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Essays on corporate bankruptcy reorganization and liquidation

Ensaios em recuperação e falência corporativa

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RESUMO

AMARAL, G. H. O (2022). Ensaios em recuperação e falência corporativa. (Tese de Doutorado). Faculdade de Economia, Administração, Contabilidade e Atuária, Universidade de São Paulo, São Paulo.

A recorrência de crises econômicas globais e locais tem enfatizado a importância dos regimes falimentares para a estabilidade do ambiente econômico. Apesar da relevância do tema de recuperação e falência corporativa, há poucos trabalhos empíricos sobre o tema no contexto dos mercados emergentes. Essa tese de doutorado preenche essa lacuna com três ensaios baseados na crescente literatura de trabalhos empíricos em direito e do direito baseado em evidências. Primeiro, nós conduzimos uma revisão sistemática da literatura dos trabalhos empíricos do tema. A revisão fornece uma visão geral da literatura teórica do tema, propõe um modelo conceitual e faz uma revisão crítica da literatura empírica, identificando uma agenda potencial para pesquisas futuras. Segundo, nós investigamos os efeitos de processos de recuperação judicial e falência sobre credores corporativos, baseado em um novo conjunto de dados que reúne informações dos processos de recuperação judicial e falência do Tribunal de Justiça de São Paulo (TJSP) e dados da Relação Anual de Informações Sociais (RAIS). Nós implementamos um estimador de diferenças em diferenças em uma amostra pareada para comparar a performance de firmas credoras em processos de recuperação judicial e falência (grupo tratamento) com firmas similares que não têm relações comerciais com empresas em processo de recuperação judicial e falência (grupo controle). Os nossos resultados indicam que os efeitos da reorganização ou falência corporativa alcançam o grupo tratamento (empresas credoras) assim como o grupo controle (firmas similares às credoras, mas sem relação comercial com empresas em processo de recuperação judicial ou falência). Há uma evidência fraca de que o impacto é diferenciado entre os grupos de tratamento e controle. Além disso, presume-se que os efeitos adversos dos processos de recuperação judicial sobre a performance corporativa são advindos principalmente de casos convertidos em falência. O terceiro ensaio examina o efeito da alteração da Lei de Recuperação Judicial e Falências (pela Lei Complementar 147/2014) na distribuição do poder de barganha dos credores nos processos de recuperação judicial. Nós argumentamos que a divisão parcial de credores quirografários em uma nova classe apenas de credores quirografários de pequeno porte pretendeu dar mais poder de barganha para estes credores de menor porte na negociação dos termos dos planos de recuperação. Nós consideramos a mudança da lei como uma fonte de variação e empregamos um teste de diferença de médias (*t-test*) e especificamos um modelo para capturar diferenças na média da performance das firmas. Nós utilizados dados dos planos de recuperação propostos (deságio para os credores e prazo de pagamento) e dados administrativos das firmas (número de empregados) como *proxies* para performance para examinar o efeito nos credores de pequeno porte. Os resultados indicam que a mudança na Lei de Recuperação Judicial e Falências em 2014 gerou pequenos efeitos na prática de negociação *ex-ante* nos processos de recuperação judicial. As recuperandas geralmente propõem deságio igual para os credores quirografários e para a nova classe de credores quirografários de pequeno porte. Apesar dos melhores termos de prazo de pagamento para os credores de pequeno porte, há pouca significância econômica dessa melhora, uma vez que o prazo médio de pagamento para os credores de pequeno porte é de dez anos. Os três ensaios reafirmam a importância de trabalhos empíricos em direito para fornecer evidências e informações críticas para avaliação e suporte a reformas legislativas, debates de políticas públicas, interpretações das normas por praticantes do direito e pesquisas acadêmicas.

Palavras-Chave: Falência Corporativa. Recuperação Judicial de Empresas. Liquidação Empresarial. Revisão Sistemática da Literatura. Pesquisa Empírica.

ABSTRACT

AMARAL, G. H. O (2022). Essays on corporate bankruptcy reorganization and liquidation. (Doctoral Dissertation). Faculdade de Economia, Administração, Contabilidade e Atuária, Universidade de São Paulo, São Paulo.

The recurring global and local economic crises have highlighted how crucial bankruptcy regimes are to the stability of the economic environment. Despite the relevance of corporate bankruptcy, there is scant empirical research on the topic in emerging market contexts. This doctoral dissertation addresses this void through three essays founded on the growing literature of empirical legal studies and evidence-based law. First, we survey empirical research on corporate bankruptcy through a systematic literature review. We provide an overview of the theoretical literature on the topic, propose a conceptual framework, and critically review the empirical literature, identifying a potential agenda for future research. Second, we investigate the spillover effects of bankruptcy reorganization and liquidation on corporate creditors. Based on a novel dataset on bankruptcy proceedings judicial data from the State Court of São Paulo (TJSP) matched to the Brazilian employer-employee administrative data (RAIS), we employ a difference-in-differences matching estimator strategy to compare the performance of bankrupt firms' creditors (treated group) and similar firms without any business relationship with a bankrupt firm (control group). Our findings indicate that the contagion effects of bankruptcy reach both the treated group (corporate creditors) and control group (similar firms with no direct link to a bankruptcy reorganization event). There is little evidence that the impact is different between the two groups. Moreover, we assume that the adverse spillover effects on both groups are mainly from bankruptcy reorganization cases converted to liquidation. The third essay examines the effects of the bankruptcy law amendment by the complementary law LC 147/2014 on the distribution of creditors' bargaining power in bankruptcy reorganizations. We argue that the partial split of unsecured creditors into a new class of only small-sized unsecured claimholders intended to give more power to this group in the negotiations of the restructuring plan. We consider the law reform as a source of variation, and we employ mean t-tests and model specifications to assess mean differences in firms' performance. Data on the proposed plan (creditors' haircuts and tenor for repayment) and the administrative employee dataset (number of employees) are used as proxies for performance to examine the effects on the small-sized claimants. The results indicate that the 2014 law reform produced small effects on the *ex-ante* bargaining practice in bankruptcy reorganizations. Debtors generally propose equal haircuts to both unsecured creditors and the new class of small-sized unsecured creditors. Despite the better terms for small-sized unsecured creditors regarding a shorter time for repayment, the economic significance is low because of an average payment tenor of ten years to the new class. The three essays reveal the importance of empirical legal studies to provide evidence and critical information for evaluating and assisting legal reforms, public policy debates, legal practitioners' interpretations of the norms, and academic research.

