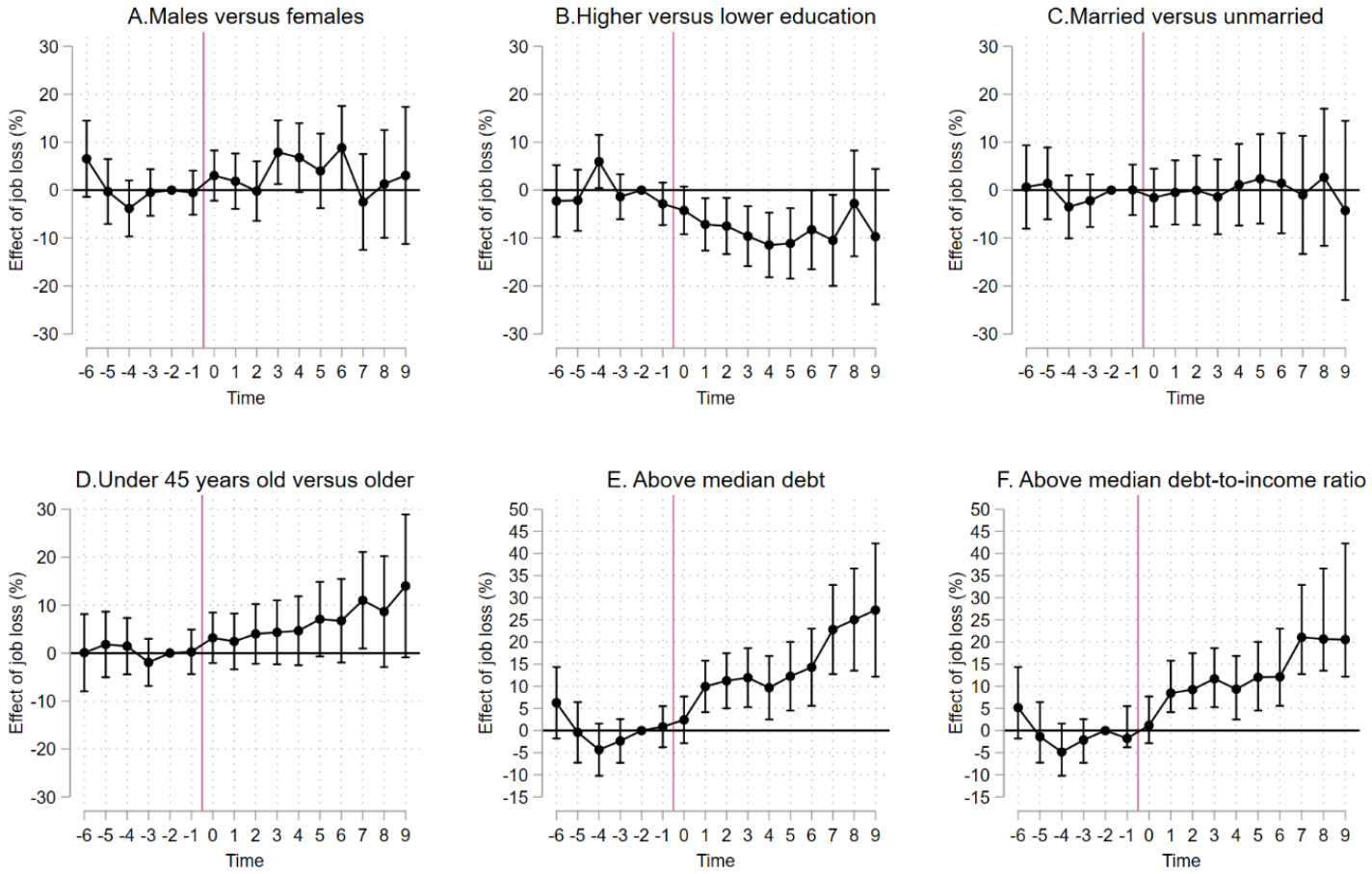

Figure 4: The effect of job loss on earnings on the probability of having enforced debts between worker groups with 95% significance levels. Effects are scaled in % changes from the pre-shock (b-2) mean.

