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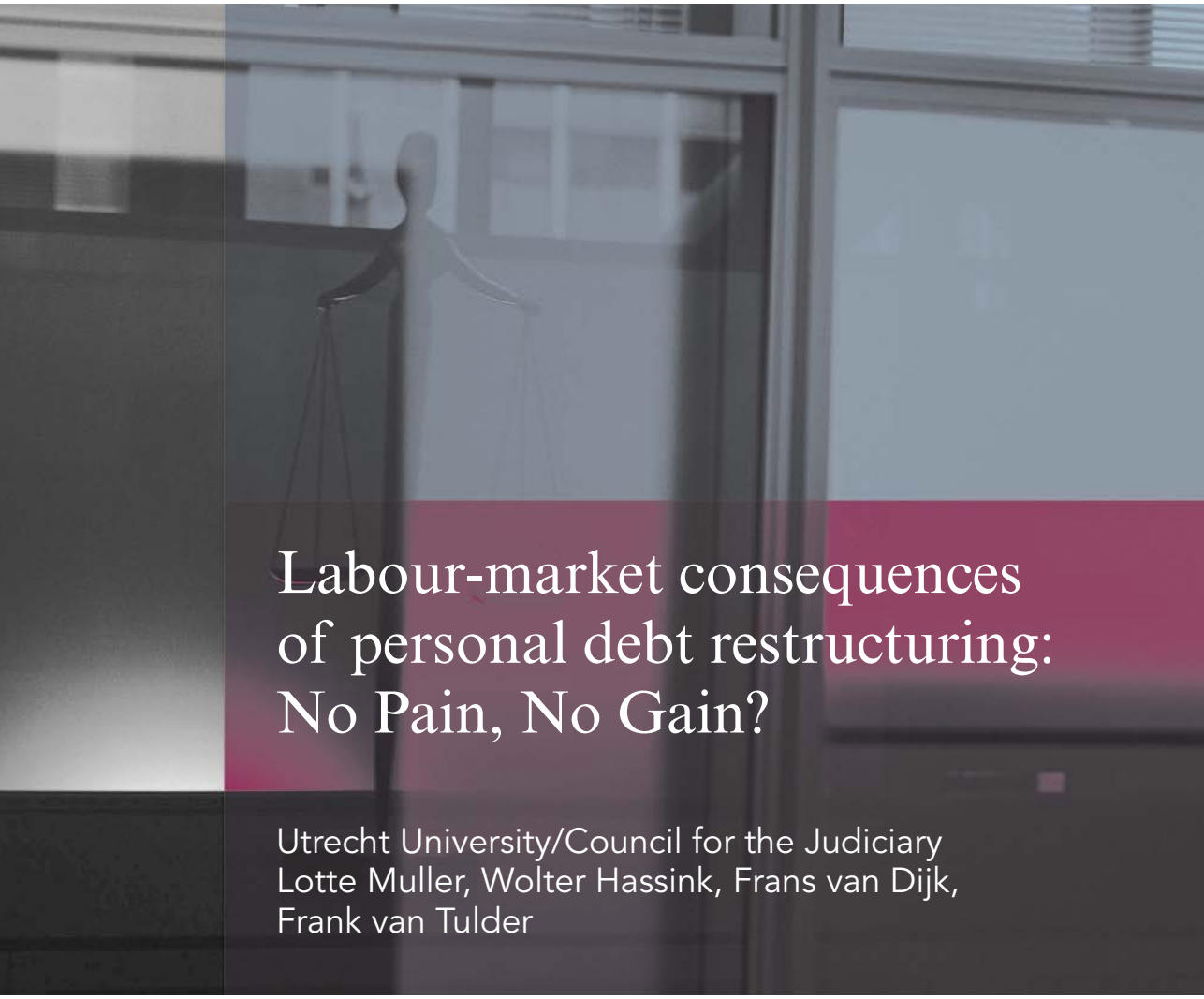

Labour-market consequences of personal debt restructuring: No Pain, No Gain?

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Abstract

Personal insolvency programmes require effective management of debtor-creditor incentives to ensure a balanced solution for insolvency. To date, literature is mixed regarding how to incentivise debtors such that the moral hazard to build debts and frequently apply for personal insolvency is minimised. The legal Dutch debt restructuring programme (*WSNP*) enables natural person debtors to attain debt forgiveness after maximal efforts to repay debts and wage garnishments for 3-4 years. If the debtor does not make significant efforts to repay debts, the court case can be reassigned to bankruptcy, without possibility for debt forgiveness; the creditor-debtor accountabil- ity balance hinges on the idea that debtors are sufficiently incentivised by this bankruptcy threat. We examine whether debtors respond to the financial incentives within the debt restructuring programme. Additionally, we consider which debtors in particular respond. We have a unique monthly level panel using Dutch court case information from Rechtbank Rotterdam (2011-2016) and linked demographic characteristics from Statistics Netherlands (2010-2018). We carry out an empirical difference in difference analysis, as well as considering heterogeneous effects. Our results are twofold. First, we find that debtors respond to the financial threat of bankruptcy, as well as respond persistently over time. Notably, debtors respond by finding employment. Second, we find that debtors do not all respond to debt restructuring in the same fashion; male debtors are persistently more responsive than their female counterparts with respect to finding employment.

JEL classification: D14 J64 J22 J31 K35

Keywords: Personal insolvency, debt restructuring, labour-market outcomes, debt forgiveness, quasi-experiment.

1

Introduction

In devising personal insolvency programmes, one determines the balance of accountability between creditors and debtors; either the creditor takes a risk when choosing to lend, or the debtor accepts risk when choosing to borrow. In balancing accountability, management of debtor- creditor incentives is crucial (Adler et al., 2000). For instance, swift debt forgiveness may create a moral hazard for debtors; debtors would be enticed to recklessly spend credit, and frequently apply for debt forgiveness. On the other hand, if debt forgiveness policies do not exist, insurmountable debts can act as a disincentive for work; "*from the viewpoint of the wage-earner there is little difference between not earning at all and earning wholly for a creditor* " (Ramsay, 2017). Finding an optimal personal insolvency system is tenuous due to its integral links to other aspects of the economy. Theoretical findings show that eliminating personal bankruptcy including debt forgiveness in favour for a system of wage garnishments improves welfare (Athreya, 2002)(Athreya et al., 2009) (Chatterjee and Gordon, 2012). However, there are also various works which contradict precisely this (Zaborowski and Zweifel, 1999) (Wang and White, 2000). Regarding labour supply in particular, Chen and Zhao (2017) finds that theoretically a system of bankruptcy, rather than wage garnishments increases labour supply. However, conclusions are also highly context dependent (Livshits et al., 2007) (Athreya, 2008). Empirical work is therefore an integral part of understanding personal insolvency systems.

The conflicting opinions on how to incentivise debtors, such that moral hazard is minimised, is also reflected in the global variety of personal insolvency policies; The US frequently used as the primary example of swift debt discharge, and continental Europe as the opposite (Efrat, 2002). Dutch personal insolvency policy bridges this difference; the 1998 introduction of debt restructuring (*Wet schuldsanering natuurlijke personen* or *WSNP*) enables personal debts can be forgiven after maximum five years of wage garnishments. This change intended to protect individuals with

insurmountable debts from a lifetime of earning for creditors. The debt restructuring programme retains its continental European character in the difficulty of admission and completion. The principle obligation of the debtor in debt restructuring is that clear effort and cooperation must be made to repay as much as possible to the creditors prior and during the procedure. If a debtor does not adhere to the requirements, the case is converted into a bankruptcy case (faillissement). In bankruptcy cases the debtor's assets are immediately liquidated for creditors, and the debtor remains indefinitely liable for any outstanding debts. It is also not possible to reapply for debt restructuring in the following 10 years. This stringency is put in place to protect the creditors. In this way, they are assured of debtors best efforts to repay. This legal debt restructuring procedure is currently more heavily depended upon to resolve insurmountable personal debts, than the existing informal municipal level voluntary debt restructuring programmes (Niemeijer et al., 2003).

This balance between creditor-debtor accountability during the debt restructuring programme hinges on the idea that debtors are sufficiently incentivised by this threat of bankruptcy, and supervision from administrators. This financial incentive is intended to safeguard creditor and debtors best interests. However, little is known whether this incentive works, and for whom it works. In this paper, we first consider who has entered into the debt restructuring programme, thereafter whether these debtors respond to the financial incentives within the debt restructuring programme. Last, we consider for whom in particular the financial incentives work. To gauge whether the financial incentives work, we evaluate whether the debtors' labour-market outcomes change after application into the debt restructuring programme. We consider labour-market outcomes, as one of the primary arguments for debt relief is that this encourages debtors work efforts. Labour-market outcomes are additionally important for the creditor-debtor accountability balance of the debt restructuring programme; during the debt restructuring wages are garnished for creditors to ensure maximal repayment.

Findings to-date, regarding the highly lenient US personal insolvency, show a mixed impact on debtors; Debtors who have undergone insolvency in the US, in general, are found to have less access to credit (Cohen-Cole et al., 2013) (Musto, 2004) and also accumulate less wealth (Han and Li, 2011). Han and Li (2007) could not find that bankruptcy and debt forgiveness has a positive impact on work efforts (annual work hours), however, Dobbie and Song (2015) suggests that wage garnishments and debt forgiveness increases annual earnings, reduces five-year mortality, and decreases five-year foreclosures rates. Dobbie and Song (2015) claims this effect is amplified under a system of strict wage garnishments. Financial health additionally improves

after wage garnishments and debt forgiveness (Dobbie et al., 2017). However, this does not mean a conservative personal insolvency system necessarily aids debtors and creditors. The French debt restructuring consists of a two-year debt suspensiondebt forgiveness is rarely possible (Blazy et al., 2011). Fraisse (2017) find that debt suspension, in the long-term, is not sufficient to prevent re-default. This literature implies we should expect stronger (labour-market) responses from debtors in the Dutch debt restructuring programme as it is a strict legal system of wage garnishments, yet also provides debt forgiveness. The Dutch system is informative for the very reason that it is this middle ground between lenient US and conservative continental Europe. However, despite the studies indicating that the number of financially vulnerable Dutch households is increasing, literature regarding debtors response to the Dutch debt restructuring programme has been non-existent (Zwinkels, 2015)(Westhof et al., 2015)(Peters and Combrink-Kuiters, 2017). However, Koning (2015) evaluates the reaction of those heavily indebted during to a voluntary debt intervention and support programme. Koning (2015) shows the voluntary debt intervention substantially increased exit out of social assistance schemes, however, due to participants exiting the labour force. Many participants also never completed the voluntary programme. In this paper, we pick-up where Koning (2015) left off; the debt restructuring programme in contrast, has a credible legally binding financial threat.

To assess whether debtors respond to the debt restructuring programme, we carry out an empirical analysis using a monthly panel data. This panel data contains newly available insolvency court case information, provided by Rechtbank Rotterdam. We consider insolvency applications between November 2011 and September 2016, which in particular includes 5, 287 cases of debt restructuring (5, 228 cases to be matched after selection). This is then linked to administrative data from Statistics Netherlands. To date, linking Dutch insolvency court case information to administrative data is unprecedented. We match those in the debt restructuring programme, to comparable individuals in the Netherlands to create a control group. We match using coarsened exact matching (CEM) as this ensures the common support assumption is directly met; this minimises selection into debt restructuring based on observables. To minimise selection based on unobservables, we include individual-specific fixed effects on differences in differences (DD) as well as the heterogeneity of the DD, to control for unobserved heterogeneity.

Applying the matched sample in the DD, we measure the debtor response during the debt restructuring programme, as well as the persistence of these responses. We consider responses in labour-market outcomes; employment, hourly wage, hours

worked and hours worked overtime. We then dissect whether specific demographic groups react differently under the debt restructuring, using the heterogeneity effect in the DD (DDD). In particular, we consider gender, age and whether the individual has a Dutch ethnicity. Our analysis provides two main novel results.

First, we find that debtors do respond to the financial threat of bankruptcy. The primarily response is finding employment; debtors are 4.25 percentage points more employed than those who did not apply for the debt restructuring programme, over the 36 months post application. Debtors also increase their hours worked (excl. overtime) by 2.82 hours per month. This result reflects the debt restructuring requirements, as unemployed debtors are required to find employment to ensure maximal repayment. However, it is of interest that this employment comes at the price of log hourly wage; debtors experience a loss of 1.33 percent in hourly wage. When considering the monthly persistence of these debtor efforts, we find after ten months post debt restructuring application, debtors are 4.94% more likely to be employed. After thirty-six months, this increases to 6.58%. This contradicts the results of Han and Li (2007), and confirms those of Dobbie and Song (2015). As we are using more finely grained data than that available to Dobbie and Song (2015), we confirm their findings of yearly employment increases, however, demonstrate this with a monthly employment response.

Second, we go beyond the existing literature when considering heterogeneous responses within our group of debtors experiencing debt forgiveness, according to demographic characteristics. We find that male debtors are more responsive than their female counterparts with respects to employment; male debtors are 4.76% more employable than their female counterparts. Dutch debtors are also more responsive with regards to employment, than non-Dutch. Although when considering the persistence of employment efforts, we see that by the end of the 36 month evaluation period, there is no longer a significant difference in employment between Dutch and non-Dutch debtors. These results are especially interesting as it indicates that either the financial threat of bankruptcy does not inspire equal employment seeking efforts, or that differing demographic groups comparatively struggle to find employment.

2

Dutch Institutional Setting[1]

To situate the Dutch debt restructuring and its incentive structure, it is beneficial to consider the international insolvency legal landscape. Debt relief globally ranges from no relief at all, to on-demand debt relief. This difference is hypothesised to be grounded in the availability of credit (vulnerability of individuals), the available government welfare safety net and historical roots; the more available credit, and lacking government welfare safety net increases the likelihood of lenient debt relief regimes (Efrat, 2002). An additionally considered reason for the differences between countries is the attitudes towards entrepreneurship. On the most lenient or liberal side of the debt relief spectrum is the case of the United States. The US insolvency system, chapter 7, grants a debt discharge to individuals within 4 months in general, with certainty. An alternative option for heavily indebted US citizens is chapter 13. This begins to resemble the Dutch debt restructuring proceeding, as a debtor must submit a 4-5 year plan to repay their outstanding debts, however, debt forgiveness is guaranteed. In contrast, in continental Europe, there either is no debt forgiveness or it is theoretically possible, however, rarely granted (Efrat, 2002)(Ramsay, 2017). For example, in the French case, when a household becomes insolvent, the *Household Debt Commission* (HDC) will suggest either an immediate payment of all debts, or a debt repayment suspension of least two years (Blazy et al., 2011). The Netherlands stands out for its middle ground between the lenient and conservative personal insolvency policies (Efrat, 2002).

In the Netherlands, when an entity becomes seriously indebted, there are several options to ensure that there is a resolve, however, these are dependent on the type of entity. Entities applying for insolvency are registered as either a legal person, or natural person. This is a relevant distinction, as they have differing degrees of liability. A legal person can be a public legal person (the state, provinces, municipalities or regional entities concerning water management) or a private legal person (private company, limited company, foundation, associations, churches, cooperatives). When

[1] Unless otherwise stated, information regarding the functioning of the Dutch debt restructuring programme presented in this section can be found in the work by Pouw and Israël (2007).

legal persons are insolvent in the Netherlands, they or their creditors can apply for either bankruptcy or moratorium. On the other hand, natural persons include individuals as consumers, sole traders (proprietorship) and partnerships. Natural persons are able to apply for bankruptcy, moratorium and debt restructuring.

Debt restructuring is the only procedure which is exclusively tailored to natural persons. In this paper, we focus solely on individuals participating in the debt restructuring procedure, however, below we will discuss all of the (natural person) debtors available insolvency options. This contextualises the debtors debt restructuring choice, as well as, highlights the incentives for a natural person to apply for debt restructuring.

In general, when a natural person ends up with problematic debts, at the municipality level (*gemeente*) in the Netherlands, there are differing procedures in place to support an informal reconciliation between creditors and debtors. These voluntary or 'amicable debt assistance' schemes (*Minnelijk traject schuldhulpverlening*) can differ widely between municipalities. Westhof et al. (2015) find that, one in five households in the Netherlands (17.4% 18.8%) was found to be at risk of developing problematic debts, had problematic debts or was already in a municipality vol- untary debt assistance programme. The majority of these households (15.7%) are households with risky debts or problematic debts who do not use the formal channels of debt assistance. Only once the municipality provisions do not ensure a resolve, debtors and creditors make their case within the Rechtbank. However, this informal municipality enforced debt reconciliation is gradually becoming less active; Niemeijer et al. (2003) find that the informal procedures are giving way to the formal legal procedures. More debtors are immediately being referred to the Rechtbank. This is due to creditor-debtor incentives, as well as, lacking municipal funding to adequately maintain the programmes (Niemeijer et al., 2003). In other words, more debtors and creditors are depending upon the legal framework, making it imperative to understand the workings of the following Rechtbank procedures.

