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The Impact of Delay: Evidence from Formal Out-of-Court Restructuring *

Stjepan Srhoj[†], Dejan Kovač[‡], Jacob N. Shapiro[§] & Randall K. Filer[¶]

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Abstract

Bankruptcy restructuring procedures are used in most legal systems to decide the fate of businesses facing financial hardship. We study how bargaining failures in such procedures impact the economic performance of participating firms in the context of Croatia, which introduced a “pre-bankruptcy settlement” (PBS) process in the wake of the Great Recession of 2007 - 2009. Local institutions left over from the communist era provide annual financial statements for both sides of more than 180,000 debtor-creditor pairs, enabling us to address selection into failed negotiations by matching a rich set of creditor and debtor characteristics. Failures to settle at the PBS stage due to idiosyncratic bargaining problems, which effectively delays entry into the standard bankruptcy procedure, leads to a lower rate of survival among debtors as well as reduced employment, revenue, and profits. We also track how bargaining failures diffuse through the network of creditors, finding a significant negative effect on small creditors, but not others. Our results highlight the impact of delay and the importance of structuring bankruptcy procedures to rapidly resolve uncertainty about firms’ future prospects.

Keywords: bankruptcy, insolvency, liquidation, restructuring
JEL: G33, G34, D02, L38, P37

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1 Introduction

1.1 Setting

Bankruptcy laws have profound effects on manager and firm behavior.¹ The majority of bankruptcy laws around the world provide for procedures involving either liquidation or reorganization (White, 1994). A key question in designing reorganization processes is the importance of speedy resolution. Complex judicial processes may incur significant delays in restructuring, which could be harmful in settings where ongoing uncertainty reduces firms' ability to maintain a strong sales pipeline, continue research and development, undertake equipment updates, and make other critical decisions (Bloom, 2007). They affect creditor as well as debtor firms. We seize a unique opportunity provided by an extraordinary dataset (see section 3.2.) to study the multifarious importance of these delays provided by implementation of a new out-of-court Pre-Bankruptcy Settlement law (PBS) introduced in Croatia in November 2012. To our knowledge this study is the first to quantify the effect (or lack thereof) of bargaining failures or delays in restructuring (reorganizing) procedures on both debtor and creditor (supplier) firms' performance.

The 2008 financial crisis reached Croatia in 2009, initiating a six-year recession ending in 2014 that resulted in a cumulative GDP drop of 12% and an increase in the unemployment rate from 8.6% to 17.3% (Srhoj and Žilić, 2021, p. 5). Many firms did not survive.²

One of modern bankruptcy laws' central roles is to promote reorganization (Stiglitz, 2001). The inefficiency of Croatia's law, in which reorganization was rarely used to help failing firms (Sajter, 2014) and the fact that there was no history of it under communism, resulted in almost all bankruptcy cases ending in court-ordered liquidation.

In November 2012 Croatian policy-makers tackled congested courts and liquidity issues

¹See, for example, Agrawal et al. (2020); Lee et al. (2011); Davydenko and Franks (2008).

²See, for example, Kovač et al. (2016); Srhoj et al. (2021).

by introducing a new PBS option that made it considerably easier for debtors to reorganize while continuing to do business, and provided illiquid and insolvent debtors an opportunity to enter a formal bargaining in which creditors worked with the debtor firm to craft a debt forgiveness and payment plan before entering the court system. This process was followed by an up/down vote that had to be approved by a super-majority of creditors with voting power weighted by size of debt. (See details in Section 2.4.).

The new law quickly began to show results. Reorganization under the out-of-court PBS process significantly reduced the time to settlement to less than a year (343 days) on average, with a median duration of 246 days. Moreover, the mean recovery rate agreed between settled debtors and creditors in PBS rose to 75.40%, a vast improvement over the meager 31% under the old law. In other words, for creditors who settled in out-of-court PBS, the intended asset recovery rate was more than twice as high,³ and for both creditors and debtors, the process took less than a third the time of either the previous court process or failure to settle under PBS.

While these results may be interesting, why should changes to the bankruptcy law of Croatia, a small country with a population of 4 million, be regarded as anything more than a footnote in history? Answer: the change in the law provides an almost perfect situation in which to study the differential effects of institutional framing options on delays and other outcomes experienced by debtors and their creditors.

We exploit a unique Croatian institution – account blockage, which freezes accounts delinquent more than 60 days and are subsequently tracked by the country’s Financial Agency (FINA). Account blockage⁴ is a legacy of the former Yugoslav Republic, where the central

³The difference in actual recovery rates might be somewhat lower since some firms eventually fail after exiting PBS, and we only observe a truncated such period.

⁴“Blockage” may, to users unfamiliar to the system, suggest a stronger institution than exists in reality. As can be seen in Table A3 some firms had their accounts blocked for over four years but exceptions for necessary operating expenses allowed them to continue to exist. During a blockage firms can have a separate bank account to pay wages, sell products in inventory and produce using existing pre-blockage working capital

planning system collected information on late payments by every firm to every creditor, and prevented firms from accessing funds to pay others until the late payments were resolved. This high-frequency data on all the account blockages among firms entering PBS enables us to see when and for how long each PBS firm’s bank accounts were frozen. We are, therefore, in a serendipitous position to provide evidence of the effect of delays in restructuring that occur not only due to bargaining success, but also bargaining failure in out-of-court negotiations. Failure in PBS appears to have had substantial negative effects on the probability of debtor firms’ survival, revenues, staffing levels, and profits. Using a matched sample, bargaining failure (i.e. not settling in PBS) led to a 21.4% lower debtor survival rate, an effect that occurs across all firm sizes from smallest to largest. On average, revenue fell by whopping 91.5%, staffing decreased by 51.8%, and profits shrank by 46.5%.

In addition, we have built an extensive dataset of the financial records of all debt-claims, i.e., approximately 180,000 debtor-creditor interactions.⁵ We find that debtors where the majority of credit was held by private suppliers had higher survival rates compared to debtors whose majority voters were state or state-owned enterprises.

While these results suggest that reducing delay helped debtors, it is possible that it hurt suppliers by pushing them to accept less favorable terms. Examining debtor/creditor pairs shows that delays have a small and heterogeneous effect on suppliers, reducing small suppliers’ survival by 2.86%, but having no effect on larger suppliers. These results provide precise estimates of post-reorganization firm performance, in contrast to previous work which has, to date, provided mostly descriptive evidence regarding firm performance after entering US chapter 11 (reorganization) due to data limitations (i.e. [Silva and Saito, 2020](#); [Iverson, 2018](#); [Kalay et al., 2007](#); [Hotchkiss, 1995](#); [LoPucki and Whitford, 1992](#)).

⁵For debtors that entered PBS between 2012 and 2016 we observe creditor data for 2009 to 2019.

1.2 The effects of delay

Several facts about Croatia's PBS process enable us to relatively cleanly identify the effects of delay. First, in a context of increasing illiquidity and a possible bankruptcy spike, spreading the wave could be welfare enhancing by avoiding overly congested courts, asset fire sales and a suddenly high number of unemployed individuals at a time when it is difficult to find alternative jobs. This situation is not only about human capital depreciation, but could also result in high government spending on unemployment benefits at a time of reduced tax revenues.

Spreading out the bankruptcy wave over a longer time period can be done by debtors and creditors sitting at the table to work out partial debt forgiveness, repayment periods, debt-to-equity swaps and changes in business model. This is, however, difficult to achieve in most frameworks lacking institutional support for the process because of creditor holdout issues, conflicts of interest across creditors, coordination failure among creditors, and informational asymmetry between debtor and creditors (for reviews, see [Senbet and Wang, 2010](#); [Silva and Saito, 2020](#)). Legal reform that formalizes out-of-court restructuring can make it easier to reach a deal, for example, by designing a transparent process of information revelation and by requiring a majority instead of unanimous vote in the reorganization. It may also reduce problems of filtering failure.

Theoretical work (see [White, 1994, 1989](#)) acknowledges filtering failures of bankruptcy procedures. This implies that creditors can select economically inefficient firms to settle, rather than those that are economically efficient, and can force economically efficient firms to liquidate. The latter is potentially a larger issue because if an economically efficient firm is sent to liquidation, there is no coming back, while if an economically inefficient firm is given a second chance, after some time it will end up liquidating. Enabling an economically inefficient firm to reorganize clearly slows down the process of transferring their resources to a higher value use. The question, however, is whether doing so is a welfare enhancing solution

when the economy as a whole faces high illiquidity, high unemployment and a deep recession. It was in just such a situation Croatia introduced the novel PBS process to provide debtors a chance to resolve their debts without having to go into a long court-based bankruptcy procedure. An increase in reorganization under PBS spreads the illiquidity issues. A high fraction of entrants to PBS (approximately 80%) were able to settle using the out-of-court option.

It is highly unlikely that 80% of Croatian debtors reorganize because there are so many more economically efficient firms that should be reorganized compared to the US, France and Germany. There is large variation in the percentage of reorganised firms emerging from the bankruptcy process across countries. Others have reported that the United States had 20% of debtors in bankruptcy reorganised via Chapter 11, as compared to 2.5% reorganized in France, less than 1% in Sweden ([Agrawal et al., 2020, p. 10](#)) and 0.39% in Germany ([Brouwer, 2006, p. 10](#)). While the PBS process is revealing new information on the debtors, the uncertainty of a six year long recession (2009-2014) makes it highly likely that creditors make mistakes in predicting the future prospects of firms, while at the same time being able to coordinate the voting with other creditors.⁶ Therefore, even if the PBS process works by spreading the bankruptcy wave so that it filters only economically inefficient firms not to settle, there must be also many economically inefficient firms that do settle. Some descriptive statistics support this claim. For example, over a quarter of settling firms do not survive until the last observed period, while as many as 42% of those settling have operating losses four years after entering PBS.

Second, entry into PBS was legally mandated for firms with a 60-day or longer account blockage in place (Official Gazette NN 108/102, 144/12). Blockage enabled creditors to effectively freeze debtors' operating bank accounts if they had missed payments, and if not removed by payment within 60 days, force the PBS reorganization process to start.

⁶These are other private supplier firms, state owned firms, tax authority and financial institutions.

This procedure dramatically reduced managers' discretion over the time between entering financial distress and starting negotiations. Considering Croatia's history, [Sajter \(2008\)](#) suggests that the main reason for the low usage of restructuring prior to adoption of PBS was the opportunity for debtors to delay the start of a bankruptcy until most of the valuable assets had been sold. During the delay, owners and managers have a further incentive to gamble with risky actions⁷ or investments that provided them at least some probability of avoiding liquidation. If successful, debtors avoided liquidation. If they failed, the cost of this gamble fell on creditors ([White, 1994](#)).

Third, if settlement was not reached in PBS the debtor was transferred to the standard bankruptcy procedure, which had almost the same voting rules for creditors to approve a reorganization, but took substantially longer, an average of 3.1 years to complete. Bargaining failures in PBS thus entailed significant delays and hence, costs.

Fourth, delay of bankruptcy is frequently a two-dimensional concept, involving both delay in starting the process and delay during the procedure. The theoretical literature emphasizes the negative welfare effects of debtors' delay in starting the bankruptcy procedure ([White, 1989, 1994](#)). Principal-agent moral hazard issues occur between debtors and creditors regarding when to start the bankruptcy or reorganization process. In a country where reorganization is a rare event, owners and managers have incentives to delay the start of bankruptcy to avoid liquidating the firm and losing their jobs.

Since the true duration of the financial distress is usually unobservable, it is difficult to compare firms settling with those not settling, as a heterogeneous delay in starting the reorganization procedure might have a confounding effect. Our high-frequency data on all account blockages among firms entering PBS enables us to see when, and for how long, each PBS firm's bank accounts were frozen. We are, therefore, in a position to provide evidence of the effect of delays in restructuring that occur due to bargaining failure in out-of-court

⁷See, for example, [Filer and Golbe \(2003\)](#).

negotiations.

1.3 Research strategy

For firms that entered the PBS process, the costs of bargaining failure were high. Roughly 75% of firms that entered PBS and reached a reorganization settlement were still active in 2019. By comparison, only 50% of otherwise-similar firms that failed to settle and then had to enter formal bankruptcy survived this long.

There might, of course, be selection into bargaining failure. To more precisely assess the impact of failure-induced delays we compare firms that settled with matched firms that failed to settle using an extensive set of debtor and debtor-creditor observables. For debtors, in addition to account blockages, we match on variables including industry, age, location, Altman Z-Score (as measured in [Altman, 1983](#); [Altman et al., 2017](#)), debt ratio, liquidity ratio, exporter status, public procurement contracts, as well as to pre-entrance outcome variables across three periods (see [Chabé-Ferret, 2017](#)). Additionally, because all the debtor-creditor pairs can be observed, debtors can also be matched on the characteristics of their creditors (see [Silva and Saito, 2018](#)), especially the vote share of creditor groups (i.e. financial institutions, state and state-owned firms, private suppliers or a mix), the concentration of debt, number of creditors, share of secured creditor claims, total claim size, and the regional Financial Agency (FINA)⁸ that supervised the case.

Turning to the effect on creditors (following the argument on bankruptcy propagation in production networks advanced by [Battiston et al., 2007](#)), we map every debtor-creditor link and track the impact of bargaining failures as they diffuse through the network of creditors.

⁸The Financial Agency (FINA) is the centralized Croatian provider of financial and electronic services. The activities undertaken by FINA include financial mediation, cash operations, business information, e-business, archiving, electronic signature authorization, education and payment transactions. FINA was in charge of administrating the PBS process. For more information: <https://www.fina.hr/en/homepage>

Given that prior studies find that micro firms tend to be particularly vulnerable to liquidity issues (i.e. [Kovač et al., 2016](#); [Perić and Vitezić, 2016](#)) we investigate whether small creditors were particularly hard hit by these spillover effects.

Our empirical approach differs from, and is complementary to, previous research investigating the effect of reorganization versus liquidation of firms in financial distress. [Bernstein, Colonnelli and Iverson \(2019\)](#) and [Bernstein, Colonnelli, Giroud and Iverson \(2019\)](#) are typical in relying on random assignment of judges who have different preferences for various outcomes. There are several problems with such an approach. Parties to the dispute will know the propensities of judges in advance of designing their proposed settlement. In addition, to the extent that judge panels have different distributions of judge leniency, firms can engage in "forum shopping" to affect the likelihood of judge type. [Parikh \(2013\)](#) reports that in a sample of 159 large bankruptcy cases in the US between 2007 and 2012, over two-thirds of cases were forum shopped. (see also [Napoli Coordes, 2015](#)).

2 Literature review

2.1 Direct and indirect costs

Long bankruptcy procedures can yield negative effects as firms face both direct and indirect costs of bankruptcy. Direct costs include commercial court fees and professional fees for attorneys, accountants, investment bankers and other consultants, that have been found to vary widely from 1.4% to 20% of debtors' pre-bankruptcy book value of assets.⁹ Not all costs are direct, however. Indirect costs include lost sales and investment prospects during the bankruptcy (which may stem from customers' unwillingness to do business with distressed firms), competitors exploiting a firm's weak position, losing critical staff, and a

⁹See [Gilson et al. \(1990\)](#); [Branch \(2002\)](#); [LoPucki and Doherty \(2004\)](#); [Bris et al. \(2006\)](#); [Altman and Hotchkiss \(2010\)](#); [Silva and Saito \(2020\)](#).

short-term focus leading to the loss of opportunities generally (Branch, 2002). These indirect costs are difficult to measure, although initial studies estimated them to range from 9.5% to 16.5% of firms' pre-bankruptcy market value (Altman, 1984; Branch, 2002). Bris et al. (2006) find U.S. firms in liquidation (Chapter 7) see a drop of 62% in median assets, while firms in reorganization (Chapter 11) see assets fall by 13% at the median. Several studies suggest that the duration of bankruptcy procedures increases indirect costs (Bris et al., 2006; Thorburn, 2000; Franks and Torous, 1989). A long court process should, therefore, result in low recovery rates for the creditors.

