Measuring the Ex-Ante Incentive Effects of Bankruptcy Reorganization Procedures

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Abstract

The EU's 2019 Insolvency Directive increases debt holders' control over bankruptcy reorganization proceedings, mirroring recent trends in U.S. Chapter 11. Critics, however, claim that too few insolvent firms use similar procedures to avoid liquidation. This view has remained unchallenged, as prior empirical work mostly studies reforms to liquidation proceedings, rather than reorganization alone. We argue that the critics' perspective is misleading, because it ignores the rules' ex-ante incentive effects on solvent firm debt and equity holders. We use administrative microdata to show that similar reforms to Danish bankruptcy reorganization actually caused a steep decline in liquidations. While few insolvent firms file for reorganization, solvent firms show significant improvements in financial management. The findings shed light on the causal effects of recent changes to European bankruptcy law and U.S. Chapter 11.

Introduction

Europe has experienced a wave of corporate liquidations since the financial crisis, with EU officials claiming that 1.7 million people lose their jobs annually to bankruptcy (Council of the EU 2018). To curb liquidations rates, the European Commission passed a directive in June 2019 to reform the bankruptcy reorganization procedures of EU countries. The directive empowers debt holders in various ways during reorganization, such as by enabling them to implement restructuring plans without management consent (Council of the EU 2019). The directive, therefore, portends a major shift in bankruptcy law for countries such as Sweden, where for example, management approval is required for restructuring (Baker and McKenzie 2017). These changes also echo recent trends in U.S. Chapter 11, which has become increasingly controlled by debt holders over time (Skeel 2003, Bharath et al. 2014).

The effects of these reorganization rules are controversial, however, because critics claim that low take-up rates for similar procedures illustrate their inability to mitigate liquidation rates (Davydenko and Franks 2008, Strömberg 2000). For example, Kaiser (1996) argues that the debt holder-friendly U.K. reorganization procedure is ineffective because too few insolvent firms use the procedure and emerge as going concerns. This view has remained unchallenged, because prior empirical work on bankruptcy reforms mostly examines changes in debt holder rights during *liquidation* rather than *reorganization*, even though these two procedures are theoretically and empirically distinct (Hart 1995).

In this paper, we argue that the critics' perspective is misleading, because it ignores the incentive effects of reorganization rules on the debt and equity holders of solvent firms operating *outside* of bankruptcy. Several theories suggest that empowering debt holders during bankruptcy reorganization can curb liquidation rates, for example, by mitigating equity holder moral hazard among solvent firms (Bebchuk

2002) and/or by increasing debt holder monitoring efforts during solvency (Cornelli and Felli 1997). These models, therefore, imply that fully evaluating reorganization rules requires understanding not only their effects on already insolvent firms (i.e. their "ex-post" effects), but also their effects on solvent firms (i.e. their "ex-ante" effects).[1]

We demonstrate that the ex-ante effects of increasing debt holder control over reorganization are of first-order importance, by analyzing recent reforms to Denmark's bankruptcy code. Following a rise in liquidations in 2010, Denmark passed a law that gave debt holders significantly more control over reorganization proceedings. Debt holders were given the newfound ability to file for reorganization and implement their own, court-enforced restructuring plans without requiring management consent. Prior to the reform, management approval was required for any reorganization plan to be legally binding; the role of debt holders was limited to ratifying reorganization plans that were proposed by management. After the reform, however, debt holders could replace management with a court-appointed supervisor to oversee the firm's activities (Bang-Pedersen 2017).

Denmark's bankruptcy reorganization reform is worth studying for several reasons. The Danish reform offers a novel setting to estimate the causal effects of reorganization rules that mirror recent changes in EU bankruptcy law and U.S. Chapter 11. Exogenous shifts in debt holders' powers during reorganization are rarely observed, and prior empirical work mostly examines shocks to debt holders' rights during liquidation.[2] Furthermore, when reorganization reforms are observed, they are often accompanied by simultaneous changes to liquidation procedures, complicating

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[1] There are theories that suggest that the ex-ante effects of these rules increase liquidation rates, for example, by reducing firm-specific human capital investments (Bebchuk and Picker 1993, Berkovitch et al. 1997). Yet even in these cases, ignoring the ex-ante effects of debt holders' role in reorganization can lead to mis-measured evaluations of the net impact of these rules. We discuss these theories further.
[2] Studies of liquidation procedures include Ponticelli and Alencar (2016), Visaria (2009), von Lilienfeld et al. (2012), Vig (2012), Assunção et al. (2014); see Armour et al. (2015) for a review. These studies reached mixed conclusions on the effects of creditor rights during liquidation, further complicating their relevance to studies of reorganization rules.

our understanding of the distinct effects of reorganization rules.[3] Chapter 11 proceedings, for example, have become increasingly controlled by debt holders through developments in debtor-in-possession financing and executive pay (Skeel 2003). The letter of the U.S. law has not significantly changed over the past thirty years, however, and these developments coincide with changes in the types of firms that file for bankruptcy (Bharath et al. 2014), hindering causal inference.

Denmark's reform enables us to measure the effects of changes in debt holder powers during reorganization, while holding fixed the rules for liquidation, as Danish liquidation proceedings were unaffected by the 2010 reform. We are able to obtain detailed administrative microdata maintained by the Danish government, as well as credit registry data from Experian, to examine the effects of Denmark's reform separately for solvent and insolvent firms. The setting we examine is also informative because the contracting environment and legal institutions in Denmark are more similar to the U.S. and E.U. than those of developing countries that are frequently the context of oft-studied liquidation reforms.

Our first finding is that, contrary to popular belief, the Danish reorganization reform led to a significant decline in corporate liquidations (see Figure 1). Before the law, there were approximately 180 liquidations per month. After the reform was passed, however, the number of liquidations dropped precipitously, by approximately 14% per month. The effects are especially strong for large employers, suggesting that the reform was effective at combating unemployment due to liquidations.

The findings contrast the views of many observers, as even Danish practitioners panned the 2010 reform after its passage. Echoing critics who focus on

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[3] Scott and Smith (1986), Araujo et al. (2012), and Hackbarth et al. (2018) are examples of studies that examine simultaneous changes in reorganization and liquidation procedures. Rodano et al. (2014) analyze an isolated shock to Italian reorganization rules, but they study a reform to the ease of loan renegotiation and its effects on loan prices, rather than unambiguous shifts in debt holder power during reorganization and the resulting effects on firm outcomes, which is the focus of our paper.

the ex-post effects of reorganization rules, they noted that less than 5% of bankruptcy filings during 2011-2016 involved reorganization, leading them to conclude that the Danish Act was ineffectual at curbing liquidations (Bariatti and von Galen 2014, Bang-Pedersen 2017). We show, however, that the reform's overlooked ex-ante effects have been sizable enough to compensate for its ex-post effects.

We exploit institutional features of the law to verify that the identification of the observed decline in liquidations is attributable to the reform, rather than to concurrent improvements in (unobservable) economic conditions. Denmark's new rules only applied to limited liability companies; sole-proprietorships were unaffected by the new bankruptcy procedures. These two types of firms comprise almost 99% of all firms in Denmark, yet only limited liability liquidations drop drastically around the passage of the reform, while sole proprietorships show a slightly upward trend in liquidations during this period. These findings and other evidence discussed below indicate that our results do not simply reflect general improvements in the economy, but instead, illustrate the causal effect of the reform on firm outcomes.

We present additional evidence to further support theories that predict a reduction in liquidations following the Danish reform. For example, we show that the impact of the reform is driven by managerial actions that reflect increased incentives to avoid financial distress: following the reform, solvent firms exhibit a marked improvement in their debt repayment patterns, consistent with Bebchuk (2002) and Cornelli and Felli (1997). Using data on the delinquency of debt repayment for loans of various sizes, we observe that firms pay 3-4% more of their outstanding loans on time (relative to a base rate of 72%) after the passage of the law. The effects are especially salient for firms with a single owner (rather than dispersed shareholders), where the manager and owner are likely to be the same person; such managers likely

have stronger incentives to transfer value from debt to equity during reorganization, as they internalize the equity surplus generated by their actions.

We then present evidence that firms shift their financing towards greater leverage and pay lower interest rates on debt following the reform. Consistent with theory, the findings indicate that external debt financing becomes cheaper, ostensibly because the reform enables debt holders to recover greater surplus during both insolvency and solvency. In turn, we observe that firms impacted by the reform also increase investment, as measured by their capital expenditures, consistent with an overall decrease in the cost of capital due to the law.

We then present findings on the governance decisions of firms, to illustrate a potential channel by which investors are able to influence corporate decision-making following the reform. We document higher managerial turnover among the chief executives and the directors of solvent companies after the new law is passed. These findings may reflect equity holders responding to the reform by replacing managers who are prone to engaging in excessively risky behavior (Bertrand and Schoar 2003). The evidence may also reflect increased monitoring efforts by debt holders after the change in law. Either way, the findings suggest that the reform causes investors to change the composition of operational decision-makers for solvent firms, which may partly explain the debt repayment and financial management patterns that we observe.

To add color to our statistical findings, we also qualitatively describe a recent example of a firm that underwent the reconstruction procedures established by the 2010 reform, to illustrate aspects of the hypotheses that we consider. Top-Toy, a leading children's toy retailer, entered 2018 with significant debts due to poor Christmas sales and a failed Enterprise Resource Planning system implementation (Mölne 2018, Norman 2018). The firm entered reconstruction in November 2018, and debt holders voted to keep the company afloat, provided that the firm followed their

recommendations to close its most unprofitable stores and streamline its operations (Philipsen 2018). Interestingly, the reconstruction proceedings were preceded by the equity owners of the firm replacing Top-Toy's CEO Søren Torp Laursen with Per Sigvardsson in January 2018, just months after then-CEO Laursen claimed that Top-Toy was not "concerned about international rumors on bankruptcy", and in fact planned on opening new stores in the coming year (Östgren 2017, Lindgren 2017). These specific events provide an example of the reform's incentive effects at work: debt holders played an active role during bankruptcy reorganization, while investors replaced managers who placed the company at risk of default prior to bankruptcy.

We present analyses to consider alternative explanations for our empirical findings. Our central identification assumption is that, after controlling for various firm-specific and aggregate economic factors, the Danish reform is exogenous to unobservable factors that influence firm outcomes. We support our identification assumption with various pieces of evidence. First, we observe changes in liquidations in the immediate months surrounding the passage of the law. It is unlikely that economic conditions dramatically improved in a similarly discrete manner, particularly for limited liability firms relative to sole proprietorships. Second, we note that our regression results largely remain the same when we incorporate various controls for aggregate and idiosyncratic economic performance, such as quarterly GDP growth and firm profitability. Third, we analyze changes in the sample composition over time to show that potential selection biases are limited. Finally, we present excerpts from Danish Parliamentary debate around the reform to illustrate that political economy considerations are unlikely to explain our results.

We provide back-of-the-envelope calculations to quantify the relative sizes of the Danish reform's ex-ante and ex-post effects on liquidations. We use the pre-reform sample data to estimate a probit model of corporate liquidations, and then use

the fitted model to predict the number of liquidations that would have occurred had the reform never been passed. We compare the predicted number of liquidations with the actual number of liquidations following the reform, as well as the number of firms that undergo reconstruction. Taken together, the figures suggest that the ex-ante effects of the reform are six to seven times larger than the reform's ex-post effects.

Our paper contributes to the literature on financial distress resolution by providing some of the first causal estimates of the ex-ante incentive effects of bankruptcy reforms that empower debt holders during reorganization. The reform we study mirrors key components of the European Commission's recently adopted insolvency directive, and is therefore pertinent to the directive's likely impact on EU member countries. In the U.S., debt holders have become increasingly influential over Chapter 11 proceedings, but there is little empirical evidence identifying the causal effects of these changes on firm outcomes. Our findings suggest that ex-ante contracting frictions are an important matter for the design of insolvency codes—even for solvent firms in developed economies such as Denmark. Our focus on the ex-ante effects of reorganization rules complements studies of bankruptcy codes that mostly emphasize their ex-post effects, such as Davydenko and Franks (2008), Franks and Sussman (2005), Hotchkiss (1995), Bharath et al. (2014), Strömberg (2000), and other work that we discuss later.[4]

The remainder of the paper is as follows. Section 2 reviews the institutional background, provides our theoretical framework, and discusses related literature, Section 3 describes the data, Section 4 presents the findings, and Section 5 concludes.