2.1 Moratorium (surseance van betaling)

Moratorium is the least common form of insolvency; its main aim preventative. It consists of a legal authorisation enabling debtors to postpone payment such that a worsening debt position is prevented. Legal persons can apply, as well as, only natural persons with employment, or a business. In the Dutch case, it is often a gateway into bankruptcy. This is also corroborated by our data, where cases of moratorium are rare, and indeed often transition into bankruptcy (see Appendix B).

2.2 Bankruptcy (faillissement)

Bankruptcy is perhaps the most recognised form of resolving debts. This legal procedure aims to repay as much of the debts as possible through sale of assets. If the debts cannot be repaid in full, an additional aim is to divide funds equitably between the creditors. If a legal person files for bankruptcy, the assets are sold in such a way as to recover as much of the debts as possible, until there is nothing of value left and the legal persons ceases to exist; this may mean that debts remain in perpetuity, unpaid. If a natural persons files for bankruptcy in the Netherlands, the legal procedure is identical as for legal persons. However, for natural persons, this has grave implications. If the total amount owed is not recovered, this can be claimed by creditors indefinitely as the person does not cease to exist.

2.3 Debt Restructuring (schuldsanering)

In response to the dilemma of natural persons undergoing indefinite bankruptcies, in 1998, an amendment to Dutch insolvency laws included the option of debt restructuring (the *Wet schuldsanering natuurlijke personen* or WSNP) for natural persons who are irreconcilably indebted. This procedure operates similarly to bankruptcy, however, with important distinctions. As in bankruptcy, debt restructuring is a liquidation procedure: assets will be monetised and consequently divided amongst creditors. In contrast to bankruptcy, if a natural person enters into the debt restructuring procedure, the individual has 3-4 years in which they must work/find work in good faith, to ensure that as much of their debts can be paid back. This can maximally extended to 5 years, however this is rare. If during debt restructuring, the debtor has amassed a sufficient amount to satisfy all creditors, a meeting with creditors will be arranged (*verificatie vergadering*). This is an important aspect of the Dutch system. Negotiations between debtor and creditor to determine whether obligations are sufficiently (perhaps not entirely) met, are encouraged. If the debtors proposition is accepted by the creditors, and he/she has satisfied all other conditions (i.e. 'good faith' throughout the entire process), then the debtor will be granted a 'clean slate', or fresh start. All outstanding claims by creditors will be legally unenforceable commitments, and the debtor can start their lives again debt free.

An important difference between debt restructuring and bankruptcy is the difficulty of accep- tance, as well as, completion. Despite this, during debt restructuring, debt forgiveness remains not guaranteed. First, the debtor must be a natural persons and legally demonstrate that there is no realistic way of extra-judicial settlement of debts;

only then can the debtor (alone), or creditor(s) apply for debt restructuring. To demonstrate that extra-judicial debt settlement is not feasible, the municipality 'amicable debt assistance' scheme (*Minnelijk traject schuldhulpverlening*) must fail to find a resolve between creditor and debtor. We take special consideration for this in our later empirical analysis. However, as mentioned prior, these municipality level programmes are becoming less depended upon by creditors or debtors and cases are more frequently transferred to the Rechtbank Niemeijer et al. (2003). Irrespective of this, the debtor must be able to show that, up to five years prior to application, efforts have been made for financial reconciliation; this includes that existing addictions to e.g. gambling must have been successfully treated.

Second, the debtor must have 'good faith' (*te goeder trouw*) during and after the debt restructuring procedure. This means demonstrating efforts or behavioural standards (e.g. cooperation) for reconciliation. There are four core obligations which comprise 'good faith'. The first is that the debtor is required to be transparent, and truthfully provide any helpful or relevant information the administration requires. Second, that the debtor must make significant effort to repay as much as possible to creditors. Third, the debtor must also not disadvantage any creditors from receiving payment. Lastly, the debtor cannot create any excessive new debts. Good faith must be shown throughout all stages of the debt restructuring process, including ten years after the proceedings. If during or after the official proceedings it is discovered that any of these conditions have been violated, the claims of creditors are reinstated; in this way, the clean slate can be revoked. The debtor is then classified as bankrupt and cannot reapply for debt restructuring on the debts in question.

Once admitted into debt restructuring, the debtors are assigned an administrator (*bewindvoerder*). The administrator is charged with two main tasks. Their first task being management and liquidation of debtor assets and settlement of debts. This means that the debtor looses the right to dispose of his/her assets or sell them. The second task is supervision of the debtor's compliance with the debt restructuring obligations. It is important to note, that the administrator assigned to the debtors is not charged with assisting or mentoring the debtors. A supervisory judge is assigned to the administrator (*rechter-commissaris*). The administrator, with approval of the supervisory judge, will put forth a personalised debt restructuring scheme.[2] In this personalised debt restructuring scheme, the amount garnished for wages is discussed or in the case that the debtor is unemployed, commitments to finding employment. The amount of wages that can be maximally retained by the debtor is 90% of minimum wage; any amount above 90% of minimum wage is automatically transferred by the employer to a bank account managed by the administrator.[3] The debtors will not be assisted by the administrator to meet these requirements for debt forgiveness.

2 If the debtor is physically or mentally unable to manage his/her financial affairs, they can be assigned an additional administrator (*beschermingsbewindvoerder*) charged with guarding the debtors best interest. This is frequently the case.

3 Under special circumstances 95% of the respective minimum wage can be retained during debt restructuring.

3 Literature

3.1 International empirical findings

Empirical work considering the balance between creditor/debtor accountability, and in particular debtor labour-market responses to insolvency proceedings, to date, has been sparse. Literature has focused on the reasons for insolvency applications rather than how the debtors react and fare under the insolvency proceedings (Fay et al., 2002) (White, 1998)(Domowitz and Sartain, 1999) (Gross and Souleles, 2002) (Livshits et al., 2010) (Boyes and Faith, 1986) (Shepard, 1984) (Lefgren and McIntyre, 2009). Existing empirical works which do focus on how debtors fare are primarily situated in the US context; in particular, how debtors respond to Chapter 7 and Chapter 13. Chapter 7 grants debtors debt discharge within 3-4 months with certainty, whereas Chapter 13 resembles the Dutch debt restructuring programme; debtors undergo 3-5 years of monthly wage garnishments (amounts varying across US states) and in return more of the debtors assets are exempt to liquidation (Efrat, 2002) (Ramsay, 2017). Often the debtors credit availability is evaluated after undergoing these insolvency Chapters. Surprisingly works considering labour-market outcomes of debtors after or during these proceedings is lacking; there are two central works, that of Han and Li (2007) and Dobbie and Song (2015).

Han and Li (2007) evaluate the impact that applying for US bankruptcy Chapter 13 and Chapter 7 have on work incentives. Due to limited observations, they consider work efforts after application to either Chapter. To do this, they use data from the Panel Study of Income Dynamics (PSID) between 1984 and 1995. They use an instrumental variable approach; the first instrumental variable is a proxy for the social stigma towards bankruptcy, and the second is the potential benefit from bankruptcy filing. These two instrumental variables were chosen as they have been most widely cited as the reason why households apply for bankruptcy in the US (Fay et al., 2002) (Boyes and Faith, 1986) (Shepard, 1984). With this approach, Han and Li (2007) find that filing for bankruptcy does not have a positive impact on annual working hours for bankrupt households. They claim this may be the result of debt discharge wealth

effects; they demonstrate using a theoretical model that the debtor would consume more and work less in bankruptcy. Han and Li (2007)'s estimated effects of personal bankruptcy on working hours are all negative, however, they are not significant at the usual confidence levels. Work effort being measured as the annual work hours of the head of a household.

In contrast, Dobbie and Song (2015) assess the debtors' response to Chapter 13 solely. They evaluate subsequent earnings, mortality and home foreclosure. Dobbie and Song (2015) were able to do this as they linked 500, 000 cases of bankruptcy filings to administrative tax and foreclosure records. To limit the bias due to endogenous selection for bankruptcy filing, they created an instrumental variable exploiting random judge assignments, and with differing judge leniency. They compare those who have gotten accepted by lenient judges to those who have been rejected by strict judges. They estimate the impact of bankruptcy protection through a two-stage least squares (2-SLS) regression, with judge leniency as an instrumental variable. Dobbie and Song (2015) find that those accepted into Chapter 13 bankruptcy protection have annual earnings increase, mortality rates decrease, and foreclosure rates decrease in comparison to those rejected into the programme. If creditors are allowed to garnish a debtors earnings, these impacts of Chapter 13 are larger. These results imply that a debt restructuring programme maintains work incentives.

As the Dutch debt restructuring programme resembles Chapter 13 in structure, although not in leniency regarding debt forgiveness, we therefore expect to find stronger debtor responses regarding earnings, and work efforts. Our data is also at a monthly level, rather than yearly, which enables a more detailed analysis than Han and Li (2007) and Dobbie and Song (2015). Han and Li (2007) and Dobbie and Song (2015) also do not consider the heterogeneous effects between debtors in their conclusions. We also make use of a difference in difference analysis rather than instrumental variables, as is common in literature nowadays. Besides this US literature regarding labour-market debtor responses, there are few other systematic empirical studies. In continental Europe, however, since the Euro-zone crisis there has been a rethinking of the role of household debt regulation and personal insolvency (Ramsay, 2017), sparking new debates.

Notable work by Fraisse (2017) considers the case of the French insolvency proceedings. The French personal insolvency procedure is managed by the Household Debt Commission (HDC), who assesses the case and suggests either an immediate payment of all debts, or a debt repayment suspension of least two years. If

it is clear that debts cannot be repaid, all the debtors non-exempt assets are liquidated for creditors, and the debtor will qualify for debt forgiveness. However, Blazy et al. (2011) find that French judges who assess this, tend to disqualify debtors with multiple creditors from debt discharge, and are sensitive to regional labour market conditions. The structure of the French personal insolvency is similar to the Dutch moratorium- many of the cases of debt suspension eventually become bankruptcies. In this way, the French system is stricter than the Dutch, and provides less debtor assistance.

Fraisse (2017) evaluate the long-term probability of debtor re-default. To do this, Fraisse (2017) uses approximately 100, 000 French first-time filers whose debt suspension cases were terminated (and received debt relief) in 2008, and evaluates if these filers have defaulted again by the end of 2015. Fraisse (2017) uses (similar to Dobbie and Song (2015)) manager leniency as the instrumental variable. Fraisse (2017) finds that the French debt grace period, reduces the likelihood of re-default over the following 7 years after initial default. However, this effect seems temporary; Five years after the initial bankruptcy (in 2008), the households which initially benefited from the procedure, are equally likely to re-default as others. This implies that a the debt suspension is not a sustainable source of aid for those applying for bankruptcy. Fraisse (2017) suggests deeper restructuring of the debt, regardless of the level of indebtedness. The main goal of these restructurings should be a balanced budget. However, Fraisse (2017) suggests that predatory lending further reduced the effectiveness of the debt suspension.

Although re-default is not within the scope of this paper, it does indicate that simply delaying payment is not sufficient to assist debtors to reducing their debts. They indicate that some incentives are required to motivate debtors to change their poor financial position. This provides intuition regarding the expected effectiveness of the Dutch debt restructuring programme; In the French case, the best outcome of the French debt suspension is bankruptcy, whereas the Dutch debt restructuring programme uses this as a threat such that debtors feel financially incentivised to improve their financial position (and thus, in turn, the financial position of their creditors).

3.2 Dutch empirical findings

Regarding the Dutch debt restructuring programme in particular, studies have predominantly focused on describing aspects of the informal municipal level amicable debt assistance schemes. These studies show that number of financially vulnerable

Dutch households is increasing (Zwinkels, 2015) (Westhof et al., 2015) (Peters and Combrink-Kuiters, 2017). To our knowledge, the only study to uncover causal relations is by Koning (2015).

Koning (2015)'s work assesses the impact that an intervention can have on Dutch welfare recipients with unmanageable debts. These are Dutch social assistance recipients living in Amsterdam. Dutch social assistance benefits are given to individuals who have exhausted all other benefits available e.g. unemployment benefits and disability insurance benefits. Koning (2015)'s work is complementary to this paper as it assess the stage prior to entering into the official debt restructuring trajectory with the Rechtbank.

The intervention Koning (2015) assesses consisted of something akin to the debt restructuring programme of the Rechtbank; the intervention focused on a voluntarily basis restructuring personal debts, preventing the occurrence of new debt problems and increasing the direct incentives to resume work. The legal debt restructuring programme is comparable, however, requires debtors to do this with the legally binding threat of bankruptcy. Koning (2015) evaluates the effectiveness of the active labour-market policy using the exit rate into employment and unemployment. He uses a continuous time method to model the selection on observables and unobservables, or Timing- of-Events approach. Koning (2015) finds that the debt programme increases exit from the social assistance programme. This seems promising, however, the exit out of social assistance programme is largely influenced by individuals exiting into non-employment. It seems that the voluntary intervention programme did not incentivise work. This holds for those who attended scheduled programme meetings, and even more pronounced for those who signed up, but did not attend (the "no-shows").

Koning (2015) complements our work not only by providing context regarding who enters into the legal Rechtbank debt restructuring programme, but also demonstrates that voluntary programmes with lacking debtor incentives do not change the debtors financial situation. In our paper we consider whether the debtors respond to the legally binding financial threat of bankruptcy. We also consider how the debtors respond in the debt restructuring programme, and not the voluntary programmes which are used prior to this; the voluntary municipal level amicable debt assistance programmes are becoming less and less depended upon to find a resolve for the debtor and creditor (Niemeijer et al., 2003).

4

Data

We use of Rechtbank Rotterdam administrative insolvency data between, November 2011 until September 2016. We have unique information regarding insolvency cases opened within the Rechtbank Rotterdam jurisdiction throughout this period. In the Netherlands, cases can only be submitted in the legal institution assigned to the region of applicant residence. Overall, excluding Rotterdam, there are 11 other Rechtbank organs where a lawsuit can be started.[4] See appendix B for further information regarding jurisdiction of Rotterdam Rechtbank. We pair the natural persons involved in these cases with their corresponding monthly job statistics from Statistics Netherlands (Spolisbus dataset), which spans from 2010 until 2018. Statistics Netherlands sources the job statistics from wage tax returns, hence, it is important to note that this dataset pertains to jobs statistics of those employed at Dutch firms (Centraal Bureau Statistiek, 2019).

This is the first time that insolvency case specific information has been linked to monthly job as well as demographic information. Rechtbank Rotterdam provided us with 19, 968 individual level records, however, this included duplicate records as well as additional records for each time the court case was altered e.g. even when debtor address changed. Hence, our raw data, a record did not necessarily pertain to a unique individual. Additionally, 3,701 records were unable to be linked with Statistics Netherlands information; there remain 7,572 records of natural persons and 8,695 legal persons. For our first selection, we removed the records which could not be linked with *Statistics Netherlands*, as well as, removing duplicate records. We also retain the records with the most up-to-date court case information. We additionally make the following primary selections:[5]

4 Other insolvency administration regions are Amsterdam, the Hague, Gelderland, Limburg, Midden-Nederland, Noord-Holland, Noord-Nederland, Oost-Brabant, Overijssel and Zeeland-West-Brabant. In 2016, Rotterdam Rechtbank received the second most debt restucturing applications. In 2015, the third most received applications. In the years 2014-2011, on average the Rechtbank Rotterdam managed 7th most cases, compared to the other insolvency administration regions. The increase in number of applications over time is also partially due to the inclusion of other Rechtspraken into the jurisdiction of Rechtbank Rotterdam (Peters and Combrink-Kuiters, 2017) (Peters et al., 2016) (Peters et al., 2015) (Peters et al., 2014) (Peters and Combrink-Kuiters, 2013) (Peters et al., 2012)

5 The data selections were made in consultation with data experts at the Rechtbank Rotterdam.

We remove all court cases which are listed as settled (*zaak afdoening*) due to being rejected (*niet toegewezen*) or due to special circumstances. This is because Rechtbank Rotterdam has indicated that these cases are not always reliably recorded.

- We have also removed court cases without a listed plaintiff (*verzoeker*), without a listed debtor, or cases where the defendant is not also a debtor.
- We consider those listed as registered individuals (*geregistreerde*) to in fact be defendants (*verweerder*).

After this selection procedure, we observe, during the five year period, that 9, 065 court cases of insolvency were opened with Rechtbank Rotterdam. In these court cases, 10, 610 individuals participated. For further information regarding the data compatibility of Statistics Netherlands and Rechtbank Rotterdam, as well as selection, see appendix Section A. In this appendix Section, we demonstrate in detail that this data is representative, with minimal measurement errors as well as our selection procedure for transparency.

In the following Subsections we first consider our general insolvency sample. This is to gain context of the Rechtbank data itself, and the context of debt restructuring procedure. Second, we dive into insolvency court case characteristics and particulars of debt restructuring. This adds to our understanding of the debt restructuring programme beyond the legal classifications. Last we discuss relevant variables to understand how the debtors react to the financial incentives present during debt restructuring. There we also briefly discuss selections made on the basis of the *Spolisbus* data.