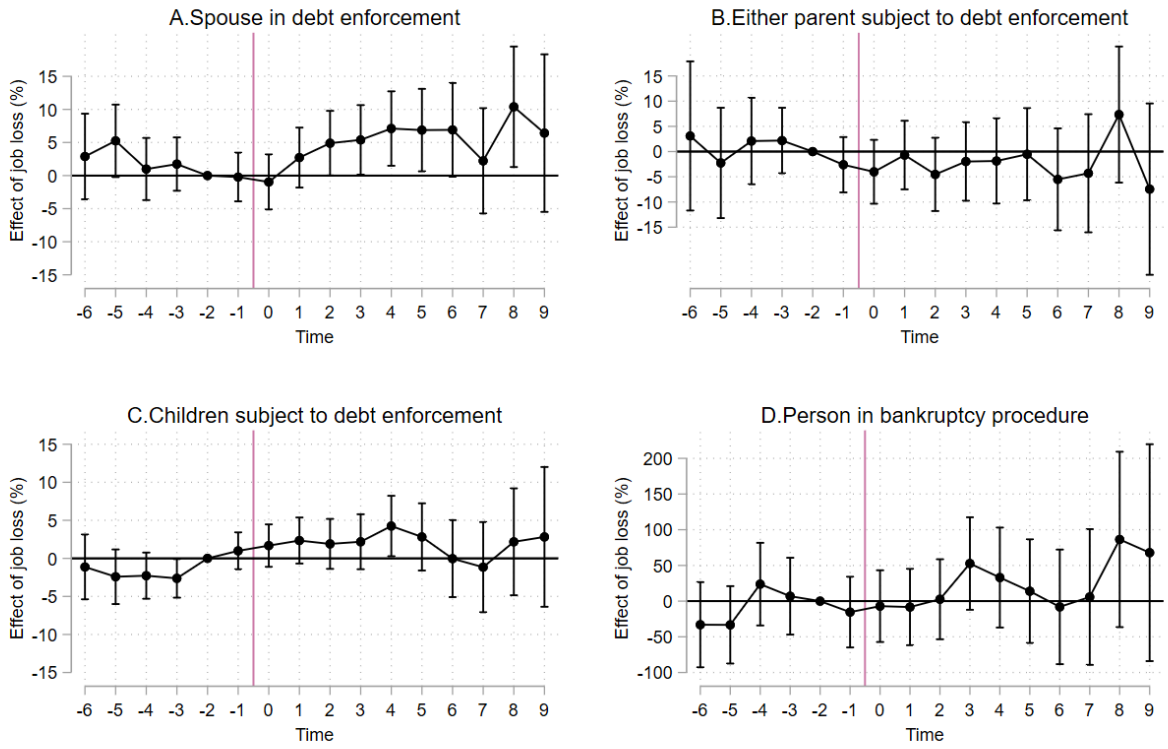

Figure 5: The effect of job loss on earnings on the probability of having enforced debts: spillover effects and start of bankruptcy procedure, with 95% significance levels. Effects are scaled in % changes from the pre-shock (b-2) mean.

Table 1: Means for treatment and control groups

Variable	Treated	Control
Age	44.07	44.04
Male	0.63	0.62
Married	0.57	0.60
Number of children under 18	0.73	0.77
Tenure (years)	7.02	7.39
Primary education	0.15	0.13
Secondary education	0.49	0.46
Higher education	0.36	0.41
Earnings, thousand euros	42.65	44.72
Overall debts, thousand euros	42.95	45.51
Debt enforcement	0.06	0.05
Debt enforcement, at least 1500 euros	0.02	0.01
Debt enforcement in 2 consecutive years	0.05	0.04
Amount in enforcement, thousand euros	0.55	0.37
Debt-income ratio	1.76	1.57
Plant personnel under 100	0.51	0.47
Plant sales under 400 thousand euros	0.15	0.13
Observations	**84,227**	**252,681**

Notes: The figures were calculated using data from Statistics Finland. Nominal values were adjusted for inflation using a GDP deflator, with 2019 as the base year. Means are calculated in year *b-2*.

Table 2: Average DD effects of job loss on earnings and the probability of having enforced debts.

	Earnings	Debt Enforcement	Debt Enforcement for two consecutive years	Debt Enforcement, at least 1500 euros
	(1)	(2)	(3)	(4)
Job loss	-5967.2 ***	0.00463 ***	0.00274 ***	0.00158 ***
	(71.51)	(0.00081)	(0.00078)	(0.00054)
Observations	3,095,459	3,095,459	2,896,996	3,095,459
Mean at *b-2*	42,646	.0598	.0501	.0171

Notes: Other controls include year, age, event time and individual-level fixed effects. The sample size is lower in Column (3), because the variable cannot be identified for the first observation year in the data (in debt enforcement for two consecutive years). Average DD estimates on the effect of job loss. Standard errors in parentheses are clustered at the individual level. *** p<0.01.