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[4] Our study also relates to Becker and Strömberg (2012), who find that explicit changes in managers' fiduciary duties towards debt holders during *solvency* mitigate debt-equity conflicts. Our findings complement their work by showing that greater debt holder control during *reorganization* also affects the behavior of managers, even without explicitly changing their fiduciary responsibilities.

2. Institutional Background, Theoretical Framework, Related Literature

2.1 Bankruptcy Reorganization in the European Union and the United States

In response to the current wave of corporate liquidations and unemployment in the EU, Josef Moser, the Minister for Justice of Austria, remarked:

"Every year, 1.7 million people lose their jobs because their company goes bankrupt. We must therefore have robust insolvency rules in place across the EU to reduce the number of bankruptcies…" (Council of the European Union Press Release 2018).

The European Commission (EC) passed an insolvency directive to reform the bankruptcy reorganization procedures of EU countries on June 6, 2019 (Council of the EU 2019). Member states will have two years to incorporate the directive into their respective insolvency codes. Under the directive, debt holders would be granted new powers during reorganization, such as the ability to pass restructuring plans without management or shareholder interference. For example, Article 12 of the directive states:

*…shareholders and other equity holders with interests in a debtor may not unreasonably prevent the adoption or implementation of a restructuring plan which would restore the viability of the business (*European Commission Procedure Number 2016/0359 (COD).

This change represents a significant shift in the current practices of many EU countries, as the guidelines run counter to insolvency principles implemented across many countries. In Sweden, for example, managers are allowed to reject debt holders' restructuring plans during bankruptcy (Renman et al. 2018, Baker McKenzie 2017).

The changes pursued by the EC also mirror current trends in U.S. Chapter 11 (Brunsden 2016). Although the letter of U.S. law has not changed significantly over the past thirty years, scholars argue that developments in the market for debtor-in-possession financing and executive compensation contracts have enabled creditors to exert greater influence over the restructuring process (Skeel 2003). Chapter 11 has therefore been seen as increasingly creditor-oriented over time (Bharath et al. 2014).

A frequent criticism of rules that grant debt holders significant power over reorganization is that too few insolvent firms make use of these procedures to avoid liquidation. For example, Kaiser (1996) criticizes the U.K. reorganization procedure—which is considered relatively creditor-friendly (Tollenaar 2017)—on the grounds that creditor control causes too few managers to make use of the procedure. Similarly, after the passage of the 1986 U.K. Insolvency Act, only a small number of new cases invoked the reformed restructuring procedure. The U.K. government reacted to this outcome by issuing a Consultation Document in 1994 calling for evidence that would facilitate further reforms to the U.K. reorganization procedure (Franks et al. 1996). As another example, the Swedish government introduced bankruptcy restructuring reforms in 1996 because it was deemed that too few firms were entering restructuring; Strömberg (2000) finds that restructuring filings were less than 1% of all bankruptcy filings from 1988 to 1991. These anecdotes illustrate how the impact of bankruptcy reorganization is often seen exclusively through the lens of its ex-post effects.

2.2 The Danish Bankruptcy Reorganization Reform of 2010

Like many other EU countries, Denmark witnessed a wave of corporate liquidations and high unemployment starting with the financial crisis. Regulators partly attributed these outcomes to archaic reorganization rules that were badly in need of overhaul. After seeking advice from a panel of policy makers, academics, and practitioners (Bang-Pedersen 2017), the Danish parliament passed new bankruptcy reorganization procedures in June 2010 with the explicit aim of helping viable businesses stay afloat during financial distress (Barfoed 2010). We describe the essential features of the reform in this section, and provide a detailed description of the reform and the Danish Bankruptcy Code in the Appendix.

Prior to the reform, the Danish reorganization procedure was relatively favorable towards the management of insolvent companies (International Insolvency Institute n.d). For example, only management was allowed to file for restructuring. While debt holders could vote to ratify management's plan, they could not file any reorganization plan themselves.

In practice, management's reorganization plans were rarely approved by creditors, and filing for reorganization was essentially just a precursor towards liquidation (International Insolvency Institute n.d, Danish Bankruptcy Council 2009). Anecdotes from the Danish Bankruptcy Council that was tasked with reforming the reorganization procedure acknowledged debt holders' concerns that management would "abuse the firm's assets" during reorganization (Danish Bankruptcy Council 2009). Ostensibly, they viewed the reorganization procedure as one that was failing to prevent liquidations because debt holders lacked confidence that management would take actions that maximized the value of their claims on the firm.

The 2010 reform introduced a new reorganization procedure, called *Rekonstruktion*, which gave debt holders significantly more powers during restructuring. Perhaps the most important change was the newfound ability of debt holders to introduce and approve restructuring plans without requiring the consent of management. These plans would then have to be executed by management, who would be required report to debt holders through a court-appointed administrator. Debt holders were also given the right to replace management and have the firm's activities overseen by the administrator if they deemed necessary. Importantly, the new rules applied only to limited liability corporations; the reorganization rules for firms such as sole proprietorships remained unchanged (Bang-Pedersen 2017).

Initial support for Denmark's reform was unanimous across Denmark's political party spectrum. In the Appendix (Section B), we present official excerpts of

Parliamentary debate surrounding the Act by various political party representatives before the passage of the reform in 2010.[5] The Danish Minister of Justice, Lars Barfoed, summarized these views before the reform's official adoption by stating:

I am pleased that there is broad support for the proposal, as it is, although there are of course things that we must work with during the committee process. There is an overall very positive backing for the proposal, I think, and not least of the intentions, namely that we should improve the possibility of insolvent but viable companies being reconstructed instead of [liquidated]. Because it is basically what the proposal is about (Danish Parliament Documents Collection Bill L 199 2009-10).

Following the passage of the reform, however, the Danish Act has been widely subjected to the same criticisms leveled at insolvency codes in which few insolvent firms take up restructuring in bankruptcy:

Despite the fact that the 2010 [reform] introduced a modern reorganization regime into the Danish Bankruptcy Act, in practice it has been quite a limited success. In the period 2011-2016, less than 5% of all insolvency proceedings concerning businesses were reorganization proceedings, whereas the remaining, more than 95% [of all insolvency proceedings] were liquidation proceedings. (Bang-Pedersen 2017).

Denmark's law mirrors essential elements of the EU's Insolvency directive, as well as recent trends in U.S. Chapter 11. Both the EU and the U.S. have witnessed debt holders exerting greater influence over the bankruptcy reorganization process. Denmark's reforms represent an exogenous increase in debt holder control over reorganization, which can be used to shed light on the causal effects of these changes.

2.3 Theory

A large body of theoretical work suggests that understanding both the ex-ante and ex-post effects of reorganization procedures is critical for empirically evaluating the impact of bankruptcy rules (see White 1996 for a review). Several models in particular, propose mechanisms through which greater say for debt holders during

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[5] The reforms were passed in June, 2010, but put into effect on April 2011. In our empirical analysis, we use the data of passage as the relevant event date, to account for anticipatory behavior that preempts the effective date (any anticipatory effects are part of the treatment effect of the reform). All our results hold if we use the effective date instead of the passage date.

restructuring has the ex-ante effects of reducing liquidations. The channels depicted in these models reflect the incentives facing equity and debt holders of solvent firms.

Bebchuk (2002), for example, provides a model in which granting debt holders greater control over the restructuring process enables them to limit equity holder moral hazard, which may otherwise lead managers to take actions that increase the value of equity at the expense of debt. These actions can include risk-shifting and unwarranted dividend payouts, for example (Jensen and Meckling 1976, Myers 2003). Reductions in equity holder moral hazard result in safer investment decisions and a reduced risk of financial distress for solvent firms.

Cornelli and Felli (1997), alternatively, provide a model in which increased debt holder rights during bankruptcy reorganization increases the incentives of debt holders to monitor management during solvency. The intuition is that increased control during reorganization enables debt holders to realize greater surplus during bankruptcy, which in turn, mitigates the ex-ante free rider problem among individual creditors that otherwise leads to inefficient monitoring of the firm.

These theories make several predictions that we are able to test empirically. First, if the reform's predicted ex-ante effects on liquidation rates are sufficiently large, then the number of liquidations observed in Denmark should decrease following the passage of the reform. Second, any observed reduction in liquidations should reflect improvements in the *ex-ante* debt repayment behavior of solvent firms, as these patterns would indicate lower risks of entering financial distress. The models suggest that these effects should be especially salient for firms with a single owner (relative to dispersed shareholders), as the manager and owner are likely to be the same person; such managers are more likely to internalize the equity gains from risk-shifting and other actions that benefit equity at the expense of debt. Third, the models predict that the cost of debt financing should decrease, because debt holders are better

protected from downside risk during solvency and insolvency. We should therefore see reductions in the interest rates on debt and a shift towards greater debt financing among solvent firms following the passage of the reform. On the real-side, we should expect to see an increase in capital investment, given a reduction in the average cost of capital due to the reform.

In testing these predictions, we simultaneously consider alternative theories that suggest that the Danish reform might actually *increase* the frequency of corporate liquidations. According to some models, for example, the Danish reform may lead managers to forgo "general" projects with higher expected returns, and instead invest in less-valuable projects that facilitate managerial entrenchment because they require managers' "specific" human capital (Bebchuk and Picker 1993; Berkovitch et al. 1997). If these alternative theories are empirically relevant in our context, then we should see positive correlations between the passage of the reform and liquidation rates and debt delinquencies. If we do not observe such effects, however, then the data would suggest that the empirical importance of these models is limited.

2.4 Related Literature

Ultimately, the net sum of the ex-post and ex-ante effects of the Danish reorganization reform on liquidations is an empirical question. In our analysis, we estimate this net sum, and then focus on the ex-ante effects of the reform by separately examining solvent and insolvent firms. If the ex-ante effects of the reform are sufficiently large, then our findings show that exclusively focusing on the ex-post effects of bankruptcy rules can be misleading, and our estimates can help us identify the empirical relevance of competing ex-ante theories of bankruptcy reorganization.

Our paper provides a unique contribution to the literature on bankruptcy resolution, by presenting some of the first causal estimates of the ex-ante effects of reorganization procedures that grant debt holders greater powers during restructuring. Our work complements two related strands of research.

The first strand consists of studies that measure the ex-post effects of reorganization rules by focusing on firms that are *already* in financial distress. For example, Davydenko and Franks (2008) and Franks and Sussman (2005) study distressed firms across various codes in the U.K., France, and Germany. Franks and Torous (1989), Gilson et al. (1990), Hotchkiss (1995), and Bharath et al. (2014) study insolvent firms in U.S. Chapter 11. Strömberg (2000) and Thorburn (1999) examine Swedish cash auctions during bankruptcy.

A second strand of research examines the main alternative procedure to reorganization during bankruptcy: liquidation. Ponticelli and Alencar (2016) examine the importance of judicial oversight of creditor claims during liquidation. Visaria (2009) and von Lilienfeld et al. (2012) study legal institutions that affect the enforcement of debt repayment. Vig (2012) examines the rights of creditors to claim collateral requirements for defaulting borrowers. Assunção et al. (2014) study the effects of creditors' ability to seize and sell collateral. These papers reach mixed conclusions on the role of creditors during liquidation, making it difficult to apply the lessons learned from liquidation studies to questions about reorganization.

3. Data

3.1 Data Sources

We use three data sources to construct panel data of detailed information on Danish firms. The first source of data is firm-year level administrative records maintained by the Danish government agency *Statistics Denmark*. We obtain these

data through a non-disclosure agreement with the agency. The information covers nearly all publicly traded and privately held companies in Denmark.[6] The records contain annual firm accounting information such as balance sheet and income statement data. We use these data to measure firm characteristics such as operating performance, financial leverage, and implied interest rates on debt.[7] The data also include information on firm incorporation status, such as limited liability or sole proprietorship classifications, geographic locations of operations, and standard European industrial classification codes (NACE). The sample years for which we obtain data are from 2000 to 2013.

The second source of data describes the annual operating status of each company in the sample; this data comes from the Danish Business Authority (DBA). The DBA monitors whether firms are operating as independent entities, involved in reconstruction, or liquidated. For firms that are liquidated, we observe the specific dates when firms cease to operate; this data spans the years 2009 to 2016.