2.2 Spillovers

Theory acknowledges two types of negative spillovers from liquidation. Offering an opportunity to restructure can avoid potential negative effects from spillovers to nearby firms that are not bankrupt (Benmelech et al., 2019; Bernstein, Colonnelli, Giroud and Iverson, 2019). Benmelech et al. (2019) find negative spillovers on employment in the non-tradeable sectors within US census blocks where a liquidated firm operated, particularly when bankrupt and non-bankrupt firms were from the same non-tradable sector. Moreover, Bernstein, Colonnelli, Giroud and Iverson (2019) and Benmelech et al. (2019) find negative spillovers resulting from a decrease in consumer traffic. In the retail sector, bankruptcy is found to have a negative effect on smaller nearby stores because customers prefer to shop in areas with greater store occupancy (Benmelech et al., 2019).

Spillovers may also be non-local. Bankruptcy propagation in production networks suggests that offering an opportunity to restructure can avoid potential negative effects from spillovers to creditors (Battiston et al., 2007). Unfortunately, very little is known about the effects of bankruptcy and reorganizations on creditors. Such research has been called for (see, for example, Silva and Saito, 2020; Bernstein, Colonnelli, Giroud and Iverson, 2019) but we are among the first to address this issue.

2.3 Global bankruptcy and restructuring (reorganization) practices

There are many analyses of bankruptcy laws in the US, Germany, France, Sweden and United Kingdom (UK) (Agrawal et al., 2020; Armour and Cumming, 2008; Brouwer, 2006; White, 1994) In addition, the World Bank annually follows several indicators related to bankruptcy laws around the world.¹⁰ Figure 1 depicts three bankruptcy law indicators, the recovery rate defined as the fraction of claims that creditors get by the end of the bankruptcy procedure, the duration from the start of the bankruptcy procedure until the first payment of funds to creditors, and the cost of the proceedings defined as the percentage of the value of the debtor’s assets.¹¹

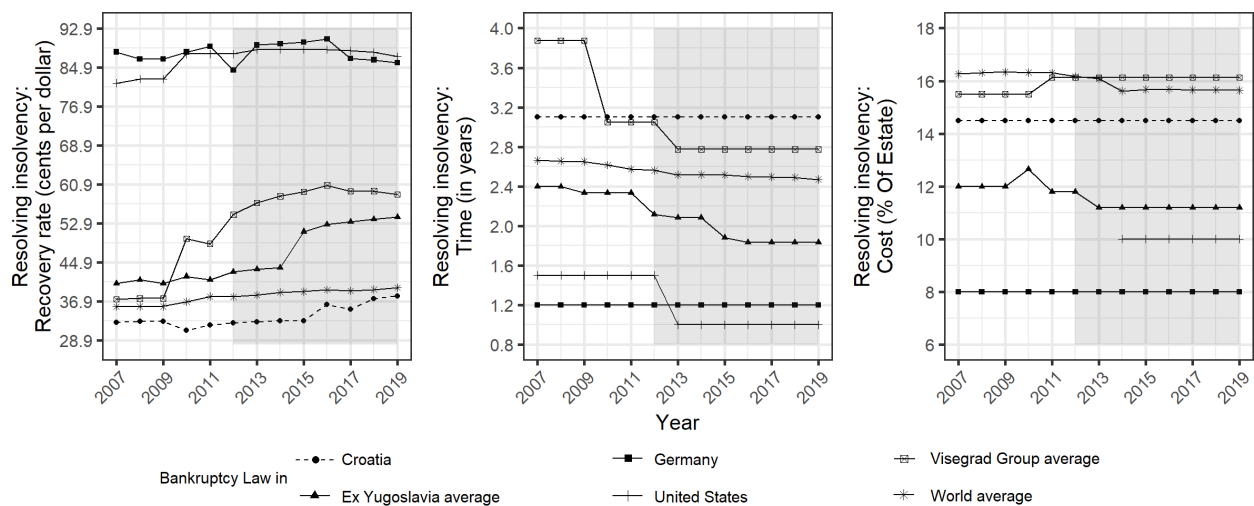


Figure 1: Comparison of Croatia’s bankruptcy law recovery rate (left), average duration (middle) and direct costs (right) and to those of the world average, Visegrad Group and ex-Yugoslavia average, United States and Germany

Source: World Bank Indicators on Resolving Insolvency. It is important to note that these indications, which are a part of the Bank’s ”Doing Business” measures are derived from surveys of ”informants” in each country and not actual records. As such they are imprecise but indicative. This may explain the apparent lack of variation in some indicators. Croatia in dashed line.

¹⁰World Bank Doing Business: <https://tinyurl.com/27rp6bzk> [Accessed: 10th January 2021]

¹¹These include court fees and government levies, fees of insolvency administrators, auctioneers, assessors and lawyers, and all other fees and costs.

The World Bank estimates the average direct cost as a share of the debtor's assets to be 10% in the US, 8% in Germany, 14.5% in Croatia, on average 11.8% in ex-Yugoslav countries, 16.13% in the Visegrad Group, and 16.17% in the world (Figure 1, right). The US has an average length of the bankruptcy process lasting 1 year, while Germany's lasts 1.2 years, and the world as a whole 2.5 - 2.6 years. In particular, according to the World Bank, in 2019, 86 countries worldwide have average bankruptcy procedures longer than 2 years, 70 countries longer than 2.5 years and 39 countries have bankruptcy procedures longer than 3 years.

The average length in the Visegrad Group was 2.8 years,¹² while it was 2.1 years on average in the ex-Yugoslav countries. On the other hand, the length of the bankruptcy process in Croatia was constant at about 3.1 years between 2003 and 2019 (Figure 1, middle).¹³ [Sajter \(2014\)](#) shows that every fifth bankruptcy case in Croatia lasted longer than six years.

Figure 1 (left) shows the recovery rate, one of the key efficiency indicators which is, *inter alia*, a function of the bankruptcy procedure duration and costs. World Bank Doing Business finds the mean recovery rates in the US or Germany to be above 85%, in the Visegrad Group 55-60%, ex-Yugoslav countries 43-54%, while mean world average is at 38-40%, and Croatia is 32-36%.

Although bankruptcy laws around the world feature both liquidation and reorganization options (i.e. [White, 1984](#)), the relative importance of these options varies widely. In the US roughly 20% of proceedings resulted in reorganization, while this percentage was only 2.5% in France, less than 1% in Sweden ([Agrawal et al., 2020, p. 10](#)) and less than 0.5% in Germany ([Brouwer, 2006, p. 10](#)). Several factors may contribute to these cross-country differences in reorganization versus liquidation probabilities including whether management

¹²The large drop in time to resolution in the Visegrad countries between 2009 and 2010 was driven by reform in the Czech Republic that applied to cases initiated after January 1, 2008 and led to a fall in average duration from 6.5 to 3.2 years. See [Janda and Rakicova \(2014\)](#).

¹³It is vital to realize that this constancy is only for firms actually entering bankruptcy, and the success of the PBS process in drastically reducing the share of troubled firms entering bankruptcy rather than reaching a work-out agreement with creditors means that the PBS law significantly improved average times to resolution across all insolvent firms in Croatia.

stays in power during the bankruptcy procedure, who initiates the procedure, whether there is an automatic stay on asset distribution, how voting rules are designed, the powers given to judges, whether an absolute priority rule (APR) is in place (see [Brouwer, 2006](#); [White, 1994](#)), but also culturally how managerial failure is seen in a particular society ([Damaraju et al., 2020](#)).

The most frequently studied bankruptcy law is the US. Under this law Chapter 11 (reorganization) is more complex than Chapter 7 (liquidation). According to [Iverson \(2018\)](#), 98% of Chapter 11 cases begin as voluntary filings. [Antill and Grenadier \(2019\)](#) report that as many as 80% of publicly traded firms in bankruptcy enter under Chapter 11, but this percentage is considerably lower for non-publicly traded firms. The literature suggests that restructuring can be beneficial in several ways. For example, reorganization can create welfare gains through maintaining employment in debtor firms and preserving the value of economically efficient firms in temporary financial distress ([Broadie et al., 2007](#); [White, 1994](#)).

When a Chapter 11 procedure is opened, the debtor enjoys a 120-180 day exclusive right to propose a reorganization plan. This is followed by a period of 60 days during which creditors can approve or reject the plan.¹⁴ In the US distressed firms reorganize ([Bradley and Rosenzweig, 1992](#)) through a majority vote of their creditors ([Bolton and Scharfstein, 1996](#); [White, 1989](#)). To confirm reorganization and exit Chapter 11, every impaired class of creditors must accept the plan with a majority vote. There is a possibility, however, of a "cram down" where a court can force acceptance of the deal even if one creditor class opposes the plan.¹⁵

There are voting differences in other bankruptcy laws around the world. In French law, creditors are given only an advisory role and are not required to approve the restructuring

¹⁴A judge has the discretion to decrease or increase the period that creditors have to decide up to year and half, depending on the complexity of the case.

¹⁵For a detailed explanation of US bankruptcy law see [Antill and Grenadier \(2019\)](#).

plan. UK law enables secured creditors to sell defaulted firms' assets as they choose, while German bankruptcy law is somewhere between France and the UK but does provide that reorganization plans require creditor approval (Davydenko and Franks, 2008, p. 556). In Sweden, management approval is required for restructuring, while the Danish Reform Act of 2010 enabled creditors to file for reorganization without management consent for approving restructuring (Agrawal et al., 2020). One of the rare studies that examined voting for restructuring (Silva and Saito, 2018) used a sample of 120 firms in Brazil between 2005 and 2014. Several factors were found to be positively associated with the acceptance of the restructuring plans, including distribution of collateral assets in debt repayment disposal and having a high share of unsecured creditors.

In the US, once a reorganization plan is approved the firm exits Chapter 11, continues doing business, and repays creditors in agreed upon installments. If the debtor starts Chapter 11 and the creditors do not approve it or the judge decides against using Chapter 11, the case is converted to Chapter 7 liquidation. Among the minority of firms that start under Chapter 11, as many as 60% manage to reorganize while 40% are converted to Chapter 7 (Bernstein, Colonnelli and Iverson, 2019, p. 8). If a firm gets converted to a Chapter 7, or decides to file under Chapter 7, then an Absolute Priority Rule is applied, such that upon selling assets, a creditor can be compensated only when all the more senior creditors have been paid in full. The ultimate decision of converting a debtor from Chapter 11 to 7 lies with the judge (see Bernstein, Colonnelli, Giroud and Iverson, 2019). In all cases, the final outcome is determined by a judge in the commercial court.¹⁶

Ponticelli and Alencar (2016) find that a bankruptcy reform in Brazil that featured an increase in creditor rights had a positive effect on secured loans, investments and output only in the municipalities with less congested courts. If commercial courts are congested, solving

¹⁶Given the strong importance of the judge, US bankruptcy law applies a blind rotation system to assign cases to judges within each court.

financial distress may be more attractive outside of formal bankruptcy. [Silva and Saito \(2020\)](#) suggest that the choice between bankruptcy or out-of-bankruptcy settlement is related to firms' liquidity, leverage, level of economic distress, and creditor coordination problems. Other authors have noted that firms favor bankruptcy procedures over negotiation when information asymmetry between debtors and creditors is severe. As early as [Gilson et al. \(1990\)](#) researchers have found that the costs of out-of-bankruptcy restructuring are lower than those in-bankruptcy. Due to lower cost and shorter duration, firms should favor out-of-bankruptcy restructuring over restructuring in bankruptcy, all else being equal. [Gilson et al. \(1990\)](#) suggest that almost half of the financially distressed public firms try to renegotiate their debt outside of bankruptcy.

2.4 Details of the PBS process in Croatia

As discussed above, in response to the severe financial crisis beginning in 2009, Croatian lawmakers introduced in November 2012 a new law introducing pre-bankruptcy settlements (NN 108/102, 144/12, 81/13, 112/13, 78/15). The PBS law offered an opportunity for insolvent firms (debtors) to settle with creditors and restructure their business to continue to operate and preserve jobs.

PBS was designed to create efficiency-enhancing step prior to the bankruptcy procedure. It was initially an entirely out-of-court option¹⁷ under which coordination of the settlement process was entirely under the supervision of the Financial Agency (FINA) and not an option in the commercial courts. It reduced congestion in the commercial courts while offering debtors an opportunity to reorganize in a shorter time period as compared to bankruptcy. If the debtor settled with creditors in the PBS, the debtor exited PBS, continued doing business, and repaid creditors in agreed upon installments. If the debtors did not settle with

¹⁷The PBS was an out-of-court reorganisation process from November 2012 until September 2015. Beginning in September 2015 PBS is incorporated within the bankruptcy law. As shown later, analyses of PBS cases opened before and after September 2015 produces similar results.

creditors, they were transferred to the bankruptcy process, which offered two end outcomes: reorganization or liquidation.

Unlike in the US, in Croatia a debtor does not have the option to choose whether to file for liquidation or reorganization. In the PBS process, a debtor is assigned an official bankruptcy trustee who is a bankruptcy procedure specialist (usually an economist or lawyer) who then analyses the firm's situation, its business model, lists current claims and assets, and together with the debtor decides whether to liquidate the firm or suggest a reorganization plan to be voted on by creditors.

There are several criteria under which debtors are obliged to open the PBS process including:

- (1) *Illiquidity 1*: 60+ days late with current liabilities exceeding 20% of the previous year's current liabilities;
- (2) *Illiquidity 2*: 30+ days late with employees' wages;
- (3) *Insolvency 1*: not capable of long-term payment of its current obligations;
- (4) *Insolvency 2*: blocked for more than 60 days;
- (5) *Insolvency 3*: heavily indebted such that the value of assets does not cover the existing liabilities.

The most commonly used indicator is Insolvency 2, given that the other indicators are highly related to account blockage.

Account blockage works the following way. A creditor sends an enforcement request to the commercial court indicating the value of the claim that has not been paid, the passed deadline, and a request that the court require repayment by the debtor within eight days. The commercial court validates the authenticity of the claim and then sends an order to FINA to seize and transfer cash from the debtor's to the creditors' accounts. If the debtor's account has a sufficient balance, the banks transfer the funds. If, however, there are not enough funds, the debtor's accounts are blocked until the debtor repays the creditors' claims.

During the period of account blockage, the debtor is prohibited from making any payments or transfers from its account other than certain specified operating expenses. Further details on the blockage process, and their relation to the PBS and bankruptcy, are given in Online Appendix 1 at: <https://tinyurl.com/jf2299bp>.

Once a debtor files for PBS, FINA checks its eligibility, and, if eligible, assigns the debtor to a settlement council (an administrative body of three with the council president always being a lawyer) to coordinate the process. During the PBS process, the account blockage is removed, but the debtor is only allowed to make payments necessary for regular business operations. PBS is considered an emergency procedure with debtors given 120 days to finalize it (although there is a possibility to delay an additional 60 days or more given additional complexity).¹⁸ The debtor publishes a list of creditors and their claims on FINA's official web site, after which creditors send suggested changes and proof of these claims to the settlement council.

After the official list of claims is established, secured creditors are offered an opportunity to withdraw their asset from the settlement procedure or to continue to be part of the bargaining process. Debtors can then propose a reorganization plan in which they can suggest a write-off of up to 70% over 4 years or less or write-off of up to 60% during a period longer than 4 years, as well as a schedule for repayment of the debt not written off. Creditors whose claims have been confirmed by the settlement council have a right to vote for or against the proposed settlement. These creditors are divided into three groups: 1) state institutions and state-owned enterprises; 2) financial institutions; and 3) other creditors. In order for the restructuring plan to be confirmed, it must either obtain votes of at least 66% of the claims of all creditors, or obtain votes of at least 50% of the claims of each type of creditor. If a debtor settles, but subsequently does not fulfill its obligations, creditors can propose an

¹⁸Obviously most cases are complex in some fashion since the median time to settlement is more than 240 days, implying at least three extensions.

account blockage forcing the debtor into bankruptcy where it cannot avail itself of PBS for a second time. Online Appendix 1 (<https://tinyurl.com/jf2299bp>.) contains a flow diagram of the PBS procedure and its interconnection with the bankruptcy law including the role of account blockages.

