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Debt Burden of Job Loss in a Nordic Welfare State

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Abstract

The paper investigates the impact of involuntary job loss on severe debt problems in Finland, where up to 50% of income may be subject to wage garnishment for 25 years. We use linked employer-employee data combined with unique administrative records covering debt enforcements from 2007 to 2018. Our event study analysis uncovers a robust and persistent impact of job loss, characterized by plant closures and mass layoffs, on debt-related challenges. Specifically, displaced workers have a 5% higher likelihood of enforced debts in the year of displacement compared to the control group. This effect increases, peaking at 16% four years post-displacement and maintaining a substantial level of roughly 10% nine years afterwards. Effects are particularly large for unpaid taxes, penal orders and fines, while job loss demonstrates only a modest impact on unpaid social or healthcare payments and alimonies. Moreover, these effects are more profound among males, less educated, and individuals already burdened with excessive debt, such as mortgages, prior to displacement.

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Tiivistelmä

Työpaikan menettämisen vaikutus ulosotto-velkoihin

Suomen ulosottojärjestelmä on hyvin tiukka, ja velallisen nettomääräisestä palkasta ja muista toistuvaistuloista voidaan ulosmitata jopa 50 prosenttia 25 vuoden ajan. Henkilöt voivat päätyä velkaongelmiin monista eri syistä johtuen, mutta kyselyiden perusteella noin puolet kokevat työn menetyksen ja/tai tulojen äkillisen alenemisen olevan juurisyy velkaongelmiin. Tässä tutkimuksessa tarkastellaankin työpaikan menettämisen vaikutusta henkilön todennäköisyyteen joutua ulosottoon.

Käytämme yhdistettyä työnantaja-työntekijäaineistoa sekä tietoja henkilöiden ulosottomerkinnöistä vuosille 2007–2018. Työpaikan menettäneillä tarkoitamme heitä, jotka menettävät työpaikkansa toimipaikan sulkemisen tai joukkoirtisanomisen takia, ja analyysissa tarkastelemme henkilöiden velkaongelmia jopa yhdeksän vuoden seurantajakson aikana. Työpaikan menettäneillä havaitaan 5–20 prosenttia suurempi alttius joutua ulosottoon verrokkiryhmään verrattuna, ja tämä vaikutus on merkittävä vielä yhdeksän vuotta työpaikan menettämisen jälkeen. Vaikutukset ovat suurempia miehillä kuin naisilla, vähemmin koulutetuilla kuin korkeakoulutetuilla ja henkilöillä, joilla oli merkittävästi velkaa jo ennen työpaikan menettämistä. Lisäksi havaitsemme, että työpaikan menetys lisää erityisesti maksamattomista veroista, rangaistus- ja sakkomääräyksistä sekä muista henkilökohtaisista maksuista (kuten osamaksut) johtuvia ulosottoja.

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Keywords: Default, Debt enforcement, Involuntary job loss, Employer-employee data

Asiasanat: Velkojen laiminlyönti, Ulosotto, Työpaikan menetys, Työnantaja-työntekijä-aineisto

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1 Introduction

Nordic countries are characterized by a strong welfare state, emphasizing social and economic equality, free education, universal social programs, and a comprehensive safety net. Given that welfare states bear idiosyncratic risks affecting households, there is often a justification for more stringent insolvency legislation and bankruptcy laws. Conversely, the United States prioritizes a consumer-friendly and lenient bankruptcy system, driven by the less comprehensive social security it provides compared to, e.g., Nordic countries. Notably, there are fundamental differences in debt collection approaches, with the European method perceived as notably strict (Gerhardt 2009; Livshits, MacGee, and Tertilt 2007).[1]

In Finland, when an individual becomes delinquent on debt, the debts can be subjected to a strict enforcement procedure. In practical terms, the National Enforcement Agency primarily seeks debt collection through the enforcement of monetary receivables and asset seizures. Because the access to bankruptcy and debt repayment process is highly restricted, individuals with enforced debts can experience garnishments of 30-50% of their future pay and recurring income for up to 25 years. This contrast sharply with the U.S., where Chapter 7 and Chapter 13 bankruptcy procedures offer a distinct perspective.[2] Despite the existence of a comprehensive welfare state, nearly 10% of the entire Finnish population, and 15% of individuals in their prime working age, had enforced debts in 2022 (Statistics Finland 2023a). This highlights the need to understand the causes of debt problems in a Nordic welfare state such as Finland.

Two prevailing theories shed light on 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 opt for bankruptcy when anticipating financial gains from such a decision. In contrast, the adverse events theory emphasizes the impact of unforeseen challenges, such as job

[1] Divergent insolvency and bankruptcy laws across various countries can be attributed, in part, to fundamental disparities in attitudes towards over-indebtedness. In the United States, over-indebtedness is perceived as a market failure, whereas in numerous European nations, it is regarded as a social and moral issue (Niemi-Kiesiläinen 1999). Heuer (2013) categorizes the insolvency frameworks of the U.S (and Canada) as the "market model", emphasizing quick debt discharge for debtors. On the other hand, Nordic countries fall under the "mercy model", characterized by stringent applicant screenings and empowering debt settlement officials to shape the debt relief process.

[2] 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 (Keys 2018; Exler and Tertilt 2020).

loss, health shock, or divorce, hindering the ability to meet debt obligations.[3] Given the limited and infrequent use of consumer bankruptcy in Finland, strategic behavior in the form of bankruptcy does not appear to be prevalent. Consequently, our focus in this paper centers on explaining the impact of adverse events on debt-related issues. Unemployment shock emerges as one of the most substantial adverse life events affecting households. Extensive research indicates that involuntary job loss not only has lasting effects on earnings and employment (Jacobson, LaLonde, and Sullivan 1993) but also deteriorates health (Kuhn, Lalive, and Zweimüller 2009). Empirical evidence underscores a clear link between unemployment and debt-related problems (**e.g.**; Del-Río and Young 2005; Keese 2009; Du Caju, Rycx, and Ilan 2016), although research employing identification strategies for causal inference is relatively limited and predominantly centered on U.S. experiences (Gerardi et al. 2018; Keys 2018; Braxton, Herkenhoff, and Phillips 2023).

To address this research gap, we contribute to the literature in four ways. First, we adopt a framework akin to Jacobson, LaLonde, and Sullivan (1993), using comprehensive administrative data to explore the causal impact of job loss on the incidence of debt enforcement in a country with a stringent debt enforcement process. The Nordic case provides a compelling point of comparison to existing evidence predominantly based on the U.S. context. Second, we utilize a unique dataset comprising administrative information on debt enforcement for the entire Finnish population. The use of administrative data enhances the credibility and precision of our analysis, originating directly from authoritative sources and thus minimizing the risk of bias or errors associated with self-reporting. Third, beyond merely quantifying the effects, our data enables us to present results based on the primary causes of unpaid debts. These causes include factors such as alimony, unpaid taxes, social and healthcare payments, or penal orders and fines. And fourth, we extend our analysis to uncover the impact of job loss on debt problems of a spouse. This expansion allows us to detect the total household burden of job loss in a Nordic welfare state, providing a more comprehensive understanding of the broader implications within familial dynamics.