The third source of data is from Experian A/S, a credit bureau that provides detailed data on the financial liabilities of firms in Denmark. Unlike Statistics Denmark, Experian only has data for limited liability firms; Experian does not contain information on sole proprietorships. However, Experian does contain detailed data on limited liability firms that supplements the data available from Statistics Denmark. For example, we are able to observe the characteristics of the debt liabilities facing sample firms, such as the amounts of outstanding debts, as well as the debt repayment histories of firms in our sample. For a subset of firms, we also observe managerial

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[6] Danish companies that earn between 0.3 and 100 million DKK are required to report their standardized accounting information to the Danish tax authorities; this information, along with survey questionnaire responses, comprise the administrative data that we examine.

[7] Statistics Denmark does not contain data on loan interest rates, however, we approximate implied interest rates on debt by computing the ratio of interest payments to total outstanding debt for a given firm-year.

turnover and governance characteristics such as whether a firm has a single owner or relatively dispersed equity ownership.

We combine these sources of information to create two firm-year panel datasets from 2009-2012, one created with Statistics Denmark data, the other created with Experian. In both datasets, for every firm-year observation, we observe balance sheet and income statement information, as well as information about the region and industry of operation. We use our (primary) dataset with Statistics Denmark information to examine liquidation probabilities, financial decisions, and investment policies for limited liability firms and sole proprietorships around the passage of the reform. We use the (secondary) Experian data to examine debt repayment patterns and managerial turnover for limited liability firms around the passage of the reform. The definitions for all the variables that we use in these analyses are presented in the Appendix (Table A1), along with the data sources corresponding to each variable.

3.2 Sample Descriptive Statistics

Table 1 contains descriptive statistics for the firms in our primary sample. There are approximately 132,070 firms in the sample; 72,505 of these firms are limited liability in their incorporation status, while the remaining 59,565 firms in our sample are sole proprietorships.[8] The average firm size is 4,562,000 DKK ($680,000 USD) in total assets, with annual average revenues of 11,644,000 DKK ($1.8M USD). As to be expected, limited liability firms are larger in size and generate higher revenues than sole proprietorships. In terms of financing patterns, the average financial leverage of sample firms is 26%, with limited liability firms taking on less debt than sole proprietorships on average. In Appendix A, we also include summary

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[8] In the entire population of Danish firms, sole proprietorships and limited liability firms comprise 99.12% of all firms; the remaining firms, such as partnerships, cooperatives, commercial funds, etc. are excluded from our analysis for simplicity.

statistics for the limited liability firms that we observe in Experian (Table A2), to illustrate that we are able to measure debt repayment patterns and managerial turnover for the vast majority of limited liability firms that are covered in Statistics Denmark's administrative records.

Figure 2 depicts the distribution of industries across firms with different incorporation statuses, as per NACE classifications. Among limited liability companies, trade and transport represent approximately 38% of sample firms, while construction and knowledge-based industries each cover 20% of sample firms. Among sole proprietorships, trade and transport comprises 50% of sample firms, while construction comprises 24% of sample firms and knowledge-based services cover 10% of sample firms.

Table 2 describes the operating statuses of firms in our sample. Specifically, the table depicts the numbers of firms that are either operating or liquidated in our sample, across the years for which we observe overlapping accounting and operating status data. Across sample years, the rates of liquidation for limited liability firms range between approximately 2-4%. Sole proprietorships show a lower propensity to become liquidated, with liquidation probabilities ranging between 0.4-0.7%.

There are several key points on display in Tables 1 and 2. First, we observe a broad cross-section of firms across industries in Denmark; our data contain companies that span different ages, sizes, and performance metrics. Second, there are clear sampling differences between limited liability firms and non-limited liability firms. As expected, limited liability corporations tend to be larger firms, and they are more likely to appear in industries such as knowledge-based and information technology services. Third, we see that the number of corporate liquidations in Denmark prior to the passage of the reform is economically large in magnitude, illustrating the potential importance of legislation aimed at reducing rates of company dissolutions.

3.3 Sampling Properties

There are various strengths and limitations of our data. One of the advantages of our dataset is that we observe nearly the entire population of firms in Denmark; our data are not subject to sample selection biases that might otherwise plague similar regression analysis in other contexts. Firms in Denmark are required by law to register with the Danish government and report their financial status to the authorities on an annual basis. The Danish government maintains and verifies the veracity of the records; these data have been increasingly used by researchers in economics and finance.

A second advantage of our data is that there are a significant number of firms that belong to various classes of incorporation status in Denmark. This variation enables us to exploit key institutional features of the reform for identification and increase the statistical power of our tests. We are also able to provide estimates that are ostensibly less subject to omitted variable biases that otherwise affect the interpretation of alternative empirical strategies such as cross-country analyses.

One of the limitations of our data is that we have limited time-series data on firms prior to 2009, as the Danish government's records on liquidations and changes in firm status are incomplete for previous years. As a result, we are unable to perform standard analyses of pre-trends of firm behavior prior to the reform. To circumvent this problem, we perform a number of alternative analyses to assess the likely importance of differential trends in firm behavior prior to the reform that could explain differences in firm behavior after the law is passed. Our ability to perform these tests is enabled by the granularity of the microdata, and we present various pieces of evidence to argue that our findings are unlikely to be driven by pre-existing trends in firm behavior between limited liability firms and non-limited liability firms.

4. Empirical Findings

4.1 Corporate Liquidations

The first step of our empirical analysis is to measure the net impact of the 2010 Danish Bankruptcy Act on corporate liquidations in the economy. As described earlier, many observers of Denmark's bankruptcy code criticized the Act as being ineffective at reducing corporate liquidations because few insolvent firms actually made use of the new bankruptcy procedures established by the Act. Table 2 shows that the annual maximum number of limited liability firms that enter reorganization is 87, which is less than 0.05% of the total firms in the sample, and less than 7% of the number of limited liability firms that are liquidated in the same year. The ex-post effects of the reform are therefore limited in terms of how many firms are potentially saved from liquidation, consistent with critics' views.

To precisely measure the full causal impact of the reform, which includes both the ex-ante and the ex-post effects, the ideal thought experiment would be to measure the firm outcomes that materialize after the passage of the law, and compare these measures with the counterfactual outcomes that would have materialized in the absence of the reform. The difference in these outcomes would represent the true impact of the law. The problem with performing this comparison in practice, however, is that the counterfactual outcomes of interest are unobservable. To circumvent this problem, we conduct several sets of analyses using observable data. We exploit legal features of the reform to motivate our identification strategy, and we argue that the collective evidence closely approximates the ideal measures that we wish to estimate.

4.1.1 Full sample estimates

Figure 1 presents a time-series plot of corporate liquidations in Denmark. The figure depicts liquidations that occur each month around the reform's official passage

in June 2010, both for limited liability firms impacted by the reform ("treated" firms) and for sole proprietorships unaffected by the reform ("control" firms). The plot shows a steady number of limited liability liquidations in the months preceding the reform; on average, there are approximately 160 limited liability liquidations each month. Immediately following the passage of the reform, however, there is a steep decline in limited liability liquidations, to approximately 125 liquidations each month. Among sole proprietorships, in contrast, we see a smooth and slightly upward trend in liquidations around the passage of the reform.

To control for other factors that influence liquidation rates, we estimate several econometric models, where the dependent variable of interest is a binary indicator of whether a firm enters into liquidation in a given year. In this paper, we present our findings from a probit model with the following specification:[9]

$$Liquidation_{it+1} = \beta_1 * Reform_t * LLC_{it} + \beta_2 * Reform_t + \beta_3 * LLC_{it} + \beta * Controls_{it} + e \quad (1)$$

where the dependent variable, $Liquidation_{it+1}$, is a binary indicator for whether firm i enters liquidation in year $t+1$. Liquidation in year $t+1$ is modeled as a function of firm and industry characteristics in year t. The main independent variable, $Reform_t$, is a binary indicator of whether the reorganization reform is passed by year t. LLC_{it} is an indicator for the limited liability status for firm i at time t, $Controls_{it}$ include measures of industry growth, firm performance ratios such as the turnover rate and profitability, firm size, liability ratio, workforce size, and firm age; we also interact each of these controls with LLC. We report results with increasing numbers of controls to show the robustness of our treatment estimates to various specification choices. In unreported

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[9] We find nearly identical results using alternative econometric models such as logit and linear probability models; these results are available upon request. Probit models are most appropriate in our setting, given the theoretical arguments presented in Judge et. al (1985) and Amemiya (1981). For example, probit is preferred to OLS because standard assumptions underlying OLS significance tests are violated with dichotomous dependent variables.

analysis, we also find that the results are robust to adding industry and region indicators to control for region and industry-specific levels of liquidation rates.[10]

The identification assumption that underlies the causal interpretation of the regression estimates in Specification 1 is that the reform is uncorrelated with unobserved determinants of corporate liquidation. Under the identification assumption, the coefficient for *Reform*LLC* tells us whether the reform has a positive or negative effect on the probability of liquidation, controlling for observable factors such as firm performance and macroeconomic conditions. To calculate the marginal effect of the reform on the probability of liquidation, we evaluate the normal probability density function at the mean values of the control variables with and without the reform.

Table 3 presents the regression estimates. The coefficient estimates for *Reform*LLC* across all columns indicate that the reform has a negative effect on the propensity for firms to get liquidated, even after controlling for aggregate and idiosyncratic firm characteristics. The marginal effect of the reform is -0.3% evaluated at the control variables' sample means. The stability of the coefficient estimates across the columns, as more control variables are added to the estimated model, illustrate the robustness of the treatment effect estimator.

Both the raw data depicted in Figure 1 and the regression estimates in Table 3 show that the Danish reform has a negative impact on liquidation rates. The findings illustrate the empirical importance of theories that describe the ex-ante incentive effects of reorganization rules that empower debt holders. In particular, the evidence is consistent with the models of Bebchuk (2002) and Cornelli and Felli (1997), which suggest that the reform's ex-ante effects on liquidations would be negative, and

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[10] To avoid inconsistency in the probit coefficient estimates (i.e. the incidental parameters problem as N→∞ with fixed T), we do not include firm fixed effects (Wooldridge 2002). In subsequent analysis of other firm outcomes using OLS specifications, however, we report results using firm fixed effects, as these controls do not impose the same econometric problems on the consistency of OLS regression estimates as they do in probit (maximum likelihood) analyses.

inconsistent with models such as Bebchuk and Picker (1993) and Berkovitch et al. (1997). The findings show that the ex-post effects of reorganization rules—i.e. the effects of reorganization rules on already insolvent firms—are insufficient for characterizing their impact on liquidation rates, countering popular views surrounding the apparent ineffectiveness of reorganization procedures controlled by debt holders.

4.1.2 Heterogeneity of main effects

The full sample estimates presented in Table 3 encompass rich heterogeneity in the effects of the reform on Danish firms. To examine the impact of the reform across firms of varying workforce sizes, we present probit estimates for Specification (1) across firms that are either below or above the sample median workforce size. The results depicted in Columns 6 and 7 indicate that the reform appears to be especially relevant across firms with large workforces. These results suggest that the reform is indeed helpful in curtailing unemployment driven by liquidations, as the firms with the largest workforces show the greatest reductions in liquidation risk after the Act.

We also estimate Specification (1) for firms operating in different industries. For some industries, there are too few liquidation events to estimate probit coefficients. Thus, we present coefficient estimates for *Reform*LLC* using a linear probability model. Figure 3 depicts these estimates by industry, and illustrates that the reform has a negative impact on liquidation rates in high employment sectors such as manufacturing, information and communications, knowledge-based services, and trade and transportation. The point estimates in other industries such as construction, real estate, and arts and entertainment, are also negative in magnitude, but statistically indistinguishable from zero given the large standard error bands.

4.2 Mechanism

4.2.1 Solvent firm debt repayment patterns

Given the demonstrated importance of the Danish reform's ex-ante effects, we depict solvent firm behavior in more detail to shed light on the mechanisms at play. Theories such as Bebchuk (2002) and Cornelli and Felli (1997) predict that debt holder control during reorganization leads to reductions in the risk of entering financial distress. We test these implications by analyzing solvent firm debt repayment patterns, and estimate the following OLS regression specification:

$$Debt\ Repayment\ Fraction_{it} = \beta_1 * Reform_t + \beta * Controls_{it} + e \qquad (2)$$

where the dependent variable, *Debt Repayment Fraction*$_{it}$, is the percentage of outstanding loans (in total and by amount) that are paid on time by firm i in year t.