4.1 Insolvency sample

Of the 9,065 available insolvency court cases, 58.32% are debt restructuring cases, 41.46% are bankruptcy cases, and 0.22% are moratorium cases.[6] Table 1, shows the varying types, roles and status' of the 10, 610 individuals participating in insolvency cases. In the first column, shows how many unique natural and legal persons are participating in any insolvency proceeding registered with Rechtbank Rotterdam. In the second column of table 1, we show how many of the natural/legal persons are defendant or plaintiffs. Of the 6,500 natural persons, we see that 91.43% are plaintiffs. In contrast, only 78.59% of legal persons are plaintiffs. In combination with table 1 column 3, we see how many plaintiffs are also debtors. Of the natural person plaintiffs, 94.82% are debtors as well. This means that many of the natural persons who have applied for any insolvency procedure, have initiated their own court case. They have entered into the judicial system on their own accord, without legal actions from the creditors. Compared to legal persons, we see that there are proportionally less plaintiffs, however, of those plaintiffs only 66.97% are also debtors. In general, table 1 shows that there are more legal persons who are creditor plaintiffs than is the case with

6 Note that these figures represent the latest declared insolvency type available at September 2016.

natural persons; more legal person creditors pursue court cases, than natural person creditors. Of these 10,610 natural and legal persons involved in the insolvency cases; where 50.51% are in debt restructuring, 49.3% in bankruptcy, and 0.19% in moratorium. Most types of insolvency court cases that the Rechtbank Rotterdam handles are debt restructuring yet comparatively less (legal or natural) persons involved.

Table 1: Type, role and status of individuals participating in insolvency cases listed with Rechtbank Rotterdam

Participant type	Freq.	Percent	Participant role	Freq.	Percent	Credit-status	Freq.	Percent
			Defendant	557	8.57	Creditor		
						Debtor	557	100
			Plaintiff	5,943	91.43	Creditor	308	5.18
						Debtor	5,635	94.82
Legal persons	4,110	38.74	Defendant	880	21.41	Creditor		
						Debtor	880	100
			Plaintiff	3,230	78.59	Creditor	1,067	33.03
						Debtor	2,163	66.97
Total	**10,610**	**100**						

Notes: A small number of creditors (< 10) acted as defendants. This is inconsistent with the structure of legal proceedings; if one is a creditor, in an insolvency case, they should have no need to defend themselves. Therefore these observations have been omitted from our analyses.

4.2. Debt restructuring sample

Our specific sample of persons participating in the debt restructuring programme consists of 5, 359 persons; 2.05% were unable to be matched with Statistics Netherlands, 0.78% are legal persons, 51.84% are female, and 45.33% are male. Of these 5, 359 persons participating, 99.95% are participating as a debtor. At the moment of application to the debt restructuring programme, individuals, in general, tend to be between 30-55 years old. Figure 1 shows the specific age categories for debtors by male and female. We see that female debtors tend to apply to the debt restructuring programme earlier than male.

Regarding the debt restructuring cases, we observe 5,375 applications for debt restructuring. Of these debt restructuring cases, 1.64% are at some point reassigned to bankruptcy, 65.23% are ongoing debt restructuring cases and 33.13% are settled. It is therefore only a minority of debtors do not meet the debt restructuring obligations such that they are financially penalised with reassignment to bankruptcy. Hence, in all our analyses, we consider only the court cases which have not been reassigned (5,287 cases). Given the court case has not been reassigned, 1,781 cases of debt restructuring have been settled. The debt restructuring case can be completed or settled in several ways.

The regular court case is terminated (*beeindigd*) due to reaching the time limit of 3-4 years. The administrator is required to submit to the Judge a report regarding all information pertaining to repayment of debts, and whether the debtor has met the debt restructuring requirements. Importantly, therein the judge is informed the court case has been completed, and is advised whether the debtor has earned debt forgiveness. The debtor can also try to come to an agreement with creditors (facilitated by the administrator) prior to the 3-4 year maximum debt restructuring term. If the agreement is accepted by creditors, then the debt restructuring case will be completed on the basis of a homologation agreement (*homologatie akkoord*).

The debt restructuring case can also be paused, or a interim termination (*tussentijdse beeindiging*). This is an indication that the debtor has not met his/her debt restructuring obligations, or can repay debts. In the case that the debtor obligations are not met, the debt restructuring court case is (after the interim termination) reassigned to a bankruptcy case. When the debtor can repay his/her debts, the case is then (after interim termination) classified as settled.
When the court case has been settled without being able to repay all debts, a distribution list is drawn up (*Uitdelingslijst*). This list communicates which creditors have precedent financial claims. When the amount is deemed to little in comparison to the debts required to repay, the court case is completed as a simplified procedure (*Beeindiging vereenvoudigde procedure*), as there is not much to distribute to creditors. In table 2, we show how these court cases have been settled. We indeed see that the majority of court cases are settled by court case termination due to meeting the required 3-4 year term and with a distribution list/homologation agreement.

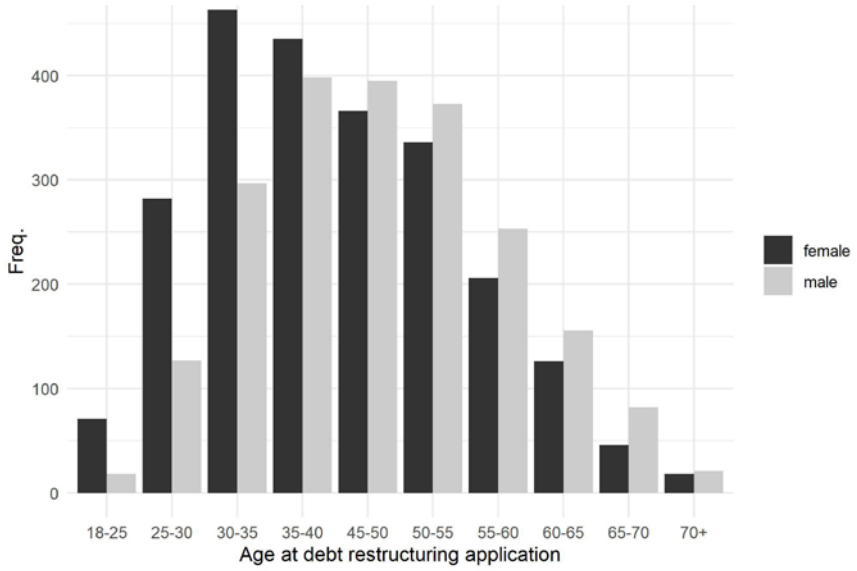


Figure 1: Debtor age at debt restructuring request

Notes: There are 5,337 debtors (this is 99.59% of all individuals participating in debt restructuring). Of these 45.77% are male, 52.16% are female and 0.19% do not have a listed age.

Table 2: Debt restructuring case settlement type

Settlement type	Freq.	Percent
Terminated	690	38.74
Simplified procedure termination	59	3.31
Interim termination	244	13.70
Distribution list/Homologation agreement	788	44.24
Total	**1,781**	**100**

Notes: The 1,781 debt restructuring cases with a settlement constitute 33.69% of our total sample.

We also generally find that, in terms of structure, debt restructuring cases are homogeneous. This is favourable when assessing whether debtors react to the financial incentives, as the procedure seems standardised across debtors.
For instance, in 99.19% of the court cases, there is only one participant, namely the debtor themselves. In the remaining 0.4% and 0.41% of court cases, there are two participants and more than two participants, respectively. When there is only one court case participant, this means that the debtor has acted as plaintiff and defendant; they have themselves applied to participate in the debt restructuring programme. This is also reflected in table 1, where across all court cases, of the natural person plaintiffs, 94.82% are debtors.
The debt restructuring cases also remains mostly homogeneous when considering the type of court case participants involved. In 99.56% of cases, there is only one debtor involved in the case. In 99.58% of cases, there are no creditors participating in the case.
We also find that the average duration of a debt restructuring case is homogeneous and in perfect accordance with the legislation; table 3 shows that the average duration (given the court case has been settled) of a court case duration is exactly 3 years on average, with a standard deviation of a year. In figure 3, we also see that roughly 80% of debt restructuring cases take between 3-4 years to be settled. Table 4 shows, in categories, the duration of debt restructuring cases in detail. These findings corroborate the validity of our Rechtbank data, and indeed confirm that the majority of individuals uniformly face wage garnishments.

Table 3: Debt restructuring duration summary

Duration (days)	Obs.	Mean	Std. Dev.
Settlement	1,781	1,134.32	309.78
Ongoing	5,287	843.25	419.11
Verdict	5,287	108.84	101.96

Notes: Ongoing refers to the duration of all cases which we have available in our Rechtbank Rotterdam data; if the case is still ongoing, this refers to the duration until September 2016.

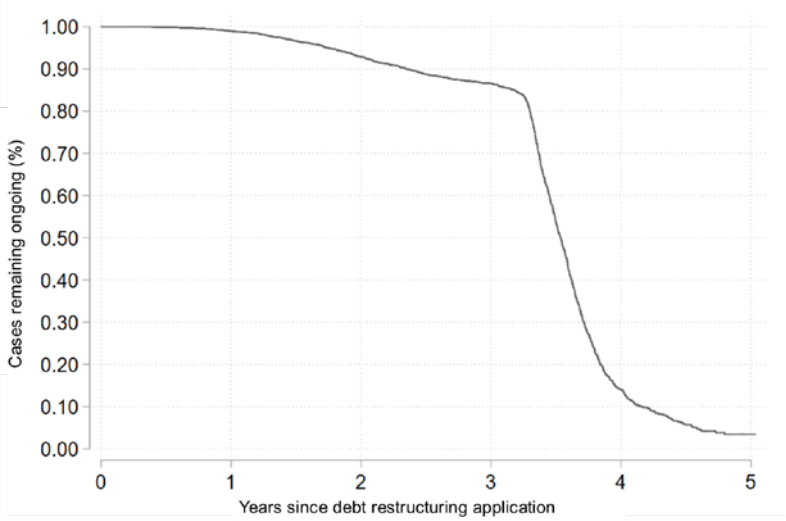


Figure 2: Duration of debt restructuring cases

Notes: This kaplan meijer survival curve is based on the duration of 1, 781 settled cases of debt restructuring; the remaining 3,506 ongoing cases of debt restructuring are not included.

Table 4: Debt restructuring case duration

Days until insolvency settlement	Freq.	Percent
0-300	26	1.46
301-400	31	1.74
401-500	53	2.98
501-600	63	3.54
601-700	73	4.10
701-800	80	4.49
801-900	67	3.76

Days until insolvency settlement	Freq.	Percent
901-1000	42	2.36
1001-1100	25	1.40
1101-1200	108	6.06
1201-1300	640	35.93
1301-1400	410	23.02
1401-1500	118	6.63
1501+	45	2.53
Total	**1,781**	**100**

Notes: The 1, 781 settled cases constitute 33.69% of our total sample

4.3 Labour-market Outcomes

To consider whether the financial incentives during debt restructuring court case induce work effort from debtors, we link the 5,337 debtors participating in debt restructuring with demographic characteristics available from Statistics Netherlands between January 2010 until December 2018. After doing so, we make the following important selections: Individuals who were unable to be linked with Statistics Netherlands information have been removed. We entirely remove individuals with negative wages, or negative employment duration.

This results in 5,211 individuals of which we know their job characteristics. This corresponds to 5,188 court cases of debt restructuring remaining. We create a balanced panel consisting of 108 months; we have 562,788 observations available pertaining to those who have entered debt restructuring. It is important to note that for variables which pertain to employment, there will be less observations as not all individuals have employment.
In the following section we discuss the various labour market outcome variables which reflect the debtor responses to the financial incentives.

Employment
We consider individuals employed in a particular month if they are listed in the *Spolisbus* data. *Spolisbus* data pertains exclusively to job information regarding those employed at Dutch firms. Those not listed in an *Spolisbus* month, (but are listed in *Gbapersoontab* data) we consider not employed. With variable employment, we evaluate the likelihood to enter into employment at a Dutch firm. The employment response we observe from debtors during debt restructuring is shown in figure 3. In the twenty-two periods prior to debt restructuring application, figure 3 shows a steep fall in debtor employment (from 38% to 35% employment). Two months prior to the debt restructuring application month we see that this changes, and thereafter the percentage employed increases. That the percentage employed changes two months prior to the actual application we consider as debtor anticipation effects as well as the failure of the municipal level amicable debt assistance programmes. Since two months prior debt restructuring application, debtor employment has increased to 41.7%.

Hours worked (excl. overtime) (Basis uren)
Statistics Netherlands has constructed this variable to measure the number of paid hours an individual works. However, if the individual works more than specified in their contract (works overtime) and gets paid more for the extra hours worked, this is not considered in this outcome variable. This is measured in the following variable.

Hours worked overtime (Overwerk uren)
This refers to the hours that an individual works more than specified in their employment contract.

Log hourly wage (excl. overtime)
This variable has been constructed by dividing *wages* (excl. excluding special pay, allowances and overtime pay) by *hours worked (excl. overtime hours*). Consequently, we take the log to find change in percentage points.

In table 5, we compare a random population sample (52, 222 individuals) with our sample of individuals entering debt restructuring regarding these labour-market outcomes. We see that our sample of debt restructuring applicants is more likely to be employed, however, with a lower log hourly wage. They also work less than the population and roughly equal amounts of overtime hours.

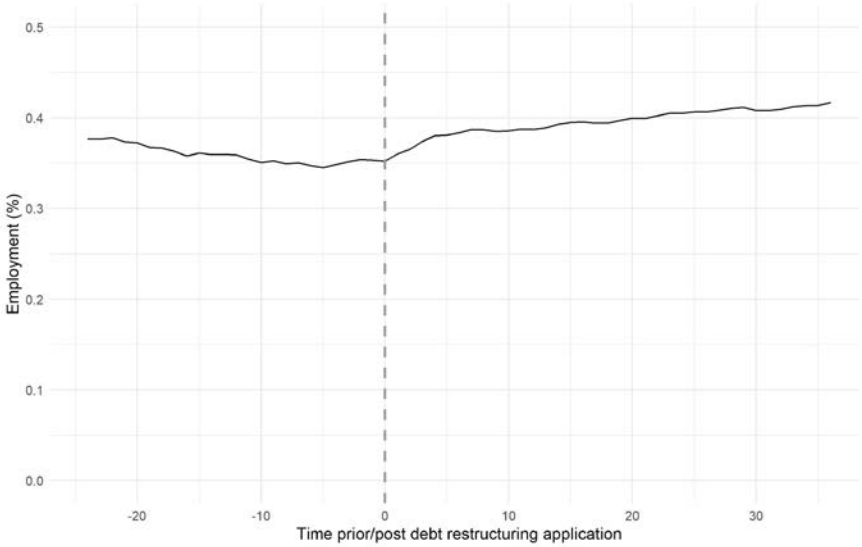


Figure 3: Debtor employment during debt restructuring

Notes: This pertains to the sample after matching with Spolisbus and selection. As this refers to time prior/post debt restructuring application, the panel is unbalanced. For months 22 until 27 we have a fully balanced panel of 5,211 individuals per month. In period 24 this has decreased to 5,020 month entries. In period 36 this has decreased to 4,488 month entries.

Table 5: Debt restructuring sample and population labour-market outcome means comparison (at two months prior to debt restructuring application)

	Employment		Log hourly wage (excl. overtime)		Hours worked (excl. overtime)		Hours worked overtime	
	Population	Sample	Population	Sample	Population	Sample	Population	Sample
Mean	**0.3244**	**0.3544**	**2.7096**	**2.4883**	**121.71**	**109.96**	**1.41**	**1.48**
St. Dev.	0.4682	0.4784	0.6180	0.4272	51.97	52.28	7.55	8.08
Variance	0.2192	0.2289	0.3819	0.1825	2700.53	2733.44	56.98	65.30
Skewness	0.7500	0.6086	-1.1337	-2.8445	-0.59	-0.37	8.51	10.34
Kurtosis	1.5625	1.3704	10.1972	35.4947	2.63	2.04	96.88	146.40
1 th percentile	0	0	0.7196	0.8267	7.96	5.28	0	
5 th percentile	0	0	1.5994	2.1394	20.36	16	0	
10 th percentile	0	0	2.0803	2.1940	36.14	30	0	
25 th percentile	0	0	2.4202	2.2918	86	69	0	
50 th percentile	0	0	2.7578	2.4671	139	117	0	
75 th percentile	1	1	3.0591	2.7072	165	156	0	
90 th percentile	1	1	3.3660	2.9050	174	173	0	
95 th percentile	1	1	3.5758	3.0418	176	175	6.64	7.85
99 th percentile	1	1	4.0675	3.3372	192	186	38.35	34
Number of individuals	52222	5211	16910	1839	16943	1847	16943	1847

Notes: Employment is a (0 – 1) binary variable, hourly wage (log) is on a monthly level. Hours worked (excl. overtime) and hours worked overtime are in terms of monthly hours. Means of labour-market outcomes are taken two months prior to debt restructuring application. For the population, a date was selected randomly on the basis of monthly how many debt restructuring applications took place.