Our findings reveal that job loss increases the likelihood of having enforced debts by 5-15% annually, with event study results underscoring a strong and long-lasting effect. A detailed analysis of debt types reveals that job loss predominantly influences debt issues tied to unpaid taxes or penal orders and fines, as opposed to, for instance, alimony or social and health-

[3] 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, MacGee, and Tertilt 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.

care payments. These effects are, at least in part, mediated through reduced income and pre-existing excessive debt before displacement, further exacerbating the burden of debt. We also report some spillover effects on debt issues of one's spouse.

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 onclude the paper by contextualizing our findings within a broader framework.

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. Notably, approximately one-half of the respondents identified unemployment, 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, spouse separations, and addictions. These findings align closely with a previous Finnish survey study by Valkama (2011), which documented that 40% of debtors (n=240) reported unemployment as a main reason 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, Aaltonen, and Rantala 2015) may also contribute.[4] While some households tend to modify consumption rather than resort to increased borrowing after

[4]Previous research has highlighted a strong causal link between exogenous job loss and various health and social factors, such as crime (Rege, Skardhamar, et al. 2019), disability pension (Rege, Telle, and Votruba 2009), mortality (Rege, Telle, and Votruba 2009; Sullivan and Wachter 2009), self-assessed health and mental health (Kuhn, Lalive, and Zweimüller 2009; Schaller and Stevens 2015) and likelihood of divorce (Charles and Stephens 2004).

job loss (Sullivan 2008; Baker 2018; Hundtofte, Olafsson, and Pagel 2019), various descriptive studies consistently highlight a clear link between unemployment or decreased income with over-indebtedness (Del-Río and Young 2005; Keese 2009; Du Caju, Rycx, and Ilan 2016), mortgage defaults (Deng, Quigley, and Order 2000; Demyanyk and Hemert 2011; Gyourko and Tracy 2014), the propensity to default some debt (Kreiner, Leth-Petersen, and Willerslev-Olsen 2019) and the likelihood of filing for bankruptcy (Domowitz and Sartain 1999; Fay, Hurst, and White 2002).[5]

The relationship between debt problems and unemployment is likely to 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 job loss[6] 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.

Braxton, Herkenhoff, and Phillips (2023) employ 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 and defining job loss similarly to Jacobson, LaLonde, and Sullivan (1993), 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

[5] Conversely, Bauchet and Evans (2019) found no discernible association between unemployment and the probability of personal bankruptcy.

[6] The scarring effects of job loss have been an active interest in labor economics for decades. Numerous studies in this field employ credible causal identification strategies and administrative data to estimate these effects on income (Ruhm 1991; Jacobson, LaLonde, and Sullivan 1993; Stevens 1997), also in Finland (Korkeamäki and Kyyrä 2014; Verho 2020).

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.

The literature has, to varying extent, demonstrated that in the U.S., job loss is linked to, or causes bankruptcy (Keys 2018; Braxton, Herkenhoff, and Phillips 2023; Gerardi et al. 2018), credit delinquency (Aaronson et al. 2019), and in some cases increased debt Aaronson et al. (2019) and Braxton, Herkenhoff, and Phillips (2023). However, we have limited understanding about longer term debt dynamics after plausibly exogenous job loss, particularly in a Nordic context, where there are more limited options for bankruptcy. Our objective is to address these gaps in the literature.

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 2021). 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 300-500 days, depending on age and employment history in 2023), 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, Aaltonen, and

Rantala 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.[7] 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.[8] 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 (National Enforcement Authority Finland, 2024).

In cases where debts are enforceable, monetary receivables, including earnings, pensions, and various social security benefits, can be subjected to wage garnishment. However, only the net pay or income exceeding the protected portions, determined by the number of dependents, is eligible for garnishment. As of 2024, 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, 2024). Depending on the individual's protected portion level and income, approximately 30 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 enforcement amount of 677 euros (33 percent).[9] 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 time it takes for debts to expire 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 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

[7] For instance, in the case of private invoices, if the invoicing party has not received 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.

[8] 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).

[9] Figure A1 of the Appendix depicts the net income after garnishment in each net income level from 0 to 10,000 euros per month.

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 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 around 3400 programs being confirmed by the court annually (Statistics Finland, 2023c).

According to the annual statistics by the National Enforcement Authority of Finland (Ulosottolaitos, 2022), 53% 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 12% 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 percent of the collection result of the garnishment. Around 10 percent of collected debts were accumulated from the realization of assets. One third of all individuals in enforcement shorten debts through wage garnishment.

To provide context for the enforcement system and debt in Finland, Figure 1 illustrates the number of all debtors (depicted on the left-hand axis) and the number of individuals with enforced debts during each year (right-hand axis) from 2008 to 2022, using data from Statistics Finland (2023b). The highest number of debtors was recorded in 2011, exceeding 2,250,000 individuals out of a total population of 5.6 million. This number decreased in 2012-2013, then gradually increased again. A significant portion of these debts were related to mortgages. Despite the overall decrease in the number of debtors between 2008 and 2022, the ratio of household indebtedness to income, defined as having a positive amount of some debt, rose during the same period, from 149% in 2008 to 173% in 2022, according to Statistics Finland (2023b).

Figure 2 offers further insight into the trends of individuals within their prime working age (25-55 years old) undergoing enforcement, categorized by

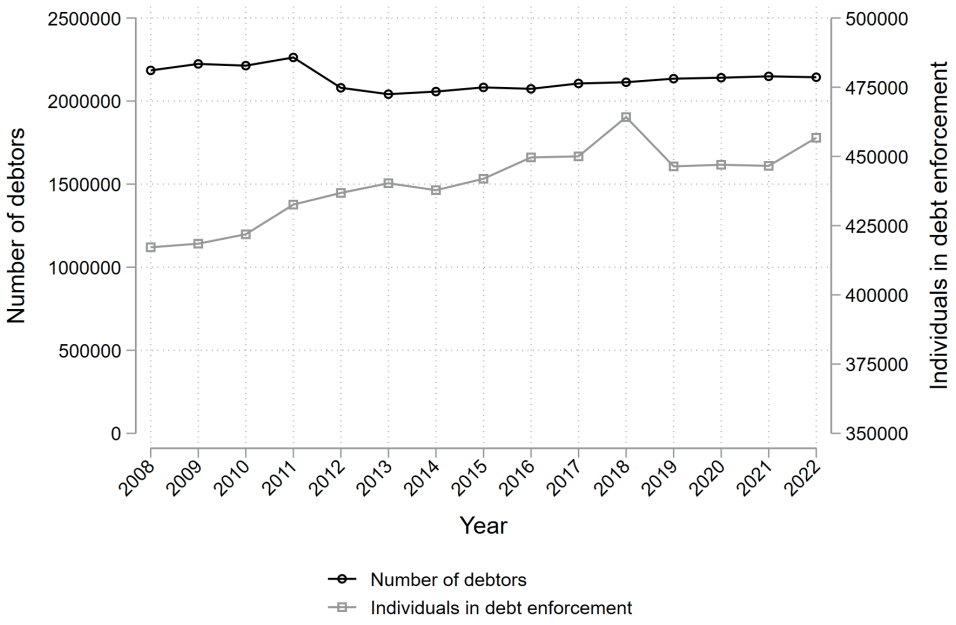

Figure 1: The number of people with debts (left-hand axis, grey line) and the number of people in debt enforcement (right-hand axis, black line) in 2008-2022. Data are based on Statistics Finland (2023).

their type of activity. The proportion of employed individuals with serious debt issues has remained fairly stable, hovering around 10%. In contrast, the percentage of unemployed individuals with enforced debts shows more fluctuation over time, with an average around 30%. This suggests that debt problems are more prevalent among those facing economic disadvantages. For example, Isotalo et al. (2021) found 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.