Keywords: Corporate Bankruptcy. Reorganization. Liquidation. Systematic Literature Review. Empirical Research.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABJ – *Associação Brasileira de Jurimetria* (Jurimetrics Brazilian Association)

APR – Absolute Priority Rule

ATT – Average Effect of the Treatment on the Treated

BBL – Brazilian Bankruptcy Law

BCB – Brazilian Central Bank

CNAE – *Classificação Nacional de Atividades Econômicas* (National Classification of Economic Activities)

CNPJ – *Cadastro Nacional de Pessoa Jurídica* (National Corporate Tax Identification Number)

CSR – Corporate Social Responsibility

DID-ME – Difference-in-Differences Matching Estimator

DIP – Debtor-in-Possession

IPCA – *Índice Nacional de Preços ao Consumidor Amplo* (Extended National Consumer Price Index)

IV-2SLS – Instrumental Variables-Two Stage Least Squares

JCR – Journal Citation Report

LC – *Lei Complementar* (Complementary Act)

OLS - Ordinary Least Squares

PIA – *Pesquisa Industrial Anual* (Annual Industry Survey)

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses

RAIS – *Relação Anual de Informações Sociais* (Annual Social Information Report)

RDD – Regression Discontinuity Design

SLR – Systematic Literature Review

TJSP – *Tribunal de Justiça de São Paulo* (State Court of São Paulo)

UNCITRAL – United Nations Commission on International Trade Law

INTRODUCTION

Legal and institutional environments are widely believed to underpin economic development. Bankruptcy (or insolvency) regimes play an important role in the economy and in society. They establish coordinated proceedings to resolve problems of firms that are unable to pay their debts. Bankruptcy norms and their interpretation provide institutional solutions to corporate crises through liquidation or reorganization. They also guide how economic agents act in the business market during and before the onset of corporate crises.

The global financial crisis (2007-2009) highlighted how crucial bankruptcy regimes are to the stability of a nation's economic environment. From a catalyst downturn in the United States housing market that spread to the global financial system, many firms from different sectors experienced a deep crisis worldwide. The *Covid-19* outbreak has also negatively impacted the global economy and firms' financial health. The sudden stoppage of several economic activities and the uptake of strong social measures to mitigate the viral transmission affected both the supply and demand sides. The distinct legal regimes' capability to provide solutions to corporate crises has been pivotal for protecting economic activity and employment levels.

The role of bankruptcy regimes may be strengthened in emerging markets. Weaker institutions and higher volatility characterize these markets. The Brazilian economic and political weaknesses have led to a high number of insolvent firms[1]. Consequently, scholars and legal practitioners have intensified the debate about the adequacy of the Brazilian bankruptcy law (Law 11.101/2005) to provide efficient solutions to a sustainable corporate business market. In December 2020, the Brazilian bankruptcy law was overhauled with substantial changes. Nevertheless, the lawmaking discussion lacked proper empirical appraisal of the bankruptcy law in force.

Despite the relevance of corporate bankruptcy, there is scant empirical research on the issue in emerging market contexts. Challenges of data availability, methods of evaluation, and causal relations are substantial. Empirical evidence is critical to efficient institutional and legal environments since it may mitigate misinterpretations of the norms and legal reforms' misguidance[2].

Founded on the growing literature of empirical legal studies and evidence-based law, we seek to contribute to the empirical literature on corporate bankruptcy. To achieve this goal, we write three essays – one systematic literature review and two empirical essays using Brazilian lawsuit and administrative data. In contrast to most prior studies, we focus our analysis primarily on the bankrupt firms' creditors instead of the debtor itself in both empirical essays. We look forward to closing some empirical literature gaps with this approach, especially

[1] Serasa Experian's (2022) data indicates that the number of delinquent firms in November 2021 was around 5,9 million. At the beginning of the time series (March 2016), the number of delinquent firms was 4,2 million. On the other hand, the indicator peak was in the first quarter of 2020 (6,2 million). Also, there were 27.303 bankruptcy reorganization and liquidation requests in the 2012-2021 period. The data reveal a yearly average number of 1.189 reorganization and 1.549 liquidation requests in the last decade.

[2] For instance, Warren and Westbrook (2009) discussed the Amendments to Chapter 11 in the United States in 2005. The authors' findings revealed that the restrictions imposed on small businesses to confirm a reorganization plan up to 180 days could prevent successful reorganizations from occurring. Based on 1994 and 2002 datasets, the authors showed that 82% of the small business that confirmed a reorganization plan did so outside the time limit (180 days from filing) imposed by the 2005 Amendment. Thus, the authors concluded that empirical evaluation could have improved the 2005 Amendment discussion.

providing evidence from an emerging market and on another economic agent than the debtor firm. These are two main gaps in the empirical literature that we can most contribute with partial filling.

The first essay provides the theoretical background and consolidates the literature on empirical corporate bankruptcy through a systematic literature review, highlighting the state of the art, limitations, pitfalls, and voids of the previous empirical research. We partly address these issues in the second and third essays. In the second essay, we analyze the bankruptcy spillover effects on bankrupt firms' creditors. We compare the performance of bankrupt firms' creditors (treated group) and similar firms unrelated to a bankruptcy event (control group). Our central assumption is founded on the expected differential performance of groups solely caused by bankruptcy spillover effects on corporate claimholders. To the best of our knowledge, no prior empirical research focuses on corporate creditors in the Brazilian context. We seek to fill this research gap. In the third essay, we investigate the effects of the 2014 Brazilian bankruptcy law amendment that created a new creditor class on the plan voting procedure of court-supervised reorganizations. The law amendment addressed creditors' bargaining power and intended to increase small-sized creditors' ability to negotiate receiving the proceeds from reorganization. We seek to determine if the legislators' goals were effectively achieved. The three essays contribute to a better comprehension of corporate bankruptcy, show future empirical research opportunities, and provide evidence from an emerging market context, partly filling identified research voids.

In this doctoral dissertation, we use the concept of "bankruptcy" as the formal filing of a petition for legal proceedings that are supervised by and litigated in bankruptcy courts[3] with at least two possible resolutions (types): reorganization or liquidation. Thus, bankruptcy should be deemed as the event of requiring a court-supervised proceeding, independently of being for the restructuring of debts and overcoming of the corporate crisis or denoting the formal procedure of selling the debtors' assets to distribute the proceeds to the creditors and discharging of debts. Several academics researching finance, accounting, law, and economics use this concept for "bankruptcy": White (1989, 2016), Wruck (1991), LoPucki & Whitford (1993), Altman et al. (2019). We deem that the U.S. Bankruptcy Code is also designed based on these criteria, providing different resolutions for bankruptcy.