3 Empirical Details

3.1 Selection into PBS

In order to remedy possible selection problems from variables correlated both with the probability of bargaining failure and the firm’s long-run outcomes, we used several matching procedures. The strength of our approach is the availability of exceptionally detailed data on debtor characteristics and debtor-creditor connections.

3.1.1 Matching

We estimate the impact of bargaining failure in PBS on debtors’ long-term survival, employment, revenue and profits, plus the impact of bargaining failure on suppliers’ long-term survival, employment, revenue and profits. The empirical approach is based on a causal model as in [Rubin \(1973\)](#). In particular cross-sectional nearest neighbor matching combined with exact matching was used to create twinned debtor firms in treated (non-settling) and control (settling) groups.¹⁹ After matching and evaluating the balancing property for these paired firms, the existence of parallel trends is evaluated by visual inspection (see Figure 2 in Section 4.4 below). Given parallel trends, a difference-in-differences model is used to estimate the average treatment effect on the treated (ATT) group for the outcomes of interest.

¹⁹In order to establish the robustness of our results we used several alternative matching strategies including 1:1 nearest neighbour with exact matching. Sensitivity analyses are conducted using two nearest neighbor matching, Mahalanobis matching, caliper matching, and placebo tests (see Section 4.5).

Comparing matched debtors in which matched firms enter the bargaining process alleviates potential unobserved confounders that lead to attempts to settle such as being oriented towards second chances, lacking the availability of other funding opportunities, or having clear possibilities for reorganization. To satisfy the Conditional Independence Assumption, it is critical to include all the important observable covariates that might affect failure in the PBS process and the outcome variables. The data used for this analysis enables control for a variety of such factors.

- (1) To account for time-specific macroeconomic shocks, we match on the year.
- (2) To account for industry-specific factors such as demand shocks (Lang and Stulz, 1992) we match on NACE 2-digit sector.
- (3) To account for agency-specific variation in FINA offices, but also region-specific labour and financial markets, demand conditions, as well as transportation costs (Puga, 2010) we match on four regional dummies that identify the FINA agency (Zagreb, Split, Rijeka, Osijek) based on the firm's headquarters location.
- (4) To account for a lower survival probability of younger firms and therefore higher probability of entering bankruptcy (Coad, 2018) we match on firm age and age squared.
- (5) To account for a lower probability of small firms' survival in recession (for evidence in Croatia, see Kovač et al., 2016) we match on firm size measured by a categorical variable divided into micro firms (up to 9 employees), small firms (10 to 49), medium firms (50 to 249), and large firms (250 or more).²⁰
- (6) To account for pre-PBS entrance conditions in an attempt to come as close as possible to the gold-standard of a randomized control (Chabé-Ferret, 2017) trial we match on several outcome variables including log employment, log sales, and inverse hyperbolic sine profits²¹

²⁰This is a standard European Union definition of micro, small, medium, and large firm, i.e. European Commission: <https://tinyurl.com/25sxe5dh> [Accessed: 15th June 2021]

²¹Since the firms can make losses, McKenzie (2017) suggests using an inverse hyperbolic sine transformation for profits to avoid the impossibility of taking the log of negative profits (i.e. losses).

in three time periods (t-1, t-2, and t-3).²²

(7) To account for the probabilities of bargaining failure and firm survival, we match on lagged Altman-type Z-scores of financial distress (which have been found to predict a firm's bankruptcy by [Altman, 1983](#); [Altman et al., 2017](#)).²³ Firms are also divided into three financial distress categories— safe, grey and distressed.²⁴

(8) To account for the probability of bargaining success ([Silva and Saito, 2018](#)) we match on the size of debt and liquidity relative to assets, the lagged debt ratio (defined as the share of total debt divided by the book value of assets), and the liquidity ratio (defined as sum of cash in the bank and short-term assets divided by the book value of assets). Since the share of debts in assets is critical for creditors, we include it for periods t-1, t-2, and t-3.

(9) To account for absolute size of firms' assets, we match on lagged log size of book total and fixed assets.

(10) To account for exposure to global markets which may lead to different incentives and a greater potential for future growth ([Wagner, 2007](#)) we match on a dummy variable of whether a firm exported prior to entering PBS as well as the exporting intensity, defined as the share of the firm's exports in total sales.

(11) To account for the facts that our research setting is in Croatia which has been characterized as a country where politicians use public procurement contracts to reward their cronies ([Vuković, 2020](#)), as well as that public funds can legitimately be used to provide firms with cushions in difficult times ([Srhoj et al., 2020](#); [Stojčić et al., 2020](#)) we match on

²²For evidence that including three time periods in matching performs well in simulation studies, see [Chabé-Ferret \(2017\)](#).

²³Distress Z'-Scores for private firms ([Altman, 1983](#); [Altman et al., 2017](#)) are calculated using book value of equity, a more widely available covariate than market value of equity which is available only for publicly traded firms. The following equation is used for calculating the Z-score: $Z=0.012*X_1 + 0.014*X_2 + 0.033*X_3 + 0.006*X_4 + 0.999*X_5$

where $X_1 = \text{Working Capital/Total Assets}$; $X_2 = \text{Retained Earnings/Total Assets}$; $X_3 = \text{Earnings before Interest and Taxes/Total Assets}$; $X_4 = \text{Book value of equity/Book value of total liabilities}$; $X_5 = \text{Sales/Total Assets}$; $Z = \text{Overall Index}$.

²⁴Distress categories are defined as safe ($Z > 2.99$), grey ($1.81 < Z < 2.99$) and distressed ($Z < 1.81$) [Altman \(1983\)](#).

lagged dummy variables for whether the firm received a public procurement contract from the state or a state-owned enterprise in each of the past three years as well as the share of value received from the government in its total revenue in the most recent year before PBS.

(12) To account for severity of operational difficulties, we match on the duration of the last account blockage spell (in days) before to PBS entrance, as well as a categorical variable for the duration of this last account blockage. This categorical variable is composed of nine categories depending on the length of account blockage.²⁵ As explained in subsection 2.2, entry into the PBS process was most commonly generated by *Insolvency 2* (blocked for more than 60 days). Since blocked debtors are not able to repay creditors, a longer duration is likely to reflect more severe operational difficulty, even conditional on current financial problems.

(13) Finally, to account for dynamic factors that can affect the probability of bargaining failure (Silva and Saito, 2018) and firm outcomes we match on aggregated data from debtor-creditor pairs. We include a set of dummy variables for whether a given class of creditors controls the majority of votes as well as if a mixed-class majority controls the majority vote (state majority is the omitted category). In addition, we include the concentration of debt, calculated as the Herfindahl-Hirschman Index of claims across debtor/creditor pairs, the number of creditors, extent of secured debt and a dummy for having a creditor with secured claims.

3.1.2 Econometric specifications

Given that balancing and parallel trends assumptions are satisfied, the impact of bargaining failure on firm survival and performance is estimated by the following equation:

$$Y_{it} = \alpha + \beta T_i + \sum_{t=-2}^{+3} \gamma_t t_{it} + \sum_{t=-2}^{+3} \delta_{ATTt}(T_i * t_{it}) + X_j^K \zeta_j + \epsilon_{it} \quad (1)$$

²⁵They can be seen in the Table A3 We recognize that the precise break points in the attempt to account for non-linearities are arbitrary but results are not sensitive to alternative choices.

where Y_{it} are the outcome variables for a firm i over the period t (i.e. from $t-3$ to $t+3$) for the log of employment, the log of sales or the inverse hyperbolic sine of profits, while it is a dummy of 1 if the firm did not start liquidation process until the year $t+3$. T is a dummy variable indication that firm i entered PBS and did not settle. The t indicates years from the year of starting the PBS, i.e. period $t=0$ indicates the year of the PBS process start, while periods range from $t-3$ in the pre-PBS period to $t+3$ in the post-PBS period. The X_j^K is a vector of control variables in the pre-PBS entrance period, including firm size, firm age and age squared, regional agency in charge, liquidity ratio, the Altman Z-scores of financial variables as defined above and the duration of the last financial blockage, while ϵ_{it} is a random, normally-distributed unobserved error term capturing factors that the model omits. Importantly, the δ_{ATT} is the *difference-in-differences* estimator, the Average Treatment on the Treated (ATT) effect. We cluster the standard errors at debtor level for the three outcome variables with multiple years of observation for a given firm.

3.2 Data

Data for analysis are drawn from five different sources.

3.2.1 PBS data

PBS data come from records of each FINA branch in charge of the PBS process. These did not have data in machine-readable format, so research assistants collected them manually from official documents. The FINA data include all 4,056 PBS debtor cases from our sample period that provided required documents to FINA, from which 3,186 settled while 870 did not.²⁶ Each PBS debtor file includes six sections.

²⁶The settled cases contained 131,333 debtor/creditor pairs, while the unsettled ones contained 52,043 pairs.

- (1) Debtor's ID, name, headquarters address and legal representative;
- (2) Relevant commercial court, its address, the responsible judge and the court clerk handling the case.
- (3) FINA regional centre where the settlement was carried out, the ID of the settlement council within the centre, the names of the council president, the other two council members and the PBS trustee.
- (4) Date of starting the PBS process, the date of the resolution of the case and the process duration in days.
- (5) Data on creditor voting, including the total number of votes where one Croatian kuna of debt owed yields one vote (meaning that the total value of claims outstanding is equal to the total number of creditor votes), the share of claims by creditor class, the total number of votes in favour of the settlement, as well as the number of positive votes from each of the three groups of creditors.
- (6) ID of each creditor, amount of each creditor's claims, secured claims and exclusive claims,²⁷ creditor type (more finely defined than voting type to include state, state owned firm, private supplier, financial institution, foreign owned firm,²⁸ NGO or private person), the amount of principal and interest due, the percentages of haircut on the principal and interest proposed, total amount to be repaid, duration within which this amount is to be repaid, grace period allowed before repayment begins, and the amount of claims to be transferred into debtor's ownership shares.

3.2.2 Firms' financial records

Administrative data from the Annual Financial Statements Registry of the Republic of Croatia is comprised of firm-level balance sheets and profit and loss statements from 2009 to

²⁷Exclusive claims are rights that enable a creditor to isolate such claim from the overall process. An example would be a car loaned to but not owned by a debtor.

²⁸To appear in the data an establishment must be directly owned by an foreign entity. Firms that are a subsidiary of a foreign firm but maintain legal status in Croatia and Croatian, not foreign.

2019. This data set contains a total of 1,223,392 firm-year observations with between 98,768 and 136,628 unique firms each year. Aside from firm ID, year and financial records, the data also includes the geographical location of the firm’s headquarters, its age and its 4-digit NACE industry code. It captures firm performance measures in both pre- and post-PBS entrance period.

3.2.3 Court registry data

The administrative data is augmented by data from the official court register containing 195,733 observations giving firm ID, dates of the firm’s entry and exit, and the relevant commercial court. This data enables construction of firm survival measures. We also use information on firm mergers and acquisitions (M&A) in order to define survival as non-liquidation and non-M&A (on firm exit, see [Cefis et al., 2021](#)).²⁹

3.2.4 Account blockages

We collect account blockage data from FINA for each debtor entering PBS. This data includes all account blockage spells of debtors in the period 2003 - 2019, giving firm ID, starting and ending dates, and spell duration.

3.2.5 Public procurement data

Data on public procurement contracts between 2008 and 2019 come from the Official Gazette of the Republic of Croatia (i.e. EOJN). It includes approximately 170,000 contracts and contains the ID of the firm winning the contract, the amount of the contract, date of receiving the contract and the contracting authority.

²⁹Less than 10 debtors were part of M&A processes in the post-PBS entrance period.

4 Results

4.1 Selection into PBS

Between the initiation of the PBS Law (November 2012) and the end of 2016, 4041 firms (including sole proprietorships) entered the PBS process (cf. Table A1 column 1). Almost half (47.9%) of these PBS cases were initiated in 2013, while 2014 saw an additional 28.6%. Figure A1 visually presents the distribution of new debtor cases over the time span 2012 - 2016.³⁰ The rapid fall-off in the use of PBS reflects both improving economic conditions and removal of the accumulated backlog of troubled firms.

About 27% of debtors did not have an account blockage prior to starting the PBS, 10% had an account blockage of less than 60 days, and 63% 60 days or more. Of these 63%, well over half (38% total blockages) had their account blocked for more than a year prior to starting the PBS process.

In the second half of 2015, the PBS law was integrated with the bankruptcy law. Subsections 4.4. and 4.4.1. show that results are similar when analyzing cases before and after the law changed separately.

Table A1 provides insight into the economic magnitude of the liquidity issues. Total debt owed by the 4041 debtors during the 2012 - 2016 period was 92.2 billion kuna (between 13 and 17 billion US dollars depending on the exchange rate). The mean debt size in 2013 was 28 million kuna (approx. 5 million US dollars), falling to 16 million kuna in subsequent years (2.3 - 2.5 million US dollars).³¹ To gauge the magnitude of these figures, this cumulative debt in PBS translated to approximately a quarter of annual reported GDP. The average debtor owed money to between 40 and 49 creditors. Table A1, column 6 shows that after

³⁰It should be recalled that the PBS law obliged debtors with account blockages greater than 60 days to enter the PBS process. Figure 2 shows the duration of firms' account blockages before starting PBS, both debtors for whom bargaining failed and those who settled.

³¹According to the Croatian National Bank, HRK for US dollar middle exchange at 31st December of each year is: 5.73 (2012), 5.55 (2013), 6.30 (2014), 6.99 (2015) and 7.17 (2016).

merging PBS and firms' financial data, 2441 debtors remained in the sample due to the fact that sole proprietorships did not have to report financial data.

4.2 Bargaining failures

Results from a descriptive probit for bargaining failure and an OLS regression for duration of the PBS process are reported in Table A2. A considerable 79% of firms entering the PBS managed to settle, leaving only 21% that experienced bargaining failure. There was a lower probability of bargaining failure and shorter PBS duration for cases with a higher concentration of debt. In addition, cases with greater total debt spent longer in the PBS process. Debtor cases run by the FINA centres in Osijek, Rijeka and Split had a lower probability of bargaining failure and a shorter PBS duration compared to cases run by FINA in Zagreb because larger and more complex cases were automatically directed to the central Agency in Zagreb.

Cases after 2013 (when the largest inflow of cases occurred) had a longer PBS duration. Having private suppliers holding a majority of votes decreased the probability of failing to settle compared to cases where the state and/or state-owned enterprises (SOEs) had a majority of votes. PBS cases begun in 2015 and 2016 had a weakly higher probability of bargaining failure than those begun earlier. (significant at $p < 10\%$).

Table A3 contains estimates adding a 9-level categorical variable for account blockage duration prior to entering PBS. Results show that debtors with longer periods of blockage have a higher probability of bargaining failure and spend a longer average time in the PBS process.

Critically, in all these descriptive estimates R^2 values are extremely low. Either non-measured characteristics are far more important in explaining PBS outcomes or, more probably, there is a very large random component to these outcomes. The inability of a large set of plausibly related factors to explain much of the outcome of the PBS process strongly sug-

gests that such outcomes are unlikely to be significantly explained by additional potentially observable factors. A high degree of randomness in outcomes lends credibility to an analysis of the effect of different PBS outcomes themselves on firm and market results.

4.3 Matching results

In order to increase confidence in observed differences in post-bargaining outcomes, settling firms were propensity-score matched with non-settling firms on several debtor and creditor characteristics for the three years prior to entering PBS.³²

Table A4 shows that there are few differences between the industry of firms experiencing failure and those successful in the process. Firms in wholesale and retail trade are slightly less likely to settle, while those in manufacturing are somewhat more likely to settle.