4.4 Independent variables and co-variates

The independent variables and co-variates are demographic characteristics (from Statistics Netherlands *Gbapersoontab*) as well as job characteristics (from Statistics Netherlands *Spolisbus*). In particular, we focus on the following characteristics:

- Gender: time-invariant, as either male or female.
- Age: this is time variant, however, for further analysis age is coarsened into categories 18-24,
- 25-34, 35-44, 45-54, 55-64, 65+. Therefore, given our analysis time-span, we can consider it time invariant.
- Ethnicity: coarsened into categories Western, non-Western, Dutch, Moroccan, Turkish, Suriname, Dutch Antilles including Aruba. This variable is time invariant.
- CAO sector employed in (based on firm classification (*standaard bedrijfsindeling* or *SBI*): private companies, subsidised sector, government, education, defence, police, judicial power (*Rechterlijke macht*), municipal government, water management authority (*Waterschappen*). This is varies over time, as individuals find new/change employment.
- Sector employed in (as is used to the classify employee insurance): This variable has 68 different categories.
  To describe this variable we use the five most prevalent sectors. This is varies over time, as individuals find new/change employment.
- Job type: this includes director or majority shareholder, trainee, supported employment for handicapped individuals (*WSW-er*), Agency worker (*Uitzendkracht*), On-call employee (*Oproepkracht*) or other. This is varies over time, as individuals find new/change employment.

These variables are summarised in the following tables (6-10). To provide context, we again compare the debt restructuring applicant means to a random population sample. In table 6, we see that there are slightly less men entering into debt restructuring, compared to the population. The average age of those entering into debt restructuring two months prior to their application is 43.92, which is similar to our average population age. However, in the debt restructuring sample, there is less variance. This is not surprising as those entering into debt restructuring are likely in a particular life phase; they are likely to be over 25 and under 60 years old.

Table 7 shows the ethnicity composition of our debt restructuring sample, in comparison to the population. We find that 51% of individuals participating in debt restructuring have a Dutch nationality, in comparison to 73% in the population sample. There are also comparatively less Westerners participating in debt

restructuring than in the general population sample. Comparatively we see that we have more Moroccan, Turkish, Surinamese and Dutch Antilles individuals apply for debt restructuring. In particular, there are 2% Surinamese individuals in our population sample, but in contrast 11% applying for debt restructuring.

Other important individual characteristics are based on their employment. Employment characteristics are shown in tables 8, 9 and 10. In table 8, we consider the CAO-sector that the individual is employed in two months prior to debt restructuring application. We see that more individuals are employed in the private sector or subsidised sector, than in government, education or the judicial power. Regarding the specific sector employed in, table 9 shows (out of 68 categories) the five most debtor employed sectors. In general we see that many more individuals two months prior to debt restructuring application are working in lending sectors (11.69% compared to the population mean of 3.3%), and cleaning (5.96% compared to the population mean of 1.17%). The type of employment that individuals have is listed in table 10. Two months prior to debt restructuring application 2.38% of individuals were working in supported employment, compared to 1.27%. With 'supported employment' we mean employment for disabled workers in an establishment which offers personal assistance or support. There is also a large difference between the number of agency workers (13.54% in debt restructuring sample, compared to 4.3% in the population).

Table 6: Gender and age composition of those entering debt restructuring (sample) compared with a random population sample (population), two months prior to debt restructuring

	Male		**Age**	
	Population	**Sample**	**Population**	**Sample**
Mean	0.4962	0.4656	44.31	43.92
St. Dev.	0.5000	0.4989	27.45	10.94
Variance	0.2500	0.2489	753.74	119.64
Skewness	0.0153	0.1381	0.20	0.26
Kurtosis	1.0002	1.0191	2.20	2.44
1 th percentile	0	0	-2.92	23.67

	Male		Age	
	Population	**Sample**	**Population**	**Sample**
5 th percentile	0	0	1.92	27.42
10 th percentile	0	0	7.58	30.00
25 th percentile	0	0	22.08	35.17
50 th percentile	0	0	43.83	43.50
75 th percentilew	1	1	64.50	51.83
90 th percentile	1	1	83.00	58.75
95 th percentile	1	1	91.67	62.75
99 th percentile	1	1	103.67	69.00
Number of individuals	52222	5211	52222	5211

Notes: Male is a (0-1) binary variable indicating male gender, while age is continuous. These means are taken two months prior to debt restructuring application. For the population sample, a random date is selected based on the amount of applications of debt restructuring

Table 7: Ethnicity composition of those entering debt restructuring (sample) compared with a random population sample (population), two months prior to debt restructuring

		Population	Sample
Western	Mean	0.0960	0.0581
	St. Dev.	0.2945	0.2340
	Variance	0.0867	0.0548
Dutch	Mean	0.7349	0.5116
	St. Dev.	0.4414	0.4999
	Variance	0.1948	0.2499
Moroccan	Mean	0.0206	0.0372
	St. Dev.	0.1421	0.1893
	Variance	0.0202	0.0358
Turkish	Mean	0.0218	0.0781
	St. Dev.	0.1459	0.2684
	Variance	0.0213	0.0720
Surinamese	Mean	0.0178	0.1173
	St. Dev.	0.1323	0.3218
	Variance	0.0175	0.1035
Dutch Antilles	Mean	0.0098	0.0896
	St. Dev.	0.0987	0.2857
	Variance	0.0097	0.0816
Non-Western	Mean	0.0991	0.1080
	St. Dev.	0.2988	0.3105
	Variance	0.0893	0.0964

Notes: All ethnicity variables are (0-1) binary variables.
The population estimates are based on 52, 222 randomly selected individuals. The sample consists of 5, 211 individuals who have applied for debt restructuring. These means are taken two months prior to debt restructuring application. For the population sample, a random date is selected based on the amount of applications of debt restructuring

Table 8: CAO-sector comparison between population and debt restructuring sample (two months prior to debt restructuring application)

	Private company		Subsidised sector		Government		Education		Judicial power	
	Population	Sample	Population	Sample	Population	Sample	Population	Sample	Population	Sample
Mean	0.6878	0.7250	0.1760	0.2139	0.0169	0.0081	0.0692	0.0195	0.0265	0.0260
St. Dev.	0.4634	0.4467	0.3808	0.4101	0.1288	0.0898	0.2538	0.1383	0.1606	0.1591
Variance	0.2148	0.1995	0.1450	0.1682	0.0166	0.0081	0.0644	0.0191	0.0258	0.0253
Number of individuals	16943	1847	16943	1847	16943	1847	16943	1847	16943	1847

Notes: All variables are (0-1) binary. We show the five most employed CAO-sectors of debtors. Means are taken two months prior to debt restructuring application. For the population sample, a random date is selected based on the amount of applications of debt restructuring.

Table 9: Sector comparison between population and debt restructuring sample (two months prior to debt restructuring application)

	Metal and technical firms		Retail		Cleaning		Health		Lending	
	Population	Sample	Population	Sample	Population	Sample	Population	Sample	Population	Sample
Mean	0.0482	0.0498	0.0536	0.0509	0.0117	0.0596	0.1728	0.1841	0.0330	0.1169
St. Dev.	0.2141	0.2176	0.2252	0.2198	0.1077	0.2367	0.3781	0.3877	0.1786	0.3214
Variance	0.0458	0.0474	0.0507	0.0483	0.0116	0.0560	0.1430	0.1503	0.0319	0.1033
Number of individuals	16943	1847	16943	1847	16943	1847	16943	1847	16943	1847

Notes: All variables are (0-1) binary. We only show the five most employed CAO-sectors of debtors. Means are taken two months prior to debt restructuring application.

Table 10: Job function comparison between population and debt restructuring sample (two months prior to debt restructuring application)

	Director or Majority shareholder		Trainee		Supported employment		Agency worker		On-call employee	
	Population	**Sample**	**Population**	**Sample**	**Population**	**Sample**	**Population**	**Sample**	**Population**	**Sample**
Mean	0.0291	0.0022	0.0145	0.0049	0.0127	0.0238	0.0430	0.1354	0.0606	0.0736
St. Dev.	0.1681	0.0465	0.1196	0.0697	0.1119	0.1525	0.2029	0.3422	0.2385	0.2612
Variance	0.0283	0.0022	0.0143	0.0049	0.0125	0.0233	0.0412	0.1171	0.0569	0.0682
Number of individuals	16943	1847	16943	1847	16943	1847	16943	1847	16943	1847

Notes: All variables are (0-1) binary. Most individuals are classified as 'other', in the population this consists of 84.01% of individuals, and for debt restructuring applicants 76.02%. Means are taken two months prior to debt restructuring application.

5 Identification Strategy

5.1 Identification challenges

To be able to consider how debtors respond to the financial incentives present during the debt restructuring programme, we require a valid control group. We use matching to create a control group, as the pool of those rejected for the bankruptcy proceedings is inconsistently recorded in Rechtbank data, and the observations recorded are minimal. It is also worth mention that those rejected from the debt restructuring proceedings do not meet important criteria set by the Rechtbank; one of these being that those who have an active addiction (e.g. gambling) are redirected to address this prior to undergoing the debt restructuring proceedings. Hence, it is difficult to attain a natural control group. Given these restrictions, matching is the most appropriate method to create a control group, and reduce observed heterogeneity. We use a coarsened exact matching (CEM) technique as this is method directly ensures that the common support assumption is met. By pruning observations based on important characteristics and using an exact match, it ensures that the common support is directly determined, rather than as a consequence of the matching as in propensity score matching (King et al., 2010). According to Iacus et al. (2012), there is a better distribution of co-variates, and one does not need to control for them as they are directly used in creating the match.
With our matched sample, we use difference-in-difference (DD) to examine whether the debtors respond to the financial incentives present during debt restructuring, as well as a means to reduce unobserved heterogeneity. We additionally consider the heterogeneity effect of the DD across key demographic characteristics. However, for the DD method to be valid, there must be a common trend prior to the shock between the control and treatment group in these outcome variables. We estimate whether this is the case using the following common trend model, eq. (1)

1)

$$Y_{it} = \varphi_0 + \sum_{\tau=-14}^{-2} \left[\omega^{\tau} (DEFAULT_i \text{ x } D_{it}^{\tau}) + \theta_{\tau} D_{it}^{\tau}) \right] + M_t + YR_t + \varepsilon_{it}$$

$$i \in \{1, 2, ..., N\}, t \in \{1, 2, ..., 108\}$$

where subscript *i* and *t* refer to individual and month, respectively. We make use of *Spolisbus* months from January 2010 until December 2018, which equates to 108 months of observation. The several labour-market outcomes discussed in Section 4 are denoted as *Y* . Variable *DEFAULT* is time invariant, with a value of one indicating the individual has or will experience debt re- structuring (treatment group). Vice versa, variable *DEFAULT* equals zero if the individual has not/ will not undergone the debt restructuring procedure and is therefore in the matched control group. We denote the months until/after debt restructuring application as binary variable $D\tau$, where D^0 represents the month of debt restructuring application. Variable *DEFAULT* multiplied with binary variable $D\tau$, indicates whether the individual is in the treatment group (so has/will apply for debt restructuring) and is in period τ. We examine negative values of τ as we want to test that coefficients $\omega\tau$ is not significantly different between the control and treatment group. We control for month and year effects (*Mt*, *Y Rt*), and *Eit* represents the idiosyncratic error term. Once we have established a common trend, we can estimate the debtor response across various labour-market outcome variables. To do this we make use of several empirical models.

5.2 DD

The first empirical model considers whether the debtors respond at all to the debt restructuring programme, across the labour-market outcomes. For this we use the following DD (eq. 2).

2)

$$Y_{it} = \delta DEFAULT_i \text{ x } POST_{it} + \rho POSTM_{it} + \beta' X_{it} + \alpha i + M_t + YR_t + \varepsilon_{it}$$

$$i \in \{1, 2, ..., N\}, t \in \{1, 2, ..., 108\}$$

Binary variable *POST* indicates whether an individual has applied for debt restructuring. When variable *POST* is zero, but *DEFAULT* has a value of one, it

indicates that the individual will apply for debt restructuring in the future. Those individuals assigned into the control group will have an artificial debt restructuring application date, which corresponds to the date in which they have been matched; prior to the date in which they have been matched, $POST_{it}$= 0 and at and after the matching date, $POST_{it}$= 1. The impact that entering into the debt restructuring has on an individual are captured in the coefficient δ; it represents the systematic differences in Y. Vector X in equation 2 includes time varying (age) and time invariant (gender and Dutch nationality) demographic characteristics. α_i represents the individual effect.

The second empirical model considers the persistence of the effects explored in equation 2; instead of looking at the pre/post response of debtors, we consider the response across each month until/since debt restructuring application. This is done in equation 3, shown below.

3)

$$Y_{it} = \sum_{\tau=-12}^{36} \left[\delta^{\tau} (DEFAULT_i \text{ x } D_{it}^{\tau}) + \rho^{\tau} D_{it}^{\tau}) \right] + \beta' X_{it} + \alpha_i + M_t + YR_t + \varepsilon_{it}$$

In the same way as in the common trend model, We denote the months until/after debt restructuring application as binary variable $D\tau$. Now the measure of systematic differences in Y is considered at a monthly level in coefficient $\delta\tau$. We consider 12 months prior to debt restructuring application, and 36 months post.

5.3 DDD

After considering whether the debtors respond (persistently) to the financial incentives, we assess the heterogeneity of the DD across key demographic characteristics. We do this by, in equation 4 we additionally consider vector X of demographic characteristics, which makes a triple interaction term with *POST* and *DEFAULT*.

4)

$$Y_{it} = (\kappa' X_{it}) \text{ x } DEFAULT_i \text{ x } POST_{it} + (\gamma' X_{it}) \text{ x } DEFAULT_i + (\eta' X_{it}) \text{ x } POST_{it} + \delta DEFAULT_i \text{ x } POST_{it} + \rho POST_{it} + \beta' X_{it} + \alpha i + M_t + YR_t + \varepsilon_{it}$$

$$i \in \{1, 2, ..., N\}, t \in \{1, 2, ..., 108\}$$

The triple interaction term coefficient (κ) represents, for example, the male debtor response to applying for the debt restructuring programme (and consequently participating in it) compared to females.

5)

$$Y_{it} = \sum_{\tau=-12}^{36} \left[(\kappa^{\tau} ' X_{it}) \text{ x } DEFAULT_i \text{ x } D_{it}^{\tau} + \delta^{\tau} \text{x } DEFAULT_i \text{ x } D_{it}^{\tau} + \rho^{\tau} D_{it}^{\tau} \right] + (\gamma' X_{it}) \text{x } DEFAULT_i + \alpha_i + M_t + YR_t + \varepsilon_{it}$$

As before, we follow up with considerations for the persistence. In eq. (5), we make use of the same vector of demographic characteristics *X*, which makes a triple interaction term with *D*τ and *DEFAULT* . Now the measure of systematic differences, κ^{τ} , is dependent on the specific month until/since debt restructuring application.

6

Empirical results

6.1 Matching Procedure

First, we discuss our CEM matching procedure in greater detail, and discuss the matching quality. To find a valid control group, we match individuals from the Rechtbank Rotterdam data exactly on demographic characteristics (from Statistics Netherlands *Gbapersoontab*) as well as job characteristics (from Statistics Netherlands *Spolisbus*). Specifically, we match exactly on the gender, age (in coarsened categories 18-24, 25-34, 35-44, 45-54, 55-64, 65+), ethnicity, CAO sector employed in, sector employed in, and job type. In the Data section (4), these were explored and shown to be key ways in which the population and those entering the debt restructuring programme differ.

Two control individuals are assigned to each individual in debt restructuring (treatment group) without replacement. We match a control group two months prior to the moment of insolvency application; we match at $\tau = 2$. We do this to take into account the anticipation and preparation for application submission. As discussed in Section 2, the debtor must participate in an amicable debt assistance programme and fail to come to a voluntary agreement with creditors. However, we recognise that this is not the official start of the debt restructuring programme. Matching at $\tau = 0$ is further investigated as a robustness check (Section 7). We find that this does not qualitatively change our findings. Once matching at $\tau = 2$ and consequent selection (as discussed in section 4), 5, 211 debt restructuring participants and 10, 414 control individuals remain. For more information regarding the matching procedure and match quality, see Appendix C.

In table 11, we demonstrate the quality of our match with t-tests comparing those in the debt restructuring programme (treatment group) with those matched as control group; the means of key variables, at the moment of match $\tau = 2$, are not significantly

different between the treatment and control individuals. As we have not matched on the dependent variables, control and treatment groups have significantly different means. This can be seen in table 11, and shown in greater detail in table 12. However, we see that dependent variable employment is not significantly different between treatment and control. This is due to the fact that we have indirectly matched on employment; we use job characteristics in matching, and those without job information, hence not employed, are matched with those who also do not have this. In the Section 7 we explore this point as robustness check, and consequently demonstrate that matching without using job characteristics leads to a poor match, and consequently no valid common trend between the treatment and the control group. The difference in difference results are not qualitatively different from the findings when matching using job characteristics.