To be consistent with the probit results in Table 3, all controls in Specification (2) remain the same as in Specification (1). We estimate this specification for all limited liability firms in Experian, as sole proprietorships are not covered in Experian. We also separately estimate this specification for firms with a single owner and firms with dispersed equity ownership. Consistent with Table 3, we also note in unreported analysis that our results are robust to adding industry and region fixed effects. Furthermore, because Specification (2) is estimated using OLS, we also note that including firm fixed effects (to control for heterogeneity in firm-specific debt repayment patterns) yields similar results.

Table 4 presents regression results using the fraction of total outstanding loans paid on time as the dependent variable. Column 1 of Panel A indicates that the fraction of outstanding debts paid on time increases by 3.57% after the passage of the reform, relative to a base rate of debt repayment of 72%. When we control for additional factors such as idiosyncratic and aggregate measures of performance, we observe similar estimates across Columns 2 through 5. In Panels B and C, we see that

the impact of the reform on outstanding debt payment is relevant both for firms with dispersed ownership and for firms with a single owner, though the coefficient estimates are slightly larger for single-owner firms.

We also estimate Specification (2) for different outstanding debt amounts, as defined by Experian, to see whether the debt repayment behavior that we observe in Table 4 is relevant across debt positions of various sizes. We estimate Specification (2) with the full set of controls for each type of debt amount reported in Experian, and we present the regression coefficients and standard error bands for *Reform* in Figure 4. The figure illustrates that the reform has a positive impact on loan repayment rates across different debt amounts.

The results in Table 4 and Figure 4 indicate that the reform caused solvent firms to increase the fraction of outstanding debt obligations paid on time. The evidence supports theories that the reform has ex-ante incentive effects that reduce the risk of financial distress, through reduced equity holder moral hazard and/or increased debt holder monitoring efforts. The particularly large effects observed for single-owner firms supports these theories even further, since managers in these firms likely have the strongest incentives to shift value from equity to debt during bankruptcy, as they are more likely to internalize the equity surplus of their actions.

4.2.2 Financing and Investment Behavior

Theories that predict a negative impact of the reform on liquidation probabilities, further suggest that the Danish Act effectively makes debt financing less costly, because debt holders become less vulnerable to downside risk after the reform. We study this implication by estimating the following OLS regression specification:

$$Financing_t = \beta_1 * Reform_t * LLC_{it} + \beta_2 * Reform_t + \beta_3 * LLC_{it} + \beta * Controls_{it} + e \quad (3)$$

where the dependent variable, *Financing$_{it}$*, is either a measure of the financial leverage (defined as the percentage of outstanding debt to assets) of firm i in year t, or the average implied interest rate on debt (defined as the percentage of total interest payments to total liabilities) by firm i in year t. All other controls are the same as in Specification (1) (excluding the liability ratio), to maintain consistency across tables. We note that our results are also robust to including industry and region indicators, as well as firm fixed effects.

The regression results are presented in Table 5. In Panel A, the coefficient estimates of the interaction term *Reform*LLC* range from 3% to 5%, which is indicative of a relative increase of approximately 4% in financial leverage for limited liability firms (relative to a base rate of 20% leverage). In Panel B, the implied interest rates on loans also appear to decrease for limited liability firms. The coefficient of the interaction term *Reform*LLC* ranges from -0.21% to -0.29%, indicating a reduction in the average implied interest rate on debt paid by solvent firms of approximately 0.25%. The findings are consistent with Bebchuk (2002) and Cornelli and Felli (1997): firms face lower costs of external debt financing following the passage of the reform, as the reform enables debt holders to extract greater surplus during bankruptcy restructuring.

We examine firm investment using the following regression specification:

$$Investment_{it} = \beta_1 * Reform_t * LLC_{it} + \beta_2 * Reform_t + \beta_3 * LLC_{it} + \beta * Controls_{it} + e \quad (4)$$

where the dependent variable, *Investment$_{it}$*, is the percentage change in physical capital stock for firm i as of year t.[11] All controls are defined in the same way as in Specification (3) to maintain consistency across tables, though we add that this specification implicitly accounts for firm-level heterogeneity in physical capital stock

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[11] This measure of investment is imperfect, since it does not account for depreciation expenses, however, it is a useful approximation for investment in physical capital, as capital expenditures are not explicitly recorded by Statistics Denmark.

levels because the dependent variable is a firm-specific change in physical capital over time. We note that the results are also robust to including industry and region indicators.

The results are presented in Table 6. The coefficient on the interaction term *Reform*LLC* ranges between 1.6-4.8% across all columns, and becomes statistically significant once we control for industry output growth. The estimates indicate that limited liability firms increase their capital expenditures after the reform by more than sole proprietorships. These findings are consistent with implications of theories such as Bebchuk (2002) and Corenlli and Felli (1997). As the reform reduces the average cost of capital facing firms, firms are able to raise more financing and invest greater amounts of capital into physical assets.

4.2.3 Governance

We examine solvent firms' governance characteristics to shed light on the potential channels through which equity and debt holders are able to influence managerial decisions such as debt repayment rates and financial leverage following the reform. While Bebchuk (2002) and Cornelli and Felli (1997) describe the outcomes that materialize as a result of changing investor incentives, these models do not make specific predictions about whether these outcomes result from informal discussions among stakeholders and/or formal changes in control. We explore one potential channel by which investors are able to influence operating decisions: managerial dismissal. Unlike informal discussions among stakeholders, managerial dismissal is an observable mechanism that can be measured. We examine executive turnover among solvent firms by estimating the following probit specification:

$$Managerial\ turnover_{it} = \beta_1 * Reform_t + \beta * Controls_{it} + e \qquad (5)$$

where the dependent variable, *Managerial Turnover$_{it}$*, is a binary indicator for whether firm i experiences managerial turnover in year t. We observe executive turnover across several different managerial positions within the firm, such as chief executive officer, chairman of the board, and plant manager. All controls are defined the same way as in Specification (2), and we note that these results are also robust to including industry and region fixed effects, as well as to alternative econometric model choices such as logit and linear probability models.

The results are presented in Table 7. Columns 1 through 5 depict the impact of the reform on CEO turnover. The coefficient on *Reform* is positive and significant, indicating that sample firms experience a higher likelihood of chief executive turnover following the passage of the reform. Columns 6 through 8 indicate that other executives within the firm, such as plant managers, directors, and the chairman of the board, also experience higher frequencies of turnover following the reform.

The findings suggest that one channel by which debt holders and equity holders are able to influence managerial behavior is through the credible threat of dismissal (in addition to informal negotiations, which are unobservable but likely to take place). Under Danish corporate law, managers have a fiduciary responsibility towards shareholders during solvency, so equity holders have a legal means by which they can replace managers who may take excessive risks with the firm's assets. Debt holders may informally influence managerial actions and executive turnover by communicating with equity holders and management (as in Nini et al. (2012)). The evidence in Table 7 suggests that investors engage with management following the reform to change solvent firm decision-making to be in line with their incentives.

4.3 Alternative Explanations

We conduct a number of analyses to test alternative explanations for our main findings. Specifically, we assess the likely importance of violations of our identification assumption in the form of unobservable investment opportunities, sample selection criteria, and political economy forces surrounding the reform.

4.3.1 Unobservable investment opportunities

One important concern for our analysis is the extent to which our findings reflect changes in unobservable investment opportunities around the time of the reform. Like many other countries, Denmark's economy improved in 2010 following the global financial crisis, and this improvement alone surely mitigated the frequency of bankruptcy events across the economy. Debt holders may have therefore found it easier to avoid bankruptcy irrespective of their ability to manage insolvent firm assets during reconstruction.

There are numerous pieces of evidence that indicate that changes in unobservable investment opportunities are unlikely to fully account for our empirical findings. First, as seen in Figure 1, the observed changes in liquidation events in our data occur precisely in the immediate months surrounding the passage of the law. It is unlikely that economic conditions dramatically improved in a similarly discrete manner. Moreover, the reduction in liquidation probabilities is relevant only for limited liability companies covered by the reform; liquidations of non-limited liability companies actually increase following the passage of the reform. Improvements in general economic conditions are difficult to reconcile with the contrasting trends in liquidations for limited liability vs. non-limited liability companies.

Second, our regression analysis explicitly controls for quarterly industry-specific GDP growth (Tables 3-7). The estimated impact of the reform on bankruptcy

probabilities is robust to the inclusion of these controls, and is also robust to controls for other firm characteristics that are likely to highly co-vary with unobservable investment opportunities, such as operating performance. Third, our subsample analysis indicates that the impact of the reform is particularly strong for firms with large workforces. If improvements in aggregate economic opportunities fully explain the observed statistical relationship between the reform and corporate liquidation, then there must be a plausible reason why reductions in liquidation risk are not observed for firms with comparatively fewer employees.

Finally, the effects that we observe in the full sample do not pertain to firms in the construction and real estate sectors, as illustrated in Figure 3. These industries were two of the sectors that were most subject to changes in economic conditions during the financial crisis, so if firms in these industries exhibited marked improvements in liquidation rates, then one might safely assume it was because these firms were benefiting from improvements in their industry conditions following the nadir of the crisis. The absence of such effects suggests that the main effects that we document are not driven by improvements in sectors that were most subject to economic recovery around the passage of the reform.

4.3.2 Sample selection biases

A second important concern is assessing the extent to which our regression estimates might be influenced by sample selection bias. If the Danish Bankruptcy Act coincided with a reduction in firm creation rates, then it is possible that the observed reduction in liquidations is simply due to a mechanical reduction in the number of new firms that are formed after the passage of the reform.

There are two pieces of evidence that reject this alternative hypothesis. First, when we re-estimate Specification (1) and restrict our sample to firms that are

incorporated before the passage of the reform (thereby eliminating new firms that are created after the reform), we observe similar results as our full sample estimates. These results are presented in Table 8: the coefficient on the interaction term for *Reform*LLC* is negative and statistically significant across all columns.

Second, in unreported analysis, we observe no significant reduction in the number of new limited liability firms that enter the sample around the passage of the reform. Instead, we observe a slight increase in the number of limited liability firms that are created, consistent with our earlier findings that the reform lowers the cost of capital facing firms who raise debt financing. These results suggest that our findings are unlikely to simply reflect changes in firm composition during the sample period.

4.3.3 Political Economy of the Danish Bankruptcy Reform

As described in Section 2 and illustrated in official excerpts from Parliamentary debate surrounding the Danish bankruptcy reform (see Appendix), changes to the Danish Bankruptcy Act were broadly supported by all the major political parties in Denmark. The unanimous support for the law appears to have been driven by the collective view that the rate of corporate liquidations in Denmark was unsustainably high in 2010, and that reforms were needed to combat the liquidations of insolvent but otherwise viable businesses. There is little evidence to suggest that the reforms were motivated by market participants attempting regulatory capture (Stigler 1915); such behavior would likely result in disjointed political support for the law. Moreover, to the extent that different industries have varying strengths of ties to specific political parties, the unanimous support for the reform suggests that political favoritism towards any one particular industry within Denmark is unlikely to be relevant in our setting.

4.4 Relative Magnitudes of Ex-ante vs. Ex-post Effects of the Reorganization Reform

We provide a back-of-the-envelope calculation of the relative magnitudes of the ex-ante vs. the ex-post effects of the Danish Reform. First, we estimate Specification (1) with the full set of controls (but no indicator for *Reform*) using sample data prior to 2010. The regression estimates capture the marginal effects of changes in various firm characteristics on the probability of corporate liquidation prior to the reform.

We then use the estimated coefficients to predict the number of liquidations that would have taken place in the absence of the reform, by multiplying the estimated coefficients by the respective post-period sample values for the explanatory variables. The difference between the predicted number of liquidations and the actual observed number of liquidations that materialize after the reform, provide an estimate of the net effects of the Danish reform, expressed in terms of the number of firms that were saved from liquidation by the reform.

We decompose these estimated net effects into ex-ante and ex-post effects, by treating the observed number of firms that enter reconstruction as an (upper bound) estimate of the law's ex-post effects. The underlying assumption is that all of the firms in reconstruction would have become liquidated under the old regime. The difference between the estimated net effects of the reform and these ex-post effects of the reform provide a (lower-bound) measure of the law's ex-ante effects.