Balancing Table A5 shows that few differences exist between firms that successfully settled under PBS and those whose negotiations failed. It does appear based on lagged profits and Altman Z-scores that firms failing in negotiations were in worse shape prior to entering the PBS process.

After matching, however, there are no meaningful differences between failures and successes. Agency location in Zagreb and Rijeka are the only remaining differences, so these are included in the analysis. All other differences, including industry, are eliminated by matching.³³

³²Resulting in the exclusion of firms less than three years old. Our matched analysis sample consists of 2,032 debtors, among whom 1,572 successfully settled using the PBS mechanism while 462 experienced bargaining failure.

³³Final matched sample $N_T=458$ and $N_C=458$. There was no bargaining failure in the 1-digit sector *Electricity, gas, steam and air conditioning supply* so exact matching on NACE 2-digit industries led to fewer matched pairs. Overlap of propensity scores are shown in Online Appendix 2 at: <https://tinyurl.com/dwruttfk>.

4.4 The effect of delay on debtors

Figure 2 clearly shows that, conditional on identical characteristics entering PBS (due to matching), firms able to settle successfully perform better on all outcomes. Panel A establishes that settling firms are significantly more likely to survive, defined as being in business at least three years after the year they began PBS. Three-year survival rates for settling firms are 75% as opposed to 50% for non-settling firms.

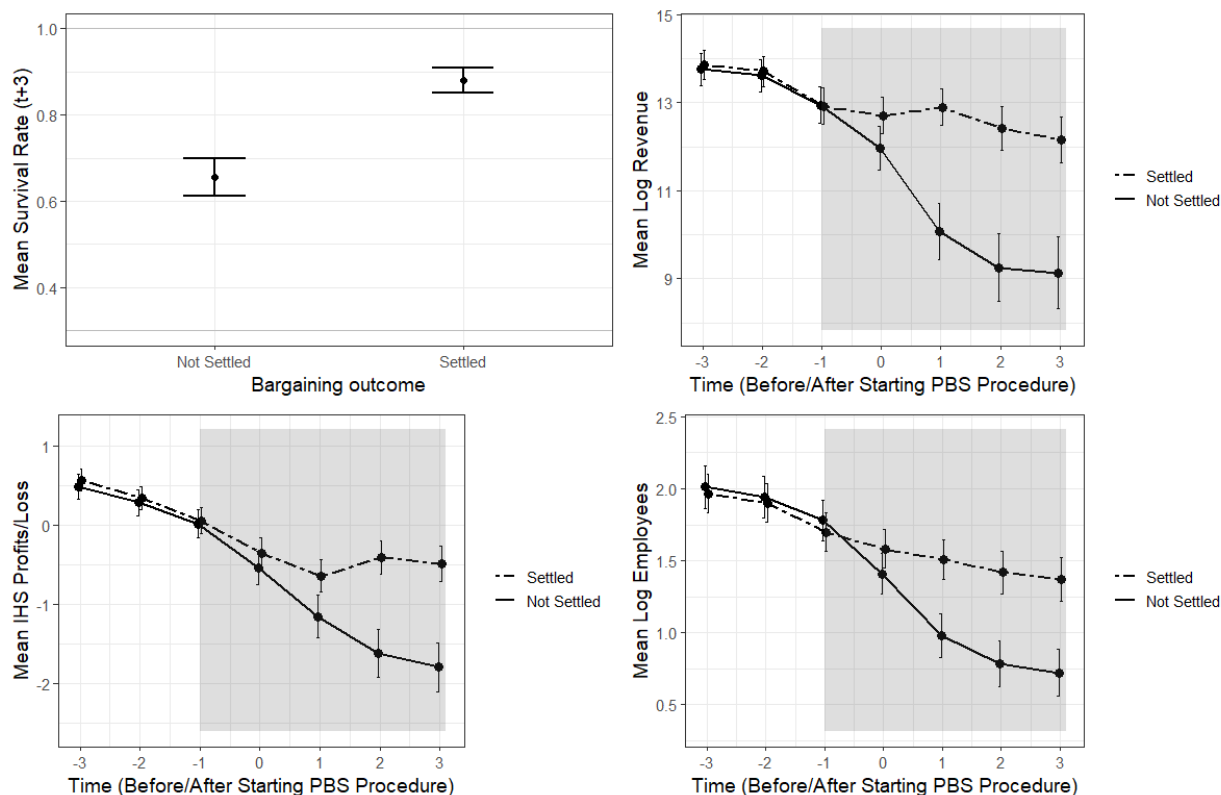


Figure 2: After matching dependent variable behavior of debtors settling and not settling

The unshaded (left-hand) side of the last three panels in Figure 2 clearly establishes that the pre-treatment parallel trends requirement holds for critical outcome variables for debtor firms after matching. The shaded (right-hand) sides in Figure 2 show unequivocally that, conditional on identical observable characteristics due to matching, firms able to settle successfully perform better with respect to all outcomes studied. It is also evident that this

positive effect (and its significance) grows substantially as time after entering PBS increases.

To reinforce the obvious visual conclusions in Figure 2, a difference-in-differences model was estimated as in the equation 1 (see subsection 3.1.2.). In the sample of settled debtors ($n_{settled} = 1572$), 26.3% (412) did not survive until the last observed year (2019), a Type I error in the PBS process while among the sample of unsettled debtors ($n_{notsettled} = 462$), 48.9% (226) survive until 2019, a Type II error of the PBS process.³⁴

Results in Table A6 show that bargaining failure reduces the three-year survival probability by an estimated 21.4 percentage points in the full sample, an estimate remarkably similar to the 25 percentage point reduction found comparing means in the matched sample. After controlling for other factors (see the list in the footnote to Table A6), the performance of firms that did not settle was substantially worse than those that did. Profits were reduced by 46.5%, employment by 51.8%, and revenue by 91.5% (evaluated at sample means in period after the year of entering PBS). Again, the effects are very similar before and after matching, implying is a low probability that there are any unobservable factors between the two groups of debtors important enough to alter these results in any meaningful way.

4.4.1 Longer term effects of delay for the 2012 - 2014 debtor cohort

The PBS law changed in the second half of 2015 (NN, 78/15), after which PBS remained an option but was more closely integrated within the bankruptcy law, as opposed to being a separate procedure entirely under the control of FINA. Analysis of only those firms entering PBS in 2012 through 2014 removes any possible differences in impact resulting from changes in the law, as well as enabling investigation of effects over a longer time horizon (up to $t+5$). We conducted matching on this subsample to achieve balance, and estimate the effects of delay on survival and firm performance.

³⁴For more on Type I and Type II error in bankruptcy, see [White \(1994\)](#) and [Cepec and Grajzl \(2019\)](#).

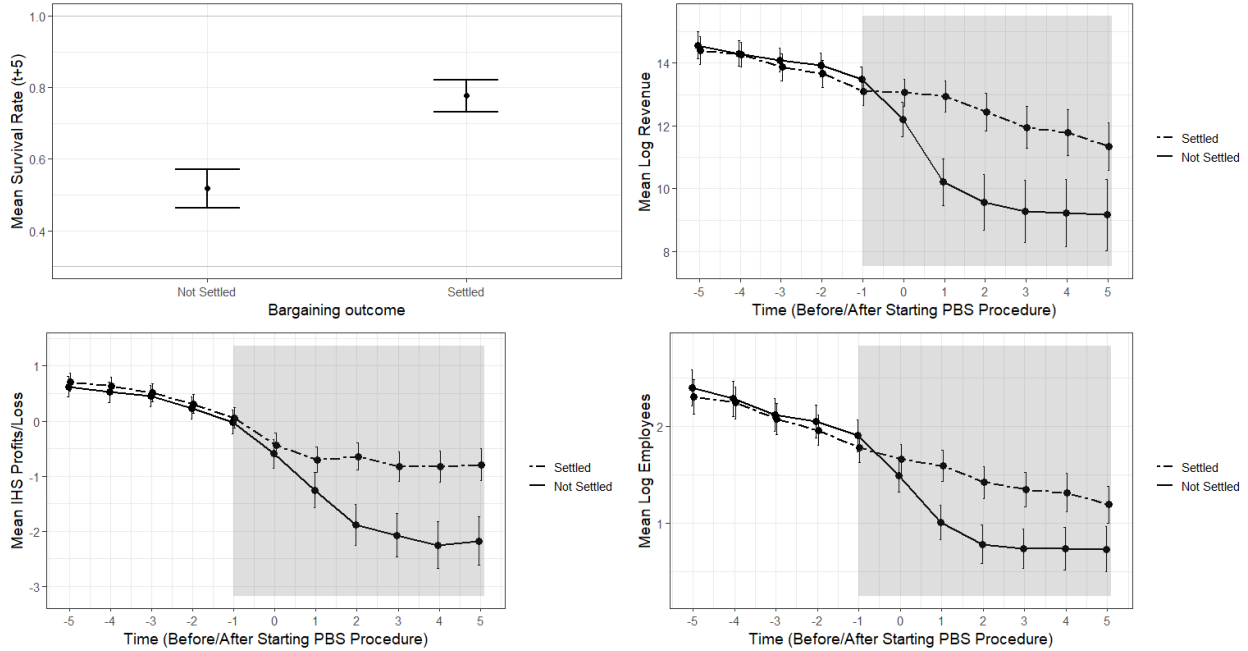


Figure 3: Dependent variables of debtors from the first cohort (2012 - 2014) compared to matched debtors not settling

Results in Figure 3 and Table A7 are very similar to those in our main estimation. The implication is two-fold. Neither the change to the law in 2015 nor the characteristics of the large backlog of cases at its initiation had a discernible effect on the impact of introducing the PBS process.

4.4.2 Heterogeneous effects of delay by debtor size

Like elsewhere in the EU, firms with 9 or fewer employees make up a large share of all firms (89% in Croatia). Such firms are 68.4% of our sample. As mentioned above these micro firms were hardest hit by the recession of 2009 (Kovač et al., 2016; Perić and Vitezić, 2016). Results in Figure 4 and Table A8 (using only the matched sample, given the similarities of results in Table A6 and A7) show that the effects of bargaining failure are not driven by small firms. Indeed, as might be expected, bargaining failure shows a stronger negative effect on profits and staffing of firms with 10 or more employees, however, the heterogeneity

is small in magnitude.

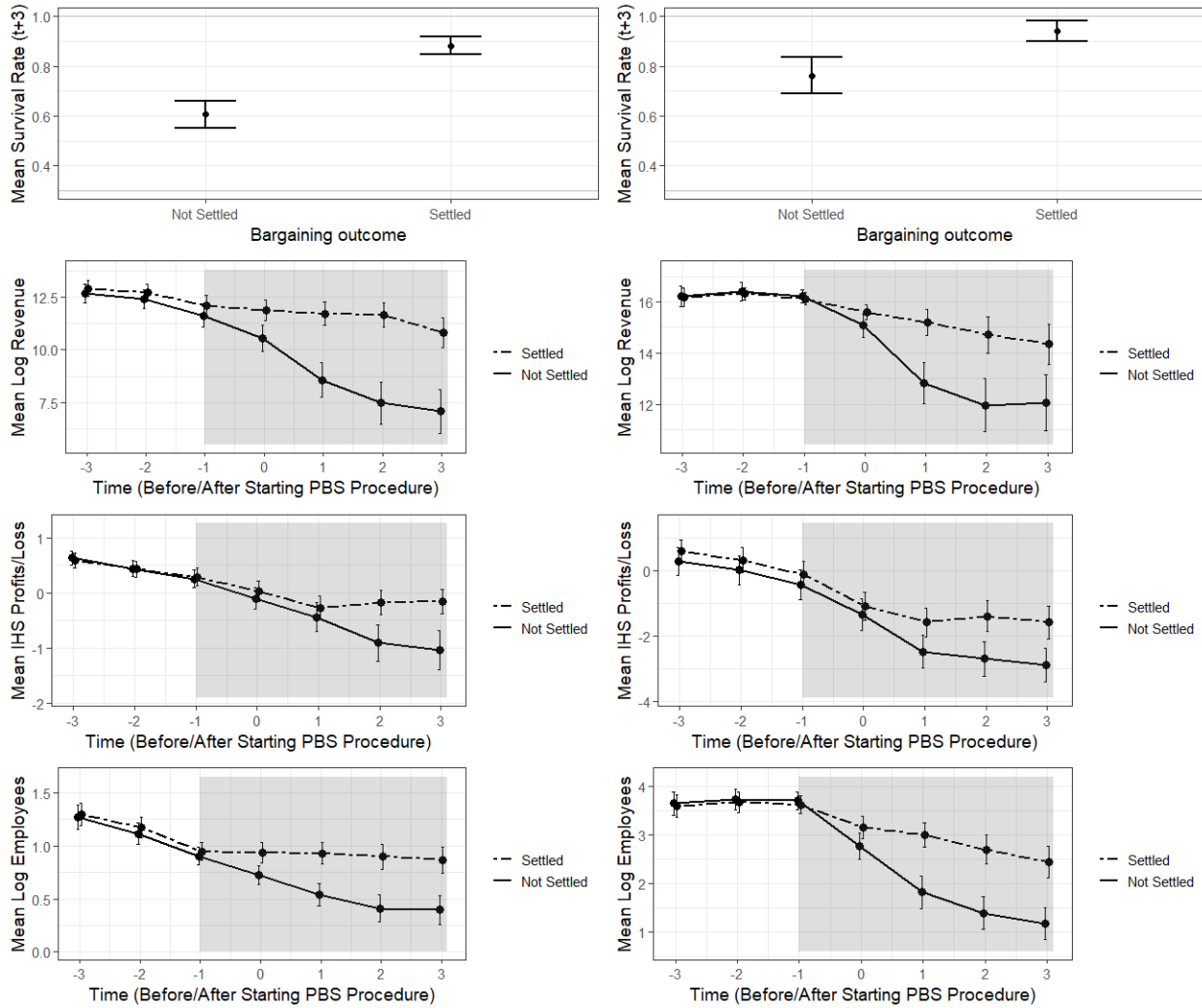


Figure 4: Dependent variables of debtors with 9 or fewer employees (left side) and debtors with 10 or more employees (right side) compared to matched debtors not settling

4.4.3 Heterogeneous effects of delay by majority voter type

Are the effects, especially the probability of survival, affected by the type of shareholder with the majority vote? Again, as can be seen in Figures A5, A6, and A7 parallel trends exist for all types of shareholder majorities. This enables estimation of

$$Y_i = \alpha + \beta T_i + \gamma t_i + \delta(T_i * t_i) + \nu MV_{private} + \xi MV_{mixed} + \eta(MV_{private} * T_i * t_i) +$$

$$\kappa(MV_{mixed} * T_i * t_i) + X_j^K \zeta_j + \epsilon_i(2)$$

where t_i is dummy indicating the post-PBS entrance period, T_i is a bargaining failure dummy, MV_{istate} is a dummy for firms i where the creditor group state and SOE controls a majority of votes, $MV_{iprivate}$ is a dummy for firms i where the creditor group private firms and/or financial institutions controls a majority vote³⁵, MV_{imixed} is a dummy for firms i , where at least two creditor classes have to agree in order to obtain a majority vote (i.e. no single creditor class controls the majority vote). The η , and κ are the products of T_i , t_i and type of majority voters, where the reference category is MV_{istate} (state and SOE control majority vote). X_j^T are the debtor-specific control variables.

Debtors have a higher long-term probability of survival when private firms have a majority of votes compared to situations when state and SOE have the majority vote (Table A9). The costs of failure to settle in terms of survival are roughly half for firms whose debt is mostly in private hands.