Table 11: Individual summary statistics using the matched (at $\tau = -2$) sample

		Control		Treatment		
		Mean	St. Dev.	Mean	St. Dev.	t-statistic
Demo-graphics	Male	0.465335	0.498821	0.465554	0.49886	-0.0258
	Age	44.01892	12.43696	43.7552	10.93806	1.2997
Ethnicity	Western	0.058095	0.233934	0.058146	0.234042	-0.0129
	Dutch	0.512195	0.499875	0.51161	0.499913	0.0690
	Moroccan	0.037162	0.189167	0.037229	0.18934	-0.0210
	Turkish	0.07826	0.268593	0.078104	0.268361	0.0342
	Surinamese	0.116862	0.321271	0.117252	0.321751	-0.0715
	Dutch Antilles	0.089399	0.285332	0.089618	0.285661	-0.0453
	Non-Western	0.108028	0.31043	0.108041	0.310462	-0.0025
CAO-sector	Private companies	0.726027	0.446055	0.728273	0.444972	-0.1761
	Subsidised sector	0.212463	0.409106	0.209021	0.406721	0.2946
	Government	0.008327	0.090882	0.008251	0.090483	0.0292
	Education	0.020414	0.141429	0.019802	0.139358	0.1519
	Defence	0.002686	0.051764	0.0022	0.046868	0.3381
	Police	0.002686	0.051764	0.00275	0.052385	-0.0432
	Judicial power	0.001074	0.032765	0.0011	0.033159	-0.0273
	Municipal government	0.024711	0.155265	0.026953	0.16199	-0.4974
	Water management	0.001612	0.040118	0.00165	0.0406	-0.0335

		Control		Treatment		
		Mean	St. Dev.	Mean	St. Dev.	t-statistic
Sector	Metal and technical firm	0.052377	0.222816	0.048955	0.215833	0.5423
	Retail	0.053452	0.224962	0.052255	0.222603	0.1865
	Cleaning	0.058824	0.235326	0.059956	0.237471	-0.1677
	Health	0.187752	0.390566	0.186469	0.389592	0.1149
	Lending firm	0.10744	0.309714	0.116062	0.320387	-0.9619
Type of job	Director or Majority shareholder	0.004029	0.063355	0.0033	0.057369	0.4144
	Trainee	0.004566	0.067428	0.005501	0.073982	-0.4689
	Supported employment	0.022831	0.149385	0.023652	0.152005	-0.1910
	Agency worker	0.122482	0.327886	0.128163	0.334363	-0.6016
	On-call employee	0.070911	0.25671	0.070957	0.256824	-0.0063
	Other	0.775181	0.417519	0.768427	0.421954	0.5634
Labour market outcomes	Employment	0.3575	0.479287	0.348877	0.476661	1.0621
	Log hourly (excl. overtime)	2.6962	0.4302	2.4963	0.3887	16.7313***
	Hours worked (excl. overtime)	119.1402	51.38839	111.6897	52.93176	5.0173***
	Hours worked overtime	1.832904	8.917498	1.341381	6.326099	2.1056**

*Notes: These t-tests were conducted at the time of match, τ= 2. All variables, except for labour-market outcomes and age, are binary variables. As there are 68 different categories in variable sector, we have selected the treatment groups' five sectors with the highest mean; the highest percentage of debt restructuring applicants works in these five listed sectors. When using ***,**,* we refer to the significance level of 1%, 5% and 10% respectively. Additionally, ethnicity Dutch Antilles includes Aruba.*

Table 12: Individual summary statistics using matched sample

	Employment		Log hourly wage (excl. overtime)		Hours worked (excl. overtime)		Hours worked overtime	
	Control	Treatment	Control	Treatment	Control	Treatment	Control	Treatment
Mean	0.3575	0.3489	2.6962	2.4963	119.14	111.69	1.83	1.34
St. Dev.	0.4793	0.4767	0.4302	0.3887	51.39	52.93	8.92	6.33
Variance	0.2297	0.2272	0.1851	0.1511	2640.77	2801.77	79.52	40.02
Skewness	0.5947	0.6341	0.1722	-2.6357	-0.40	-0.30	7.67	7.76
Kurtosis	1.3536	1.4021	8.1233	24.5555	2.71	2.39	78.02	86.10
1 th percentile	0	0	1.7269	1.2214	6.07	5.25	0	0
5 th percentile	0	0	2.1948	2.1318	23	16	0	0
10 th percentile	0	0	2.2618	2.1883	39.5	30.36	0	0
25 th percentile	0	0	2.4114	2.2995	83	70.18	0	0
50 th percentile	0	0	2.6562	2.4778	130	120	0	0
75 th percentile	1	1	2.9312	2.7221	160.33	156	0	0
90 th percentile	1	1	3.1993	2.9062	173	173	0.49	0
95 th percentile	1	1	3.4045	3.0326	176	176	10.59	8.85
99 th percentile	1	1	3.9521	3.2571	200	192	45.71	31.32
Number of individuals	10414	5211	3714	1815	3723	1818	3723	1818

Notes: Employment is a (0 − 1) binary variable, hourly wage (log) is on a monthly level. Hours worked (excl. overtime) and hours worked overtime are in terms of monthly hours. Means of labour-market outcomes are taken two months prior to debt restructuring application, $\tau = -2$. For the control group, a date was selected randomly on the basis of monthly how many debt restructuring applications took place.

6.2 Common Trend Assumption

For the validity of the difference in difference analysis, we test whether there is a common trend between the control and treatment groups (who were matched at τ = 2). We perform an F-test on equation 1. Table 13 shows that for 12 months prior to matching, there is no significant difference, with respects to the labour-market outcomes, between the control and the treatment group. However, if we consider 24 months prior to matching we find that log hourly wage becomes significantly different between the two groups at 10% level. However, we deem 12 months sufficient to ensure we have a valid control group, and can perform a difference in difference analysis.

Table 13: Common trend F-statistic on outcome variables Y for sample matched at $\tau = -2$ (eq. 1)

	Months prior to match	
Dependent variable	**12**	**24**
Employment	1.4262	1.2927
Log hourly wage	1.2515	1.4345*
Hours worked (excl. overtime)	0.6935	1.2619
Hours worked overtime	1.0002	0.8125

Notes: the number of parameters for F-test at 12 months prior to match is 11 for all variables. For 24 months prior to match, there are 23 parameters, except for employment, where there are 22.

6.3 Estimates: DD

Once we have established our matching quality and common trend assumption validity, we can consider whether the debtors respond to the financial incentives present in the debt restructuring programme. Columns of table 14 report the systematic differences between treatment and control group (coefficient τ from equation 2) in employment, log hourly wage (excl. overtime) and hours worked overtime. The reference category for the two-way interaction term *DEFAULT POST* is those who are/will not undergo the debt restructuring procedure, and prior to their artificial potential debt restructuring application.

From table 14 we see that individuals who applied for the debt restructuring programme are 4.25 percentage points more employed than those who did not apply for the debt restructuring programme, over the 36 months post application. However, employed debtors experience a loss of percent in hourly wage and increase their hours worked (excl. overtime) by 2.82 hours per month. We see that those in the debt restructuring programme do not significantly change their hours worked overtime.

Our results demonstrate that, after applying (and then participating) in the debt restructuring programme under the threat of bankruptcy, debtors are more likely to be employed, and work more hours. Debtors also rather increase their employment than increasing hours worked overtime at existing places of employment. This implies that debtors are responsive to the financial threat of bankruptcy and wage garnishments. These results are in line with Dobbie and Song (2015), who shows that annual earnings increase after Chapter 13. These results are also complementary to those of Koning (2015), as we show that that debtors respond when there is a credible legal financial threat, rather than a voluntary agreement.

In figure 4 we show whether debtors respond to the financial incentives of the debt restructuring programme persistently (eq. 3). The fixed effects coefficients of employment are given as a percentage on the y-axis in figure 4a. The y-axis of figure 4b represents the fixed effects coefficients of log hourly wage (excl. overtime). The y-axis of figures 4c and 4d show the fixed effects coefficients of hours worked (excl. overtime) and hours worked overtime, which are all given in hours. The x-axis of all figures 4 show months until and after actual/artificial debt restructuring application; we highlight month zero as it is the month of actual/artificial application. It is also important to note that, for all figures 4, the fixed effects coefficients are not significant before at least two months prior to month zero (application of debt restructuring). This further demonstrates that our DD common trend assumption is met, but also the effect of preparations two months prior to the debt restructuring application.

The preparation effect is most pronounced in employment (fig. 4a). This is intuitive, as employment demonstrates debtor 'good faith', and enhances the likelihood of acceptance into the debt restructuring programme. In the first ten months post debt restructuring application, there is a steeper increase in employment, than in the last 26 months. However, the increase in employment remains generally steady. After ten months post debt restructuring application, debtors are roughly 4.94% more likely to be employed. After thirty-six months, this increases to 6.58%. A potential explanation for this could be that debtors feel more motivated during the first year of debt restructuring to change their employment situation. An alternative explanation is

heterogeneous employment reactions amongst debtors during debt restructuring; we will consider this in greater detail in Subsection 6.3.

These employment findings also strongly resemble the findings of Dobbie and Song (2015), despite our empirical identification differences. Dobbie and Song (2015) also finds a large increase in employment within the first year, and a reduced rate of employment thereafter. However, Dobbie and Song (2015) have yearly estimates, and only for five years post Chapter 13 application; with our novel detailed monthly estimates, we also confirm that the upward employment trend. The following figures also provide a more detailed picture of the debtors response, as it goes beyond the scope of Dobbie and Song (2015).
In figure 4b, we see that despite the promise of increased employment, the log hourly wage becomes negative and is slightly statistically significant over time. At the end of the 36 period, we find that debtors experience a loss of 2.86% of hourly wage. Rather than increasing pay per hour, figure 4c shows that hours worked (excl. overtime) increases steadily exactly after the submission of debt restructuring application. This contradicts the hypothesis of Han and Li (2007), as we find that debtors significantly increase work effort, but are not rewarded with higher wages per hour. We do not see, however, changes in 4d. This again confirms that debtors find employment rather than increasing hours worked at existing employment.

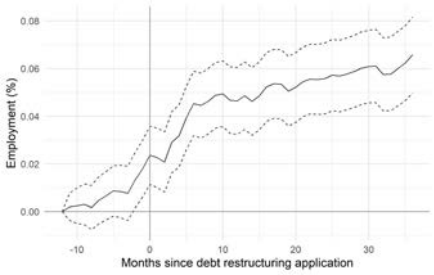
Table 14: DD estimates whether debtors respond to the financial incentives (eq. 2)

	Employment	**Log Hourly Wage (excl. overtime)**	**Hours Worked (excl. overtime)**	**Hours worked overtime**
DEFAULT × *POST*	0.0425***	-0.0133***	2.82***	0.10
’	(0.0047)	(0.0050)	(0.72)	(0.14)
Number of parameters	23	23	23	23
Number of individuals	15,625	8,450	8,464	8,464
Number of observations	759,762	281,205	281,915	281,915

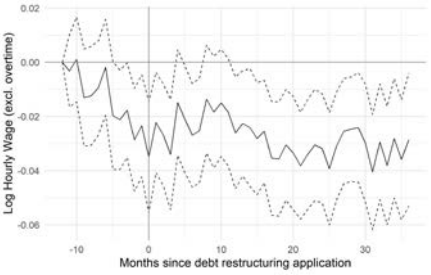
Notes: Each column gives the dependent variable. Parameter estimates of the two-way interaction term are reported. The reference categories of DEFAULT and POST are the solvent individuals prior to their potential debt restructuring application. All regression analyses include individual-specific fixed effects and controls for calendar year, calendar month, age (in categories 18 – 30, 30 – 45, 45 – 60 and 65+), gender and ethnicity. The period under observation is January 2010 until December 2018, in which we consider insolvent and solvent individuals 12 months prior and 36 months post actual and potential debt restructuring application, respectively. Parameter estimates of the co-variates are not reported.

Figure 4: Time-dependent debt restructuring financial incentives response with respects to employment (a), log hourly wage (excl. overtime) (b), hours worked (excl. overtime) (c) and hours worked overtime (d) (Eq. 3)

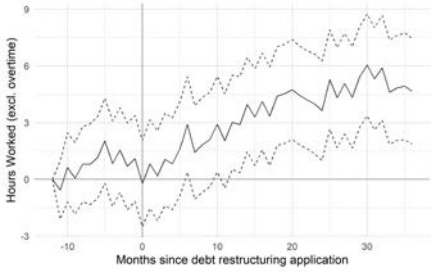
(a) Employment



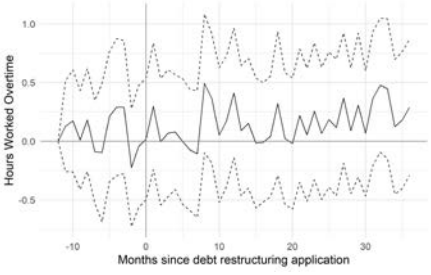
(b) Log Hourly Wage



(c) Hours Worked (excl. overtime)



(d) Hours Worked Overtime



Notes: The reference group is those who did not participate in the debt restructuring (and have been matched to an individual two months prior to their actual debt restructuring application). The reference month is the twelfth month prior to debt restructuring application. The 95% confidence intervals are computed using clustered standard errors by individual. All five fixed effects regression models include 116 parameters, of which there are 48 two-way interaction terms, with respects to time.

Table 15: Whether particular types of debtors respond to the financial incentives. The Heterogeneity of DD from eq. (4)

	Employment	Log Hourly Wage (excl. overtime)	Hours worked (excl. overtime)	Hours worked overtime
DEFAULT × *POST* ×	0.0354***	-0.0001	-2.19	0.23
	(0.0096)	(0.0098)	(1.44)	(0.28)
AGE 30-45	0.0252	0.0368	8.23***	-0.55
	(0.0170)	(0.0227)	(2.68)	(0.42)
AGE 45-60	-0.0002	0.0464**	7.61***	-0.37
	(0.0172)	(0.0229)	(2.72)	(0.43)
AGE 60+	-0.0297	0.0435	6.18	-0.85
	(0.0200)	(0.0356)	(4.58)	(1.04)
DUTCH NATIONALITY	0.0257***	-0.0146	1.11	0.21
	(0.0095)	(0.0101)	(1.44)	(0.27)
Number of parameters	36	36	36	36
Number of individuals	15,625	8,450	8,464	8,464
Number of observations	759,762	281,205	281,915	281,915

Notes: Parameter estimates of the three-way interaction terms are reported. Three-way interaction term including male has a reference category of those who are solvent, prior to potential debt restructuring applicant and female. Three-way interaction term including age (30 – 45, 45 – 60 and 65+) has as reference category of those who are solvent, prior to potential debt restructuring applicant and between 18 – 30 old at the time. Lastly, three-way interaction term including Dutch nationality has a reference category of those who are solvent, prior to potential debt restructuring applicant and non-Dutch (therefore either non-Western, Western, Moroccan, Turkish, Suriname, Dutch Antilles or Aruba). All regression analyses include individual-specific fixed effects and controls for calendar year, calendar month, age (in categories same categories), gender and ethnicity. Estimates of two-way interaction terms and co-variates are not reported.

6.4 Estimates: heterogeneous effects of DD

We have seen in Section 4, that the debt restructuring court cases are homogeneous in terms of structure, however, this does not necessarily mean that all the debtors react in the same fashion during the programme. The observed debtor labour-market responses to the financial threat of bankruptcy reported in table 14 and figure 4 may be driven by specific debtor subgroups; for example, the increasing but kinked shape of figure 4a. Hence we evaluate whether specific demographic characteristics drive results found in the previous Subsection (by using eq. (4) and (5)). In particular, we are considering categories *MALE*, *AGE* and *DUTCHNATIONALITY* , with reference categories being females, age between 18, 30, and non-Dutch respectively. Table 15 reports the value of δ, or the systematic differences, according to specific demographic groups (eq. 4); demographic characteristics form a triple interaction term. The employment column shows that those in the debt restructuring programme after application and also male experience a 3.54% increase in employment, compared to women. Also having a Dutch nationality, compared to those without, has a positive effect of 2.57% on employment. Interestingly, age does not play a significant role in determining which debtors react to the debt restructuring financial incentives through seeking employment. The sign of the coefficients, however, are in line with the expectation that it is more challenging to find work as one ages.