The relevant figures used in our calculations are provided in Table 9. Panel A presents the regression coefficients from the baseline model specification estimated using limited liability firms in 2009. Based on these coefficients, Panel B shows that the predicted number of firms that would have entered into liquidation in 2012 is approximately 2,369. The actual number of observed liquidations in 2012 was 1,731, implying that the net effect of the reform was a reduction of 638 potential liquidations. Given that there were only 83 reorganizations in 2012, the ratio of the ex-ante effects

(555 fewer liquidations) divided by the ex-post effects (83 fewer liquidations) is 6.69. Our estimates therefore suggest that the ex-ante effects of the reform are approximately six to seven times larger than their ex-post effects.

5. Conclusion

This paper presents empirical estimates of the ex-ante incentive effects of bankruptcy reorganization rules that give debt holders greater control over the reorganization process. Denmark's 2010 reform to its bankruptcy laws, in which managers were no longer allowed to block debt holder restructuring plans, led to a significant total decline in corporate liquidations, even as few insolvent firms entered into the newly established reorganization procedures. Solvent firms improve their debt repayment patterns dramatically following the reform. The findings illustrate that characterizing the impact of bankruptcy rules solely through their ex-post effects—a perspective that surfaces frequently in debates about insolvency codes around the world—can be misleading.

The findings in our paper are relevant to recent reforms passed by the European Union, as well as recent trends in U.S. Chapter 11. The EC's recently adopted directive for new bankruptcy rules mirrors the changes instituted by Denmark. These changes also reflect current trends in U.S. Chapter 11, which has become increasingly controlled by debt holders over time. The findings in our paper provide guidance for understanding the causal effects of these changes.

Our paper studies a key aspect of reorganization rules—the allocation of decision making power during restructuring—however, there are many other aspects of reorganization procedures that still require further study. For example, as the EU's reforms will take at least two years to implement, it will be important to see how the reforms interact with the pre-existing rules and institutions that often conflict with

each other in different EU countries. Additionally, it is important to understand the different enforcement mechanisms that govern judicial decisions which follow from the EU's directive. Understanding these issues and other challenges that arise during bankruptcy reorganization is a critical topic for future research.

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Figures and Tables

Figure 1: Corporate Liquidations by Month
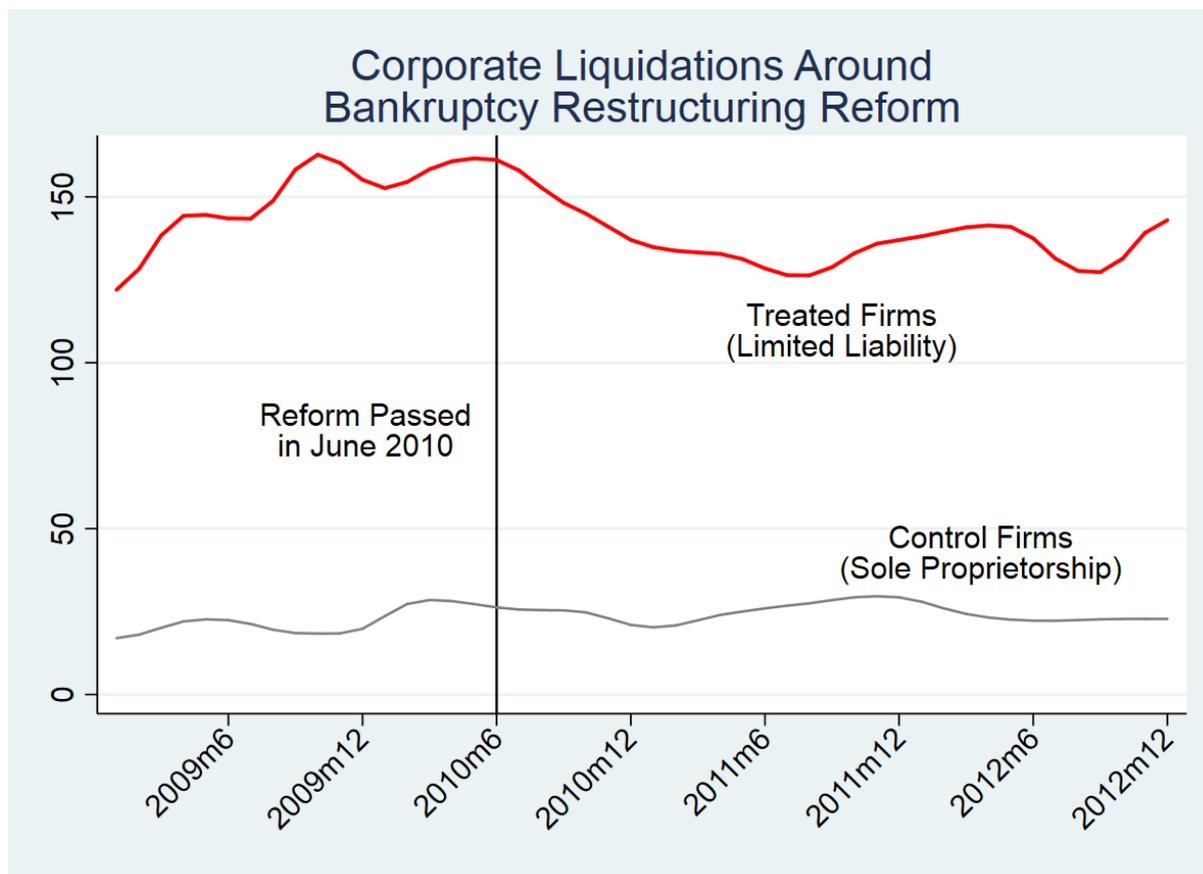
The figure shows the seasonally adjusted number of monthly liquidations between 2009 and 2012, using raw data from Statistics Denmark, across firms with different incorporation statuses and at least one employee. Treated firms include limited liability firms subject to the June, 2010 bankruptcy restructuring reform that enabled debt holders to initiate restructuring plans without management consent. Control firms include sole proprietorships that were not impacted by the reform.

Figure 2: Industry Distribution of Sample Firms

## Panel A—Statistics Denmark Sample
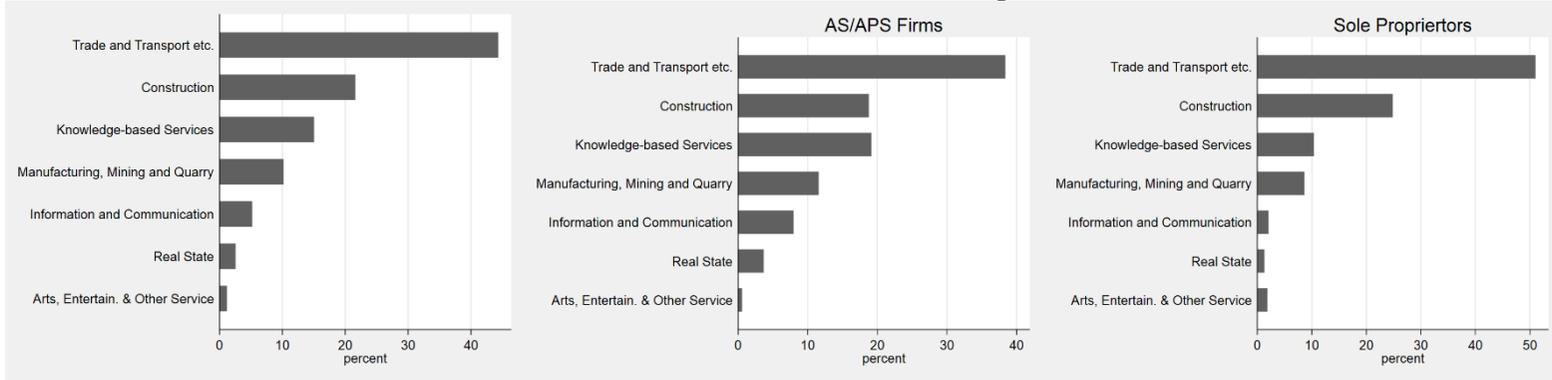
Panel B—Experian Sample
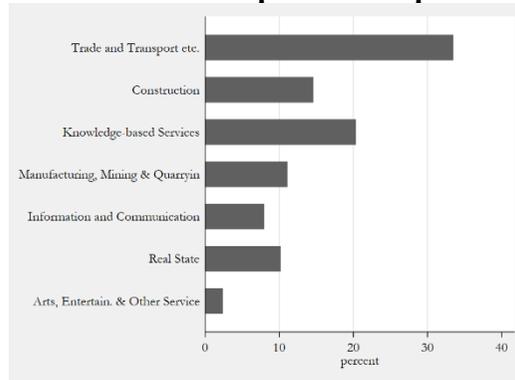
These figures show the industry distributions of sample firms during the 2009-2012 period. The industry classification used is the Dansk Branchekode 2007 (DB07), which is based on the European industry standard classification system NACE (Nomenclature des Activités Économiques dans la Communauté Européenne). Our sample includes information on firms in all industries except those in the following industries: Agriculture, Financial and Insurance, and Public Administration, which are not covered by Statistics Denmark.

Figure 3: The Liquidation Effects of the Bankruptcy Restructuring Reform Across Industries
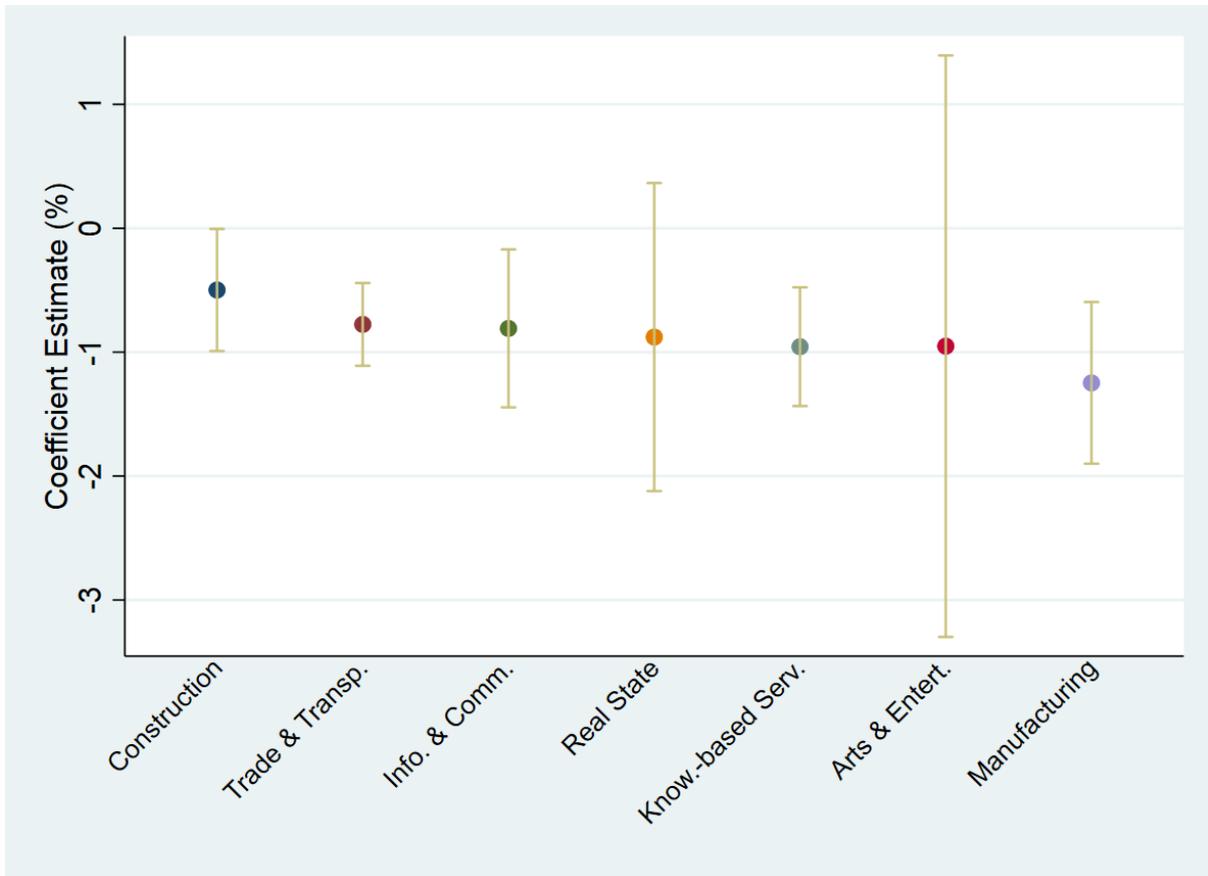
This figure presents the marginal effect estimates of the Danish bankruptcy reform on corporate liquidation probabilities across different industries, using a linear probability model of Specification 1. 95% confidence intervals are shown around each coefficient estimate; standard errors are heteroskedasticity-robust and clustered at the firm-level.