3 Data

3.1 Data sources

In this study, we use administrative data compiled by Statistics Finland. The FOLK-module provides comprehensive background information for the entire population, encompassing details on wages, employment, other activities, and debts. The Business Register provides extensive information on firms and plants. These datasets are linked together through unique identification codes. Our analysis spans the years 2007-2017 to identify layoffs, while data beyond this period aid in evaluating pre-trends and their impacts on indebtedness. We narrow our focus to the working-age population, specifically individuals aged 20-64.

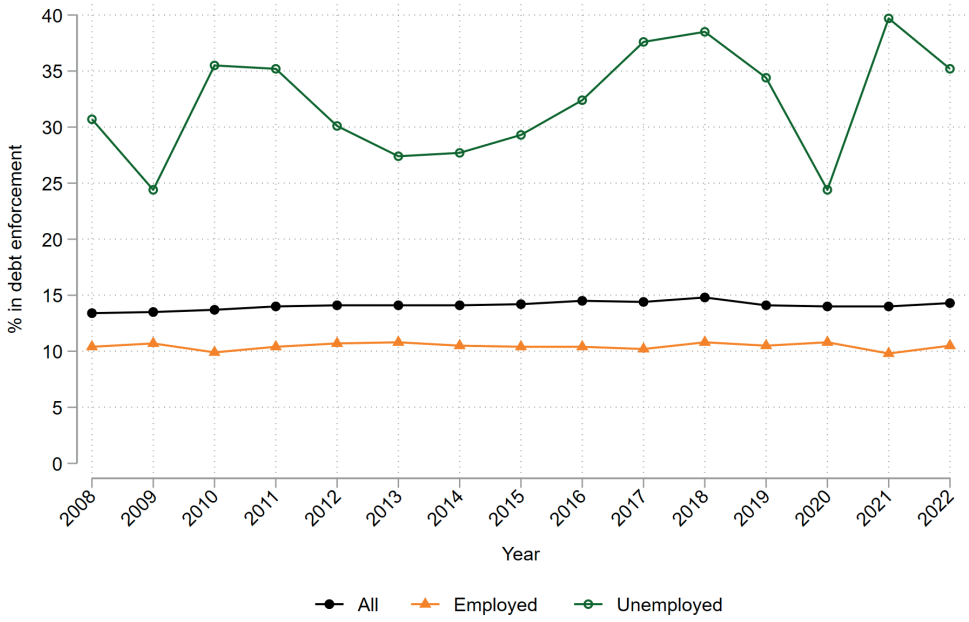

Figure 2: The share of 25-55-year-old people in debt enforcement by employment status in 2008-2022. Data are based on Statistics Finland (2023).

The matched employee-employer data are further linked with information on debt enforcements from the National Enforcement Agency. These register-based data offer monthly updates on outstanding debts, payments, and the specific type of debt undergoing garnishment. The debt type is categorized by legal classifications, though some nuanced debt types may not be explicitly identified. The debt types variable features 122 levels, and for our analysis, we use seven aggregated categories. These encompass enforced debts related to taxes, social and healthcare payments, alimony, penal orders and fines, loans and insurances, real property payments, and other private debts (see Table A1 of Appendix for more details). While the entire dataset from the National Enforcement Agency spans the years 2008-2019, precise information on the debt type is available 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 employ an indicator variable that receives a value of one if an individual has undergone debt garnishment for at least two consecutive years.

3.3 Involuntary job loss and sample construction

In accordance with existing literature, we 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. Following Izadi and Tuhkuri (2021), we 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.

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. Nevertheless, we also explore two additional definitions of treatment. First, following Keys (2018) for potential insights into mechanisms, we estimate the model conditional on being non-employed in the year after displacement $(b+1)$. It is important to note that these estimates lack causal interpretation without additional assumptions.

Secondly, as emphasized by Sullivan and Wachter (2009) and Izadi and Tuhkuri (2021), the quasi-random event is the firm-level shock, necessitating stronger assumptions for the displacement shock to be considered exogenous. Consequently, we also estimate the effect of firms laying off personnel without conditioning on the worker leaving the firm. The instrumental variable approach cannot be applied in this scenario due to the certain non-fulfillment of the exclusion restriction; nonetheless, we report these "ITT effects" in robustness tests.

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 (9 categories in 5-year intervals), education (3 categories), industry (coarsened), tenure (4 categories), occupation (9 categories based on the 1-digit level), plant size (4 categories), and gender. Education level is defined according to the ISCED (International Standard Classification of Education) classification, industry classification follows Statistics Finland's Standard Industrial Classification TOL 2008, and occupation information adheres to the ISCO-08 classification. 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 98% of the treated individuals.[10] Consequently, our estimation sample comprises 128,250 treated individuals and 382,222 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 $b-1$. While not mandated by the 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 41, with 70% being males and 62% married.[11] About two-thirds of them have children under 18 years old, and a majority (62%) have secondary education. The average working tenure in the same plant is 7 years.

[10] The main results remain robust for using only age and gender as matching variables.

[11] 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.

Table 1: Means for treatment and control groups

Variable	Treated	Control
Age	41.15	41.16
% Male	70.0	70.8
Married	61.6	61.5
Number of children under 7	0.315	0.320
Number of children aged 7-18	0.608	0.616
Primary education	14.40	14.30
Secondary education	61.6	62.0
Higher education	24.0	23.7
Wage earnings, euros	40,955	39,973
Overall debts, euros	41,814	42,200
% in enforcement	5.60	5.55
% over 1000 euros in enforcement	1.78	1.58
Amount in enforcement, euros	514.1	381.5
Debt/income-ratio	1.61	1.67
% decrease in employment at average layoff	47.3	-
Tenure at displacement	6.94	6.99
Observations	128,250	382,222

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

The pre-displacement earnings average 40,000 euros annually, with an overall debt burden (such as mortgages) of approximately 42,000 euros. The proportion of workers who had their debt enforced is 5.6%, significantly below the Finnish average for the prime working-age population (15%). This suggests that most individuals with their debt enforced lack a stable and strong attachment to the labor market. The average amount subjected to enforcement is nearly 400 euros for the control group and approximately 500 euros for the treatment group.