When considering log hours worked, column 2 from table 15, age does play a significant role. Those in the debt restructuring programme after application and also aged between 30 45 experience a 4.64% increase in wages per hour, compared to those aged between 18 30. Interestingly, all other demographic characteristics do not affect the debtor response regarding log hourly wage; women and men do not react significantly different after entering the debt restructuring programme with respects to log hourly wage. The same holds for nationality. This the debt restructuring programme may drive debtors to find employment, however, not focusing on improving wages per hour. Age categories, however, also affect the number of hours worked. Those in the debt restructuring programme after application and also aged between 30 45 work monthly 8.23 hours more than those aged between 18 30. Those aged between 45 60 work monthly 7.61 hours more than those aged between 18 30. This could show that those who are older, respond by to the debt restructuring programme by finding employment with higher wages per hour, or strongly adjust their working hours. However, it could also be interpreted as those who are older compensate for their age by working more hours to ensure employment. Additionally, debtors across the demographic groupings do not significantly respond by increasing hours worked overtime at existing employment. This corroborates our original

discussion that debtors find employment rather than increasing hours worked at existing employment.

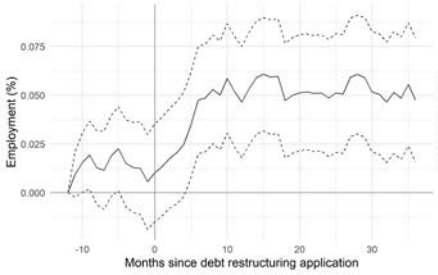
In figure 5 we show the persistence of these heterogeneous effects on employment (eq. 5). We show the persistence of responses in solely employment, and not log hourly wage, hours worked (excl. overtime) and hours worked overtime as they do not have persistent effects across all the demographic groups. Regarding employment, we also do not show the persistence of the debtor response when aged between 45 60 and 60+, as they are also not significant. These figures are, however, depicted in Appendix D.

In figure 5a in particular, we see the how male debtors in the debt restructuring programme respond over time compared to female debtors. We find that male debtors employment consistently increases in the first 10 months of debt restructuring compared to women. This then stabilises, however employment rates remains significantly higher than that of women. This finding is novel and has interesting implications; either male debtors respond stronger to the financial threat of bankruptcy, or that female debtors are (36 months after debt restructuring application) 4.76% less employable than their male counterparts.

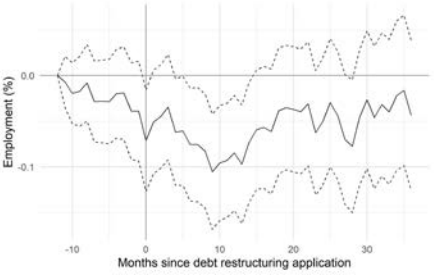
Further research must be done to disentangle this discrepancy between men and women employment responses. In figure 5b we show that those aged over (and including) sixty, find employment significantly worse than those between the age of 18 30, however we see that this is a temporary effect which lasts roughly 16 months after debt restructuring application. Having a Dutch nationality also temporarily ensures significantly higher employment (figure 5c). Towards the end of the debt restructuring programme (month 30+), we see that there is little difference between Dutch and non-Dutch employment efforts. It is interesting that these efforts are made roughly just throughout the procedure. It could imply that the Dutch have a better understand what is expected of them during the programme, and reduce their employment efforts once the programme is completed. For this reason, it would be of great value and interest to further research into how debtors respond in the long-term after the completion of their debt restructuring programme.

Figure 5: Persistence of debtor reactions during debt restructuring on employment, given key demographic characteristics (eq. 5).

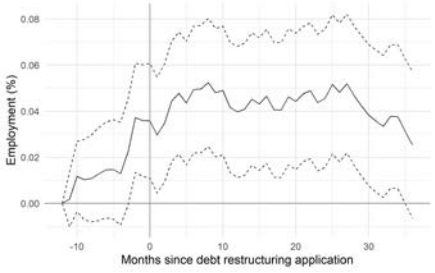
(a) Employment: male



(b) Employment: ages 60+ compared tobaseline 18 - 29



(c) Employment: Dutch



Notes: Figure 5a is showing how males in debt restructuring compare to baseline females in debt restructuring. Figure 5b is relative to those who also entered into debt restructuring and are in the baseline age category (between 18 - 29). We have omitted age categories 30 - 45 and 45 - 60, as these did not have a significant persistent effect on employment. Figure 5c shows how those with a Dutch nationality in debt restructuring compare to baseline non-Dutch in debt restructuring. Confidence intervals of 95% are constructed from clustered standard errors by individual, and are depicted using dashed lines. The control group sample has been matched at t= −2. All fixed effects regression models include 599 parameters.

7 Robustness Checks

7.1 Matching at $\tau = 0$

In this paper, we have matched our sample of debtors with individuals who resemble them, based on observables, two months prior to the debtors debt restructuring application ($\tau = 2$). This was chosen as we assumed that preparations for application would already then be underway. However, as a robustness check, we additionally consider matching on the month of application itself. We match on the same variables as stated prior (section 6). Matching (and consequent selection as stated in section 4) at $\tau = 0$ results in 5,062 debt restructuring applicants (treatment) and 10,183 control individuals matched. In table 16 we show the results of testing the common trend assumption. Unlike the common trend of our control matched at $\tau = 2$ (table 13), we now see significant common trends. For 24 months prior, all common trends except hours worked overtime, are significantly different. For 12 months prior common trends except log hourly wage and hours worked overtime, are significantly different. In other words, our common trend assumption for the difference in difference analysis for the matched control group at $\tau = 0$ does not hold. This is accordance with our expectations as individuals have already begun preparing for their debt restructuring case application. As discussed in Section 2, the amicable debt assistance programme must redirect the debtor to the legally binding debt restructuring programme.
In table 17, we report whether the debtors respond to the financial incentives of the debt restructuring programme (eq. 2 and 4), however, with a control group matched at $\tau = 0$ instead of $\tau = 2$. Comparing the difference in difference results from matching at $\tau = 0$ (table 17) and $\tau = 2$ (table 14), we see that the employment coefficient remains unchanged and equally significant. The coefficient of log hourly wage, hours worked (excl. overtime) and hours worked overtime changes slightly, however, remains equally significant and with the same sign. In general, there are no qualitative differences in the difference in difference coefficients.

Next we assess whether there are changes in the heterogeneity of the DD (see table 18). We again find that coefficient values change slightly, however, the sign does not. Coefficients which are significant in the τ= 2 matching (table 15) all remain significant at the 10% level. Additionally, in the matched sample at τ= 0, age categories become significant; for dependent variable employment, *AGE* 30 45 is now significant. For dependent variable log hourly wage, coefficients for *AGE* 30 - 45 and *AGE* 60+ are now significant.

We therefore conclude that, using the matchedifference in difference coefficient estimates, but also as it meets the common trend requirement and is conceptually more appropriate.

Table 16: Common trend F-statistic on outcome variables Y for sample matched at τ = 0 (eq. 1)

	Months prior to match	
Dependent variable	12	24
Employment	5.4892***	3.1218***
Log hourly wage	1.4388	1.6066**
Hours worked (excl. overtime)	2.1205**	1.8967***
Hours worked overtime	1.2886	1.1010

Notes: The number of parameters for F-test at 12 months prior to match is 11. For 24 months prior to match, there are 23 parameters.

Table 17: DD estimates whether debtors respond to the financial incentives while control group matched at $\tau = 0$ (eq. 2)

	Employment	Log Hourly Wage (excl. overtime)	Hours Worked (excl. overtime)	Hours worked overtime
DEFAULT × POST	0.0495***	-0.0128***	2.9059***	0.0714
	(0.0047)	(0.0049)	(0.7186)	(0.1388)
Number of parameters	23	23	23	23
Number of individuals	15,275	8,238	8,251	8,251
Number of observations	740,248	278,457	279,159	279,159

Notes: Each column gives the dependent variable. Parameter estimates of the two-way interaction term are reported. The reference categories of DEFAULT and POST are the solvent individuals prior to their potential debt restructuring application. All regression analyses include individual-specific fixed effects and controls for calendar year, calendar month, age (in categories 18 – 30, 30 – 45, 45 – 60 and 65+), gender and ethnicity. The period under observation is January 2010 until December 2018, in which we consider insolvent and solvent individuals 12 months prior and 36 months post actual and potential debt restructuring application, respectively. Parameter estimates of the co-variates are not reported.

Table 18: Whether particular types of debtors respond to the financial incentives. The Heterogeneity of DD from eq. (4) using a control group matched at $\tau = 0$

	Employment	Log Hourly Wage (excl. overtime)	Hours worked (excl. overtime)	Hours worked overtime
DEFAULT × POST × MALE	0.0341***	-0.0079	-2.3223	0.1790
	(0.0095)	(0.0097)	(1.4397)	(0.2820)
AGE 30-45	0.0373**	0.0572**	8.2322***	-0.4246
	(0.0171)	(0.0231)	(2.7349)	(0.4319)
AGE 45-60	0.0015	0.0684***	7.1848***	-0.2051
	(0.0172)	(0.0231)	(2.7818)	(0.4416)
AGE 60+	-0.0210	0.0668*	5.7333	-0.7395
	(0.0195)	(0.0361)	(4.5741)	(1.0540)
DUTCH NATIONALITY	0.0227**	-0.0127	0.8158	0.2388
	(0.0094)	(0.0099)	(1.4409)	(0.2738)
Number of parameters	36	36	36	36
Number of individuals	15,275	8,238	8,251	8,251
Number of observations	740,248	278,457	279,159	279,159

Notes: Parameter estimates of the three-way interaction terms are reported. Three-way interaction term including male has a reference category of those who are solvent, prior to potential debt restructuring applicant and female. Three-way interaction term including age (30 – 45, 45 – 60 and 65+) has as reference category of those who are solvent, prior to potential debt restructuring applicant and between 18 – 30 old at the time. Lastly, three-way interaction term including Dutch nationality has a reference category of those who are solvent, prior to potential debt restructuring applicant and non-Dutch (therefore either non-Western, Western, Moroccan, Turkish, Suriname, Dutch Antilles or Aruba). All regression analyses include individual-specific fixed effects and controls for calendar year, calendar month, age (in categories same categories), gender and ethnicity. Estimates of two-way interaction terms and co-variates are not reported. 7.2.

7.2 Matching without job characteristics

When matching on job characteristics, we have indirectly matched on employment; those without a job characteristics were matched with others who do not have a job characteristics. This poses a problem for the validity of our DD and DDD analysis. To address this concern, as a robustness check, we test equations 2-5 on a control group matched only on demographic characteristics; age, gender and ethnicity. We match two months prior to debt restructuring application, $\tau = 2$.
Matching without job characteristics (and after selection) we have 5,211 individuals in debt restructuring and 10,430 matched control individuals. We observe the quality of our match in table 19. Perhaps unsurprisingly, now across job characteristics no longer matched on (CAO- sector, sector and type of job) there are significant differences between those entering into the debt restructuring programme, and the matched control. Most importantly, these differences have an impact on the common trend assumption for the difference in difference analysis.

In table 20, we show the common trend assumption between the treatment and control group, for 12 and 24 months. We now see that 12 months prior to two months before debt restructuring application, there is no longer a common trend between treatment and control regarding employment. For 24 months prior, we see that employment, log hourly wage, hours worked (excl. overtime) trends are significantly different. Hours worked overtime remains a common trend for all months. In general, the common trend assumption no longer holds when we do not match using job characteristics.

Regardless, we check whether the difference in difference coefficients vary greatly compared to the case where we match using job characteristics. Table 21 shows that the difference in difference coefficients all remain significant if they were so in table 14. The coefficient values differ slightly, however, the sign remains unchanged. The heterogeneity of the difference in differences when matching without job characteristics is depicted in table 22. We again find that coefficient values change only slightly. The sign of the coefficients does not change, except that the impact of being male on hours worked overtime; in table 22 we see a negative coefficient, while when using job characteristics in the match, the coefficient is positive (table 15). Coefficients which are significant in the case of matching on job characteristics (table 15) all remain significant at the 10% level when not matching on job characteristics. Additionally, when not matching on job characteristics, age categories become significant. Hence, matching using job characteristics controls for more observables, as well as, provides a more conservative estimate regarding significance.

Table 19: Comparison with those in debt restructuring (treatment) and their matched control group

		Control		Treatment		
		Mean	**St. Dev.**	**Mean**	**St. Dev.**	**t-statistic**
Demo-graphics	Male	0.4656	0.4988	0.4656	0.4989	0.0031
	Age	43.9182	12.3305	43.7552	10.9381	0.8084
Ethnicity	Western	0.0580	0.2338	0.0581	0.2340	-0.0354
	Dutch	0.5116	0.4999	0.5116	0.4999	-0.0011
	Moroccan	0.0374	0.1897	0.0372	0.1893	0.0507
	Turkish	0.0780	0.2683	0.0781	0.2684	-0.0132
	Surinamese	0.1172	0.3216	0.1173	0.3218	-0.0165
	Dutch Antilles	0.0897	0.2858	0.0896	0.2857	0.0254
	Non-Western	0.1081	0.3105	0.1080	0.3105	0.0025
CAO sectorq	Private companies	0.6624	0.4729	0.7283	0.4450	-5.2289***
	Subsidised sector	0.1930	0.3947	0.2090	0.4067	-1.4896
	Government	0.0227	0.1489	0.0083	0.0905	3.904***
	Education	0.0724	0.2591	0.0198	0.1394	8.2683***
	Defence	0.0070	0.0835	0.0022	0.0469	2.3439
	Police	0.0092	0.0954	0.0028	0.0524	2.7428***
	Judicial power	0.0009	0.0300	0.0011	0.0332	-0.2401
	Municipal government	0.0299	0.1703	0.0270	0.1620	0.6456
	Provincial government	0.0016	0.0402	0.0000	0.0000	1.7175*
	Water management	0.0009	0.0300	0.0017	0.0406	-0.8429

		Control		Treatment		
		Mean	**St. Dev.**	**Mean**	**St. Dev.**	**t-statistic**
Sector	Metal and technical firms	0.0430	0.2029	0.0490	0.2158	-1.063
	Retail	0.0380	0.1912	0.0523	0.2226	-2.6476***
	Cleaning	0.0236	0.1518	0.0600	0.2375	-7.6131***
	Health	0.1901	0.3924	0.1865	0.3896	0.3462
	Loan firms	0.0378	0.1908	0.1161	0.3204	-12.6123***
Type of job	Director or majority shareholder	0.0270	0.1621	0.0033	0.0574	6.1108***
	Trainee	0.0027	0.0519	0.0055	0.0740	-1.7825*
	Supported employment	0.0137	0.1162	0.0237	0.1520	-2.9288***
	Agency worker	0.0472	0.2120	0.1282	0.3344	-12.0928***
	On-call employee	0.0290	0.1678	0.0710	0.2568	-8.0237***
	Others	0.8804	0.3245	0.7684	0.4220	11.8103***
Labour market	Employment	0.5325	0.4990	0.3489	0.4767	22.0165***
	Log hourly wage (excl. overtime)	2.8396	0.4676	2.4963	0.3887	28.2391***
	Hours worked (excl. overtime)	130.3918	45.1882	111.6897	52.9318	14.6593***
	Hours worked overtime	1.6113	8.0673	1.3414	6.3261	1.3016

Notes: These t-tests were conducted at the time of match, τ= 2, only without making use of job characteristics from Spolisbus data. All variables, except for labour-market outcomes and age, are binary variables. As there are 68 different categories in variable sector, we have selected the five sectors with the highest mean; the highest percentage of individuals works in these five listed sectors. Additionally, ethnicity Dutch Antilles includes Aruba.

Table 20: Common trend F-statistic on outcome variables Y for sample matched without variables from Spolisbus (eq. 1)

	Months prior to match	
Dependent variable	12	24
Employment	1.864**	2.1198***
Log Hourly Wage	1.4456	1.912***
Hours worked (excl. overtime)	1.2057	2.1469***
Hours worked overtime	1.2327	1.1946

Notes: The number of parameters for F-test at 12 months prior to match are 11 parameters. For 24 months prior to match, there are 23 parame- ters. Except for the employment 24 months prior to match, where there are 22 parameters.

Table 21: DD estimates whether debtors respond to the financial incentives (eq. 2) using matching without Spolisbus variables

	Employment	Log Hourly Wage (excl. overtime)	Hours Worked (excl. overtime)	Hours worked overtime
DEFAULT × POST	0.0578***	-0.0187***	4.0688***	0.0430
	(0.0047)	(0.0046)	(0.6706)	(0.1308)
Number of parameters	23	23	23	23
Number of individuals	15,641	9,829	9,844	9,844
Number of observations	760,545	362,411	363,273	363,273

Notes: Each column gives the dependent variable. Parameter estimates of the two-way interaction term are reported. The reference categories of DEFAULT and POST are the solvent individuals prior to their potential debt restructuring application. All regression analyses include individual-specific fixed effects and controls for calendar year, calendar month, age (in categories 18 – 30, 30 – 45, 45 – 60 and 65+), gender and ethnicity. The period under observation is January 2010 until December 2018, in which we consider insolvent and solvent individuals 12 months prior and 36 months post actual and potential debt restructuring application, respectively. Parameter estimates of the co-variates are not reported.