We acknowledge that other authors in the fields of law, finance, and economics adopt a distinct definition of bankruptcy, restricting it to the formal procedure of selling the debtor's assets to repay the creditors. These authors typically consider the word "reorganization" for the U.S. Bankruptcy Code Chapter 11 and "bankruptcy" for the U.S. Bankruptcy Code Chapter 7 (Rasmussen, 1991; Baird & Rasmussen, 2002). A smaller number of academics, mainly from civil law nations, also use "court-supervised reorganization" to allude to the legal procedure of corporate restructuring (Hege, 2003; Leyman et al., 2011; Blazy & Chopard, 2012).

Considering the Brazilian legal regime, the Dictionary of Law, Economics and Accounting English-Portuguese (2013) considers "bankruptcy" as the translation for the legal procedure of "*falência*" and "reorganization" or "court-supervised reorganization" for the procedure of "*recuperação judicial*". These translation definitions are closer to the restrictive criterion of

[3] In Brazil, we acknowledge that a civil court may supervise bankruptcy cases due to the lack of specialized bankruptcy or corporate courts in several states' jurisdictions (judicial districts).

bankruptcy that we do not apply in our research[4]. Finally, it is worth noting that even the U.S. legal system uses both criteria for the word "bankruptcy". The U.S. federal and state regulations adopt the criterion used in this research for bankruptcy[5] as well as the other criterion applied in other studies[6].

[4] Exceptionally, we may use the term "court-supervised reorganization" as a synonym for "bankruptcy reorganization" (*recuperação judicial*) in essays 2 and 3 since we deem both terms clearly understandable in our empirical research within the Brazilian legal regime. However, we never use the sole word "bankruptcy" for translating the formal procedure of "*falência*"; rather, we use "bankruptcy" meaning filing for a court-supervised proceeding with two possible resolutions, and "bankruptcy liquidation" and "liquidation" for the Brazilian legal procedure of "*falência*".

[5] Electronic Code of Federal Regulations (e-CFR) - Title 12 - Banks and Banking - CHAPTER II - FEDERAL RESERVE SYSTEM SUBCHAPTER A - BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM PART 250 - MISCELLANEOUS INTERPRETATIONS Interpretations § 250.166 Treatment of mandatory convertible debt and subordinated notes of state member banks and bank holding companies as "capital" - (2) Acceleration clauses - (iv): "*(...) Accordingly, debt issues that permit acceleration of principal only in the event of bankruptcy (liquidation or reorganization) in the case of bank holding companies and receivership in the case of banks may generally be classified as capital*".; as well as

Electronic Code of Federal Regulations (e-CFR) - Title 29 - Labor - Subtitle B - Regulations Relating to Labor - CHAPTER XL - PENSION BENEFIT GUARANTY CORPORATION SUBCHAPTER E - PLAN TERMINATIONS PART 4041 - TERMINATION OF SINGLE-EMPLOYER PLANS Subpart B - Standard Termination Process § 4041.21 Requirements for a standard termination - (b) Plan sufficiency - (1) Commitment to make plan sufficient – (iii): "*In any case in which the person making the commitment is the subject of a bankruptcy liquidation or reorganization proceeding, as described in § 4041.41(c)(1) or (c)(2), the commitment is approved by the court before which the liquidation or reorganization proceeding is pending or a person not in bankruptcy unconditionally guarantees to meet the commitment at or before the time distribution of assets is required*"

[6] State Regulations Delaware Administrative Code - Title 16 - Health and Safety Department of Health and Social Services Division of Health Care Quality 3325 - Financial Capability Reporting 16 Del. Admin. Code § 3325-7.0 - Audited Financial Disclosure Requirement: "*7.2 Conditions which may prompt DHSS to require audited financial disclosure include but are not limited to: (...) 7.2.8 Bankruptcy, reorganization or closure*".

U.S. Code - Title 42 - CHAPTER 82 - SUBCHAPTER IX - § 6991c Approval of State programs - (c)Financial responsibility: "*(3) In any case where the owner or operator is in bankruptcy, reorganization, or arrangement pursuant to the Federal Bankruptcy Code or where with reasonable diligence jurisdiction in any State court of the Federal courts cannot be obtained over an owner or operator likely to be solvent at the time of judgment, any claim arising (...)*."

1. EMPIRICAL CORPORATE BANKRUPTCY: A SYSTEMATIC LITERATURE REVIEW

Abstract: This essay surveys empirical research on corporate bankruptcy. From an overview of the theoretical literature on the topic and a proposed research framework, we proceed to summarize, synthesize, and analyze the empirical literature on corporate bankruptcy published in peer-reviewed articles from 2000 to 2020. Related topics like corporate financial distress, corporate insolvency, and corporate failure are peripherally covered. We conduct our research through a systematic literature review framework (PRISMA) to ensure methodological rigor, transparency, and replicability. We present our conceptual framework of empirical corporate bankruptcy research for codification. Based on an integrated template comprising information extracted from each selected paper, we show the state of the art, flaws, caveats, and gaps from the empirical literature. Finally, we propose an agenda for future research.

Keywords: Systematic Literature Review. Corporate Bankruptcy. Reorganization. Liquidation. Empirical Research.

1.1 Introduction

Corporate bankruptcy is a multidimensional phenomenon (Levratto, 2013). Concepts and theories of related fields, such as law, business management, economics, accounting, and sociology, are essential to research on the topic. The foundation and the running of a business involve risks that may result in corporate bankruptcy (White, 2016). Thus, bankruptcy regimes play an important role in the economy and in society as they provide institutional solutions to corporate crises. They also guide how economic agents act in the business market during and before the onset of corporate crises.

Corporate bankruptcy has also been an issue of increasing interest to researchers and economic agents. The recurring global or local economic crises highlight how crucial are bankruptcy regimes to the stability of a nation's economic environment. Recent downturns, such as the global financial crisis (2007-2009), the European sovereign debt crisis (2010-2012), the Brazilian political and economic crisis (2014-2017), the Turkish currency and debt crisis (2018-2019), and the *Covid-19* outbreak crisis (2020-ongoing), have boosted corporate bankruptcy worldwide[7].

Figure 1 shows the number of corporate bankruptcy cases filed in the United States since 2000. The data illustrates the trends of increasing bankruptcy filings in turmoil periods, such as the U.S. subprime financial crash (2007-2010) but not for the available data of the initial years of the *Covid-19* pandemic[8]. In **Appendix 1.1**, we show additional data provided by Statista (2022), revealing that corporate bankruptcy trends vary significantly from country to country. For instance, in major developing economies, Brazil and South Africa have shown a stable number of insolvencies proceedings in the 2007-2019 period, while Russia has greatly

[7] These are examples of environmental jolts (external factors) that may affect corporate bankruptcy. Internal characteristics, such as bad management, operational deficiencies, and working capital shortages, are also causes of corporate bankruptcy (Trahms et al., 2013).