4 Empirical analysis

4.1 Specification

We examine the effect of job loss due to plant closures and mass lay-offs on the probability of debt enforcement as follows:

$$Y_{it} = \alpha_i + \sum_{t=-6}^{9} \delta_i \cdot \text{Treat}_{bi} + \gamma_t + \rho_{it} + \varepsilon_{it} \quad (1)$$

where i denotes individual, and $Treat_{bi}$ gets a value of one if individual i experienced job displacement in year b, and gets a value of zero for the control group. We follow individuals nine years after displacement, and six years before displacement. We use event time $b-2$ as reference period. In equation (1), α_i denotes individual fixed effects, γ_t time fixed effects and ρ_{it} age fixed effects. The coefficient of interest is the coefficient for event time and treatment status. 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), this coefficient identifies the causal effect of the shock. Error term ϵ_{it} is clustered at the individual level.

We provide several heterogeneity analyses to examine how the effects vary between different individual groups, such as based on gender, marital status, education level, age group and by initial debt status. To this end, we use a triple-differences design, where we interact a characteristic dummy C_i (e.g., males versus females) with the treatment:

$$Y_{it} = \alpha_i + \sum_{t=-6}^{9} \delta_i \cdot \text{Treat}_{bi} + \sum_{t=-6}^{9} \beta_i \cdot \text{Treat}_{bi} \cdot C_i + \gamma_t + \rho_{it} + \varepsilon_{it} \qquad (2)$$

Here the coefficient on $time_t$ will correspond to the difference in treatment effects between those have $C_i = 1$ (i.e. males if C_i is indicator for being male).

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 (in %) from the pre-shock (period $b-2$) mean. Our main results are illustrated in Figure 3 and the initial point estimates are provided in tabular format in Table A2. Notably, we observe significant effects on various measures of indebtedness following job loss. As an additional outcome, we also report the impact of job loss 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 16% in year $b+4$ compared to the control group. In absolute terms, this represents an increase in the probability of almost 1 percentage point (from the mean of 0.06). Strikingly, job loss demonstrates long-lasting consequences on debt problems, with displaced workers having approximately a 10% higher probability of having enforced debts compared to the control group in year $b+9$. The effect on

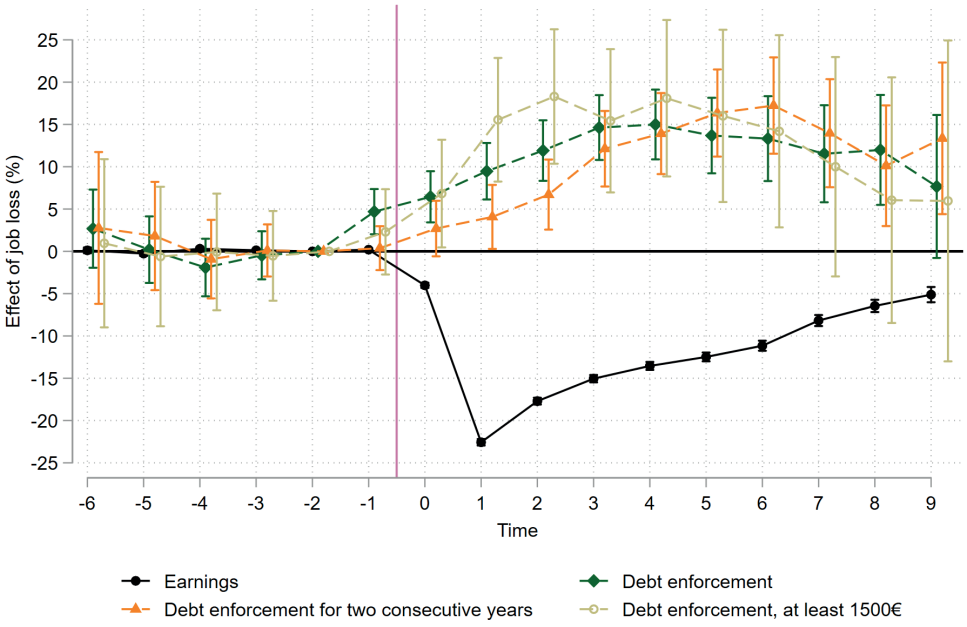

Figure 3: The effect of job loss on earnings and three measures for debt enforcement with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean.

the probability of having enforced debts of least 1,500 euros is also positive and statistically significant, peaking at approximately 18% in $b+4$. However, this effect diminishes over time and is no longer statistically significant from $b+6$ onwards. These results remain robust for our third indicator outcome, indicating having enforced debts for two consecutive years.[12]

We posit that a crucial factor mediating the impact of job loss 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 a primary channel. As illustrated in Figure 3, wage earnings undergo a substantial reduction of approximately 20% percent following job loss, aligning with previous research (Korkeamäki and Kyyrä 2014; Verho 2020; Braxton, Herkenhoff, and Phillips 2023). While the negative wage effect is statistically significant and persistent, it diminishes over time. Nine years after displacement, wages are roughly 5% lower for displaced workers compared to the control group. To further explore this relationship, we conduct additional analyses focusing on the subgroup of treated individuals who ul-

[12] We present a standard robustness check for our main approach. We have estimated the effect of displacement defined that individual experiencing a mass layoff, they are not forced to leave the firm. These results are similar to the ones reported in Figure 3, but the effects are lower in magnitudes (see Figure A2 of the Appendix). Figure A3 of the Appendix presents main results for different enforcement sums showing similar results irrespective of definition.

timately become unemployed after displacement. As anticipated, the effects are more pronounced for each outcome, as depicted in Figure A4 of the Appendix. For instance, job loss, conditional on a positive unemployment spell, increases the probability of having enforced debts by 10-20% throughout the observation period. The effect is substantial (30%) for having enforced debts at least 1,500 euros in year $b+1$. It is crucial to note that these findings does not serve as evidence of the direct effect of poor labor market attachment on indebtedness. Instead, it shows that this subgroup not only experiences a more substantial decline in earnings but also a more pronounced increase in the probability of indebtedness.

Table 2 presents our event study estimates for each of the seven enforced debt types. We observe that displacement has a positive and persistent effect of having enforced debts arising from penal orders and fines, and unpaid taxes. Job loss increases the probability of having debt problems related to penal orders and fines by 7% immediately after displacement, increasing to 19% three years after displacement, and still being almost 40% seven years afterwards. These findings indicate that displacement not only increases debt problems, but may also enhance criminal and reckless behavior (Rege, Skardhamar, et al. 2019). The effect is also notable for unpaid taxes, with a 10% increase one year after job displacement, reaching a peak of 34% three years after displacement, and remaining at approximately 22% seven years after displacement. Similarly, the effect persists one to five years after displacement for other debt issues, including, e.g., unpaid rents and instalment purchase payments, showing an 8-16% increase in the probability. However, job loss has only a modest effect on debt problems related to public loans and insurances, alimonies and real property payments. Notably, job loss has a statistically significant effect on the probability of having enforced debts related to social and healthcare two and four years after displacement, but the effect then becomes statistically insignificant, plausibly explained by the generous and cost-effective healthcare system in Finland, or by the fact that public debts expire in five years.