Table 3: Average DD effects of job loss on the probability of having enforced debts by debt type

	Social & healthcare	Penal orders & fines	Taxes	Loans & insurances	Real property payments	Alimony	Other private debts
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Job loss	-0.000082	0.000826	0.00137 **	0.000142	0.000146	0.000392	0.00176 **
	(0.000509)	(0.000603)	(0.000644)	(0.000576)	(0.000264)	(0.000358)	(0.000774)
Observations	2,152,442	2,152,442	2,152,442	2,152,442	2,152,442	2,152,442	2,152,442
Mean at *b-2*	.0113	.0185	.0214	.0152	.0024	.0058	.0330

Notes: Other controls include year, age, event time and individual-level fixed effects. Average DD estimates on the effect of job loss. Standard errors in parentheses are clustered at the individual level. ** p<0.01.

Table 4: Average baseline DD effects and differences in effects of job loss on the probability of having enforced debts between worker groups

	Males (IT) versus females (BL)	Higher educ. (IT) versus lower educ. (BL)	Married (IT) versus nnmarried (BL)	Older individuals (IT) versus younger individuals (BL)	Above median debt (IT) versus below median debt (BL)	Above median debt-to-ratio (IT) versus below debt-to-ratio (BL)
	(1)	(2)	(3)	(4)	(5)	(6)
Job loss, baseline	0.00310**	0.00679***	0.00448***	0.00312***	0.00183	0.00212*
	(0.00121)	(0.00119)	(0.000929)	(0.00103)	(0.00114)	(0.00110)
Job loss x group interaction	0.00247	-0.00535***	0.000336	0.00303*	0.00628***	0.00564***
	(0.00161)	(0.00149)	(0.00183)	(0.00161)	(0.00161)	(0.00160)
Observations	3,095,459	3,095,459	3,095,459	3,095,459	3,095,459	3,095,459
Mean at *b-2*	.0598	.0598	.0598	.0598	.0598	.0598

Notes: BL = baseline group; IT (interaction term group). Age group: Under or above 45-year-old. Other controls include year, age, event time and individual-level fixed effects. Education level, marital status, age, and initial debts are measured at year *b-2*. Standard errors in parentheses are clustered at the individual level. ***p<0.01 and * p<0.10.

Table 5: Average DD effects of job loss on the probability of having enforced debts: spillover effects and start of bankruptcy procedure

	Spillovers			
	Spouse in debt enforcement	Parent in debt enforcement	Child in debt enforcement	Person in bankruptcy procedure
	(1)	(2)	(3)	
Job loss	0.00078	-0.00139	0.00326 ***	0.0000403
	(0.00092)	(0.00104)	(0.00112)	(0.0000634)
Observations	1,750,959	1,833,047	2,258,889	3,095,459
Mean at *b-2*	.0340	.0491	.0588	.000451

Notes: Other controls include year, age, event time and individual-level fixed effects. Information on a spouse, parents and children are fixed at year *b-2*. Standard errors in parentheses are clustered at the individual level. ***p<0.01 and * p<0.10.