[8] On the one hand, numerous firms faced severe financial difficulties, especially those operating in sectors most affected by the *Coronavirus* crisis, such as traveling. On the other hand, many governments have offered massive financial support to businesses, partially mitigating the adverse economic effects of the pandemic.

reduced the annual number of insolvencies and Turkey has moderately increased the business insolvencies but with high variation throughout 2007-2019.

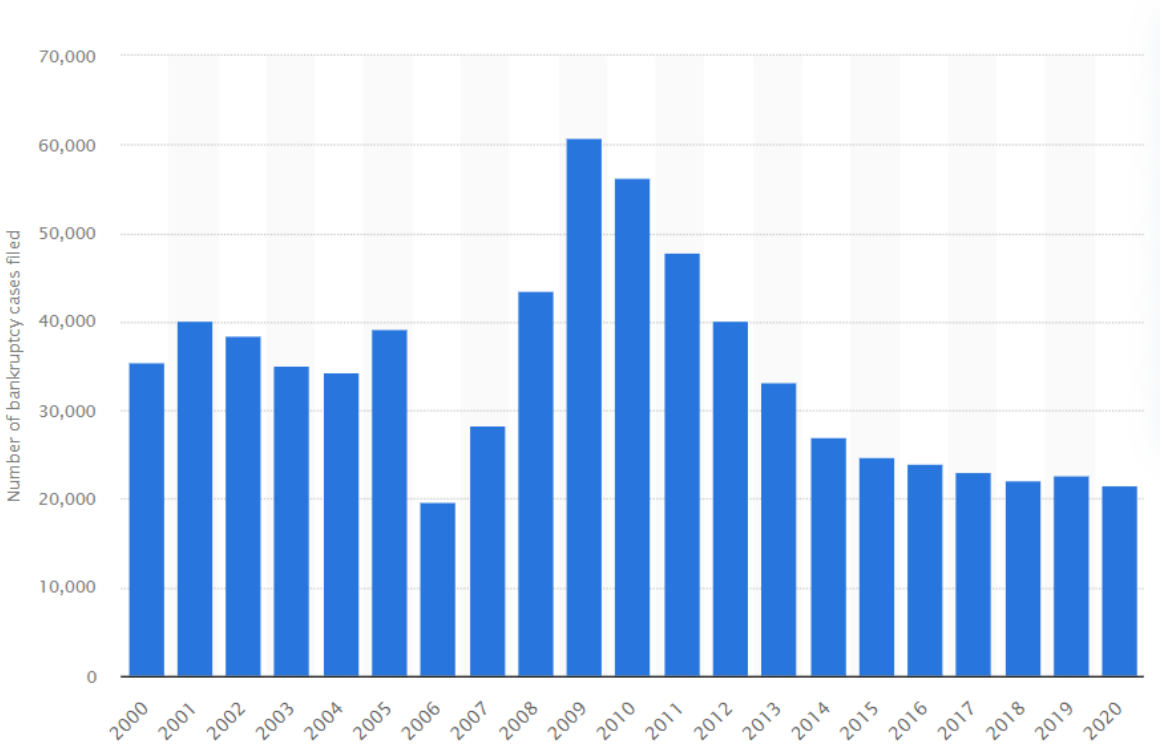


Figure 1 - Corporate bankruptcy cases filed in the United States (2000-2020).
Source: Statista (2022).

Despite being a research topic for many decades, an accurate definition of corporate bankruptcy is still missing. Terms like financial distress, insolvency, failure, bankruptcy, default, among others, are used interchangeably in several papers (Altman et al., 2019). It is beyond the goals of this essay to provide a precise definition of these terms. However, we must define the boundaries of 'corporate bankruptcy' in our research for an accurate systematic literature review.

To bound our literature review scope, we considered corporate bankruptcy as the legal proceedings to resolve problems of firms that are unable to pay their debts (Dobbie & Song, 2015; White, 2016)[9]. Therefore, a formal bankruptcy declaration must be filed in a court by the debtor firm or its creditors. Generically, there are two main bankruptcy proceedings: liquidation or reorganization. Some authors employ the terms 'formal bankruptcy' or 'legal bankruptcy' (Aguiar-Díaz & Ruiz-Mallorquí, 2015; Jones, 2017) to certify that the term is unequivocally understood.

We decided to restrict the focus of our systematic literature review within the narrower concept of bankruptcy for two reasons. First, a formal proceeding in a court is an observable fact. It clarifies the conditions to be within the scope of this essay, and it allows for a more straightforward check of the accuracy of the selected articles. Second, there is a growing

[9] We emphasize that the scope of this literature review does not include noncorporate firms or personal bankruptcy.

empirical literature that investigates the effects of legal reforms, judicial proceedings, and jurisdictions' characteristics on corporate bankruptcy and macroeconomic outcomes (Bris et al., 2006; Warren et al., 2009; LoPucki & Doherty, 2014; Ponticelli & Alencar, 2016; Fonseca & Doornik, 2019; Bernstein, Colonnelli, & Iverson, 2019). To the best of our knowledge, there is no prior work that provides an overview of the empirical research on legal corporate bankruptcy worldwide, especially following a systematic review, and presents a critical appraisal of the related literature[10].

Thus, this essay surveys empirical research on corporate bankruptcy to fill this literature void. From a quick overview of the theoretical literature in the topic and a proposed research framework, we summarize, synthesize, and analyze the empirical literature on corporate bankruptcy published in peer-reviewed articles from 2000 to 2020. Related topics like corporate financial distress, corporate insolvency, and corporate failure are only peripherally covered.

We conduct our systematic literature review based on Pati & Lorusso (2018) approach through a framework mostly used in the domain of health research to ensure methodological rigor, transparency, and replicability. We employ the PRISMA framework[11] to guide our survey of empirical articles on corporate bankruptcy. We develop our in-depth critical review of the selected papers based on Creswell (2009).

This systematic literature review offers three additional contributions to the literature on corporate bankruptcy. First, it partly fulfills an important gap by summarizing, synthesizing, and critically analyzing the empirical studies on the topic worldwide. Second, our approach integrates findings from law, business management, finance, economics, and accounting literature what expands our systematic literature review reach. Third, the study contributes to legal practice as we summarize evidence-based findings of prior research, which may support legal reform discussions and influence bankruptcy norms' interpretation.

The remainder of this essay proceeds as follows. Section 2 describes the research design and the key steps of the PRISMA protocol. Section 3 provides a brief overview of the theoretical literature and displays our proposed research conceptual framework. Section 4 presents a summary of the empirical literature on corporate bankruptcy from 2000 to 2020. Section 5 provides a critical appraisal of the most significant empirical literature, indicating major gaps and flaws in prior studies, and proposing a research agenda. Section 6 concludes.