Table 22: Whether particular types of debtors respond to the financial incentives. The Heterogeneity of DD from eq. (4) using matching without Spolisbus variables

Employment	Log Hourly Wage (excl. overtime)	Hours worked (excl. overtime)	Hours worked overtime	
DEFAULT × POST ×				
MALE	0.0422***	-0.0083	-1.4994	-0.0096
	(0.0094)	(0.0091)	(1.3430)	(0.2631)
AGE 30-45	0.0235	0.0346	8.6262***	-0.7427*
	(0.0167)	(0.0221)	(2.5937)	(0.4117)
AGE 45-60	-0.0089	0.0479**	6.3816**	-0.6648
	(0.0169)	(0.0222)	(2.6261)	(0.4200)
AGE 60+	-0.0397**	0.0563*	1.2812	-1.2330
	(0.0198)	(0.0311)	(4.0671)	(0.9878)
DUTCH NATIONALITY	0.0313***	-0.0138	1.5015	0.1447
	(0.0093)	(0.0096)	(1.3540)	(0.2579)
Number of parameters	**36**	**36**	**36**	**36**
Number of individuals	15,641	9,829	9,844	9,844
Number of observations	**760,545**	**362,411**	**363,273**	**363,273**

Notes: Parameter estimates of the three-way interaction terms are reported. Three-way interaction term including male has a reference category of those who are solvent, prior to potential debt restructuring applicant and female. Three-way interaction term including age (30 – 45, 45 – 60 and 65+) has as reference category of those who are solvent, prior to potential debt restructuring applicant and between 18 – 30 old at the time. Lastly, three-way interaction term including Dutch nationality has a reference category of those who are solvent, prior to potential debt restructuring applicant and non-Dutch (therefore either non-Western, Western, Moroccan, Turkish, Suriname, Dutch Antilles or Aruba). All regression analyses include individual-specific fixed effects and controls for calendar year, calendar month, age (in categories same categories), gender and ethnicity. Estimates of two-way interaction terms and co-variates are not reported.

8

Conclusion

In the face of personal debt forgiveness, there is the question of minimising moral hazards; how to find a balanced solution for debtors and creditors is not all too clear. Literature regarding how debtors fare during and after personal insolvency has mixed results. In Dutch debt restructuring, the legislation uses the threat of bankruptcy, and thereby financial incentives, to motivate debtors to work and repay as much of their debts. In this way, the Dutch personal insolvency legislation balances giving debtors debt forgiveness, and creditors what they are owed. In this paper, we eval- uated whether the debtors do respond in the intended fashion. Thereafter we considered whether specific demographic subgroups drive the results; do all debtors respond in the same way? To address this we have used of a novel combination of data from Statistics Netherlands and Rechtbank Rotterdam. Due to the novelty of our data, and the lacking literature, we have also consider in detail who has applied and consequently participated in the debt restructuring programme. We analysed this data using a fixed effect individual specific DD (including heterogeneity of the DD). Our analysis provides two main novel results.

First, we find that debtors respond to the financial threat of bankruptcy, as well as respond persistently over time. Notably, debtors respond by finding employment. Debtors also work more hours on a monthly basis after application. They do not, however, increase the hours worked overtime at existing employment. This is perhaps not surprising, given the unemployed debtors obligation in debt restructuring is to find employment; Finding employment is a reflection of the official debt restructuring requirements, if it is not met, the debtors' court case is reassigned to bankruptcy. Interestingly, despite the increase in employment, this comes with a reduction in hourly wages after application.

Second, we find that debtors do not all respond to debt restructuring in the same fashion; male debtors are persistently over time more responsive than their female

counterparts with respect to finding employment. It is also notable that Dutch debtors respond by increasing their employment, but only do so during the debt restructuring programme. These finding are especially interesting as it indicates that either debtors are not equally responsive to the debt restructuring threat of bankruptcy, or that employment is harder to find for certain demographics.

All in all, with these two main findings, we show that debtors respond to the financial threat of bankruptcy by adjusting their labour market outcomes, however, not all debtors respond in the same fashion. To date this detailed analysis regarding debtor response is novel, however, we complement the existing Dutch work of Koning (2015); in contrast to the voluntary debt intervention programmes prior to debt restructuring, we show that legally binding repercussions are motivational to find employment. In the international debate, we parallel the findings of Dobbie and Song (2015), that a system of wage garnishments and the promise of debt forgiveness increases employment; only in our paper do so with more finely grained data, confirming the monthly persistence of these efforts. We also directly contradict the findings of Han and Li (2007). We find that debtors work more, and increase their employment, at the expense of employment quality. We go beyond existing literature in examining the heterogeneous debtor responses to the debt restructuring programme. As we have found that the financial threat does not inspire equal employment responses between female and male debtors, this begs the question whether the debt restructuring programme affects men and women differently, or whether the labour market opportunities for women are lesser. As the debt restructuring system legally strives to effect all participants equally, this finding is of value.

Limitations we have faced in this work are that we did not have information available regarding the amount of debt the individuals have, or the reason for the debts. For instance, it would be of great interest to match a control group on variables such as marital status, and prior health history. For further research we also suggest considering the period after the completion of the debt restructuring programme. This will give insights into the long-term debtor responses. This could additionally comment on re-default, enabling a comparison with the findings of Fraisse (2017).

Appendix

A

Data Selection

In this section, we detail the selection process such that our netdata is replicable, and the degree of compatibility between Statistics Netherlands and Rechtbank data is transparent. We first discuss the compatibility of Rechtbank Rotterdam data with data from Statistics Netherlands, thereafter the refinements made to the raw Rechtbank Rotterdam data, and lastly the linking of individuals participating in debt restructuring to Statistics Netherlands 's Spolisbus data. We discuss this by demonstrating data alterations chronologically in the following tables.

We first discuss the initial compatibility of the Rechtbank Rotterdam data, and that of the Statistics Netherlands. Rechtbank Rotterdam provided 19, 968 records to be made compatible with the Statistics Netherlands background information (see table 23). From these 19, 968 records, ta- bles 24, 25 and 26 show how many records have been successfully linked with Statistics Netherlands databases.

Table 23: Rechtbank Rotterdam raw data (2011-2016) provided

Type of person	Observations
Natural	11,431
Legal	8,537
Total	**19,968**

Notes: these observations include duplicate records for certain natural/legal persons.

Table 24 provides a summary of how many of the Rechtbank Rotterdam provided observations were able to be linked with the Statistics Netherlands database; 81.47% of the data provided has been compatible. Tables 25 and 26 chronologically by rows

detail the specific selections made by Statistics Netherlands to attain values shown in table 24.

Table 24: Summary overall Rechtbank Rotterdam data compatibility

Data compatibility summary	nr. records	percent
successfully linked legal persons	8,695	43.55
successfully linked natural persons	7,572	37.92
unsuccessfully linked natural persons	3,701	18.53
Total provided observations	**19,968**	**100**

Notes: Observations here refers to the number of records available; this is at the person level, however, including duplicate records.

Table 25: Natural person compatibility

	Compatibility of records: natural persons	Remaining obs.
(0)	Natural persons records available	11,431
(1)	Firm records incorrectly listed as natural persons are counted (and consequently linked) as a firm. This was recommended by Statistics Netherlands.	11,273
(2)	Natural persons without a listed address could not be linked	7,764
(3)	Natural persons with a listed address but not present in the Statistics Netherlands database cannot be linked	7,572
	Final remaining observations	**7,572**

Notes: Observations here refers to the number of records available; this is at the individual level, however, including duplicate records.

Table 26: Legal person compatibility

	Compatibility of records: legal persons	Remaining obs.
(0)	legal persons records available	8,537
(1)	Firms listed as persons are merged as a firm	8,695
	Final remaining observations	**8,695**

Notes: Observations here refers to the number of records available; this is at the firm level, however, including duplicate records.

To implement the compatibility information presented in table 24, we first clean and make selections within the Rechtbank Rotterdam data. In the table 27, we are transparent about the specific reasoning behind how we have processed the Rechtbank Rotterdam raw data. We list chronologically by row, the adjustments made and the justification for this. For ease of understanding, we have also split the selections made according to stages. The stages 5 and 6 indicate the final individual level and court case level Rechtbank Rotterdam data, respectively. This will then be linked to *Statistics Netherlands* data, such that a panel dataset can be created.

Table 27: Selection process

	Stage	Assumptions	Remaining obs.
0	Raw file counts	Raw insolveny data	19968
1	Organisations of raw files: NTR-WOON	Raw NTRWOON data	7764
		Case related variables, which are in the insolventie file as well as NTRWOON, are removed from NTRWOON (Date zaak aanvraag, insolventie wijzeafdoening, date zaak afdoening, date insolventie afdoening, date zaak uitspraak, rechtsvorm, partijrol, indicatieschuldenaar, nrhndls, vlgnr, insolventievorm). Note we keep case number and participant number as on these variables we will merge. Consequent entirely duplicate observations are removed. There were also (< 10) individuals which have 2 records describing the same case. This is due to address changes (2 listed unique addresses). We make the assumption to keep the records indicating Rotterdam as current address, removing records stating otherwise.	6856
2	Merge	Merged NTRWOON person details to each mention of respective individual in insolvency file. All NTRWOON entries were matched.	19968
3	Collapse level of the case	We make the assumption to delete variables vlgnr nrhndls & volgnummer. This leads to many entirely duplicate entries, which were consequently removed.	19968 13417

	Stage	Assumptions	Remaining obs.
		We censor the data. We only use the cases where the insolvency procedure has been requested 11th November 2011 or later.	12665
		We assume case participants listed as registered (geregistreerde) are in fact defendants (verweerders); 2034 observations are recoded.	12665
		We remove cases which are settled (wijze zaak afdoening) because they have not been accepted (niet toegewezen) by the Rechtbank. These include cases turned down	12476
		We remove cases where the insolvency is settled (wijze insolventie afdoening) by special circumstances. These insolvency cases are settled because they were withdrawn (ingetrokken), transferred (overgedragen), appealed the case verdict (vonnis hoger beroep) or have a court verdict (vonnis rechtbank)	11632
4	Collapse level of the individual	START This is done by merging the NTRWOON step 2 file with collapsed firm level file from step 4.	11632
		We remove records pertaining to 14 court cases which had a negative duration. We also remove entries relating to court cases with implausible structures; court cases with no plaintiffs (verzoeker) present, cases where there is no listed debtor (schuldenaar), cases where the defendant (verweerder) is not a debtor. We also remove cases where the verdicts do not match across NTRWOON and insolvency files.	11533

	Stage	Assumptions	Remaining obs.
		We drop insolventievorm as variable as have this variable has been condensed at the level of the case. Consequent duplicate entries are removed.	10873
5	Resulting collapsed files	Individual level	10610
		Bankruptcy (faillissement).	5231
		Debt Restructuring (Regeling Schuldsanering).	5359
		Moratorium (Surseance).	20
6	Resulting collapsed files	Court case level	9065
		Bankruptcy (faillissement).	3758
		Moratorium (Surseance).	20

Now that we have considered the cleaning process of the Rechtbank Rotterdam court case data, we turn to linking this to the Statistics Netherlands Spolisbus data. In table 28, we chronologically detail the selection procedure. Row (0) indicates the individual level Rechtbank Rotterdam data which can be linked to Spolisbus. Row (1) indicates the compatibility with Rechtbank Rotterdam and textitSpolisbus; 131 recorded individuals participating in debt restructuring did not have a listed name and address which was recognised by Statistics Netherlands, and therefore cannot be linked. This stems from information presented in table 23; we specifically consider how many individuals participated in the debt restructuring programme which Statistics Netherlands could not link to their databases. After this, we remove individuals with a negative job duration (row 2), and negative wage (row 3). This results in 5, 211 available individuals for matching, pertain- ing to 5, 188 cases of debt restructuring. In our monthly level panel we therefore have 562, 788 observations available over 108 months (2011-2018).

Table 28: Linking Rechtbank Rotterdam data to Spolisbus and consequent selection

Assumption	Remaining: Individuals	Court cases	Observations
(0) Available for linking	5359	5287	
(1) Unlinked individuals removed	5228	5205	564624
(2) Individuals with negative job duration removed	5218	5195	563544
(3) Individuals with negative wages removed	5211	5188	562788

Notes: This table should be read from row 0 to row 3, as this chronologically details the remaining individuals/court cases/observations available after selection. Observations refers to the number of records pertaining to individuals across the total available 108 months (2010-2018).

Finally, an important caveat regarding data from the Rechtbank is that it pertains exclusively to insolvency within defined municipalities. This means that our data exclusively considers those residing in the Rotterdam region jurisdiction. However, in 2013 the municipality Dordrecht was added to the Rotterdam jurisdiction; distinguishing applications in municipality Dordrecht from those in the existing region of Rotterdam is not possible after 2013. This causes an artificial increase in insolvency applications in consequent years. See table 29 for exact cities present in these regions.

Table 29: Cities present in Rotterdam Rechtbank Jurisdiction 2013-2016

Municipality Rotterdam	Municipality Dordrecht
Albrandswaard	Alblasserdam
Barendrecht	Binnenmaas
Brielle	Cromstrijen
Capelle aan den IJssel	Dordrecht
Goeree-Overflakkee	Giessenlanden
Hellevoetsluis	Gorinchem
Krimpen aan den IJssel	Hardinxveld-Giessendam
Lansingerland	Hendrik-Ido-Ambacht
Maassluis	Korendijk
Nissewaard	Leerdam
Ridderkerk	Molenwaard
Rotterdam	Oud Beijerland
Schiedam	Papendrecht
Vlaardingen	Sliedrecht
Westvoorne	Strijen
	Zederik
	Zwijndrecht

Notes: Between 2011-2012, Municipality Rotterdam was the sole region for which we have data available.

Appendix

B

Additional descriptives

In this section, we provide additional descriptives regarding all types of insolvency court cases managed by Rechtbank Rotterdam. We do so to add additional context regarding the debt restructuring programme in particular. To be able to apply for any form of insolvency with the Rechtbank Rotterdam, individuals/firms must reside in the municipality of Rotterdam (and after 2013 including Dordrecht). Table 30 shows the (most recent) address of court case participants. If an individual moves during the insolvency proceedings, the case is transferred to the Rechtbank with jurisdiction. See in appendix A that court cases which have been transferred are omitted. This is because there is no information prior/post transfer, which could create biases. Of the natural persons participating in court cases, 92.12 percent have a listed city of residence. In our data, legal persons on the other hand, do not have a city of residence associated.

Table 30: Court case participant city of residence

City of Residence	Nr. individuals	Percent
Rotterdam	2462	23.20
Spijkenisse (in Nissewaard)	372	3.51
Schiedam	358	3.37
Vlaardingen	326	3.07
Capelle aan den IJssel	303	2.86
Dordrecht	279	2.63
Hellevoetsluis	199	1.88

City of Residence	Nr. individuals	Percent
Hoogvliet Rotterdam	152	1.43
Ridderkerk	148	1.39
Maassluis	96	0.90
Barendrecht	93	0.88
Zwijndrecht	90	0.85
Gorinchem	70	0.66
Other	1040	9.80
Missing	4622	43.56
Total	**10,610**	**100**

Notes: This refers to the most recent listed address. The missing category pertains to individuals and firms without a listed city of residence. Of those without a listed city of residence, 11.08% pertains to individuals, and 88.92% firms.

Regarding all types of insolvency court cases, the majority of individuals enter at an age between 30 and 55 (see table 31). This does not differ greatly with the age of those entering debt restructuring. In this paper we also predominantly discuss the structure of debt restructuring cases, however, it may add context to consider this generally across all types of insolvency. Tables 32-34 provide a breakdown of how many participants, including which type, have participated in court cases provided by Rechtbank Rotterdam. In the available court cases, 84.51% consist of solely one (legal or natural) participant (table 32).

Table 31: Court case participant age at insolvency application

Age	Nr. individuals	Percent
18 – 25	113	1.74
25 – 30	452	6.95
30 – 35	857	13.18
35 – 40	851	13.09
40 – 45	965	14.85
45 – 50	902	13.88
50 – 55	803	12.35
55 – 60	528	8.12
60 – 65	318	4.89
65 – 70	151	2.32
70–	46	0.71
Missing	514	7.91
Total	**6,500**	**100**

Notes: This only pertains to natural persons participating in cases.

It is relatively rare to have a court case with three or more than three participants. Regarding specific participant types, in 68.02% of all court cases, there is only one natural person participating (table 34). This does stand in contrast with the structure of the debt restructuring court cases, where 99.19% of cases contain one natural person participant. With the inclusion of bankruptcy and moratorium court cases, we see more frequently (30.25%) that no natural persons are participating at all. This is perhaps intuitive as more legal persons go through the bankruptcy proceedings. It is also more likely that there are more legal participants in any court case, than natural persons; 7.46% of court cases contain 2 or more legal person participants (table 33), compared to 1.73% for natural persons, (table 34). To make a further breakdown of court case structure, we examine the combination of participants per case in tables 35, 36 and 37.