Several explanations are possible for this result. One is that private creditors have stronger incentives to continue negotiating and accept haircuts than do state and SOEs. Another is that investors are more focused on financial outcomes in the negotiations than state actors who may have preservation of employment or other non-financial goals. Finally governments may simply be worse managers or worse analysts of the complex issues involved in reorganization.

4.5 Other robustness checks

The results presented above for numerical outcomes include closed firms (i.e., shut-down after emerging from PBS, as opposed to those that failed in PBS). These obviously have

³⁵Since there were only a few dozen debtor cases where financial institutions have a 66% majority vote, we merged these cases with others where private suppliers have the majority.

values of zero for revenue, profit and employees. Online Appendix 2 (Table 3) shows that the effects of bargaining failure on revenue, profits and jobs conditional on survival resemble those in the main estimation. Results that are reported in Online Appendix 2 (Tables 4-7) show effects of failure to settle in the main estimation are of similar magnitude to the ones obtained by alternative matching procedures including caliper matching with tight caliper set at 0.2 x standard deviation of the propensity score, Mahalanobis matching, and (one or two) nearest neighbour matching.³⁶

4.6 Effects on suppliers (creditors)

As we have seen, bargaining failure in the settlement process has strong negative impact on debtors' survival, revenue, profits and jobs. This might impose greater costs on the firm's suppliers as well. To examine the effects on suppliers we estimate the following equation

$$Y_{it} = \alpha + \beta T_i + \sum_{t=-2}^{+3} \gamma_t t_{it} + \sum_{t=-2}^{+3} \delta_{ATTt}(T_i * t_{it}) + Z_j^T \xi_j + \epsilon_{it} \quad (3)$$

where t_i indicates time from two years prior to PBS entrance to three-years post PBS; T_i is a dummy for bargaining failure; δ is the ATT; Z_j^T are supplier-specific control variables; and ϵ_i are effects unobserved by the econometrician. The X_j^T vector includes suppliers' liquidity defined as the sum of cash in the bank and short-term assets divided by the total book value of assets. It also includes the size of the liquidity shock defined as the suppliers' total claims registered in the PBS procedure divided suppliers' cash in bank at the end of the last year. We cluster the standard errors at supplier level.

Both unmatched (suppliers to all firms entering PBS) and matched (only suppliers nested within the matched debtors) are analyzed. Figure A8 and Table A10 show effects for settled and unsettled PBS cases. The pre-treatment parallel trends assumption appears to hold

³⁶In addition, Online Appendix 2 Tables 4-7 also provide results of placebo tests which support our main estimation.

(Figure A8).³⁷ It is clear that supplier profit falls immediately when one of their customers enters PBS but this impact is not different for suppliers to customers who do and do not settle (Table A10). To the extent that there are any effects, they are concentrated among very small suppliers (who may be highly dependent on firms in PBS) This can be seen in both Figure 5, Table A10, robustness checks in Online Appendix 2 Table 8).

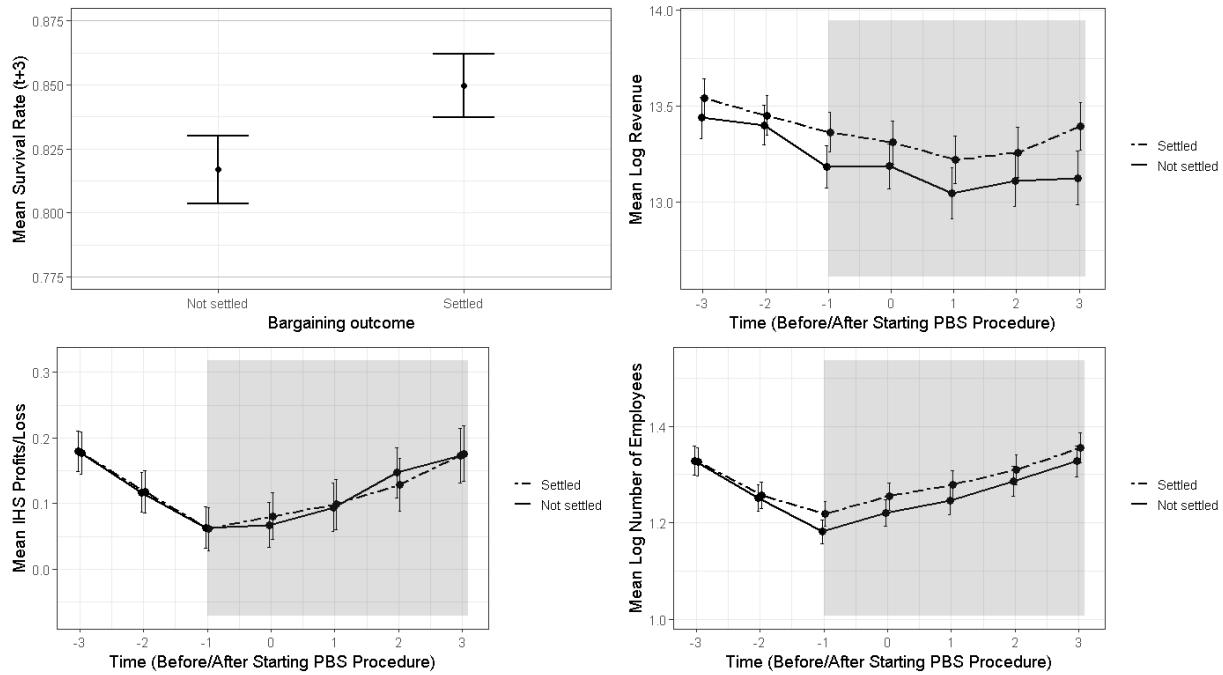


Figure 5: The dependent variables of settled and non-settled suppliers before and after entering PBS: micro suppliers nested in the matched debtor sample

³⁷Online Appendix 2 (at <https://tinyurl.com/dwruttkf>) shows descriptive statistics of the settled and not settled supplier nested samples.

5 Conclusion

While there are some non-trivial differences between the pre- and post-PBS environments,³⁸ the fundamental options were remarkably similar. Before the introduction of PBS, debtors and creditors could settle before entering the court system, while after its adoption they also could fail to settle and end up in bankruptcy court. The massive change in the proportion settling or going to court strongly suggests that a simple change in the default option can have a substantial impact.

In summary, what do we learn from analysis? Several conclusions can be reached.

- PBS resulted in substantially greater firm survival rates.
- This is true in both the short and medium (up to five years) term.
- Time to resolution for the three quarters of firms who successfully settle in PBS is less than a third as long as for those who did not settle under PBS or for all firms in the pre-PBS system.
- These results hold for observationally identical firms that do and do not settle.
- While filtering failures may exist, they are unlikely to drive these results. If sorting on unobservables were perfect, the results would imply that the system before implementation of PBS resulted in significantly more excess closures. They would also imply that the share of long-term viable firms that enter the bankruptcy process (including PBS) was substantially greater in Croatia than in every other developed economy.
- The more rapid resolution for ultimately viable firms under PBS means that these firms can make effective business decisions to optimize operations and undertake investments much sooner than would otherwise be possible.

³⁸Particularly with respect to voting formulae for creditor acceptance of a reorganization plan

- Even though some firms that settle in PBS eventually fail, there are several advantages over having them all fail simultaneously. Some firms that survive would obviously fail because of errors at the time of PBS, but by no means all failures will be due to this effect. Others may fail because of subsequent unanticipated events, such as entry of a new competitor, or simple bad luck. Among the advantages of delaying failure of even eventual “mistakes” are:
 - spreading out disruptions over time, enabling better management of adjustments, especially of workers;
 - delaying expenditures on things like unemployment compensation at times of unusual budget pressure such as the great recession or COVID-19 crisis;
 - basing outcomes on realizations rather than expectations, thereby reducing “mistakes” of excess failure due to bad predictions and the fact that some firms with negative projected net present values will end up with a positive draw from the outcome distribution.
- To the extent that suppliers are harmed by failures in the PBS process, any such effect is solely among very small suppliers, thus suggesting that mitigation efforts would entail relatively small costs.

On the other hand there are some things we do not (yet) know.

- What is the impact of fewer bankruptcies on the balance between long-run “scars” on workers and capital, versus gains from creative destruction?³⁹
- Similarly, would the increased survival of relatively inefficient but marginally viable firms reduce the net benefit (productivity improvement from capital and worker reallocation minus transaction costs) from forced closure?

³⁹For a subtle but persuasive discussion of the importance of creative destruction and the role of the state and its institutions in supporting it, see [Aghion et al. \(2021\)](#)

Societal effects, however, are much less clear. Courts have the ability to reflect costs and benefits to others who are not a party to the agreement (consumers, alternative producers, etc.). Indeed, the classic argument for why bankruptcy should exist is the role played by releasing capital and labor to more efficient uses. On the one hand, [Bernstein, Colonnelli and Iverson \(2019\)](#) show long-run utilization of assets from liquidated firms is lower when compared to reorganized firms, and the lower utilization is concentrated in markets with fewer potential users or in areas with lower access to finance. On the other hand, recent work by [Ma et al. \(2021\)](#) tracks innovative bankrupt firms that reorganize, and shows that due to secured debts they sell more of their core innovations, which then diffuse more slowly in the economy. Finally, [Araujo et al. \(2021\)](#) find that wages increase for workers who change to alternative jobs after bankruptcies, implying that these workers achieve higher productivity, suggesting that unless search and other costs are very high, bankruptcy improves social welfare.⁴⁰ If so, and PBS reduces or delays reallocation of labor and capital to higher productivity uses, then higher survival rates may be welfare reducing. The optimal way of encouraging creative destruction is a much bigger issue than we can address here.

Despite these open issues, our findings clearly show that framing effects involving relatively small legal changes can have substantial impact on economic outcomes. [Müge et al. \(2017\)](#) lists 13 characteristics of insolvency regimes that reduce the negative impact of "zombie" firms in delaying efficiency-enhancing restructuring of labor and capital. Of these, at least 5 are mitigated by the PBS process in Croatia.

- Reducing time to discharge from insolvency.
- Providing an early warning mechanism and pre-insolvency regime.
- Creating an ability for creditors to initiate restructuring.

⁴⁰For more discussion on job displacement, wage losses, lost firm wage premiums, worker productivity depreciations and transferability of skills, see [Fackler et al. \(2021\)](#); [Yi et al. \(2017\)](#).

- Preventing a minority of creditors from blocking a restructuring plan.
- Requiring a low degree of court involvement.

It is clear, then, that formalizing an out-of-court process, as was done in Croatia, ought to have significant efficiency advantages and is an option well worth consideration by other countries worried about the efficiency of their system for dealing with insolvent firms.

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Appendix

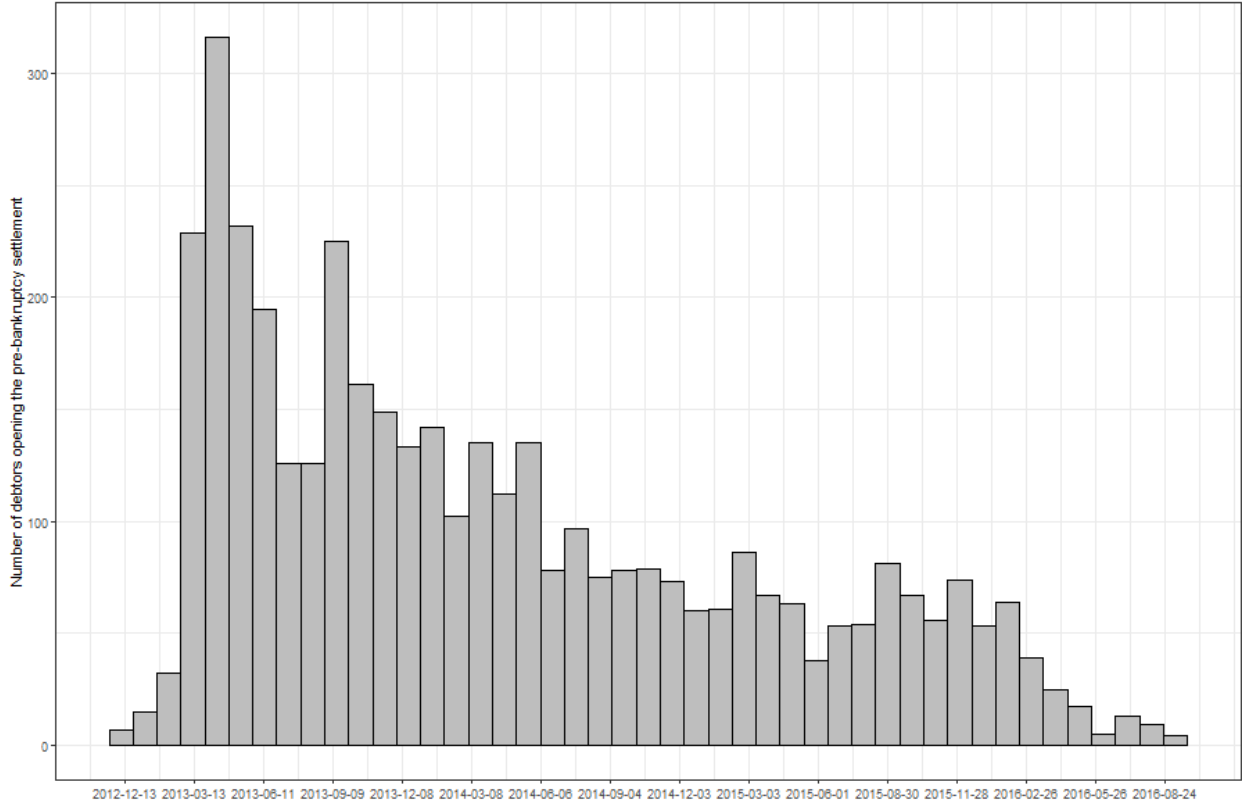


Figure A1: Time distribution of the starts of the PBS procedure 2012 - 2016

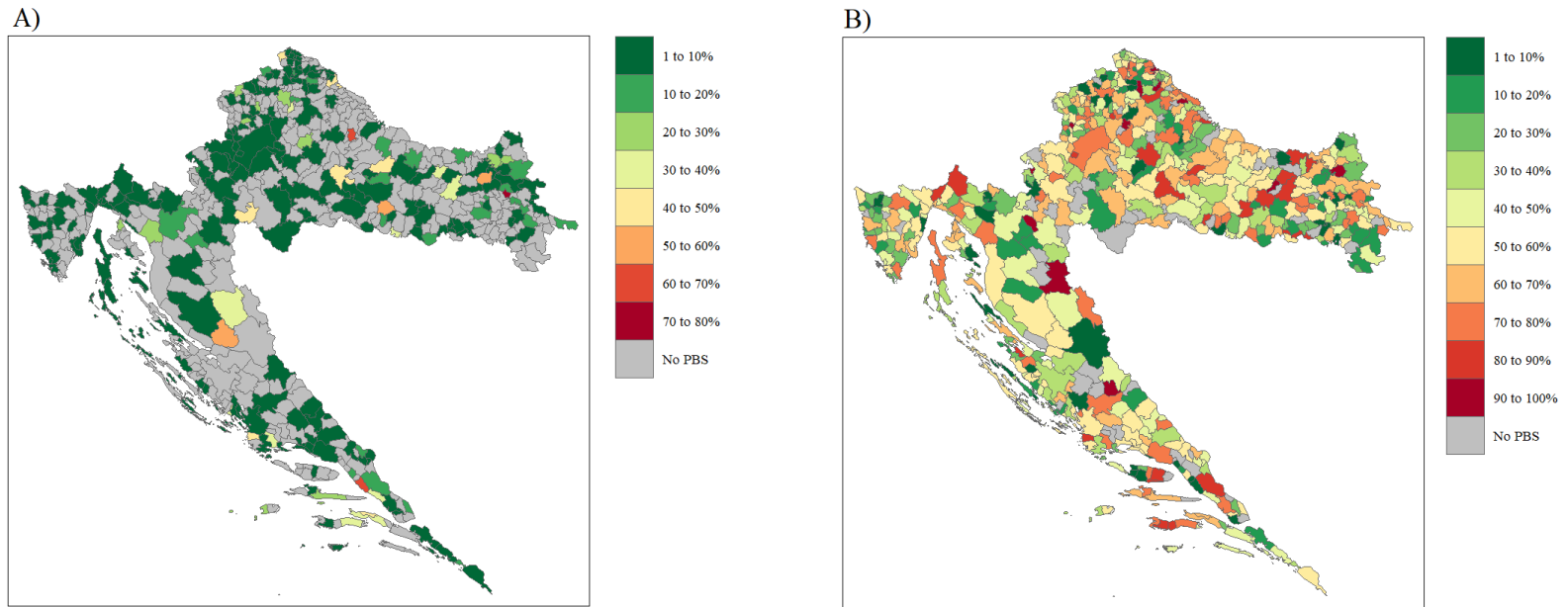


Figure A2: Share of debtor (A) and supplier (B) firms employment in total municipality/city private sector employment (first cohort of 2013)