4.3 Heterogeneity analyses

We conducted additional estimations to examine the effects by different individual groups based on Equation (2). The heterogeneity analyses were performed by gender, education level (higher education versus other), marital status, and age group (20-44 versus 45-64 years of age), and the results are detailed in Figure 4. The estimation results are presented in percent changes in the probabilities, illustrating the estimated differences in the effects of job loss on debt enforcement by worker groups. Panel A of the figure presents the heterogeneity analysis by gender. We find that the effect is stronger for males than for females. Specifically, males have on average a 10% higher probability of having enforced debts as a response to job loss

Table 2: Effect of job loss on the probability of having enforced debts by debt type

	Debt Types						
Treated # Time	Social- and health-care	Penal orders & Fines	Taxes	Loans and insurances	Real property payments	Alimony	Other
-7	0.000682	0.000573	0.000996	0.00107	0.0000726	0.000391	-0.00121
	(0.000879)	(0.00113)	(0.00115)	(0.00103)	(0.000395)	(0.000554)	(0.00136)
-6	0.000717	0.00203**	0.00153	-0.000156	-0.0000327	0.000248	-0.000179
	(0.000783)	(0.00104)	(0.00102)	(0.000879)	(0.000352)	(0.000480)	(0.00116)
-5	0.000634	0.00170*	0.00151*	0.00101	-0.0000696	0.000593	-0.00110
	(0.000666)	(0.000893)	(0.000885)	(0.000755)	(0.000314)	(0.000417)	(0.000978)
-4	0.000979	0.000644	0.000220	-0.000295	0.000198	0.000354	-0.00219***
	(0.000596)	(0.000800)	(0.000781)	(0.000640)	(0.000270)	(0.000339)	(0.000817)
-3	0.0000447	0.000633	0.0000505	-0.000596	0.000268	0.000240	-0.00124*
	(0.000499)	(0.000708)	(0.000675)	(0.000521)	(0.000236)	(0.000251)	(0.000646)
-2	0	0	0	0	0	0	0
-1	0.000894*	0.00194***	0.00133**	0.000367	0.000176	0.0000480	-0.0000506
	(0.000489)	(0.000685)	(0.000644)	(0.000505)	(0.000215)	(0.000252)	(0.000635)
0	0.000557	0.00139*	0.000894	0.0000112	-0.0000707	0.000396	0.00113
	(0.000588)	(0.000762)	(0.000747)	(0.000622)	(0.000276)	(0.000342)	(0.000811)
1	0.000721	0.00220***	0.00210**	0.000912	0.000409	0.000803*	0.00262***
	(0.000654)	(0.000838)	(0.000845)	(0.000717)	(0.000331)	(0.000414)	(0.000939)
2	0.00142*	0.00336***	0.00455***	0.00263***	0.000589	0.00107**	0.00433***
	(0.000740)	(0.000921)	(0.000969)	(0.000813)	(0.000377)	(0.000484)	(0.00106)
3	0.00144*	0.00372***	0.00746***	0.00282***	0.00117***	0.000516	0.00519***
	(0.000857)	(0.00107)	(0.00114)	(0.000932)	(0.000416)	(0.000570)	(0.00122)
4	0.00150	0.00268**	0.00582***	0.00116	0.000769	0.0000857	0.00381***
	(0.00100)	(0.00119)	(0.00131)	(0.00106)	(0.000499)	(0.000683)	(0.00139)
5	0.00000110	0.00229*	0.00629***	0.00133	0.000320	0.000348	0.00343**
	(0.00114)	(0.00135)	(0.00150)	(0.00122)	(0.000590)	(0.000792)	(0.00159)
6	0.00129	0.00158	0.00444**	0.00106	0.0000178	-0.000538	0.00169
	(0.00152)	(0.00177)	(0.00196)	(0.00160)	(0.000834)	(0.000991)	(0.00206)
7	0.000684	0.00705**	0.00470	0.00252	0.00155	-0.00231	0.00121
	(0.00269)	(0.00336)	(0.00347)	(0.00254)	(0.00154)	(0.00182)	(0.00342)
Observations	2,715,955	2,715,955	2,715,955	2,715,955	2,715,955	2,715,955	2,715,955
Mean at $b-2$	0.0121	0.0194	0.0221	0.0156	0.00274	0.00557	0.0328

Notes: Year, age, event time and individual fixed effects included. Standard errors in parentheses. *** (p<0.01), ** (p<0.05), * (p<0.10).

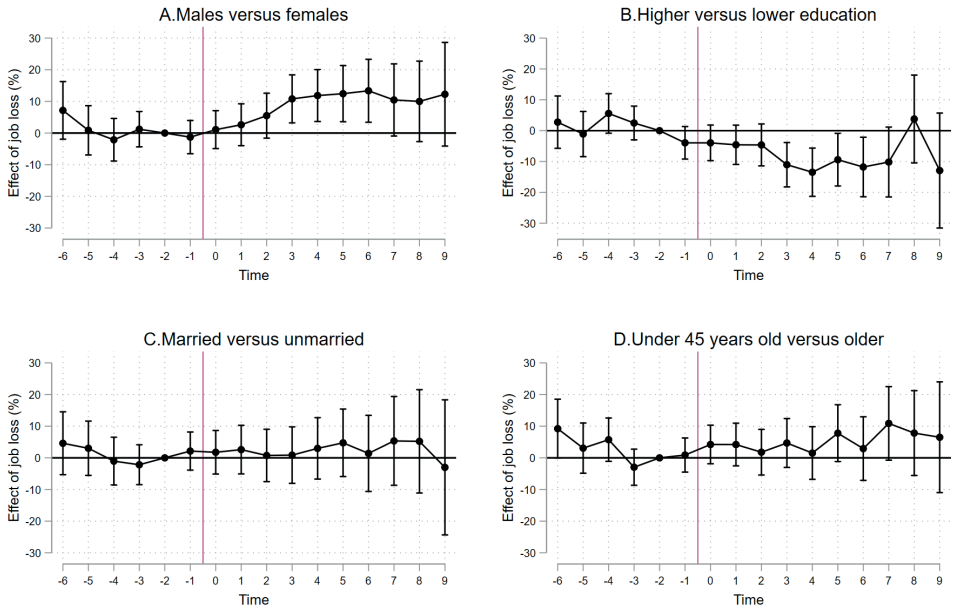

Figure 4: Heterogeneity in the effects of job loss on the probability of having enforced debts, reported with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean.

three to six years after displacement compared to females. Panel B of the figure depicts the results by education level. Based on the information on the highest completed degree, we assigned individuals to one of two educational categories: low education (= primary or secondary education, ISCED levels 1-4) or high education (= some tertiary education, ISCED levels 5A, 5B and 6). Our findings suggest that individuals with higher education levels have approximately 10% lower probability of having enforced debts compared to lower educated individuals three to six years after displacement. Finally, we observe that the effect of job loss on the probability of having enforced debts does not significantly differ between married or unmarried individuals (Panel C) or by age group (Panel D).

Accordingly, we investigate the influence of pre-displacement debts on the outcomes. Building on the findings reported in Keys (2018), 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 debt-to-income ratio. Both variables are measured before the treatment. We then analyze the disparities in the effects for two subgroups: individuals with above the median total debts in euros (or above the median debt-to-income ratio), and those with below the median values. The variations in the effects of job loss between these subgroups are depicted in Figure 5.