Figure 4: Changes in Debt Repayment Patterns
Following the Bankruptcy Restructuring Reform
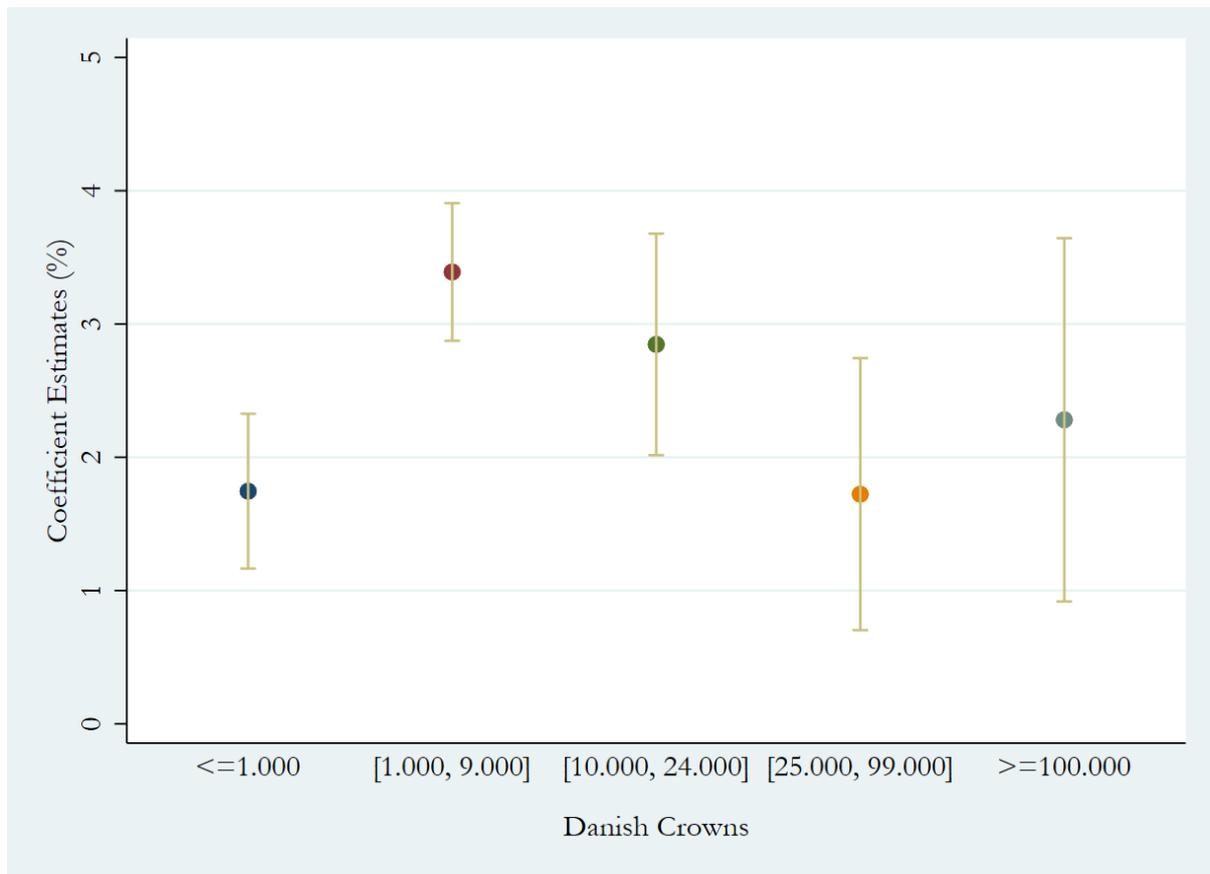
This figure presents the effects of the Danish bankruptcy restructuring reform on debt repayment rates (vertical axis) for limited liability firms across different outstanding debt sizes (horizontal axis), as per Specification 2. The sample includes all firms in the Experian database, which does not include sole proprietorships. Standard errors are heteroskedasticity-robust and clustered at the firm-level.

Table 1: Sample Descriptive Statistics

This table shows descriptive statistics of sample firms using administrative data from Statistics Denmark. The sample consists of all firms tracked by Statistics Denmark during the 2009-2012 sample period. There are a total of 353,155 observations divided between 187,318 observations of Limited Liability Firms and 165,837 observations of Sole Proprietors. There are a total of 132,070 unique firms, of which 59,565 are sole proprietors and 72,505 are limited liability firms. Monetary values are expressed in terms of thousands of Danish Crowns (DKK). All variables are winsorized at the 1% level. Variable definitions are presented in Table A1 in the Appendix.

Variable Name	Full Sample		Limited Liability Firms		Sole Proprietors	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Revenue	11,644	232,183	19,978	318,549	2,231	4,068
Gross Profit	5,104	133,179	8,610	182,780	1,144	2,260
Total Assets	4,562	10,695	7,136	13,607	1,655	4,303
Fixed Assets	5,677	201,668	9,677	276,449	1,159	15,685
Current Assets	4,991	126,642	8,833	173,774	651	3,097
Cash	768	36,491	1,343	50,092	118	798
Total Liabilities	6,272	144,938	10,662	198,549	1,314	12,663
Long Term Debt	1,765	68,590	2,966	93,704	407	9,865
Total Equity	4,396	174,376	7,848	239,328	497	5,223
Revenue Ratio (Revenue/Total Assets)	3.45	4.14	2.54	2.59	4.47	5.19
Profitability Ratio (Gross Profit/Assets)	2.00	5.88	1.31	6.59	2.78	4.84
Tangibility Ratio (Fixed Assets/Assets)	0.40	2.84	0.38	3.87	0.43	0.41
Cash Ratio (Cash/Total Assets)	0.12	0.52	0.14	0.71	0.10	0.12
Liability Ratio (Total Liab./ Total Assets)	0.97	1.06	0.81	0.76	1.15	1.29
Leverage Ratio (Total Debt/Total Assets)	0.26	2.42	0.20	3.21	0.32	0.89
Equity Ratio (Total Equity/Total Assets)	-0.05	13.45	0.17	18.22	-0.30	3.15
Number of Employees	5.32	64.88	8.90	88.88	1.27	3.18
Firm Age	12.53	10.80	11.25	10.80	13.97	10.61

Table 2: Sample Liquidations and Restructurings

This table shows the number of liquidations and bankruptcy reorganizations (reconstructions) during the 2009-2012 period. The table depicts the number of liquidations by incorporation status: limited liability or sole proprietorships, using administrative data from Statistics Denmark. The liquidation rate is calculated as the percentage of firms that are liquidated, out of the total number of firms observed in a given year with the same incorporation status. The data source for firms in reconstruction following the reform is the Danish Business Authority (DBA).

Sample	Liquidations		Liquidation Rate			Reconstruction		
Firm Type	Limited Liability	Sole Proprietors	Limited Liability	Sole Proprietors	Total	Limited Liability	Sole Proprietors	
2009	1,790	254	3.53%	0.67%	0	0	0	
2010	1,989	331	3.21%	0.64%	0	0	0	
2011	1,671	335	2.69%	0.59%	87	87	0	
2012	1,731	306	1.97%	0.42%	83	83	0	

Table 3: Corporate Liquidations and the Bankruptcy Reorganization Reform

This table presents probit model estimates of the impact of the 2010 Danish bankruptcy reorganization reform on corporate liquidation probabilities. The dependent variable is an indicator of whether a given firm becomes liquidated in a given year. The variable $Reform$ is an indicator of whether the observation is made following the passage of the reform in June 2010, and the variable LLC is an indicator of limited liability status. In columns 1-5, the sample includes all firms in the Statistics Denmark database over the 2009-2012 period. In columns 6-7, the sample consists of firms ranked by either below versus above median employment size. The regressions in all columns include interactions between the control variables and the variable LLC as controls are added to the specification; the coefficients on these interaction terms are not reported for the sake of brevity but available upon request. Standard errors are clustered at the firm-level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	All	All	All	All	All	< Median Employees	> Median Employees
Reform * LLC	-0.06**	-0.08***	-0.09***	-0.08***	-0.09***	-0.07	-0.11***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)
Reform	-0.07***	-0.06**	-0.06**	-0.07***	-0.06**	-0.06	-0.03
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
LLC	0.65***	0.68***	0.68***	2.59***	1.77***	1.42***	1.39***
	(0.02)	(0.03)	(0.03)	(0.08)	(0.10)	(0.15)	(0.23)
Liability Ratio		0.15***	0.15***	0.26***	0.29***	0.25***	0.38***
		(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)
ΔGDP Sector			0.02	-0.06	-0.26	-0.12	-0.22
			(0.20)	(0.21)	(0.22)	(0.31)	(0.31)
Log (Total Assets)				0.22***	0.12***	0.08***	-0.12***
				(0.01)	(0.01)	(0.02)	(0.03)
Revenue Ratio					0.00	0.01	-0.02**
					(0.01)	(0.01)	(0.01)
Profitability Ratio					-0.05***	-0.07***	-0.11***
					(0.01)	(0.01)	(0.02)
Log(Employees)					0.03***	0.02***	0.38***
					(0.00)	(0.00)	(0.04)
Log(Firm Age)					-0.03***	-0.03***	-0.05***
					(0.00)	(0.00)	(0.01)
Constant	-2.47***	-2.71***	-2.71***	-4.31***	-3.40***	-3.22***	-1.91***
	(0.02)	(0.02)	(0.02)	(0.08)	(0.09)	(0.14)	(0.21)
Obs.	353,155	353,155	353,145	353,145	353,145	193514	159631
R^2	0.007	0.020	0.020	0.021	0.023	0.030	0.022

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Debt Repayment Patterns and the Bankruptcy Reorganization Reform

This table presents linear regression estimates of the impact of the 2010 Danish bankruptcy reorganization reform on debt repayment patterns for limited liability firms. The dependent variable is Repayment Percentage (scaled by 100), which is the percentage of total outstanding loans that are paid on time by a firm in a given year. The variable $Reform$ is an indicator of whether the observation is made following the passage of the reform in June 2010. Standard errors are heteroskedasticity-robust and clustered at the firm level.

Panel A: All Limited Liability Firms

	(1)	(2)	(3)	(4)	(5)
Reform	3.57***	3.55***	3.30***	3.28***	3.11***
	(0.22)	(0.22)	(0.23)	(0.23)	(0.24)
Liability Ratio		-1.94***	-1.92***	-1.94***	-2.09***
		(0.15)	(0.15)	(0.15)	(0.16)
ΔGDP Sector			0.44	0.53	0.90
			(1.72)	(1.72)	(1.72)
Log (Total Assets)				-0.13*	0.11
				(0.08)	(0.12)
Revenue Ratio					1.37**
					(0.54)
Profitability Ratio					1.65***
					(0.22)
Employees 1-9					1.30**
					(0.56)
Employees 10-19					1.42**
					(0.64)
Employees >20					-0.62
					(0.69)
Log(Firm Age)					0.67***
					(0.08)
Constant	72.00***	73.62***	74.02***	75.20***	68.74***
	(0.22)	(0.25)	(0.25)	(0.75)	(1.20)
Obs.	89,388	89,290	84,241	84,241	83,244
R^2	0.002	0.008	0.008	0.008	0.012

Panel B: Limited Liability Firms with a Single Owner

	(1)	(2)	(3)	(4)	(5)
Reform	5.50***	5.57***	5.08***	5.03***	4.70***
	(0.62)	(0.62)	(0.65)	(0.65)	(0.66)
Liability Ratio		-2.43***	-2.43***	-2.51***	-2.77***
		(0.40)	(0.42)	(0.45)	(0.44)
ΔGDP Sector			5.12	5.29	5.28
			(4.75)	(4.75)	(4.77)
Log (Total Assets)				-0.28	-0.12
				(0.26)	(0.33)
Revenue Ratio					0.31
					(1.34)
Profitability Ratio					1.77***
					(0.57)
Employees 1-9					1.54
					(1.28)
Employees 10-19					0.43
					(1.67)
Employees >20					-3.83*
					(2.05)
Log(Firm Age)					2.09***
					(0.38)
Constant	69.62***	71.46***	72.13***	74.45***	65.69***
	(0.59)	(0.65)	(0.68)	(2.29)	(3.27)
Obs.	13,629	13,606	12,866	12,866	12,714
R^2	0.005	0.013	0.012	0.012	0.019