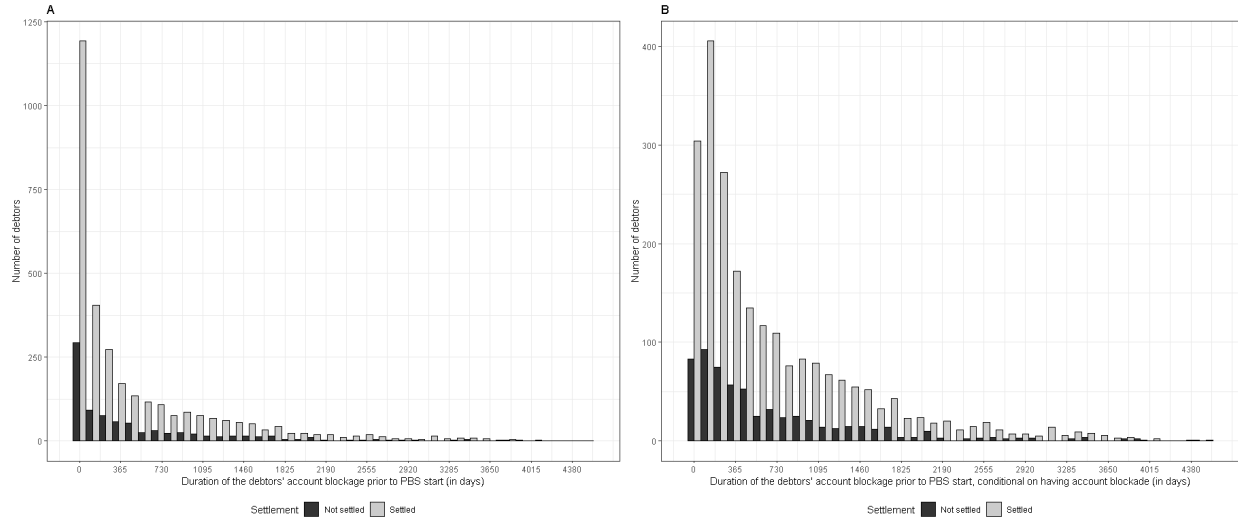


Figure A3: Duration of the debtors' account blockage prior to starting the PBS process (in days), all debtors (A) and conditional on having account blockage (B)

Note: The B graph, value zero shows debtors that had account blocked one day or longer.

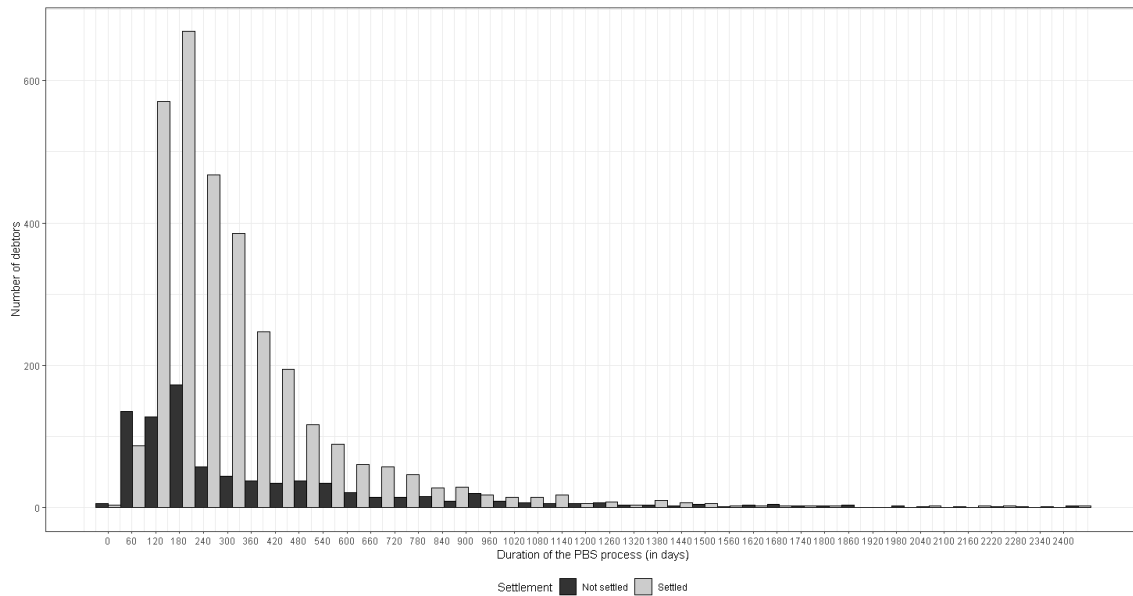


Figure A4: PBS process duration distribution by settled and non-settled debtor cases

Note: Bargaining success cases last on average 329 days, and 252 days at the median.

Bargaining failure cases last on average 391 days, and 215 days at the median.

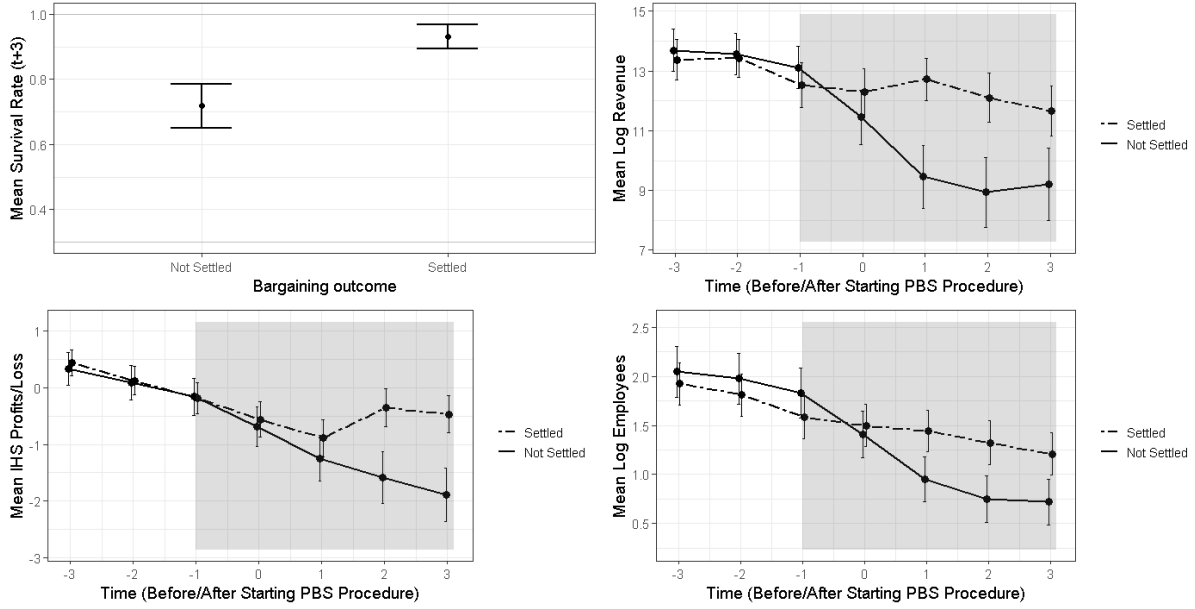


Figure A5: Dependent variable behavior of debtors with private firms/financial institutions majority vote: settled and not settled

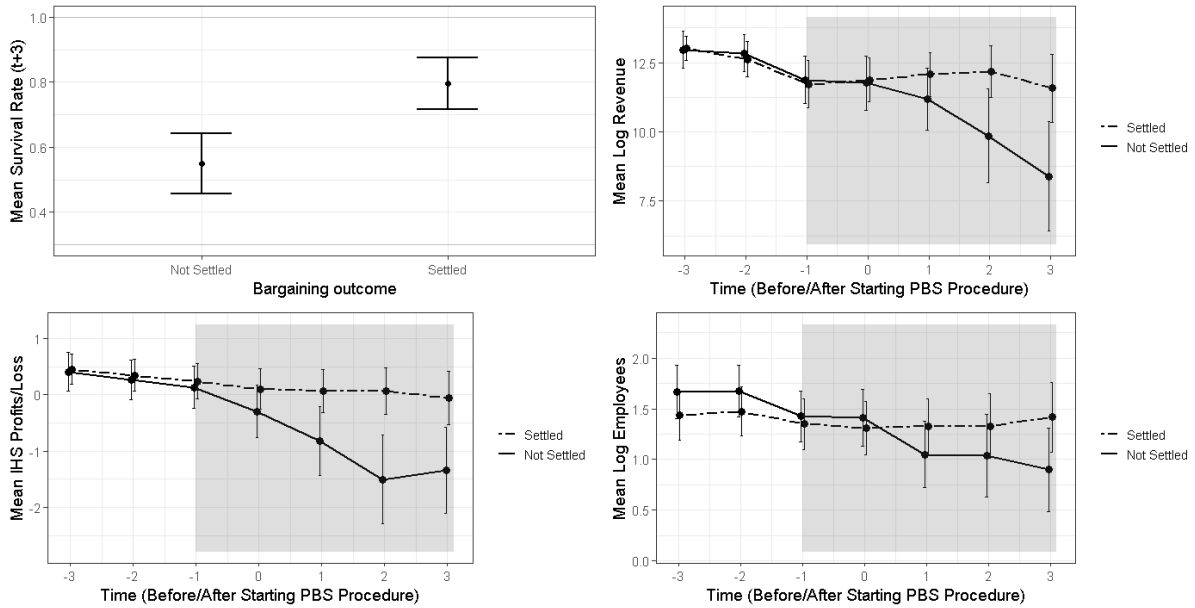


Figure A6: Dependent variable behavior of debtors with state/state owned firms majority vote: settled and not settled

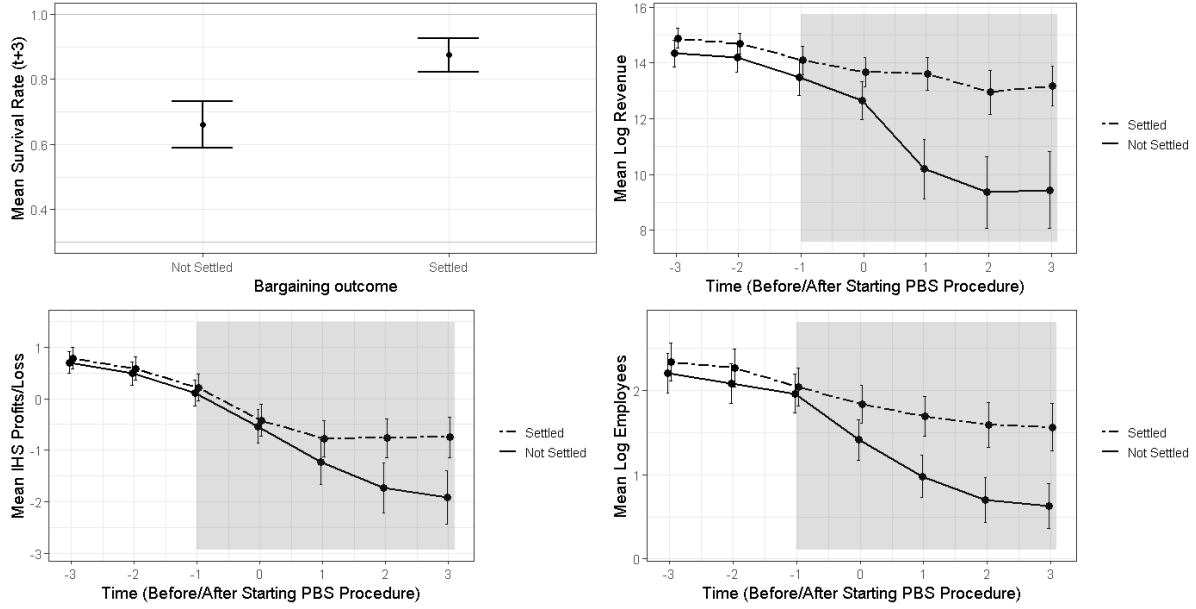


Figure A7: Dependent variable behavior of debtors with mixed majority vote: settled and not settled

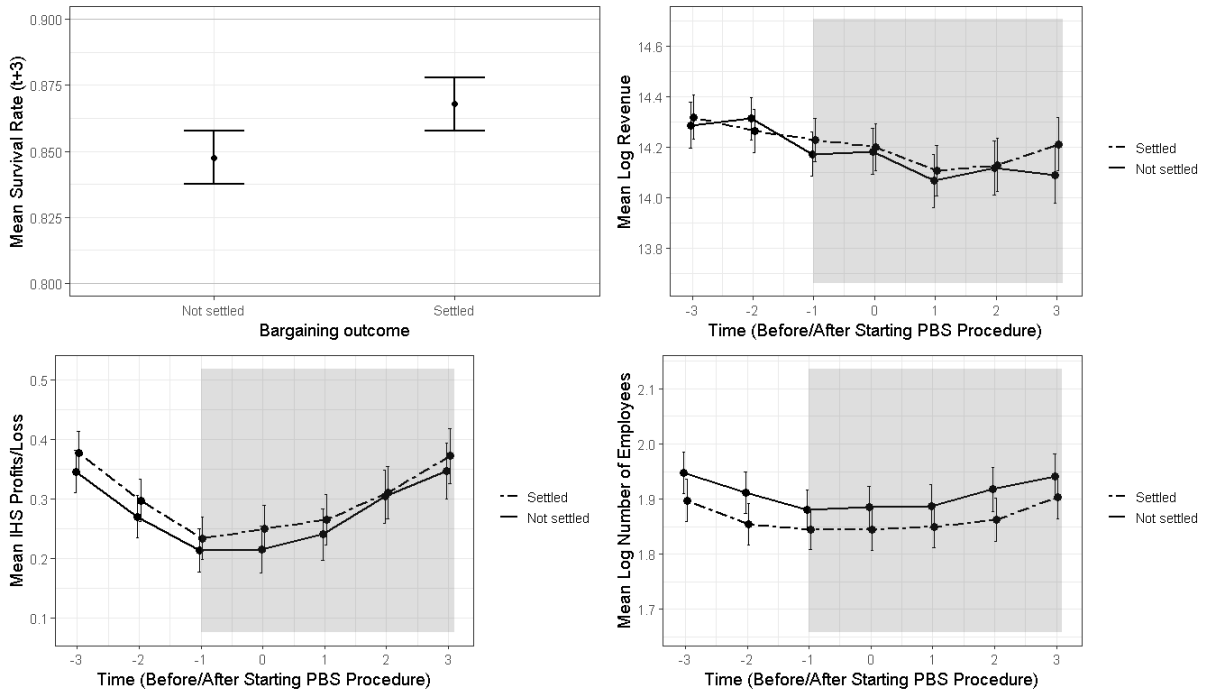


Figure A8: The dependent variables of settled and non-settled suppliers before and after entering PBS: suppliers nested in the matched debtor sample