Appendix

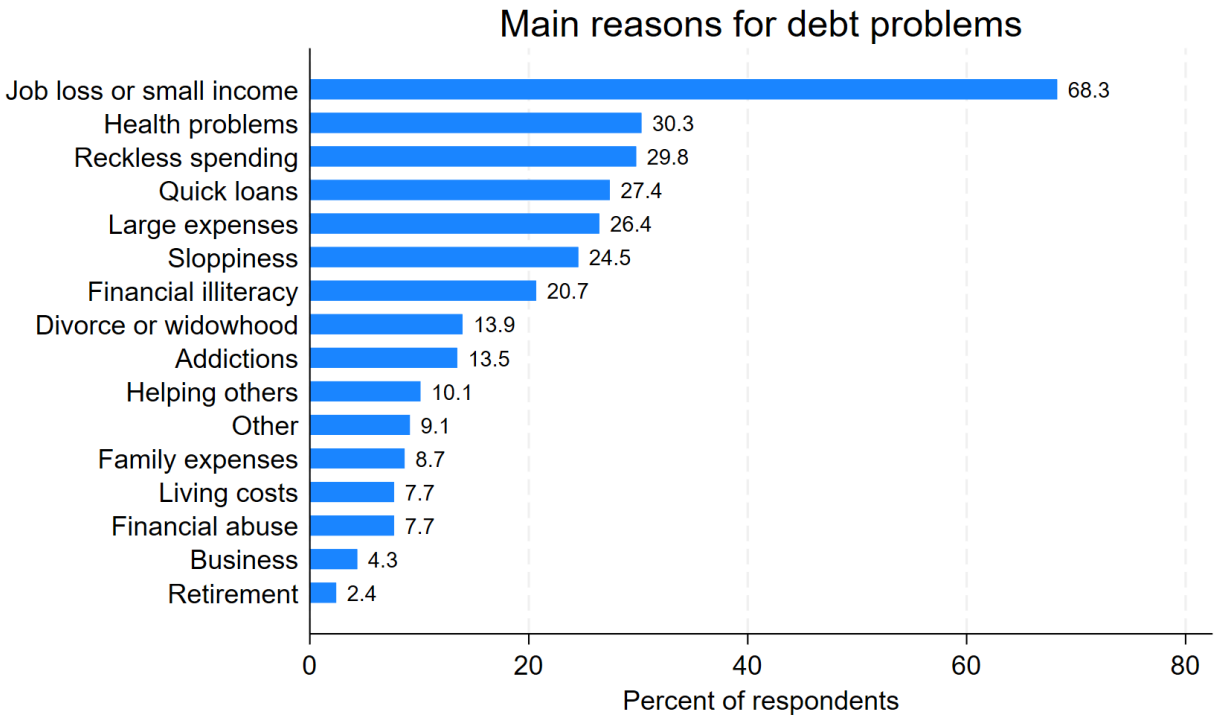

Figure A1: The main reasons for debt problems, multiple choices allowed. Calculations are based on data on 208 respondents from the survey conducted by Guarantee Foundation.