Table 4 (continued)

Panel C: Limited Liability Firms with Dispersed Equity Ownership

	(1)	(2)	(3)	(4)	(5)
Reform	2.15***	2.15***	2.18***	2.21***	2.00***
	(0.74)	(0.74)	(0.77)	(0.77)	(0.78)
Liability Ratio		-3.69***	-3.50***	-3.45***	-3.70***
		(0.85)	(0.84)	(0.85)	(0.85)
ΔGDP Sector			10.46*	10.40	12.05*
			(6.33)	(6.33)	(6.33)
Log (Total Assets)				0.23	0.61
				(0.32)	(0.51)
Revenue Ratio					2.75
					(1.80)
Profitability Ratio					2.41***
					(0.83)
Employees 1-9					-5.85***
					(1.86)
Employees 10-19					-6.69***
					(2.24)
Employees >20					-5.94**
					(2.51)
Log(Firm Age)					1.21***
					(0.47)
Constant	73.04***	75.82***	75.87***	73.85***	69.79***
	(0.71)	(0.91)	(0.93)	(3.07)	(4.98)
Obs.	7,682	7,677	7,229	7,229	7,158
R2	0.001	0.015	0.014	0.014	0.020

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Financing Effects of the Bankruptcy Reorganization Reform

This table presents linear regression estimates of the impact of the 2010 Danish bankruptcy reorganization reform on firm financing. The dependent variable in Panel A is Financial Leverage, defined as total debt as a percentage of the firm's assets; in Panel B the dependent variable is the implied interest rate on debt. Both variables are scaled by 100. The variable $Reform$ is an indicator of whether the observation is made following the passage of the reform in June 2010, and the variable LLC is an indicator of limited liability status. The regressions in all columns include interactions between the control variables and the variable LLC, but are not all reported for the sake of brevity. Standard errors are heteroskedasticity-robust and clustered at the firm-level.

Panel A: Financial Leverage

	(1)	(2)	(3)	(4)	(5)
Reform * LLC	3.15***	3.02***	2.94***	3.11***	3.08***
	(0.20)	(0.21)	(0.20)	(0.19)	(0.19)
Reform	-2.72***	-2.86***	-2.78***	-3.23***	-3.37***
	(0.17)	(0.18)	(0.17)	(0.17)	(0.17)
LLC	-15.14***	-15.04***	-61.65***	-17.77***	-33.67***
	(0.20)	(0.20)	(1.02)	(1.22)	(1.44)
ΔGDP Sector		-6.57***	-4.53***	-8.53***	-8.79***
		(1.59)	(1.53)	(1.47)	(1.47)
Log(Total Assets)			-7.14***	-0.40***	-1.54***
			(0.11)	(0.12)	(0.14)
Revenue Ratio				2.83***	1.57***
				(0.05)	(0.07)
Profitability Ratio					2.00***
					(0.12)
Log(Employees)					0.39***
					(0.01)
Log(Firm Age)					0.47***
					(0.03)
Constant	30.02***	30.04***	74.95***	20.12***	30.23***
	(0.18)	(0.18)	(0.75)	(0.92)	(1.10)
Obs.	353,155	353,145	353,145	353,145	353,145
R^2	0.042	0.042	0.096	0.159	0.174

Panel B: Interest Rates on Debt

	(1)	(2)	(3)	(4)	(5)
Reform * LLC	-0.29***	-0.24**	-0.24**	-0.21*	-0.19*
	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)
Reform	-0.45***	-0.48***	-0.48***	-0.49***	-0.53***
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)
LLC	-0.74***	-0.75***	-2.13***	0.11	-0.37
	(0.10)	(0.10)	(0.32)	(0.39)	(0.48)
ΔGDP Sector		-1.23**	-1.16**	-1.24**	-0.84
		(0.59)	(0.59)	(0.59)	(0.59)
Log(Total Assets)			-0.21***	-0.07*	-0.08*
			(0.03)	(0.04)	(0.05)
Revenue Ratio				0.06***	0.15***
				(0.01)	(0.02)
Profitability Ratio					-0.16***
					(0.03)
Log(Employees)					-0.02***
					(0.00)
Log(Firm Age)					0.16***
					(0.02)
Constant	7.23***	7.23***	8.56***	7.41***	7.01***
	(0.07)	(0.07)	(0.20)	(0.31)	(0.39)
Obs.	351,669	351,659	351,659	351,659	351,659
R^2	0.002	0.002	0.002	0.002	0.006

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Capital Investment and the Bankruptcy Reorganization Reform

This table presents linear regression estimates of the impact of the 2010 Danish bankruptcy reorganization reform on firm capital investment. The dependent variable is the year-to-year percentage change in physical capital stock for a given firm (scaled by 100). The variable $Reform$ is an indicator of whether the observation is made following the passage of the reform in June 2010, and the variable LLC is an indicator of limited liability status. The regressions in all columns include interactions between the control variables and the variable LLC, but are not all reported for the sake of brevity. Standard errors are heteroskedasticity-robust and clustered at the firm-level.

	(1)	(2)	(3)	(4)	(5)
Reform * LLC	1.56	1.85	4.38***	3.67**	4.80***
	(1.54)	(1.54)	(1.53)	(1.52)	(1.53)
Reform	-4.41***	-4.55***	-3.91***	-2.97***	-3.74***
	(1.13)	(1.13)	(1.11)	(1.11)	(1.11)
LLC	1.08	-5.21***	-6.14***	-5.99***	-20.65***
	(1.36)	(1.49)	(1.49)	(1.52)	(2.67)
Liability Ratio		-9.78***	-9.74***	-3.05***	-2.80***
		(0.28)	(0.28)	(0.34)	(0.35)
ΔGDP Sector			30.95***	35.09***	36.77***
			(8.03)	(8.01)	(8.03)
Revenue Ratio				-3.16***	-2.58***
				(0.10)	(0.17)
Profitability Ratio					-1.56***
					(0.29)
Log(Employees)					0.20***
					(0.05)
Log(Firm Age)					-7.66***
					(0.61)
Constant	19.07***	29.85***	29.81***	33.76***	55.96***
	(1.00)	(1.08)	(1.08)	(1.10)	(2.14)
Obs.	270141	270141	270132	270132	270132
R^2	0.046	0.053	0.053	0.173	0.196

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Managerial Turnover and the Bankruptcy Reorganization Reform

This table presents probit model estimates of the impact of the 2010 Danish bankruptcy reorganization reform on management and board turnover for limited liability firms. The dependent variable in each column is an indicator variable for whether a firm experiences turnover for a specific position in a given year. The variable $Reform$ is an indicator of whether the observation is made following the passage of the reform in June 2010. Standard errors are clustered at the firm level.

	(1) CEO Turnover	(2) CEO Turnover	(3) CEO Turnover	(4) CEO Turnover	(5) CEO Turnover	(6) Plant Manager Turnover	(7) Chairman of the Board Turnover	(8) Director Turnover
Reform	0.05***	0.05***	0.05***	0.06***	0.06***	0.04***	0.04**	0.03**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
Liability Ratio		0.02***	0.02***	0.04***	0.03***	0.03***	0.04***	0.03***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ΔGDP Sector			0.32**	0.26*	0.32**	0.17*	0.13	-0.07
			(0.13)	(0.13)	(0.14)	(0.09)	(0.12)	(0.10)
Log (Total Assets)				0.09***	0.07***	0.04***	0.13***	0.10***
				(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Revenue Ratio					0.21***	0.11***	0.21***	0.21***
					(0.03)	(0.02)	(0.02)	(0.02)
Profitability Ratio					-0.02**	-0.00	-0.01	-0.02***
					(0.01)	(0.01)	(0.01)	(0.01)
Employees 1-9					-0.10***	-0.10***	0.02	0.01
					(0.02)	(0.01)	(0.02)	(0.01)
Employees 10-19					0.08***	0.01	0.17***	0.20***
					(0.03)	(0.02)	(0.02)	(0.02)
Employees >20					0.24***	0.02	0.16***	0.09***
					(0.03)	(0.02)	(0.03)	(0.02)
Log(Firm Age)					-0.00**	-0.01***	-0.01***	0.01***
					(0.00)	(0.00)	(0.00)	(0.00)
Constant	-2.36***	-2.38***	-2.42***	-3.19***	-3.14***	-2.37***	-3.50***	-3.10***
	(0.01)	(0.01)	(0.02)	(0.04)	(0.06)	(0.04)	(0.05)	(0.04)
Obs.	314,657	312,197	290,944	290,944	275,784	275,784	275,784	275,784
R^2	0.000	0.000	0.003	0.004	0.004	0.007	0.007	0.002

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Liquidation Effects for Firms Incorporated Prior to the Reform

This table presents probit model estimates of the impact of the 2010 Danish bankruptcy restructuring reform on corporate liquidation probabilities for firms that were already incorporated prior to the reform (i.e. prior to June, 2010). The dependent variable is an indicator of whether a given firm becomes liquidated in a given year. The variable $Reform$ is an indicator of whether the observation is made following the passage of the reform in June 2010, and the variable LLC is an indicator of limited liability status. The regressions in all columns include interactions between the control variables and the variable LLC as controls are added to the specification; the coefficients on these interaction terms are not reported for the sake of brevity but available upon request. Standard errors are clustered at the firm-level

	(1)	(2)	(3)	(4)	(5)
Reform * LLC	-0.08***	-0.10***	-0.14***	-0.13***	-0.09***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Reform	-0.07***	-0.06**	-0.06**	-0.07***	-0.06**
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
LLC	0.58***	0.56***	0.57***	2.05***	1.48***
	(0.02)	(0.03)	(0.03)	(0.09)	(0.11)
Liability Ratio		0.15***	0.15***	0.26***	0.29***
		(0.00)	(0.00)	(0.01)	(0.01)
ΔGDP Sector			0.02	-0.06	-0.26
			(0.20)	(0.21)	(0.22)
Log(Total Assets)				0.22***	0.12***
				(0.01)	(0.01)
Revenue Ratio					0.00
					(0.01)
Profitability Ratio					-0.05***
					(0.01)
Log(Employees)					0.03***
					(0.00)
Log(Firm Age)					-0.03***
					(0.00)
Constant	-2.47***	-2.71***	-2.71***	-4.31***	-3.40***
	(0.02)	(0.02)	(0.02)	(0.08)	(0.09)
N	294,722	294,722	294,719	294,719	294,719
R^2	0.007	0.020	0.020	0.021	0.023

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 9: Comparison of Ex-Ante and Ex-Post Effects of the Reorganization Reform

This table presents estimates of the relative magnitudes of the ex-ante and ex-post effects of the 2010 Danish Reorganization Reform. Panel A presents coefficient estimates from a probit model of liquidation outcomes on the control variables used in Specification (1), estimated using our sample of limited liability firms in 2009. Standard errors are clustered at the firm-level.*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Panel B depicts the number of liquidations that would be predicted by the model estimates in Panel A in 2012 using control variable values from 2012, as well as the actual number of liquidations and observed reorganizations in 2012.

Panel A: Liquidation Model Estimates

Liquidation Probability	
Liability Ratio	0.2806***
	(0.0137)
ΔGDP Sector	0.5070*
	(0.2773)
Log (Total Assets)	0.1148***
	(0.0151)
Revenue Ratio	0.0005
	(0.0072)
Profitability Ratio	-0.0493***
	(0.0121)
Log(Employees)	0.0294***
	(0.0027)
Log(Firm Age)	-0.0270***
	(0.0033)
Constant	-3.3647***
	(0.1205)
Obs.	175032
R^2	0.016
Sample	Limited Liability Firms (2009)

Panel B: Ex-Ante and Ex-Post Effect Estimates

Year	Predicted Liquidations	Actual Liquidations	Predicted – Actual (Liquidations)	Reorganizations	Ratio of Ex-Ante / Ex-Post effects
2012	2,369	1,731	638	83	6.69

Appendix

A. Description of Denmark Insolvency Code

Danish insolvency law is governed by the Danish Bankruptcy Act, called *Konkursloven*, which was passed in 1977. The 1977 Act replaced the existing insolvency code that had been first established in 1872. There are essentially two procedures in the Danish insolvency code: reorganization and liquidation (in Danish parlance, 'liquidation' is often referred to as 'bankruptcy'). Like many other countries, there have been numerous revisions to Denmark's procedures over the past forty years. Perhaps the largest reform, however, was the 2010 Amendment, which introduced a new procedure for bankruptcy reorganization called *Rekonstruktion* (Bang-Pedersen 2017).