1.2 Research Design

Following the methods of Pati & Lorusso (2018) for a systematic literature review[12], we employ the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)

[10] Despite several literature reviews on bankruptcy prediction models (Appiah et al., 2015; Shi & Li, 2019), there is a gap of reviews on corporate bankruptcy empirical research. The closely related work to ours is Hotchkiss et al. (Hotchkiss et al., 2008). Nevertheless, the authors concentrated their analysis in developed countries, especially in the United States. Moreover, they did not follow a systematic literature review, and they did not focus exclusively on legal corporate bankruptcy, which is only briefly discussed.

[11] Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is a minimum set of items for reporting in systematic reviews and meta-analyses. Available at: http://www.prisma-statement.org/.

[12] A systematic literature review is "a systematic way of collecting, critically evaluating, integrating, and presenting findings from across multiple research studies on a research question or topic of interest. It is 'systematic' since it adopts a consistent, widely accepted, methodology" (Pati & Lorusso, 2018, p. 15).

framework as our systematic research strategy. It is mostly used in the domain of medical research to ensure methodological rigor, reduced reporting bias, transparency, and replicability. Next, we describe the ten key steps of our research strategy.

We first determined the scope of our review. We addressed three implicit research questions. What is the state of the art of empirical research on corporate bankruptcy? What are the main voids and flaws of the empirical literature? What are the main insights for future research? Second, we defined the boundaries of 'corporate bankruptcy' in our study to certify that the term is unequivocally understood. We considered corporate bankruptcy as the legal proceedings to resolve problems of firms that are unable to pay their debts (Dobbie & Song, 2015; White, 2016). We next selected one of the main academic journal databases to perform a wide search of published peer-reviewed papers on empirical corporate bankruptcy, namely, Scopus. We decided to focus our study on five research fields: Finance, Economics, Business Management, Accounting, and Law.

Following, we decided on the inclusion and exclusion criteria of our survey. The selected papers must have been written in English[13] and published from 2000 to 2020[14]. We limited our scope to published peer-reviewed scholarly articles. Empirical studies published in books, annual meetings, conventions, or dissertations were not included. We also did not incorporate reference list searching (snowballing) or hand searches[15]. In the fifth step, we searched the following combinations of terms, which must appear in the titles in the selected database. The search was based on a combination of two primary words ("corporate" or "firm") and three secondary words ("bankrupt*" or "reorganize*" or "liquidat*"). **Table 1** exhibits the detailed keyword combination design.

Table 1 - Keyword Combination Design.

Primary words		**Secondary word**
Corporate		Bankupt*
		OR
OR	AND	Reorganiz*
		OR
Firm		Liquidat*

We then created a journal citation report (JCR). Within the journal citation report, we organized headers for relevant information that supports our screening phase. We created headers for database, author(s) name, year of publication, journal, publication details (volume

[13] We restricted our review to papers written in English because it is the language accepted in most of the top journals' submissions. On the one hand, it may bias our study towards English native language countries. It might particularly impact our survey on empirical law research, in which literature in the original language is more common than in other fields. On the other hand, it may avoid research bias towards other languages that the authors master. Thus, focusing on English written papers eases future updates and the replicability of our study.

[14] By defining the date range from 2000 to 2020, we ensured the inclusion of publications related to several bankruptcy law reforms and amendments that had taken place in the 21st century. Moreover, we encompassed the most recent papers which may use more complex statistical techniques and test for causality.

[15] Nevertheless, we may have referred to gray literature (not peer-reviewed publications) or other pivotal papers not included in our scope to add information to specific points of our analysis, especially concerning major gaps and recent trends in the literature. In these cases, the literature is briefly presented and is not included in the journal citation report (JCR) nor any statistics of this essay.

/ number), author(s)' affiliation, DOI/ ISSN, research field, title, keywords, and abstract. After that, we checked for duplicates.

From this expanded sample, we started the screening process. We first proceeded to title review to eliminate unrelated papers. We then moved to abstract review in which we assessed the accuracy of the article to the scope of our empirical literature survey in more detail. We screened out purely theoretical papers on corporate bankruptcy. We also removed papers in which the term 'bankruptcy' did not correspond to the definition considered in this essay (legal or formal bankruptcy). Empirical articles exclusively related to bankruptcy prediction models were also excluded[16]. We carefully recorded all exclusions applied to determine our final sample for transparency and replicability.

From the final sample, we designed an integrated template, which we filled with the information extracted from each selected article. The template consists on several research attributes (categories) such as author(s), year of publication, research field, title, journal, paper's description (purpose), focused economic agent (debtor/ creditor/ employee / government / other shareholder), method, statistical technique(s), sample characteristics (year(s), country/region of the data), level of analysis (country/region, sector, business group, firm), measure of bankruptcy, dependent variable(s), conceptual perspective, main findings (outcomes), main research contributions, pitfalls, flaws, and bias. We last summarized, synthesized, compared, and critically analyzed the selected articles on empirical corporate bankruptcy according to the categories defined in our conceptual framework. For our final sample, we considered only articles with at least 10 citations in Scopus. We developed our in-depth critical review based on Creswell (2009). **Table 2** summarizes the ten key steps in conducting our systematic literature review on empirical corporate bankruptcy.

Table 2 - Key Steps of our Systematic Literature Review on Empirical Corporate Bankruptcy.

Step	Description	Inputs
1	Development of research question(s)	What is the state of the art of empirical research on corporate bankruptcy? What are the main gaps and flaws of the empirical literature? What are the main insights for future research?
2	Definition of terms in the research	Corporate bankruptcy: legal proceedings to resolve problems of firms that are unable to pay their debts (Dobbie & Song, 2015; White, 2016).
3	Selection of academic journal databases	Scopus.
4	Definition of the inclusion and exclusion criteria	- Publication type: published peer-reviewed scholarly articles. - Search type: only articles identified on core academic databases. No list searching (snowballing) or hand searches. - Citations (Scopus): greater or equal to 10. - Years: 2000 to 2020. - Language: only papers written in English.
5	Definition of the keyword combination design	"corporate" or "firm" [and] "bankrupt* or reorganize* or liquidat*".
6	Creation of a journal citation report (JCR)	- Reference citation manager: Mendeley. - JCR's headers: database, author(s) name, year of publication, author(s)' affiliation, journal, publication details (volume / number), DOI/ ISSN, research field, title, keywords, and abstract.