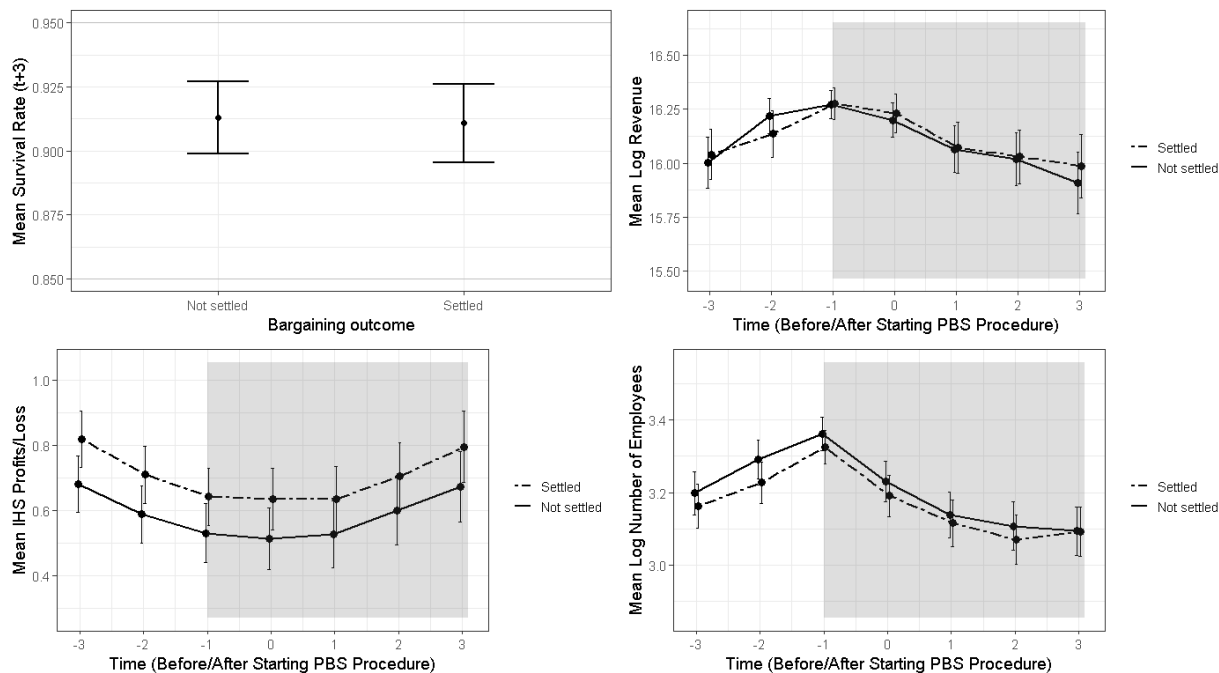


Figure A9: The dependent variables of settled and non-settled suppliers before and after entering PBS: larger suppliers nested in the matched debtor sample

Table A1: Descriptive information on debtors

	Full				Merged				
Year	Debtors count	Debt sum	Mean debt	No. of creditors	Mean no. creditors	Debtors count	Debt sum	Mean debt	Jobs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012	10	4910	491	3076	308	10	4910	491.0	2921
2013	1936	53574	28	91217	47	1164	51173	44.5	33037
2014	1157	18180	16	46333	40	674	13432	20.2	14693
2015	743	11915	16	36105	49	470	8306	17.7	7392
2016	195	3707	19	6618	34	123	3455	28.3	376
Total	4041	92286		183349		2441	81276		58419

Note: Monetary values (columns 2, 3, 7, and 8) are in million kuna (HRK).

Table A2: Models for selection into bargaining failure and duration of the bargaining process

	<i>Dependent variable:</i>			
	Bargaining failure		Bargaining duration (in days)	
	<i>probit</i>		<i>OLS</i>	
	(1)		(2)	
Log Herfindahl-Hirschman Index	−0.051***	(0.016)	−26.849**	(11.929)
Log Number of Creditors	0.006	(0.009)	0.040	(6.510)
Have Secured Creditor	−0.033*	(0.017)	14.488	(13.488)
Log Total Claims	0.008	(0.006)	23.659***	(4.474)
Majority Creditor: Suppliers (ref: State)	−0.071***	(0.019)	6.232	(16.009)
Majority Creditor: Financial Institutions	−0.043	(0.026)	−0.976	(22.364)
Majority Creditor: Mixed	−0.032	(0.020)	−10.475	(15.268)
Agency Center Osijek (ref: Zagreb)	−0.067***	(0.016)	−158.197***	(13.947)
Agency Center Rijeka	−0.069***	(0.018)	−33.271**	(16.034)
Agency Center Split	−0.075***	(0.018)	−22.680*	(13.556)
Agency Center Zagreb Exec.	−0.045*	(0.022)	19.150	(18.522)
Year 2012 (ref: 2013)	−0.111	(0.070)	−215.737**	(88.618)
Year 2014	0.007	(0.015)	32.146***	(10.669)
Year 2015	0.031*	(0.019)	52.758***	(12.755)
Year 2016	0.064**	(0.034)	44.310**	(22.108)
Constant			240.717**	(116.785)
Observations	3871		3871	
Mean dep. var.	0.206		343.518	
(McFadden) R ²	0.021		0.128	
(ML) Adjusted R ²	0.020		0.125	
Log Likelihood	−1800.718			
Akaike Inf. Crit.	3635.436			
Residual Std. Error			277.461	(df = 3854)
F Statistic			35.427***	(df = 16; 3854)

Notes: Significant at 1%***, 5%** , and 10%*. First column provides marginal effects for a probit regression.

Table A3: Inclusion of account blockage information in the models for selection into bargaining failure and duration of the bargaining process

	<i>Dependent variable:</i>			
	Bargaining failure		Bargaining duration (in days)	
	<i>probit</i>		<i>OLS</i>	
	(1)		(2)	
Account blocked up to 7 days	0.030	(0.042)	45.488	(28.117)
Account blocked 8 - 59 days	0.028	(0.028)	34.678*	(18.872)
Account blocked 60 - 120 days	0.007	(0.029)	12.679	(19.772)
Account blocked 121 - 365 days	0.045**	(0.024)	10.417	(13.753)
Account blocked 366 - 730 days	0.059***	(0.024)	27.699*	(15.364)
Account blocked 731 - 1095 days	0.058**	(0.028)	46.382***	(17.810)
Account blocked 1096 - 1460 days	0.028	(0.031)	23.097	(20.364)
Account blocked above 1460 days	0.052**	(0.026)	35.950**	(16.595)
Constant	0.352	(0.612)	229.249*	(117.212)
Observations	3871		3871	
Mean dep. var.	0.206		343.518	
(McFadden) R ²	0.025		0.131	
(ML) Adjusted R ²	0.023		0.126	
Log Likelihood	-1794.744			
Akaike Inf. Crit.	3639.488			
Residual Std. Error			277.302	(df = 3846)
F Statistic			24.163***	(df = 24; 3846)

Notes: Significant at 1%***, 5%** , and 10%*. Reference category is no account blockage (0 days). All models include control variables: log Herfindahl-Hirschman Index, log number of creditors, a dummy for having a secured creditor, log total claims, majority voter (state, suppliers, financial institutions and mixed majority), regional FINA in charge (Zagreb, Split, Osijek, Rijeka and Executive Agency in Zagreb), year of opening the PBS process. First column provides marginal effects for a probit regression.

Table A4: Industry distribution: PBS debtors with bargaining failure and success

Industry NACE 1-digit	Bargaining Share (%) success		Bargaining Share (%) failure	
	(1)	(2)	(3)	(4)
	Agriculture, forestry and fishing	76	4.83	18
Mining and quarrying	11	0.70	0	0.00*
Manufacturing	330	20.99	81	17.53*
Electricity, gas, steam and air conditioning supply	3	0.19	0	0.00
Water supply, sewerage, waste management and remediation activities	14	0.89	5	1.08
Construction	323	20.55	94	20.35
Wholesale and retail trade; repair of motor vehicles and motorcycles	328	20.87	123	26.62***
Transportation and storage	56	3.56	13	2.81
Accommodation and food service activities	106	6.74	40	8.66
Information and communication	42	2.67	9	1.95
Financial and insurance activities	1	0.06	2	0.43*
Real estate activities	54	3.44	11	2.38
Professional, scientific and technical activities	128	8.14	35	7.58
Administrative and support service activities	44	2.80	17	3.68
Education	18	1.15	3	0.65
Human health and social work activities	8	0.51	2	0.43
Arts, entertainment and recreation	11	0.70	5	1.08
Other service activities	19	1.21	4	0.87
Total	1572	100.00	462	100.00

Notes: Stars in the fourth column represent significance levels from the t-test for difference in means. Significant at 1%***, 5%***, and 10%*.

Table A5: Balancing property: before and after matching (*continued*)

	Before	Matching			After	Matching			
	Mean	Mean	Diff.	p-value	Mean	Mean	Diff.	p-value	St.Bias
	Failure	Success			Failure	Success			Reduction
	(n=462)	(n=1572)			(n=458)	(n=458)			
No account blockage (AB)	0.262	0.324	-0.062**	0.011	0.258	0.269	-0.011	0.708	81.832
AB 1-7 days	0.028	0.031	-0.003	0.753	0.028	0.026	0.002	0.840	20.515
AB 8-59 days	0.084	0.068	0.016	0.239	0.083	0.087		0.813	74.219
AB 60-120 days	0.054	0.063	-0.009	0.501	0.055	0.061	-0.007	0.672	22.716
AB 121-365 days	0.210	0.195	0.015	0.473	0.212	0.212	0.000	1.000	100.000
AB 366-730 days	0.145	0.127	0.019	0.299	0.146	0.144	0.002	0.925	88.545
AB 731-1095 days	0.082	0.080	0.002	0.894	0.083	0.083	0.000	1.000	100.000
AB 1096-1460 days	0.050	0.049	0.000	0.969	0.050	0.046	0.004	0.758	-889.648
AB 1461+ days	0.084	0.063	0.021	0.112	0.085	0.072	0.013	0.462	39.906
Last blockage duration	438.788	381.750	57.038*	0.063	442.546	409.520	33.026	0.407	42.681
Log sales (t-1)	12.959	13.188	-0.229	0.303	12.943	12.913	0.030	0.921	87.644
Log sales (t-2)	13.629	13.577	0.052	0.802	13.617	13.705	-0.088	0.727	-74.188
Log sales (t-3)	13.762	13.750	0.012	0.955	13.751	13.849	-0.098	0.695	-773.187
IHS profits (t-1)	-0.629	-0.369	-0.260***	0.002	-0.630	-0.591	-0.039	0.730	85.478
IHS profits (t-2)	-0.374	-0.140	-0.234***	0.004	-0.386	-0.334	-0.052	0.620	77.970
IHS profits (t-3)	-0.174	0.038	-0.211***	0.006	-0.186	-0.125	-0.061	0.543	71.373
Log employment (t-1)	1.785	1.765	0.020	0.802	1.780	1.697	0.083	0.404	-320.599
Log employment (t-2)	1.947	1.931	0.016	0.840	1.942	1.901	0.041	0.687	-153.037
Log employment (t-3)	2.020	2.045	-0.026	0.754	2.013	1.966	0.047	0.646	-86.826
Log total debt (t-1)	15.300	15.134	0.165	0.123	15.296	15.179	0.117	0.385	28.898
Log total assets (t-1)	15.162	15.092	0.069	0.555	15.161	15.045	0.117	0.443	-67.218

Table A5: Balancing property: before and after matching (*continued*)

	Before	Matching			After	Matching			
	Mean	Mean	Diff.	p-value	Mean	Mean	Diff.	p-value	St.Bias
	Failure	Success			Failure	Success			Reduction
	(n=462)	(n=1572)			(n=458)	(n=458)			
Log fixed assets (t-1)	12.546	12.903	-0.357	0.158	12.540	12.347	0.192	0.567	48.167
Debt ratio (t-1)	1.381	1.285	0.096*	0.084	1.375	1.415	-0.040	0.594	60.543
Debt ratio (t-2)	1.172	1.113	0.059	0.204	1.168	1.178	-0.010	0.866	83.058
Debt ratio (t-3)	1.046	1.029	0.017	0.681	1.043	1.049	-0.005	0.917	67.652
Liquidity ratio (t-1)	0.625	0.566	0.059*	0.002	0.624	0.642	-0.017	0.489	71.067
Public contract (t-1)	0.056	0.054	0.003	0.834	0.055	0.052	0.002	0.883	12.011
Public contract (t-2)	0.050	0.051	-0.001	0.944	0.048	0.046	0.002	0.876	-175.650
Public contract (t-3)	0.045	0.045	0.001	0.960	0.044	0.046	-0.002	0.873	-301.339
Share of public sales (t-1)	0.019	0.012	0.007	0.144	0.019	0.016	0.003	0.633	54.963
Exporter dummy (t-1)	0.154	0.171	-0.017	0.386	0.153	0.151	0.002	0.927	86.887
Exporting share (t-1)	0.042	0.040	0.001	0.863	0.042	0.042	0.000	0.983	84.883
Z-Score (t-1)	-0.775	-0.439	-0.336*	0.058	-0.780	-0.729	-0.051	0.838	85.866
Distress Zone dummy	0.892	0.898	-0.006	0.721	0.891	0.889	0.002	0.916	62.851
Grey Zone dummy	0.076	0.066	0.010	0.454	0.076	0.079	-0.002	0.902	79.023
Safe Zone dummy	0.032	0.037	-0.004	0.668	0.033	0.033	0.000	1.000	100.000
Micro firm dummy	0.690	0.681	0.009	0.707	0.690	0.694	-0.004	0.886	52.609
Small firm dummy	0.188	0.221	-0.033	0.127	0.190	0.214	-0.024	0.366	27.043
Medium firm dummy	0.097	0.082	0.016	0.284	0.098	0.079	0.020	0.295	-24.961
Large firm dummy	0.024	0.016	0.008	0.251	0.022	0.013	0.009	0.314	-16.153
Firm age	12.818	13.248	-0.430	0.194	12.843	12.941	-0.098	0.814	77.229
Firm age squared	204.550	214.293	-9.743	0.281	205.092	206.915	-1.823	0.872	81.214

Table A5: Balancing property: before and after matching (*continued*)

	Before	Matching			After	Matching			
	Mean	Mean	Diff.	p-value	Mean	Mean	Diff.	p-value	St.Bias
	Failure	Success			Failure	Success			Reduction
	(n=462)	(n=1572)			(n=458)	(n=458)			
Agency Zagreb	0.457	0.373	0.084***	0.001	0.459	0.443	0.015	0.642	82.090
Agency Split	0.108	0.137	-0.029	0.104	0.105	0.118	-0.013	0.529	52.982
Agency Rijeka	0.050	0.080	-0.030**	0.030	0.050	0.050	0.000	1.000	100.000
Agency Osijek	0.069	0.114	-0.045***	0.005	0.070	0.081	-0.011	0.532	73.666
Executive Agency Zagreb	0.316	0.296	0.020	0.410	0.317	0.308	0.009	0.776	56.603
Maj. voter Financ. Inst.	0.082	0.081	0.001	0.929	0.083	0.092	-0.009	0.640	-556.481
Maj. voter State and SOE	0.245	0.205	0.040*	0.068	0.247	0.225	0.022	0.437	45.921
Maj. voter Suppliers	0.301	0.339	-0.038	0.125	0.297	0.319	-0.022	0.475	42.238
Mixed majority	0.372	0.375	-0.003	0.913	0.373	0.365	0.009	0.784	-214.330
Log HHI	8.072	8.140	-0.068**	0.044	8.077	8.115	-0.038	0.382	45.412
Log number of creditors	3.417	3.342	0.075	0.256	3.408	3.339	0.068	0.397	7.711
Secured creditor dummy	0.251	0.245	0.006	0.804	0.249	0.238	0.011	0.701	-93.817
Secured claims share	0.125	0.109	0.016	0.251	0.125	0.122	0.002	0.904	86.473