Prior to the 2010 reform, only management could petition for reorganization. Debt holders did not have the ability to file for restructuring or initiate reorganization plans without the consent of management (Gullitz-Wormslev and Levin 2011, International Insolvency Institute n.d.). The process of reorganization consisted of several steps. Management would typically first file for an automatic stay (in Danish parlance, a 'suspension of payments'), that would last at most 12 months. Debt holders would not be allowed to take actions against the firm during this period, while management would continue to operate the firm. During those 12 months, management could propose a restructuring plan (in Danish parlance: 'compulsory composition') that would need debt holder and court approval (Gullitz-Wormslev and Levin 2011, International Insolvency Institute n.d.).

If a restructuring plan was approved, then it would be binding across all stakeholders in the firm. Existing managers of the firm would continue to oversee the firm's operations, but would have to report to a court-appointed administrator to ensure that the firm was abiding by any approved restructuring plan. In practice, debt holders rarely approved reorganization plans proposed by management. Instead, liquidation proceedings were much more common than reorganization.

The 2010 reform introduced *Rekonstruktion*, a reorganization procedure designed to help economically viable companies survive as going concerns during times of financial distress (Barfoed 2010). In contrast to the prior code, a petition for Rekonstruktion can be filed by either the insolvent firm's management or by the insolvent firm's debt holders *if* the firm is a limited liability company. If the firm is not a limited liability company and the managers(s) are personally liable for any debts, such as the case for sole proprietorships, then only the managers (and not the debt holders) can file for restructuring (Bang-Pedersen 2017). The legal condition of insolvency is established by the firm's inability to meet debt obligations on time.

As before, during the time that an insolvent firm is under restructuring proceedings, an automatic stay is typically issued to prevent debt holders from taking actions against the firm. Restructuring proceedings can last up to 12 months; during this time, debt holders and the court work to determine a viable restructuring plan. Debt holders vote on the plan under a variety of guidelines. Perhaps the most important guideline is that debt holders can vote for a plan that does not receive management approval; management consent is not required for the debt holders of limited liability firms to pass a court-enforceable reorganization plan.

Another consideration is that only debt holders who will be affected by the restructuring plan—i.e. debt holders who can expect to receive some form of dividend from the firm—are eligible to cast votes. Additionally, secured creditors can only cast votes if the value of their secured debt is greater than the value of their collateral. Finally, a plan is approved as long as a majority (50%) of the outstanding creditor claims does not cast votes

against the plan, where claims are determined by the relevant monetary amounts of debt due to each voting debt holder.

The court's primary role in approving the restructuring plan is to ensure that unsecured creditor interests are protected. The court does not have the power to implement its own restructuring plan unless creditors vote in support of it. Once a plan is approved, then the plan is binding for all stakeholders in the firm, including all debt holders that may not have participated in the court meeting, as well as all debt holders who may have voted against the plan.

The execution of the restructuring plan is overseen by management. However, to ensure that these plans are carried out properly and that debt holders are protected from abuse, management is supervised by a court-appointed administrator and required to report all material information about the business to the court. Furthermore, debt holders are also given the right to replace management and have the firm's activities overseen by the administrator if deemed necessary. The decision to replace management is conditional upon a majority vote among debt holders (Bang-Pedersen 2017).

If an insolvent firm does not enter into reorganization proceedings, then the firm can enter liquidation proceedings. The procedures for liquidation have largely stayed the same over time; the 2010 reforms did little to change these rules (Sjørslev and Højslet 2018). Both before and after the reform, a petition to liquidate the firm could be filed by either the managers or the firm's debt holders. During liquidation proceedings, the management and the board of directors of the insolvent firm are relieved of their duties, and the court oversees the liquidation of the assets so as to maximize proceeds to debt holders in order of their priority and size of relevant claims.

B. Political Views Surrounding Danish Bankruptcy Reform of 2010

Political support for the Danish Bankruptcy Reform of 2010 was unanimous across the political spectrum of Denmark. In this section, we present excerpts of Parliamentary debate prior to the voting and passage of the reform from Denmark's three largest political parties. The source of these excerpts is Section 8 of Consideration of Bill No. L 199: Proposal for a law amending the Bankruptcy Act and various other laws (Reconstruction, etc.) by Justice Minister Lars Barfoed. The original Danish text is translated to English using Google translate.

The proposal we are here with is actually a real, very good proposal. That's also considering the time we are currently in. Unfortunately, we are in the situation in Denmark that there have actually been no such bankruptcies in the past. We have to go back to 1979 before we reach the same number of bankruptcies among companies. It requires action. And from Ventre's side, we think that the government has come up with a good initiative, just this bill.

You have asked the Bankruptcy Council to come forward with some suggestions and constructive feedback on how this proposal can be designed so that we ensure [the survival of] companies as much as possible, but of course, with a reasonable balance, not just saying that a company should at all costs survive. However, you go in and look at certain types of companies. They give them an opportunity to make a reconstruction rather than closing and liquidating a company that might have a good production potential or a good service that is much needed and as the employees in the company, has a great know-how, so they might be able to move on.

- Irene Simonsen, spokesperson for Venstre, Denmark's Liberal Party

Unfortunately, it is obvious to us all that the crisis is far from over and we see that a lot of companies still experience falling sales figures. In Denmark, we have not experienced in recent times as many companies succumb to, as we unfortunately see now, companies that usually work well, but who now have to turn the key and send their employees home to an uncertain future in the unemployment queue. Not long ago, it was announced that more than 650 companies had to shut down already here in March. It is 35 per cent more bankruptcies than at the same time in 2009 and the highest rate we have seen in Denmark for a long time…

However, we are also pleased that the Minister, with this bill, takes a positive step in the right direction, a small and delayed step, we think, but it is one step and we look forward to being laid to improve opportunities for economically-troubled companies to be continued in order to be declared bankrupt, for example, as proposed by the bill to introduce more reconstruction opportunities.

- Maja Panduro, spokesperson for Socialdemokratiet, Denmark's Social Democratic Party

If a company that is in financial difficulties is otherwise viable, it is a shame if the legislation and the rules we have today can only lead one place, namely to bankruptcy of the company, termination of the company, firing of employees. It would be advisable if, in the context of reconstruction – i.e. with a company that is in financial difficulties but otherwise it is viable and where a recruiter can be appointed - there is an opportunity to come up with a proposal for how to get the economy up so that the company can go on with what the company really is best at, for example. We therefore think that the proposal here is a very good proposal that tries to solve the situation that if you are in financial difficulties, the only option is such bankruptcy. It should not be, and it should not be either. There should be opportunities there where there is hope that it may get better.

- Tom Behnke, spokesperson for Det Konservative Folkeparti, Denmark's Conservative People's Party

Table A1: Variable Definitions

This table presents the full list of all variables, along with their definitions, used in the analysis. Availability of the data item in Statistics Denmark (DST) and Experian is denoted in the last two columns.

Variable Name	Definition	In DST?	In Experian?
Liquidation Status	Indicator variable if company is liquidated the next year	Yes	Yes
Revenue	Sales	Yes	Yes
Operational Costs	Operational Costs	No	Yes
Gross Profit	Revenue- Operational Costs	Yes	Yes
Total Assets	Fixed Assets+ Current Assets	Yes	Yes
Fixed Assets	Fixed Assets	Yes	Yes
Current Assets	Current Assets	Yes	Yes
Cash	Cash	Yes	Yes
Dividends	Dividends		
Total Liabilities	Short Term Debt +Long Term Debt+ Long Term Liabilities Providers	Yes	Yes
Short Term Debt	Short Term Debt	No	Yes
Long Term Debt	Long Term Debt	Yes	Yes
Long Term Liabilities Providers	Long Term Liabilities Providers	Yes	No
Interest Rate of Debt	Interest Payments / Total Debt	Yes	Yes
Total Equity	Total Equity	Yes	Yes
Revenue Ratio	Revenue/Total Assets	Yes	Yes
Profitability Ratio	Gross Profit/ Total Assets	Yes	Yes
Tangibility Ratio	Fixed Assets/Total Assets	Yes	Yes
Cash Ratio	Cash/Total Assets	Yes	Yes
Liability Ratio	Total Liabilities/ Total Assets	Yes	Yes
Leverage Ratio	Total Debt/Total Assets	Yes	Yes
Equity Ratio	Total Equity/Total Assets	Yes	Yes
Number of Employees	Number of full time employees	Yes	No
Firm Age	Years since incorporation	Yes	Yes
ΔGDP Sector$_{t-1}$	Year-to-year change in sector GDP	Yes	Yes
Repayment Fraction	Fraction of the number of non-equity outstanding liabilities paid on time in the past 12 months	No	Yes
Repay Value 0-1	Fraction of the number of non-equity liabilities with outstanding balance below 1K DKK paid on time in the past 12 months.	No	Yes
Repay Value 1-9	Fraction of the number of non-equity debts with outstanding balance between 1K and 9K DKK paid on time in the past 12 months.	No	Yes
Repay Value 10-24	Fraction of the number of non-equity debts with outstanding balance between 10K and 24K DKK paid on time in the past 12 months.	No	Yes
Repay Value 25-99	Fraction of the number of non-equity debts with outstanding balance between 25K and 99K DKK paid on time in the past 12 months.	No	Yes
Repay Value >100	Fraction of the number of non-equity liabilities with outstanding balance above 100K DKK paid on time in the past 12 months	No	Yes
Employees 0	Indicator variable for firms with 0 employees	No	Yes
Employees 1-9	Indicator variable for firms with 1-9 employees	No	Yes
Employees 10-19	Indicator variable for firms with 10-19 employees	No	Yes
Employees >20	Indicator variable for firms with more than 20 employees	No	Yes
Administrative Director Turnover	Indicator variable if administrative director leaves the firm	No	Yes
Plant Manager Turnover	Indicator variable if plant manager leaves the firm	No	Yes
Chair Turnover	Indicator variable if chair leaves the board	No	Yes
Board Turnover	Indicator variable if board member leaves the board	No	Yes

Table A2: Experian Sample Descriptive Statistics

This table presents descriptive statistics for all sample firms contained in the Experian database during the 2009-2012 sample period. There are 142,551 unique limited liability (AS/APS) firms in the database. Experian does not maintain information for Sole Proprietorships. Monetary values are expressed in terms of thousands of Danish Crowns (DKK). All variables are winsorized at the 1% level. Variable definitions are presented in Table A1 in the Appendix.

Variable Name	Obs.	Mean	Std. Dev.
Liquidation Probability	314,657	0.02	0.13
Debt Repayment Fraction	89,388	0.75	0.31
Revenue	313,160	14,334	292,149
Operational Costs	12,901	-127,379	756,374
Gross Profit	298,181	7,462	137,923
Total Assets	314,380	16,250	56,616
Fixed Assets	274,568	27,509	969,498
Current Assets	313,160	14,334	292,149
Cash	285,433	2,044	57,586
Total Liabilities	314,357	20,823	634,267
Long Term Debt	117,205	19,474	519,001
Short Term Debt	30,776	1,001	29,007
Total Equity	314,357	17,479	549,394
Revenue Ratio (Revenue/Total Assets)	311,399	0.70	0.70
Profitability Ratio (Gross Profit/ Total Assets)	296,425	0.64	11.23
Tangibility Ratio (Fixed Assets/Total Assets)	273,480	0.40	2.11
Cash Ratio (Cash/Total Assets)	284,211	0.20	0.29
Liability Ratio (Total Liabilities/ Total Assets)	312,197	0.97	2.05
Leverage Ratio (Total Debt/Total Assets)	28,694	0.47	12.87
Employees 0	314,657	0.33	0.47
Employees 1-9	314,657	0.49	0.50
Employees 10-19	314,657	0.09	0.28
Employees >20	314,657	0.10	0.29
Administrative Director Turnover	314,657	0.01	0.10
Plant Manager Turnover	314,657	0.03	0.16
Chair Turnover	314,657	0.01	0.12
Board Turnover	314,657	0.02	0.15
Firm Age	314,657	14.20	17.56