Our findings yield important insight into the mechanisms between job

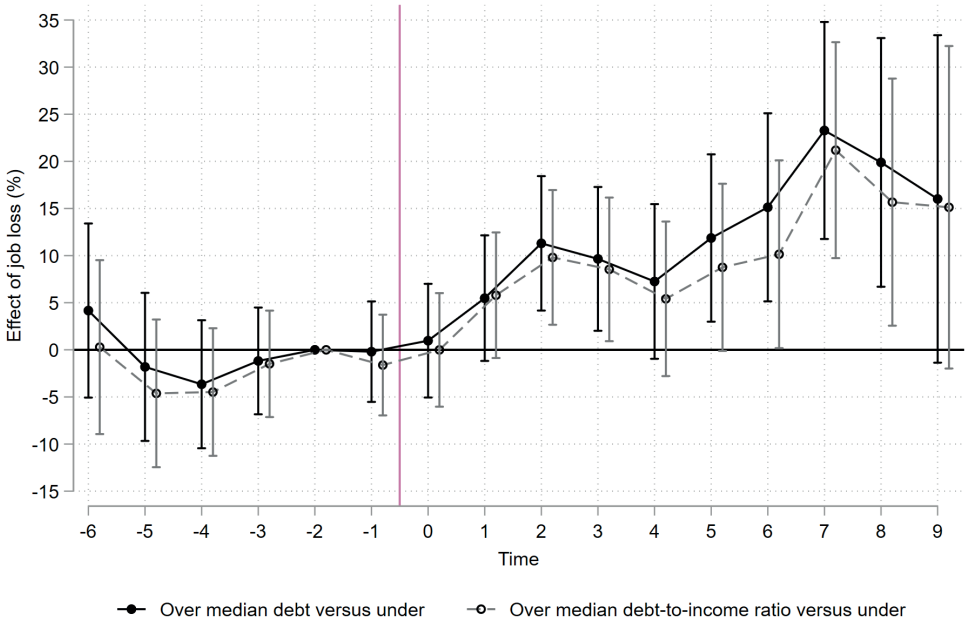

Figure 5: Heterogeneity in the effects of job loss on the probability of having enforced debts, reported with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean.

displacement and debt problems. The results indicate that the likelihood of having enforced debts in response to job displacement is higher among individuals who already had a heavy debt burden related to e.g., mortgages, before the treatment. Specifically, individuals who had above the median total debts before the treatment have a 10-20% higher likelihood of having enforced debts compared to individuals who had below the median total debts before the treatment. The effects are statistically significantly different from each other for two to eight years after displacement. The figure depicts a similar pattern for debt-to-income ratio, although the estimates are not always statistically significant.

4.4 Extensions: Spillover effects and debt restructuring

As an extension, we examine whether an individual's job loss experience affects one's spouse. Figure 6 shows that job loss has modest spillover effects within the family. Point estimates suggest that job loss increases, on average, spouses' risk for debt enforcement by 2.5 to 5% one to six years after displacement, but the effect diminishes over time. Figure 7 further examines the effect on the probability of entering debt restructuring process. This is an indicator for the probability of bankruptcy. The results show that although job loss influence serious debt problems, individuals do not seem to adjust through bankruptcies.

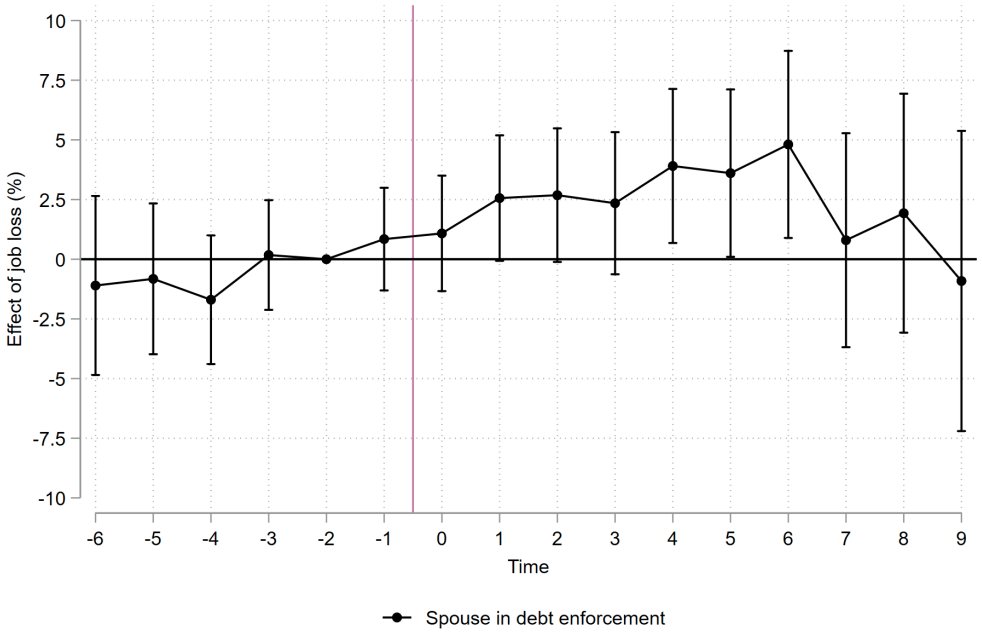

Figure 6: The effect of job loss on the probability of one's spouse having enforced debts, reported with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean.

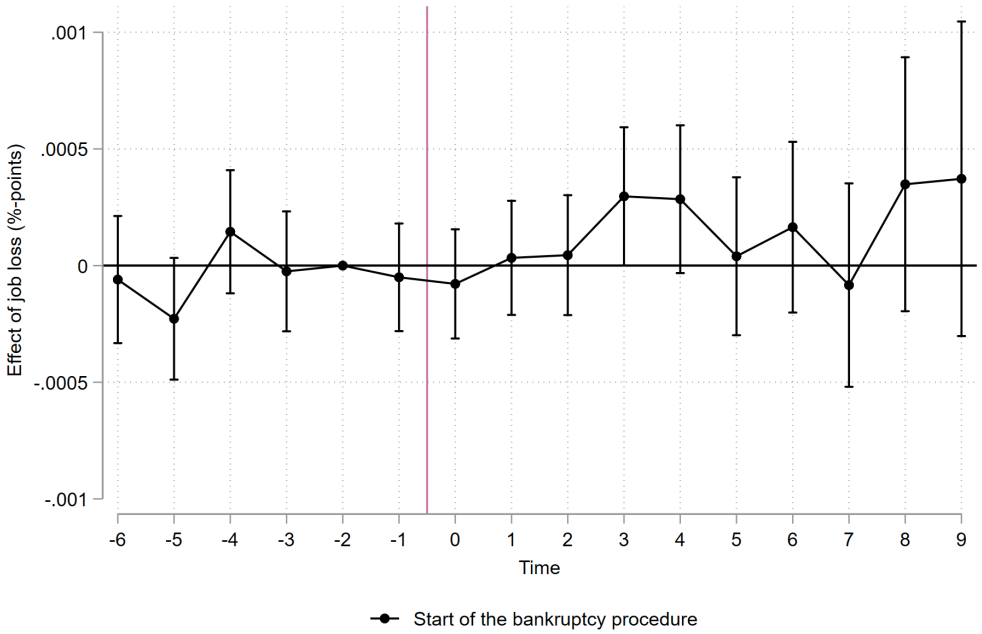

Figure 7: The effect of job loss on the probability of entering bankruptcy prochedure, reported with 95% significance levels.