[16] There is a vast literature on corporate bankruptcy prediction models. It includes several systematic literature reviews that mainly summarize and analyze methodological issues, such as statistical techniques and sample characteristics (Appiah et al., 2015; Aziz & Dar, 2006; Shi & Li, 2019). Because other empirical studies on corporate bankruptcy were not yet systematically summarized and critically analyzed, we concentrate our work in this identified literature gap.

7	Removal of duplicated publications	Duplicates are removed.
8	Screening process	- Title review - Abstract review - Quality check
9	Collection and codification of selected articles	Collection and codification of selected articles attributes
10	In-depth critical review of selected articles	- Summarization. Synthetization. Comparison. Analysis. Critical Evaluation.

1.3 Bankruptcy Definition and Conceptual Framework

A vast literature in Business Management, Economics, Finance, and Law discusses corporate bankruptcy. The first works were published at the beginning of the 1900s in the Law literature and discussed legal practices in bankruptcy proceedings. In the Finance field, the first work to use the term "corporate bankruptcy" was the seminal article written by Altman (1968) to predict corporate bankruptcy from financial ratios using discriminant analysis, the origin of the still used Z-score.

Despite being a research topic for many decades, an accurate definition of corporate bankruptcy is still missing. Terms like financial distress, insolvency, failure, bankruptcy, among others, are used interchangeably in several papers (Altman et al., 2019). It is beyond the goals of this essay to provide a precise definition of the terms related to bankruptcy. Nevertheless, we aim to contribute to the issue by proposing a sequential path of terms commonly used to describe corporate crisis in Finance and Economics literature that we used to define the boundaries of 'corporate bankruptcy' of our systematic literature review. We partly followed the definitions from Wruck (1991), Armour (2001), and Altman et al. (2019). **Figure 2** depicts the proposed sequential path of corporate crisis.

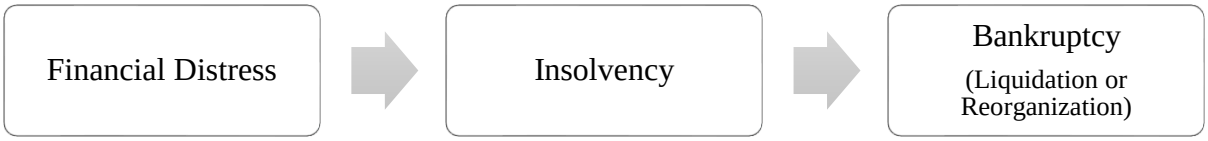


Figure 2 - Proposed sequential path of corporate crisis.

Corporate crises may occur because of internal factors, like bad management and operational deficiencies, or external factors, such as environmental jolts (Trahms et al., 2013). Conditional on a crisis, "financial distress" corresponds to a situation in which a firm is not only violating (or close to regularly violate) its promise to repay debts to creditors but also lacks short-term perspectives to square up its cash flow due payments (Wruck, 1991; Altman et al., 2019). In short, "a situation where cash flow is insufficient to cover current obligations" (Wruck, 1991, p. 421). It may occur even if a firm has an excellent long-term outlook regarding its products or services. Accounting or financial criteria may reveal a financially distressed firm through indicators like debt overhang or working capital shortages.

Following the proposed path of corporate crisis, "insolvency" arises from financial distress and may be identified by three different criteria. From an accounting criterion, insolvency is characterized when a firm's liabilities exceed its assets (Altman et al., 2019). This criterion has some shortcomings. First, some intangible assets may not be considered in the balance sheet because of accounting rules, diminishing firms' assets value. For instance, this flaw may be strengthened in the service and the IT sectors. Second, a firm balance sheet appraisal is a

temporary picture of the firm's financial situation. It lacks a continuous outlook, which may better indicate the company's future financial capacity to serve its debts.

The second criterion is based on the firm's discounted cash flow forecast. Under this criterion, "insolvency" is observed when future discounted payoffs obtained from the products or services sold are lower than the future expected payments to creditors (workers, suppliers, banks, and investors). Thus, the firm is not only unable to meet current cash payments but also to manage the forecasted prospects on the debt structure and assets' liquidity to face primarily short-term debts (Wruck, 1991; Armour, 2001). We argue that this criterion considers the firms' ability to serve their obligations more accurately. Contrary to Armour (2001) and Wruck (1991), we claim that "cash-flow insolvency" is a more permanent and severe crisis than "financial distress".

Third, from a legal criterion, "insolvency" is recognized when one of the situations established in a bankruptcy law occurs. It varies across countries since bankruptcy codes may indicate several conditions or situations in which a court may consider "legal insolvency" to take place. Generally, a firm's violation to repay a certain amount of debt to creditors (legal default[17]) is one of the conditions formally considered in bankruptcy laws. Moreover, legal insolvency is usually a requirement for creditors to file for a debtor to go into bankruptcy.

Last, "bankruptcy" portrays the extreme phenomenon of firms' inability to repay their debts. It occurs when private negotiations fail, and a formal bankruptcy declaration is filed in a court by the debtor firm or its creditors initiating a court-supervised proceeding (Altman et al., 2019; White, 2016). This essay restricts the term "bankruptcy" to this legal or formal criterion. One clear advantage of this constrained concept is that it refers to an observable fact, easing the identification of the event. Thus, in our proposed path, "bankruptcy" corresponds to the last stage of a corporate crisis that may be solved through a court reorganization or a court liquidation proceeding. The bankruptcy reorganization refers to the court-coordinated procedure for enabling the firm to attempt to overcome the crisis. The bankruptcy liquidation refers to the court proceeding of getting a debtor firm to an end through the firm's assets sales and the distribution of the proceeds to creditors (White, 1989; Wruck, 1991).

Foreshadowing our survey, we expand the theoretical literature on corporate bankruptcy presented by Hotchkiss et al. (2008). The proposed conceptual framework may have motivated previous empirical studies and indicates future research opportunities. Figure 3 illustrates our seven-categories framework of corporate bankruptcy research that we considered that bounds most of the empirical corporate bankruptcy research.