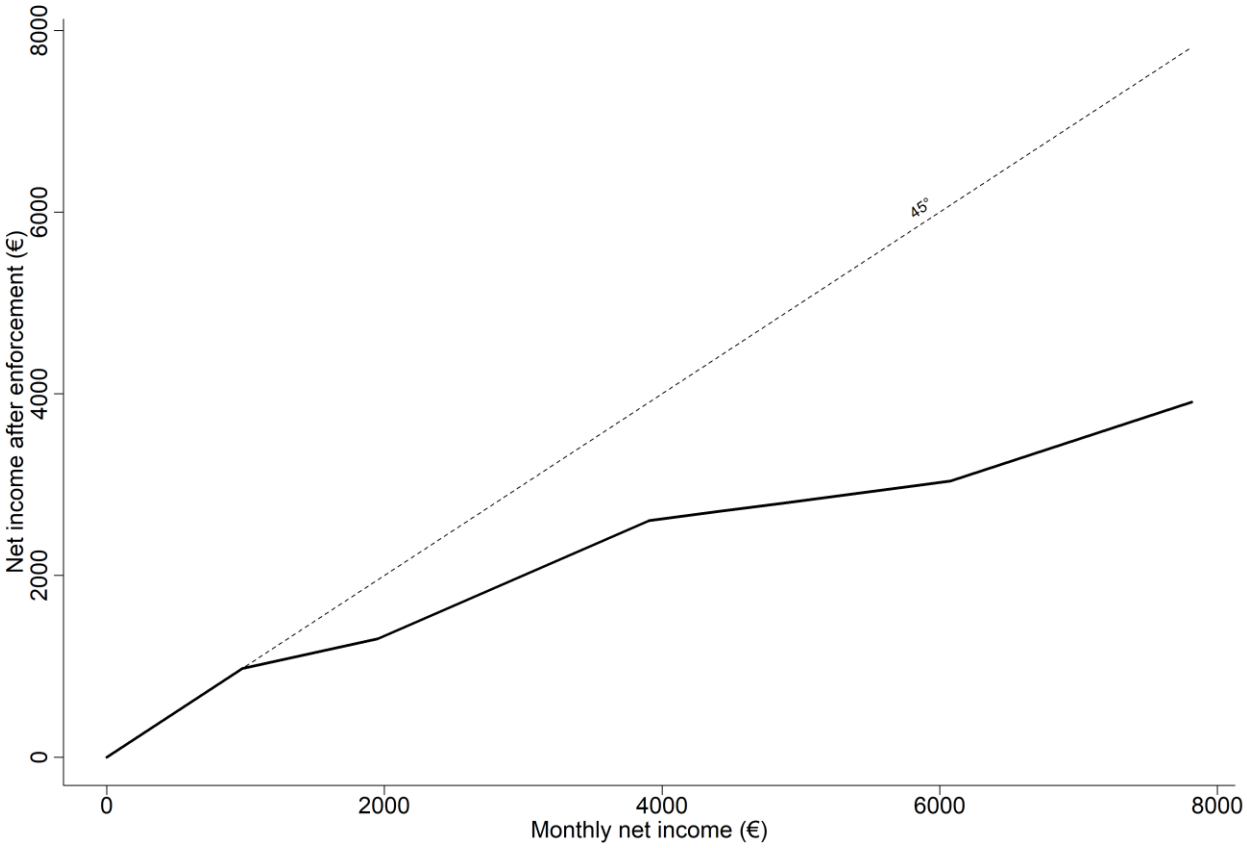

Figure A2: Net monthly income after enforcement in each net income level, from 0 to 8,000 euros per month in 2025 for a debtor with no dependents. Source: Authors' own calculations based on National Enforcement Authority Finland.

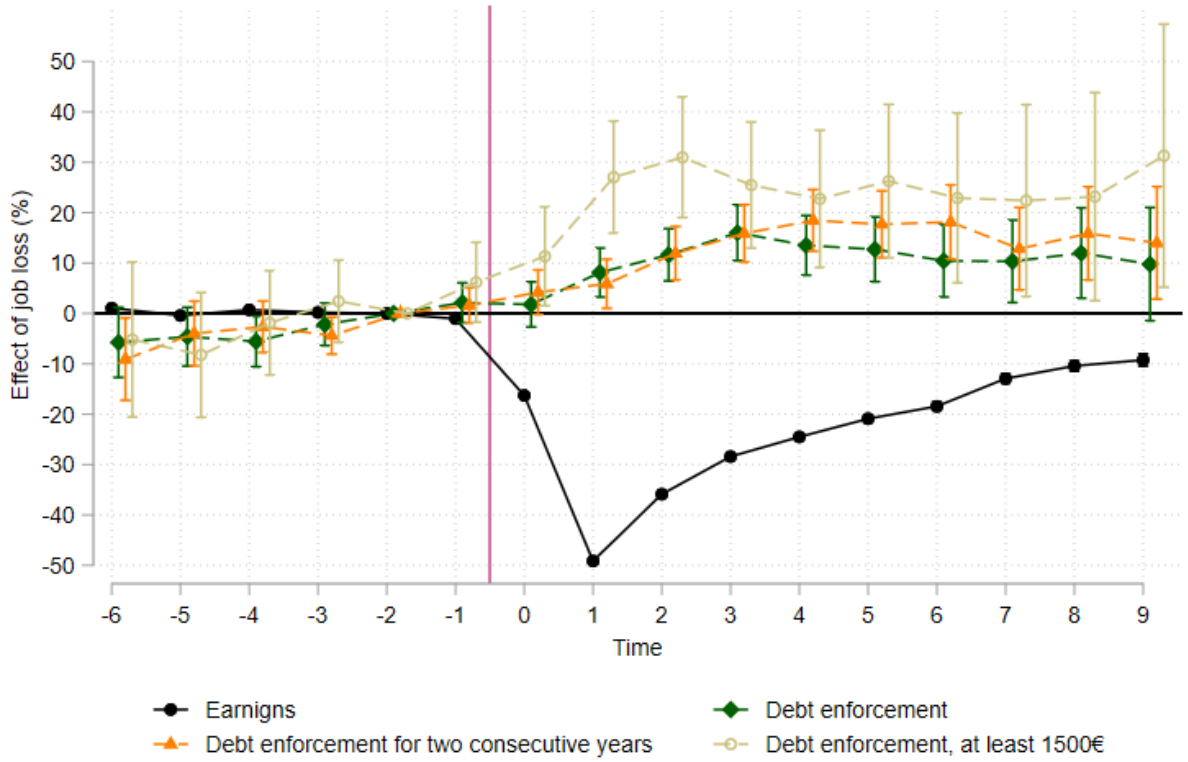

Figure A3: The effect of job loss on earnings and three measures of debt enforcement conditional on being non-employed in the year after displacement (*b+1*) with 95% significance levels. Effects are scaled in % changes from the pre-shock (*b-2*) mean.