5 Discussion

Annually, between 13 to 15% of prime working age individuals are in debt enforcement in Finland, making it a major public program. We find that a negative shock in the form of plausibly exogenous job loss increases the likelihood of being in debt enforcement by up to 16%in the following nine years. The effect follows roughly an inverse U-shape, reaching its maximum at around year four and is slightly larger when we consider more serious debt problems, such as having at least 1,500 euros in enforcement. Thus, following a job loss shock, over-indebtedness takes multiple years to fully accumulate, with some reversal in a nine-year window. This contrasts with the earnings effect, which is at its largest in the first year following the job loss and tapers off towards the end of the nine-year follow-up period.

We contrast these findings to 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 years 2 and 3. We find an up to 19% increase in debt enforcement of private debts (Table 2). Since it takes some 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, Herkenhoff, and Phillips (2023) find evidence that some individuals who face job loss in a mass layoff take on more debt. Braxton, Herkenhoff, and Phillips (2023) show that around 1/3 of individuals borrow and 1/3 delever or default. These diverging behaviors could explain the increase in debt enforcement. When we study the effect job loss on bankruptcies in our setting, we find no effect as shown in Figure 7. No single year in the figure shows a statistically significant estimate. This finding is in stark contrast to the systematic finding of a steep and immediate increase in bankruptcies following a job loss in the U.S. (Keys 2018; Braxton, Herkenhoff, and Phillips 2023; Gerardi et al. 2018).

Three key factors may contribute to a large observed effect in Finland compared to the U.S. Firstly, our approach to measuring over-indebtedness is different from most U.S. job loss studies. We use an administrative dataset on debt enforcement instead of focusing on credit card debt delinquency or debt. Delinquency is driven by creditors and less likely to be strategic behavior by debtors. Secondly, 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 debt restructuring. DeFusco et al. (2024) show that less than 1% of workers aged 16–64 are in wage garnishment in the U.S, while in Finland the corresponding share is substantially higher. Our finding of no increase in bankruptcies after job loss would indicate that a quick transition to bankruptcy is not an option available to most individuals in the Nordic

model. The possibility of defaulting without fulfilling the entire debt obligation operates as a form of social insurance and could act as a substitute to other social insurance policies (Braxton, Herkenhoff, and Phillips 2023).

Thirdly, our data allow us to follow the displaced individuals for a period of 9 years, giving us a valuable understanding of their longer-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 appear to severely affect debt problems related to social or healthcare payments in Finland. This distinction may be attributed to the widespread coverage of occupational healthcare (nearly 90%) and the affordability of public healthcare, with partial reimbursement for drug purchases and an annual expense limit of 600 euros. Instead, the effects are larger for unpaid taxes, penal orders and fines, and many sources of private debts.

6 Conclusion

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 inference. Finland provides a unique study design as a Nordic welfare state with a rigorous debt enforcement process in which up to 50% of future earnings garnished for up to 25 years. Acquiring a better understanding of the longer-term debt dynamics in the face of exogenous lob loss in a Nordic context with rich administrative data can offer useful guidance in developing more effective policy.

Our findings reveal that job displacement exerts substantial adverse effects on various measures of indebtedness. We find no effect on the probability of bankruptcies, but do find an indication on spillover effect on spouses. Our analysis underscores that displaced workers face enduring and pronounced adverse effects, partly through reduced income and the burden from existing debt.

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A Appendix

Table A1: Categories of debt types

Debt types	Description
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 group	Customs, unpaid rents, installment purchase payments, evictions, other debt collections, enforcements, debt provable in bankruptcy

Table A2: The effect of job loss on earnings and the probability of having enforced debts

Treated # Time	Earnings	Debt Enforcement	Debt Enforcement for 2 consecutive years	Debt Enforcement, at least 1,500€
-6	51.05	0.00161	0.00120	0.000163
	(74.77)	(0.00142)	(0.00222)	(0.000866)
-5	-112.6*	0.000121	0.000838	-0.000104
	(61.26)	(0.00121)	(0.00158)	(0.000719)
-4	130.5**	-0.00115	-0.000609	-0.0000119
	(51.51)	(0.00105)	(0.00115)	(0.000601)
-3	54.60	-0.000283	-0.0000899	-0.0000912
	(38.81)	(0.000874)	(0.000761)	(0.000462)
-2	0	0	0	0
-1	85.49**	0.00283***	0.0000471	0.000393
	(41.24)	(0.000822)	(0.000641)	(0.000439)
0	-1719.6***	0.00389***	0.00122	0.00117**
	(68.66)	(0.000930)	(0.000812)	(0.000554)
1	-9661.3***	0.00571***	0.00198**	0.00266***
	(83.76)	(0.00103)	(0.000933)	(0.000637)
2	-7579.6***	0.00718***	0.00318***	0.00313***
	(88.17)	(0.00110)	(0.00102)	(0.000692)
3	-6441.7***	0.00882***	0.00569***	0.00264***
	(94.87)	(0.00118)	(0.00110)	(0.000738)
4	-5797.3***	0.00904***	0.00673***	0.00309***
	(103.2)	(0.00127)	(0.00118)	(0.000806)
5	-5343.3***	0.00825***	0.00778***	0.00273***
	(113.8)	(0.00137)	(0.00127)	(0.000887)
6	-4777.2***	0.00803***	0.00817***	0.00242**
	(130.1)	(0.00154)	(0.00140)	(0.000990)
7	-3502.4***	0.00695***	0.00658***	0.00171
	(142.8)	(0.00176)	(0.00158)	(0.00113)
8	-2763.0***	0.00723***	0.00485***	0.00103
	(158.8)	(0.00200)	(0.00176)	(0.00126)
9	-2189.8***	0.00462*	0.00644***	0.00102
	(196.9)	(0.00260)	(0.00221)	(0.00165)
Observations	3,723,907	3,723,907	2,722,365	3,723,907
Mean, $b-2$	42,852	.0565	.0511	.0146

Notes: Year, age, event time and individual fixed effects included. Standard errors in parentheses. *** (p<0.01), ** (p<0.05), * (p<0.10).