In this research, we briefly present an overview of the theoretical literature of each category of our corporate bankruptcy framework to provide the background for the discussions based on the summarization and analysis of the empirical literature. We focus on relevant

[17] In our view, "default" differs from the other previous definitions, "financial distress", "insolvency", and "bankruptcy", in two ways. First, conversely to "financial distress" and "insolvency", default is an event instead of a situation. If a firm misses payments on a loan agreement, the firm defaults on that obligation, even if the reason is just due to occasional mismanagement. On the other hand, even if transitory, "financial distress" and "insolvency" are not independent events; rather, the terms convey an idea of an overall corporate condition. Conversely, "bankruptcy" is also related to an event, in that case, to a filing for court-supervised reorganization or liquidation proceedings. However, "bankruptcy" differs from "default" in the nature of the event. The last is a non-payment, and the first is a filing for legal procedure, thus, representing a later stage (more extreme crisis).

publications of both theoretical and empirical papers regarding Bankruptcy Theoretical Research (Aghion et al., 1994; Araujo & Funchal, 2006; Bebchuk, 1988; Bruce, 2012; Jackson, 1986; LoPucki, 1983; Miller, 2004), Bankruptcy Prediction Models (Altman, 1968; Aziz & Dar, 2006; Jones, 2017), Bankruptcy Outcomes (Cornelli & Felli, 1997; Warren et al., 2009; LoPucki & Doherty, 2014; Ponticelli & Alencar, 2016; Moraes, 2019), Bankruptcy Spillovers (Bernstein et al., 2019; Bernstein, Colonnelli, & Iverson, 2019; Castro Martins, 2020; Fonseca & Doornik, 2019; Graham et al., 2019; Harner & Marincic, 2011; Moraes, 2019), Bankruptcy Costs (Andrade & Kaplan, 1998; Thorburn et al., 2000; Bris et al., 2006; Jupetipe et al., 2017), Institutional and Legal Environment (Ponticelli & Alencar, 2016; Warren et al., 2009), Decision's choices for corporate bankruptcy court-supervised proceedings (Hege, 2003; Helwege & Packer, 2003; Davydenko & Franks, 2008; Wang, 2012; John et al., 2013; García-Posada & Mora-Sanguinetti, 2014; Coordes, 2015), and Other Topics (Gilson et al., 1990; Singhal & Zhu, 2013).

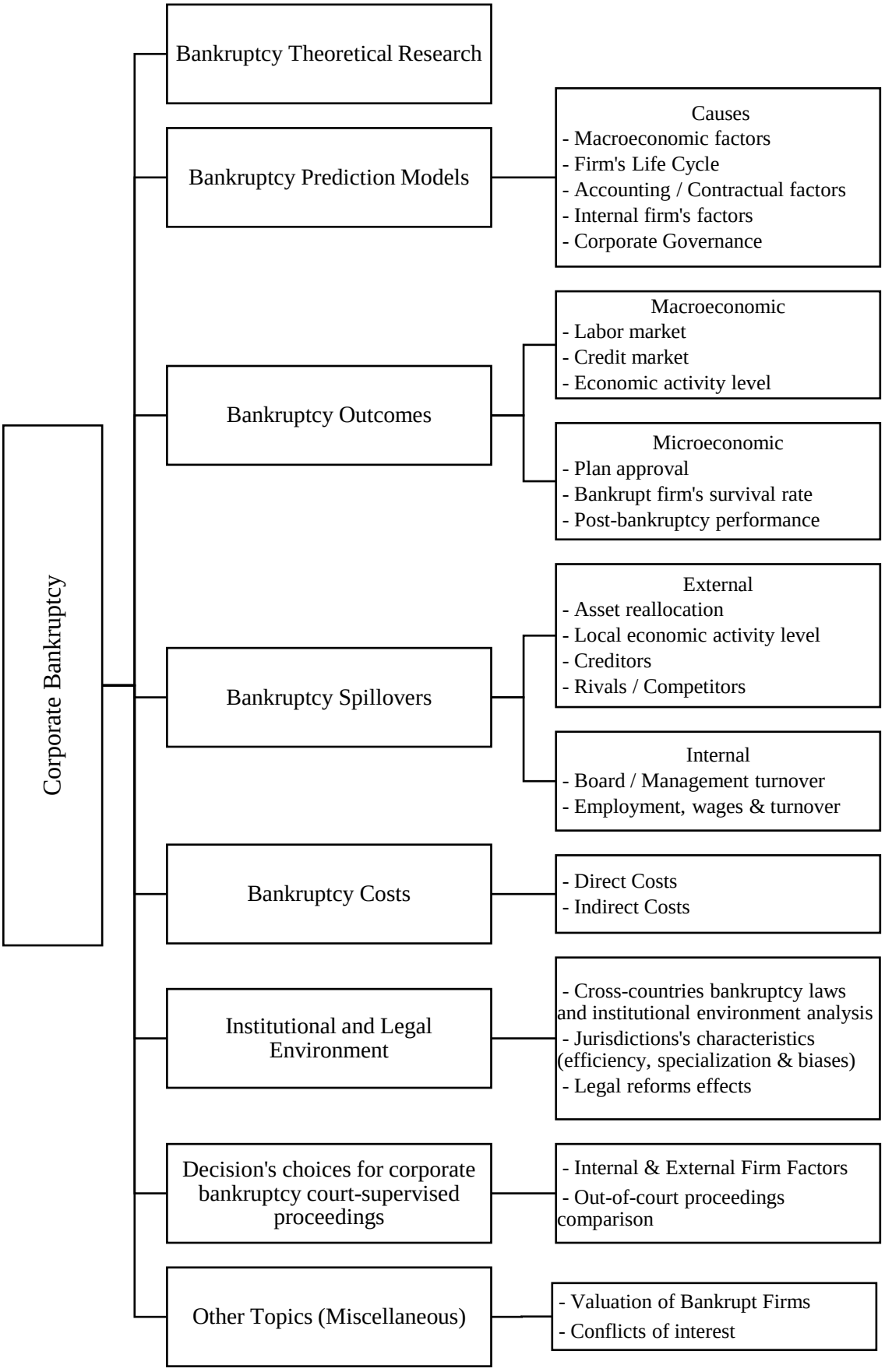


Figure 3 - Empirical Corporate Bankruptcy Conceptual Framework.

1.4 Results of the Systematic Literature Review

Sample Selection

Our sample selection starts with 622 documents gathered from the following keyword combination design searching in article title only of Scopus database: (*firm or corporate) and (bankrupt* or reorganiz* or liquidat**). We refined the search by limiting the publication year to 2000-2020, resulting in 427 documents. We also limited the search to articles and reviews written in English and published in journals only - 315 papers[18]. We then performed title and abstract reviews, reducing the number of papers to 106. Most of the exclusions were papers focusing on methodological issues of bankruptcy prediction models (74 articles - 35%). Following this step, we required the articles to have at least 10 citations in the Scopus database (remaining 48 papers), and we checked the papers for quality and conformity. Our final sample of selected articles consists of 37 high-quality peer-reviewed papers. We collected and codified the selected articles' attributes within this final sample. **Appendix 1.2** discloses the selection process on PRISMA diagram flow adopted in this research.

We acknowledge that our detailed keyword combination design has significantly reduced the number of pre-selected articles. Several well-known empirical papers were not included in our survey. However, other specifications resulted in a number of papers beyond the resources for this research[19]. Our research strategy and implementation focused on obeying a rigorous, transparent, and replicable methodological path. Extending this survey using other search specifications might partly mitigate our selection process caveat.