Table 32: Number of participants per case of insolvency

Number participants per case	Nr. Cases	Percent
1	7,661	84.51
2	1,309	14.44
3	55	0.61
>3	40	0.44
Total	**9,065**	**100**

Notes: This pertains to all types of insolvency court cases

Table 33: Legal persons' participation

Number legal persons	Nr. Cases	Percent
0	5,658	62.42
1	2,731	30.13
2	654	7.21
>2	22	0.24
Total	**9,065**	**100**

Notes: This pertains to all types of insolvency court cases

Table 34: Natural persons' participation

Number natural persons	Nr. Cases	Percent
0	2,742	30.25
1	6,166	68.02
2	139	1.53
>2	18	0.2
Total	**9,065**	**100**

Notes: This pertains to all types of insolvency court cases

In table 35, we show that, given there is one natural person involved in the insolvency court case, it is most common that there are no legal persons also participating (88.68%). This is the same given there is one legal person involved in the insolvency court case; it is most likely that only one legal person is participating (66.45%). However, table 35 shows that it is relatively less likely that a natural person is participating with other legal participants, than a legal participant participating with other legal participants.

In table 36, we continue the same line of thought, only now regarding natural persons. Given there is a legal person participating in an insolvency court case, it is most common that there are no natural persons involved (82.82% of court cases). If there is one natural person involved in a case, it is most common (94.86% of court cases) that he/she is to be the sole participant of the case.

Lastly, we show in table 37 that if there is at least one natural person present in the case, it is most prevalent that there is only 1 entity participating in the case. If there is at least one legal persons participating in the case, it is most likely that there is also one entity participating in the case, however, it is also common that there are 2 persons involved.

Table 35: Combination of legal participants in a court case

Participant type	**Number additional legal persons involved**			
	0	1	>1	Total
Natural	5,764	675	61	6,500
Legal	0	2,731	1,379	4,110
Total	**5,764**	**3,406**	**1,440**	**10,610**

Notes: This table is at the individual level; we consider each individual and their additional insolvency court case participants.

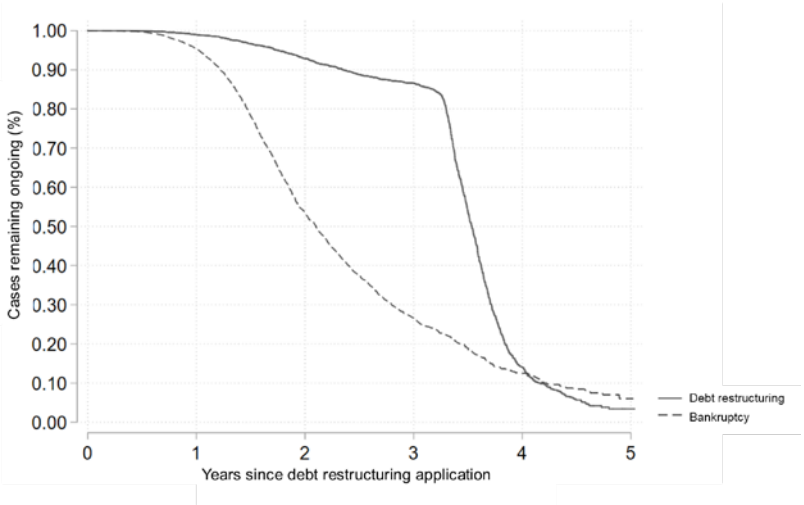
Table 36: Combination of natural participants in a court case

Participant type	Number additional legal persons involved					
	1	2	3	4	>4	Total
Natural	5,559	780	76	71	14	6,500
Legal	2,102	1,838	89	69	12	4,110
Total	**7,661**	**2,618**	**165**	**140**	**26**	**10,610**

Notes: This table is at the individual level; we consider each individual and their additional insolvency court case participants.

Besides court case structure, it is also of interest to understand the duration of the debt restructuring programme in contrast with that of bankruptcy; figure 6 shows that debt restructuring duration observed in the in text figure 3, however, now contextualised with the dashed line pertaining to the duration of bankruptcy. Generally, the bankruptcy court cases are completed sooner than the debt restructuring. This is also because the debt restructuring programme has a set duration of 3-5 years. Half of the bankruptcy court cases we observe have been completed after over two years, whereas this is roughly 4 years for those in debt restructuring. What is especially of interest is that after four years of court case participation, there are more ongoing bankruptcy cases than debt restructuring. Due to the structure of the debt restructuring programme, difficult court cases are either completed or transferred by the four year mark. In bankruptcy, difficult court cases can continue indefinitely. This pertains to roughly, 15% of bankruptcy court cases.

Figure 6: Duration debt restructuring comparison with bankruptcy



Notes: This figure pertains solely to completed court cases of debt restructuring as well bankruptcy.

Appendix C

Coarsened exact matching

We match individuals undergoing the debt restructuring (treatment) programme with those who have similar demographic characteristics, and to our knowledge, are not participating in a debt restructuring programme (control). We find a match for our treatment group based on their demographic characteristics two months prior to debt restructuring application. Specifically, we match exactly on the gender, age (in coarsened categories 18 - 24, 25 - 34, 35 - 44, 45 - 54, 55 64, 65+), ethnicity, CAO sector employed in, sector employed in, and job type. Each treatment individual was randomly matched with two control individuals with the exact same characteristics across these variables. As a robustness check, we match our treatment group to a control group based on treatment characteristics in the exact month of debt restructuring application (using the same matching variables). An additional robustness check was matching without making use of job characteristics (individuals matched on characteristics two months prior to debt restructuring application). Once we have completed the matching and made selections (removed individuals who have a listed negative income), we have tables 38, 39 and 40 showing the number of individuals matched by years.

Table 38: Individuals matched at $\tau = -2$

Year	Control	Treatment
2011	777	390
2012	2295	1150
2013	2006	1001
2014	1992	995
2015	2242	1125
2016	1102	550
Total	**10414**	**5211**

Notes: The matching was completed at a monthly level.

Table 39: Individuals matched at $\tau = 0$

Year	Control	Treatment
2011	535	269
2012	2214	1108
2013	2013	1005
2014	1929	964
2015	2209	1105
2016	1283	641
Total	**10183**	**5092**

Notes: The matching was completed at a monthly level.

Table 40: Individuals matched without job characteristics

Year	Control	Treatment
2011	779	390
2012	2299	1150
2013	2008	1001
2014	1995	995
2015	2249	1125
2016	1100	550
Total	**10430**	**5211**

Notes: The matching was completed at a monthly level.

Appendix

D

Persistence of heterogeneous effects

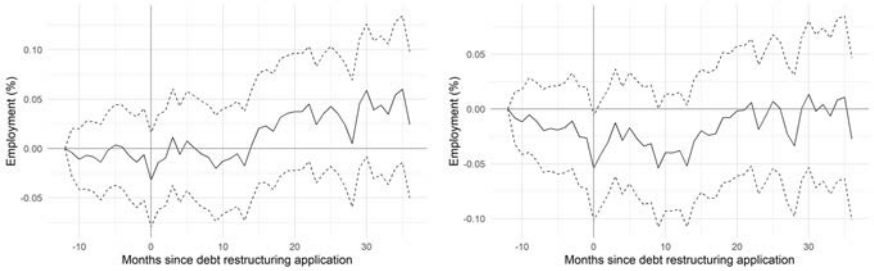
In this section, we show the insignificant DD heterogeneous effects (equation 5). These are also of interest as they demonstrate that efforts of debtors in debt restructuring are equal across the various demographic subgroups we have considered. This indicates that either the debt restructuring programme incentivises equally across demographic groups, or that the opportunities on the labour market are equal for all demographic groups; We suggest further research, as it could indicate that the debt restructuring programme is effective in uniformly treating participants.

Specifically, first we show in table 7, the remaining age categories which did not have a persistent significant heterogeneous effect on employment. In figures 8, 9 and 10, we show that debt restructuring participants, across the various demographic subgroups, respond uniformly with regards to adjusting log hourly wage, hours worked (excl. overtime) and hours worked overtime, respectively.

Figure 7: Persistence of debtor reactions during debt restructuring on employment, given key demographic characteristics (eq. 5).

*(a)*Employment: ages 30 – 45 compared to base-line 18 – 29

(b) Employment: ages 45 – 60 compared to base-line 18 – 29

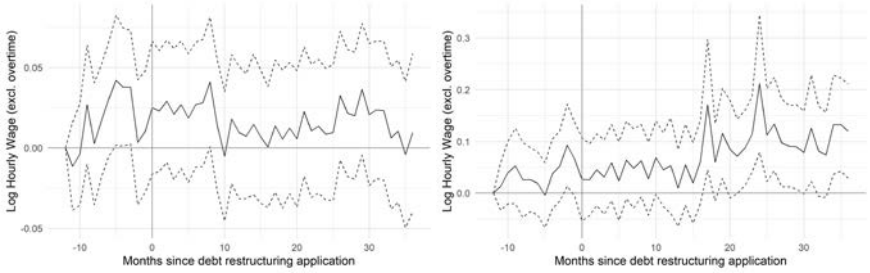


Notes: These are earlier omitted age categories 30-45 (fig. 7a) and 45- 60 (fig. 7b), as they show insignificant persistent effect on employment. Confidence intervals of 95% are constructed from clustered standard errors by individual, and are depicted using dashed lines. The control group sample has been matched at t = 2. All fixed effects regression models include 599 parameters.

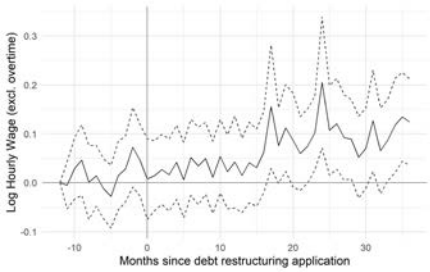
Figure 8: Persistence of log hourly wage (excl. overtime) adjustments per demographic characteristic (eq. 5)

(a)Log hourly wage: male base-line 18 – 29

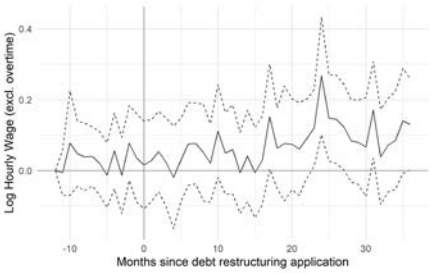
(b) log hourly wage: ages 30 - 45 compared to base-line 18 - 29



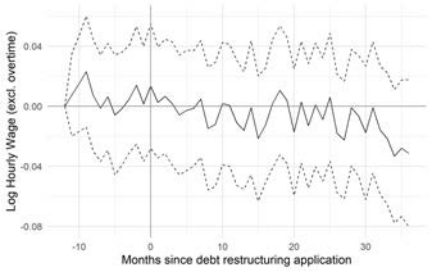
(c) Log hourly wage: ages 45 - 60 compared to base-line 18 - 29



(d) Log hourly wage: ages 60+ compared to base-line 18 - 29



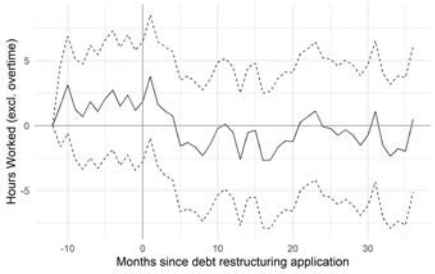
(e) Log hourly wage: Dutch



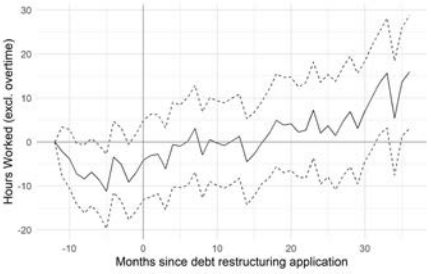
Figures 8b until 8d are relative to those who also entered into debt restructuring and are in the base-line age category (between 18 - 29). Figure 8a is showing how males in debt restructuring compare to base-line females in debt restructuring. Figure 8e shows how those with a Dutch nationality in debt restructuring compare to base-line non-Dutch in debt restructuring. Confidence levels of 95% are shown using dashed lines. These are made using data which has been matched at t = −2.

Figure 9: Persistence of adjustments in hours worked (excl. overtime) per demographic characteristic (eq. 5)

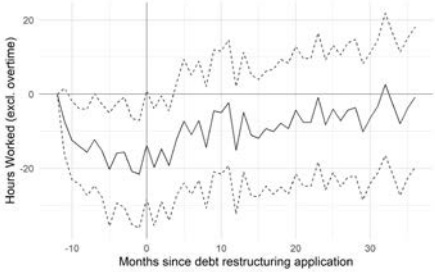
a) Hours worked: male



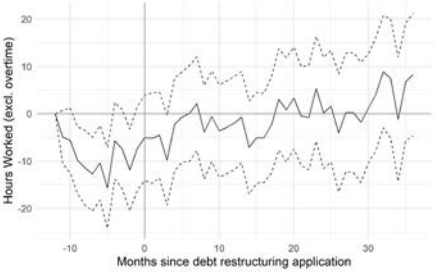
(b) Hours worked: ages 30 - 45 compared to base-line 18 - 29



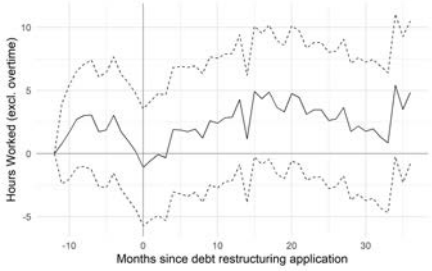
(c) Hours worked: ages 45 – 60 compared to base-line 18 – 29



(d) Hours worked: ages 60+ compared to base-line 18 – 29



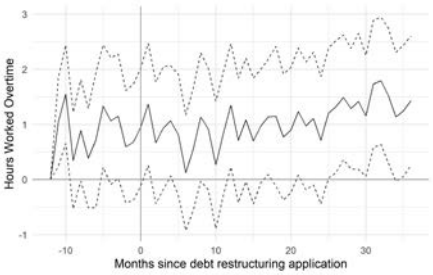
(e) Hours worked: Dutch



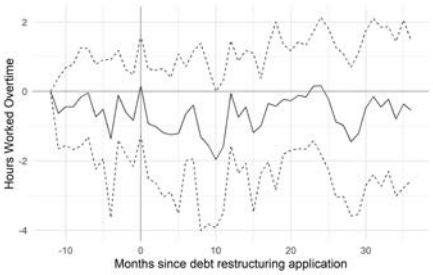
Figures 9b until 9d are relative to those who also entered into debt restructuring and are in the base-line age category (between 18 - 29). Figure 9a is showing how males in debt restructuring compare to base-line females in debt restructuring. Figure 9e shows how those with a Dutch nationality in debt restructuring compare to base-line non-Dutch in debt restructuring. Confidence levels of 95% are shown using dashed lines. These are made using data which has been matched at t = −2.

Figure 10: Persistence of adjustments in hours worked overtime per demographic characteristic (eq. 5)

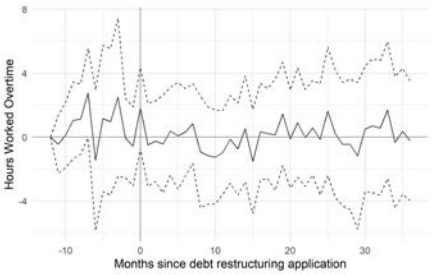
(a) Hours worked overtime: male



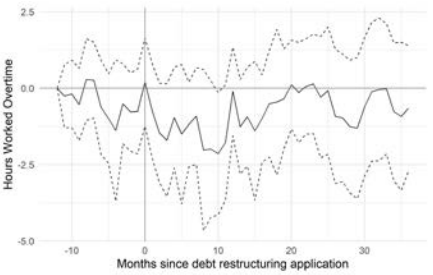
(b) Hours worked overtime: ages 45 - 60 compared to base-line 18 – 29



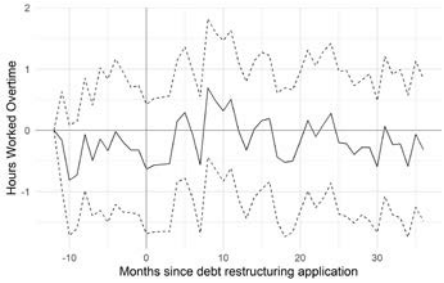
(c) Hours worked overtime: ages 30 – 45 compared to base-line 18 – 29



(d) Hours worked overtime: ages 60+ compared to base-line 18 – 29



(e) Hours worked overtime: Dutch



Figures 10c until 10d are relative to those who also entered into debt restructuring and are in the base-line age category (between 18 - 29). Figure 10a is showing how males in debt restructuring compare to base-line females in debt restructuring. Figure 10e shows how those with a Dutch nationality in debt restructuring compare to base-line non-Dutch in debt restructuring. Confidence levels of 95% are shown using dashed lines. These are made using data which has been matched at t = −2.

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