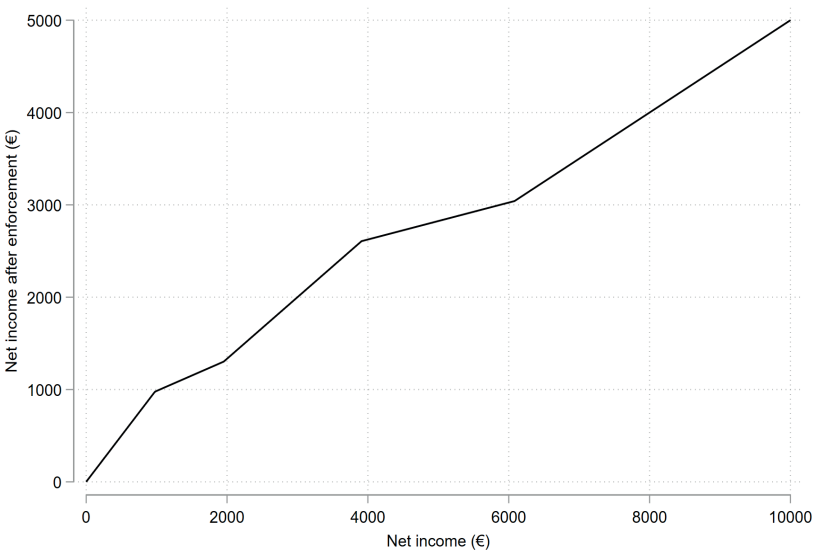

Figure A1: Net monthly income afrer enforcement in each net income level, from 0 to 10,000 euros per month. Source: Authors' own calculation based on National Enforcement Authority Finland

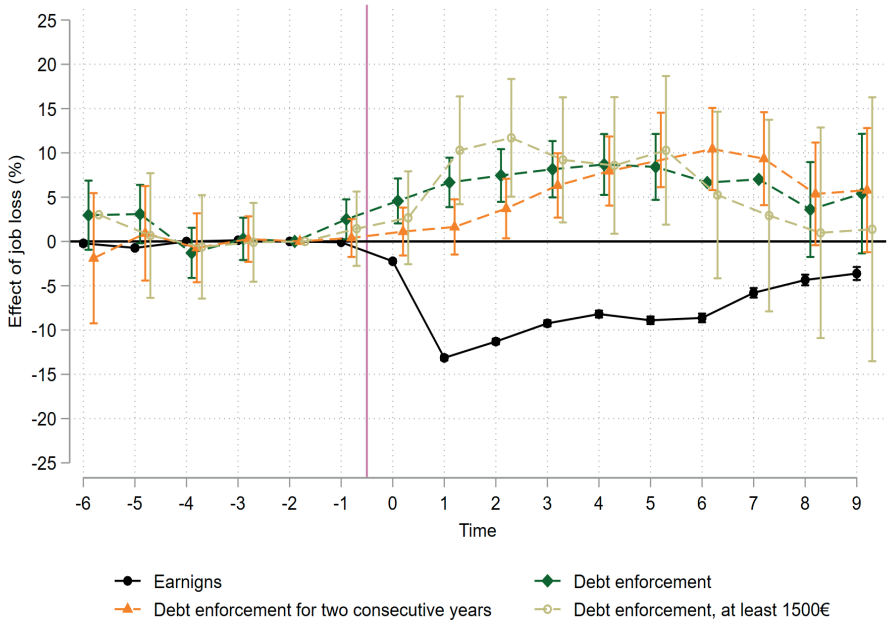

Figure A2: The effect of job loss on earnings and three measures for debt enforcement, reported with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean. Displaced workers due to downsizing do not necessarily have to leave the firm.

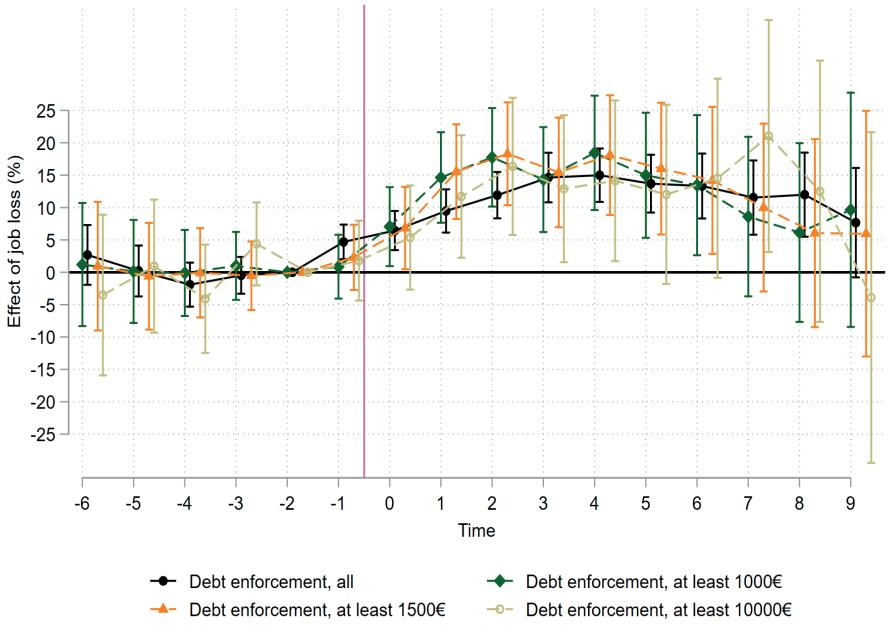

Figure A3: The effect of job loss on four measures for debt enforcement with different sums, reported with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean.

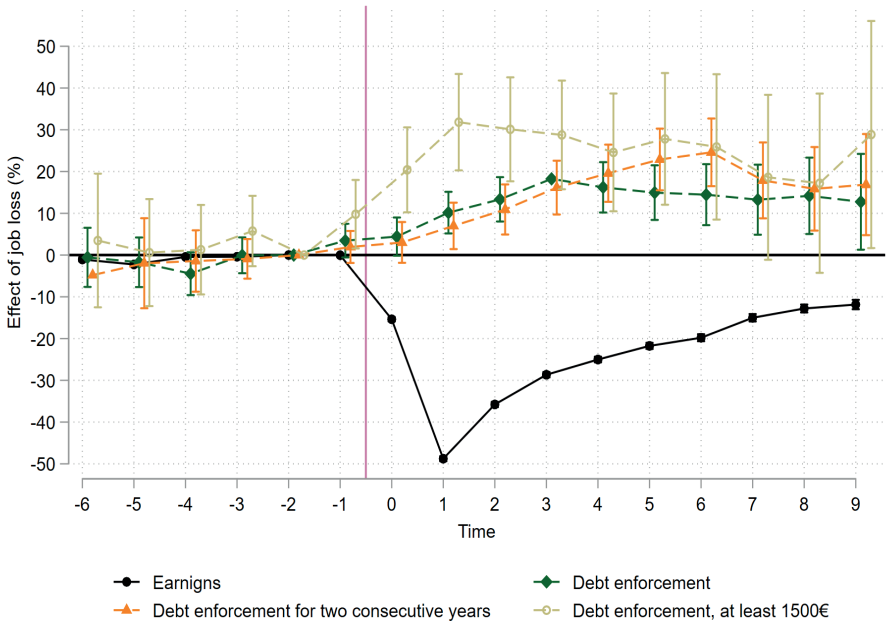

Figure A4: The effect of job loss on earnings and three measures for debt enforcement, reported with 95% significance levels. Effects are scaled in % changes from the pre-shock $(b-2)$ mean. Displaced workers experience positive unemployment spell year after displacement.

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