Table A6: OLS and matching results of bargaining failure on debtors' survival, revenue, profits and jobs

	Survive		Log Revenue		IHS Profits		Log Employees	
	Unmatched	Matched	Unmatched	Matched	Unmatched	Matched	Unmatched	Matched
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bargaining Failure	-0.234*** (0.018)	-0.229*** (0.026)						
Barg. Fail. x Time (t-2)			0.040 (0.154)	0.010 (0.183)	-0.017 (0.036)	0.017 (0.045)	0.042 (0.042)	-0.006 (0.049)
Barg. Fail. x Time (t-1)			-0.241 (0.214)	0.127 (0.259)	-0.046 (0.063)	0.037 (0.079)	0.046 (0.050)	0.037 (0.059)
Barg. Fail. x Time (t)			-0.996*** (0.253)	-0.733** (0.297)	-0.080 (0.088)	-0.081 (0.105)	-0.237*** (0.068)	-0.258*** (0.079)
Barg. Fail. x Time (t+1)			-3.179*** (0.318)	-3.013*** (0.361)	-0.275** (0.107)	-0.290** (0.127)	-0.641*** (0.087)	-0.648*** (0.097)
Barg. Fail. x Time (t+2)			-3.761*** (0.351)	-3.583*** (0.402)	-0.625*** (0.127)	-0.721*** (0.150)	-0.843*** (0.100)	-0.909*** (0.110)
Barg. Fail. x Time (t+3)			-3.632*** (0.391)	-3.662*** (0.445)	-0.623*** (0.137)	-0.756*** (0.159)	-0.906*** (0.111)	-0.957*** (0.123)
<i>N</i>	2043	916	12470	5359	12470	5359	12470	5359
Mean dep. var.	0.839	0.767	12.858	12.550	-0.011	-0.230	1.680	1.589
R ²	0.149	0.182	0.656	0.646	0.779	0.811	0.802	0.782
Adjusted R ²	0.142	0.167	0.433	0.371	0.636	0.665	0.673	0.613
Residual Std. Error	0.340	0.386	3.351	3.744	1.151	1.186	0.864	0.931

Notes: Significant at 1%***, 5%***, and 10%*. All models include control variables: year dummies, firm size (micro, small, medium and large firm), firm age and age squared, regional FINA in charge (Zagreb, Split, Osijek, Rijeka and Executive Agency in Zagreb), liquidity ratio and Z-Score in year prior to opening the PBS process, and the length of the last account blockage up to 30 days prior to opening the PBS process. Models 3-8 have clustered standard errors at debtor-level. Reference level in models 3-8 is Bargaining failure x Time (t-3). Time is defined as the year(s) since the year of opening the PBS procedure.

Table A7: OLS and matching results of bargaining failure on debtors' survival, revenue, profits and jobs: PBS procedures starting 2012-2014

	Survive		Log Revenue		IHS Profits		Log Employees	
	Unmatched	Matched	Unmatched	Matched	Unmatched	Matched	Unmatched	Matched
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bargaining Failure	-0.249*** (0.027)	-0.257*** (0.033)						
Barg. Fail. x Time (t-4)			-0.074 (0.196)	-0.045 (0.228)	-0.112** (0.044)	-0.029 (0.053)	-0.071 (0.057)	-0.024 (0.067)
Barg. Fail. x Time (t-3)			-0.009 (0.208)	0.257 (0.260)	-0.122* (0.064)	0.025 (0.077)	-0.093 (0.070)	0.002 (0.083)
Barg. Fail. x Time (t-2)			-0.002 (0.234)	0.314 (0.292)	-0.136* (0.078)	0.013 (0.100)	-0.055 (0.075)	0.045 (0.091)
Barg. Fail. x Time (t-1)			-0.185 (0.260)	0.410 (0.324)	-0.133 (0.097)	0.006 (0.122)	-0.062 (0.082)	0.077 (0.102)
Barg. Fail. x Time (t)			-1.188*** (0.316)	-0.936** (0.369)	-0.216* (0.129)	-0.095 (0.157)	-0.386*** (0.095)	-0.243** (0.114)
Barg. Fail. x Time (t+1)			-3.233*** (0.398)	-3.026*** (0.448)	-0.481*** (0.155)	-0.368** (0.183)	-0.860*** (0.110)	-0.751*** (0.126)
Barg. Fail. x Time (t+2)			-3.789*** (0.437)	-3.417*** (0.498)	-0.938*** (0.178)	-0.827*** (0.205)	-1.129*** (0.124)	-0.950*** (0.144)
Barg. Fail. x Time (t+3)			-3.949*** (0.518)	-3.539*** (0.606)	-0.934*** (0.189)	-0.806*** (0.218)	-1.170*** (0.139)	-0.998*** (0.162)
Barg. Fail. x Time (t+4)			-3.505*** (0.544)	-3.387*** (0.647)	-1.063*** (0.199)	-0.990*** (0.235)	-1.062*** (0.145)	-0.959*** (0.171)
Barg. Fail. x Time (t+5)			-3.375*** (0.575)	-3.077*** (0.676)	-1.020*** (0.217)	-0.986*** (0.252)	-1.002*** (0.157)	-0.861*** (0.183)
N	1550	680	13974	5856	13974	5856	13974	5856
R ²	0.156	0.230	0.587	0.587	0.682	0.747	0.739	0.714
Adjusted R ²	0.148	0.213	0.433	0.405	0.563	0.634	0.642	0.588
Residual Std. Error	0.434	0.424	3.276	3.656	1.309	1.271	0.946	0.995

Notes: Significant at 1%***, 5%**, and 10%*. All models include control variables: year dummies, firm size (micro, small, medium and large firm), firm age and age squared, regional FINA in charge (Zagreb, Split, Osijek, Rijeka and Executive Agency in Zagreb), liquidity ratio and Z-Score in year prior to opening the PBS process, and the length of the last account blockage up to 30 days prior to opening the PBS process. Models 3-8 have clustered standard errors at debtor-level. Reference level in models 3-8 is Bargaining failure x Time (t-5). Time is defined as the year(s) since the year of opening the PBS procedure.

Table A8: Heterogeneous effects of bargaining failure: firms 1-9 and 10 and more employees

Number of employees:	Survive		Log Revenue		IHS Profits		Log Employees	
	1-9	10+	1-9	10+	1-9	10+	1-9	10+
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DID Effect	-0.249*** (0.032)	-0.183*** (0.039)						
Barg. Fail. x Time (t-2)			-0.007 (0.269)	0.065 (0.166)	0.028 (0.052)	-0.023 (0.112)	0.089 (0.064)	-0.003 (0.095)
Barg. Fail. x Time (t-1)			-0.056 (0.372)	-0.046 (0.230)	0.060 (0.080)	-0.026 (0.186)	0.089 (0.075)	0.006 (0.113)
Barg. Fail. x Time (t)			-0.926** (0.435)	-0.721** (0.292)	0.047 (0.099)	-0.025 (0.278)	-0.069 (0.093)	-0.599*** (0.168)
Barg. Fail. x Time (t+1)			-3.160*** (0.517)	-2.731*** (0.425)	-0.032 (0.115)	-0.445 (0.312)	-0.253** (0.108)	-1.364*** (0.197)
Barg. Fail. x Time (t+2)			-3.856*** (0.561)	-3.359*** (0.503)	-0.376*** (0.141)	-0.766** (0.353)	-0.355*** (0.118)	-1.638*** (0.205)
Barg. Fail. x Time (t+3)			-3.643*** (0.631)	-3.388*** (0.584)	-0.410*** (0.150)	-0.763** (0.370)	-0.405*** (0.125)	-1.680*** (0.224)
<i>N</i>	636	286	3684	1749	3684	1749	3684	1749
R ²	0.178	0.194	0.573	0.620	0.837	0.777	0.560	0.759
Adjusted R ²	0.161	0.155	0.205	0.347	0.697	0.616	0.180	0.585
Residual Std. Error	0.403	0.326	4.421	2.551	0.886	1.741	0.815	1.072
F Statistic	10.394***	5.028***						

Notes: Significant at 1%***, 5%** , and 10%*. All models include control variables: year dummies, firm age and age squared, regional FINA in charge (Zagreb, Split, Osijek, Rijeka and Executive Agency in Zagreb), liquidity ratio and Z-Score in year prior to opening the PBS process, and the length of the last account blockage up to 30 days prior to opening the PBS process. Models 3-8 have clustered standard errors at debtor-level. Reference level in models 3-8 is Bargaining failure x Time (t-3). Time is defined as the year(s) since the year of opening the PBS procedure.

Table A9: Triple difference of bargaining failure with respect to vote majority on debtors' survival, performance and jobs

	Survive	Log Revenue	IHS Profits	Log Employees
	(1)	(2)	(3)	(4)
Barg. Fail.	-0.301*** (0.060)			
Barg. Fail. x Private Majority	0.144* (0.076)			
Barg. Fail. x Mixed Majority	0.030 (0.077)			
Barg. Fail. x Post		-1.877*** (0.507)	-0.493*** (0.148)	-0.554*** (0.149)
Barg. Fail. x Private Majority x Post		-1.044 (0.650)	-0.081 (0.230)	-0.125 (0.190)
Barg. Fail. x Mixed Majority x Post		-0.378 (0.611)	0.149 (0.253)	-0.096 (0.199)
<i>N</i>	916	5359	5359	5359
R ²	0.218	0.623	0.785	0.762
Adjusted R ²	0.200	0.331	0.619	0.577
Residual Std. Error	0.438	3.861	1.265	0.973
F Statistic	12.452***			

Notes: Significant at 1%***, 5%** , and 10%*. Reference category: State Majority. All models include control variables: firm size (micro, small, medium and large firm), firm age and age squared, regional FINA in charge (Zagreb, Split, Osijek, Rijeka and Executive Agency in Zagreb), liquidity ratio and Z-Score in year prior to opening the PBS process, and the length of the last account blockage up to 30 days prior to opening the PBS process. Models 2-4 have clustered standard errors at debtor-level.

Table A10: Unmatched and matched results of bargaining failure on suppliers' survival, revenue, profits and jobs

	Survive		Log Revenue		IHS Profits		Log Employees	
	Full	Nested	Full	Nested	Full	Nested	Full	Nested
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bargaining Failure	-0.023*** (0.008)	-0.012* (0.007)						
Barg. Fail. x Time (t-2)			0.161*** (0.058)	0.081 (0.051)	0.004 (0.010)	0.004 (0.012)	0.016 (0.015)	0.010 (0.015)
Barg. Fail. x Time (t-1)			0.052 (0.072)	-0.027 (0.062)	-0.006 (0.015)	0.008 (0.017)	0.001 (0.018)	-0.010 (0.017)
Barg. Fail. x Time (t)			0.051 (0.081)	-0.017 (0.069)	-0.005 (0.019)	-0.002 (0.021)	-0.013 (0.021)	-0.014 (0.020)
Barg. Fail. x Time (t+1)			-0.019 (0.089)	-0.075 (0.077)	0.001 (0.021)	-0.003 (0.024)	-0.019 (0.023)	-0.028 (0.023)
Barg. Fail. x Time (t+2)			-0.032 (0.091)	-0.088 (0.080)	-0.003 (0.023)	-0.002 (0.026)	-0.024 (0.024)	-0.028 (0.024)
Barg. Fail. x Time (t+3)			-0.100 (0.096)	-0.180** (0.083)	-0.008 (0.026)	-0.005 (0.029)	-0.023 (0.025)	-0.041* (0.025)
<i>N</i>	14397	9283	91485	59612	91485	59612	91485	59612
R ²	0.129	0.141	0.690	0.708	0.857	0.851	0.842	0.849
Adjusted R ²	0.122	0.130	0.631	0.653	0.830	0.823	0.812	0.821
Residual Std. Error	0.344	0.326	1.983	1.868	0.484	0.558	0.522	0.541
F Statistic	18.129***	13.184***						

Notes: Significant at 1%***, 5%***, and 10%*. All models include supplier-level control variables: NACE 2-digit sector fixed effects, county fixed effects, year fixed effects, firm age and age squared, Altman Z-Score, liquidity ratio and liquidity shock in year prior to opening the PBS process. Models 3-8 have clustered standard errors at supplier-level. Reference level in models 3-8 is Bargaining failure x Time (t-3). Time is defined as the year(s) since the year of opening the PBS procedure.

Table A11: Heterogeneous effects of bargaining failure: suppliers up to 9 employees and above 9 employees

	Survive		Log Revenue		IHS Profits		Log Employees	
	1-9 (1)	10+ (2)	1-9 (3)	10+ (4)	1-9 (5)	10+ (6)	1-9 (7)	10+ (8)
Bargaining Failure	-0.029*** (0.009)	0.003 (0.010)						
Barg. Fail. x Time (t-2)			0.058 (0.066)	0.105 (0.066)	0.002 (0.011)	0.007 (0.027)	-0.005 (0.017)	0.028 (0.025)
Barg. Fail. x Time (t-1)			-0.061 (0.084)	0.008 (0.067)	0.005 (0.015)	0.011 (0.038)	-0.034* (0.020)	0.016 (0.027)
Barg. Fail. x Time (t)			-0.040 (0.093)	-0.005 (0.074)	-0.014 (0.018)	0.020 (0.048)	-0.035 (0.023)	0.018 (0.036)
Barg. Fail. x Time (t+1)			-0.124 (0.104)	-0.007 (0.090)	-0.017 (0.020)	0.025 (0.055)	-0.039 (0.025)	-0.009 (0.042)
Barg. Fail. x Time (t+2)			-0.150 (0.107)	-0.004 (0.097)	-0.021 (0.022)	0.033 (0.059)	-0.040 (0.026)	-0.0003 (0.045)
Barg. Fail. x Time (t+3)			-0.257** (0.109)	-0.046 (0.111)	-0.026 (0.024)	0.029 (0.066)	-0.041 (0.027)	-0.035 (0.046)
<i>N</i>	6410	2873	40464	19148	40464	19148	40464	19148
R ²	0.136	0.138	0.659	0.605	0.876	0.830	0.679	0.741
Adjusted R ²	0.121	0.107	0.592	0.530	0.851	0.798	0.616	0.692
Residual Std. Error	0.350	0.268	2.051	1.391	0.373	0.818	0.490	0.624
F Statistic	9.352***	4.408***						

Notes: Significant at 1%***, 5%***, and 10%*. All models include supplier-level control variables: NACE 2-digit sector fixed effects, county fixed effects, year fixed effects, firm age and age squared, Altman Z-Score, liquidity ratio and liquidity shock in year prior to opening the PBS process. Models 3-8 have clustered standard errors at supplier-level. Reference level in models 3-8 is Bargaining failure x Time (t-3). Time is defined as the year(s) since the year of opening the PBS procedure.

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Stjepan Srhoj, Dejan Kovač, Jacob N. Shapiro, Randall K. Filer

The Impact of Delay: Evidence from Formal Out-of-Court Restructuring

Abstract

Bankruptcy restructuring procedures are used in most legal systems to decide the fate of businesses facing financial hardship. We study how bargaining failures in such procedures impact the economic performance of participating firms in the context of Croatia, which introduced a “pre-bankruptcy settlement” (PBS) process in the wake of the Great Recession of 2007 - 2009. Local institutions left over from the communist era provide annual financial statements for both sides of more than 180,000 debtor-creditor pairs, enabling us to address selection into failed negotiations by matching a rich set of creditor and debtor characteristics. Failures to settle at the PBS stage due to idiosyncratic bargaining problems, which effectively delays entry into the standard bankruptcy procedure, leads to a lower rate of survival among debtors as well as reduced employment, revenue, and profits. We also track how bargaining failures diffuse through the network of creditors, finding a significant negative effect on small creditors, but not others. Our results highlight the impact of delay and the importance of structuring bankruptcy procedures to rapidly resolve uncertainty about firms’ future prospects.

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