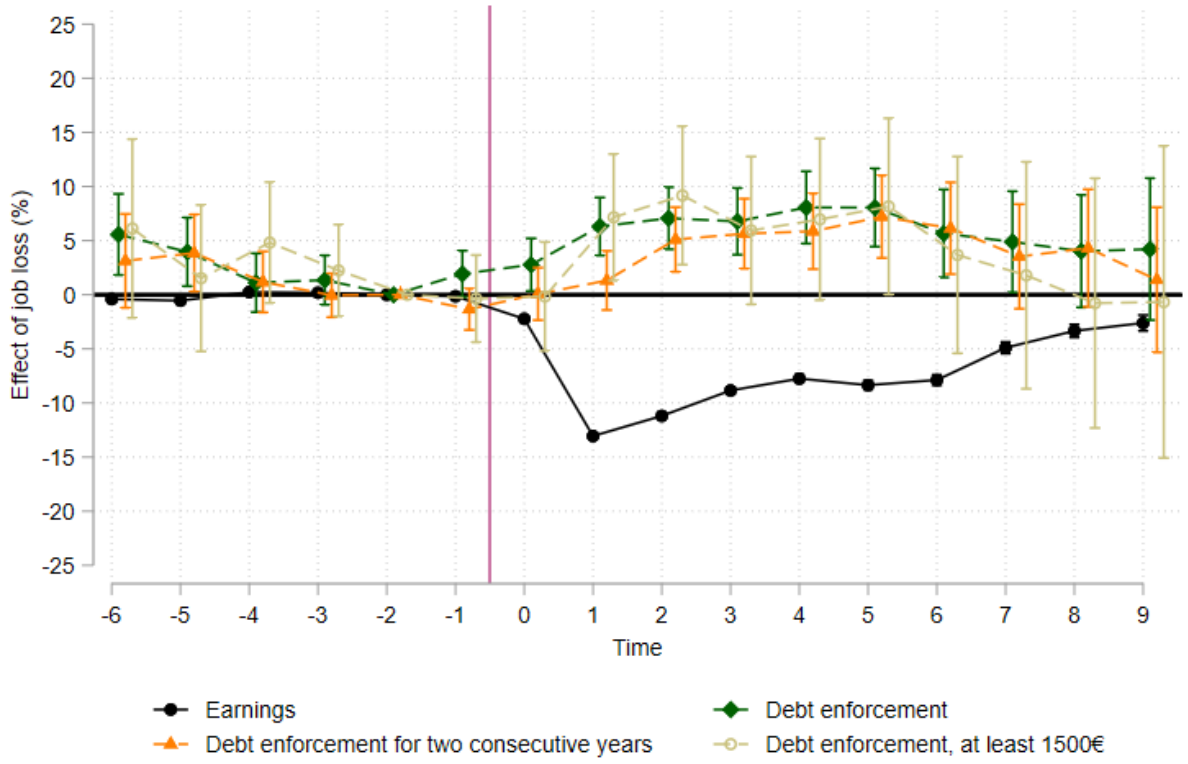

Figure A4: The effect of job loss on earnings and three measures of debt enforcement without conditioning on the worker leaving the firm with 95% significance levels. Effects are scaled in % changes from the pre-shock (*b-2*) mean.

Table A1: Debt types

	Debt types
Social and healthcare	Clinic and hospital payments, dental payments, childcare, home help service, and other social and health care payments
Taxes	Inheritance tax, transfer tax, VAT, withholding tax, outstanding tax, stamp duty, property tax, and other taxes
Penal orders and fines	Parking tickets, public transportation penalty fares, court and trial fares, on-the-spot fines, penalty payments, compensation for damage
Alimony	Alimony
Loans and insurances	Public mortgage, indemnity insurance, other insurances, traffic insurance, student loans, promissory note payments
Real property payments	Waste disposal payments, sewage payments, property toll payments
Other private debts	Customs, unpaid rents, instalment purchase payments, evictions, other debt collections, enforcements, debt provable in bankruptcy