Descriptive Results of the SLR

The conceptual framework designed in Section **1.3** guides our analysis of the peer-reviewed papers published between January 2000 and December 2020. **Figure 4** shows the number of journal publications regarding "empirical corporate bankruptcy" and "empirical firm bankruptcy" in Scopus database. We display data on our sample of 315 papers (in which we performed the screening on title review) and our final sample of 37 articles. From the widened sample, we notice an increasing number of publications on the topic. We argue that the recent increase is due to the number of academic journals recently registered in the databases and the growing attention due to the recurring global and local economic crises. No pattern was identified in the final reduced sample.

[18] Final Boolean keyword combination design: "*TITLE ((firm OR corporate) AND (bankrupt* OR reorganiz* OR liquidat*)) PUBYEAR > 1999 PUBYEAR < 2021 AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (SRCTYPE , "j"))*".

[19] Primary words: "corporate" or "firm"; Secondary words: "bankrupt*" or "reorganize*" or "liquidat*". Search field: only Article Title. Within several relevant papers, the article title did not contain the words "corporate" or "firm" but only "bankrupt*". The number of papers in the Scopus database considering only the word "bankrupt*" in the Article Title was 3.305 documents for the sample period 2000-2020. If extended the search within abstract, keywords, and title, the search resulted in 11.197 documents for the same period.

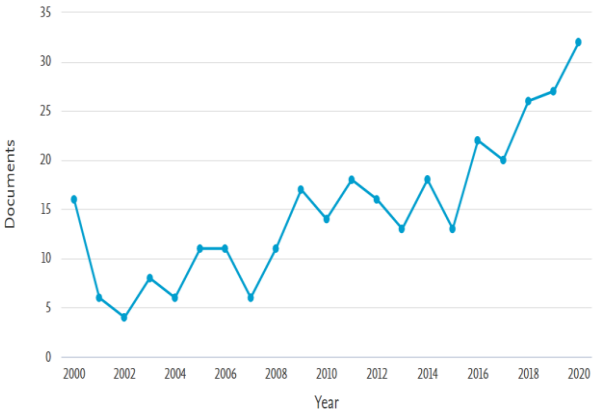


Fig. A – Sample of 315 articles.
Source: Scopus.

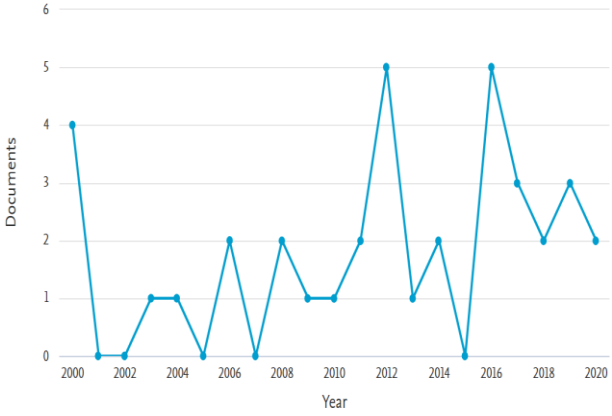


Fig. B – Final sample of 37 articles.
Source: Scopus.

Figure 4 - Total Publications of "Empirical Corporate/Firm Bankruptcy" in Scopus database (2000-2020).

Additionally, the data extracted from the Scopus database suggest a bias towards developed countries and primarily English native language countries in publishing on the topic (**Figure 5**). The United States is by far the nation with the highest number of published articles. This bias is more pronounced in the largest sample of 315 papers (not reported)[20]. Considering the articles from our samples, no author has published more than six papers in the widened sample of 315 papers (no author with more than two papers in our final sample), hinting at a dispersed production on empirical corporate bankruptcy.

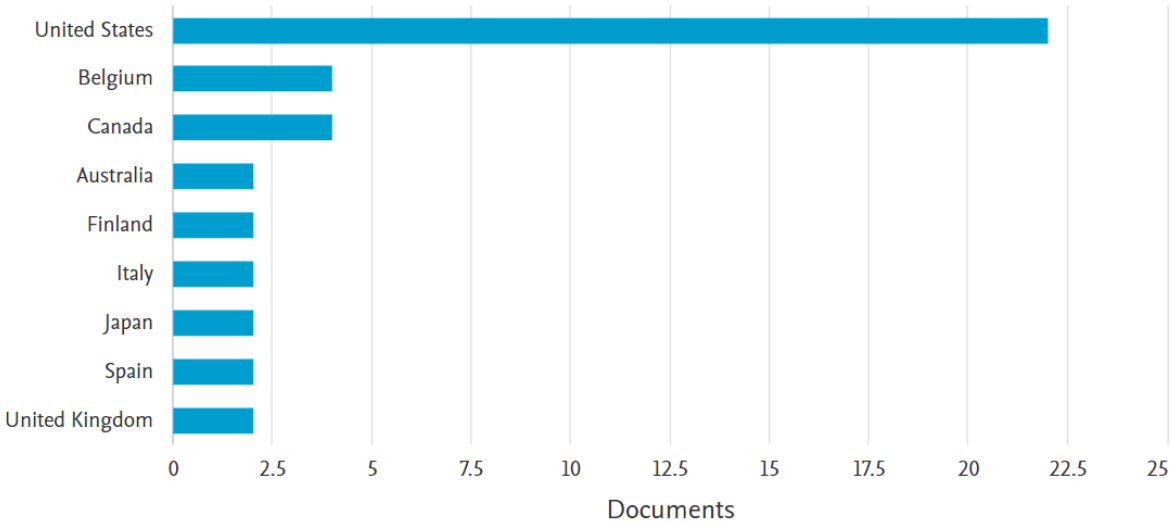


Figure 5 - Total Publications of "Empirical Corporate/Firm Bankruptcy" in Scopus database by country (2000-2020) - Final sample of 37 articles.
Source: Scopus.

Finally, displayed in **Figure 6**, researchers published almost two thirds (90%) of the peer-reviewed articles on the topic in Business, Management, and Accounting, or in Economics, Econometrics, and Finance[21] in our final sample. The data is overlapped (one paper can be classified in more than one field). In the expanded sample of 315 papers (not reported), it is

[20] Graph not reported. The top3 countries in the number of articles published are the United States (103 papers), the United Kingdom (25 papers), and Australia (19 papers).
[21] Research fields categorized by Scopus.

interesting to note that Hard Sciences (Computer Science, Decision Sciences, Engineering, and Mathematics), mostly related to bankruptcy prediction models, represent 18,4% of the published papers, a greater participation than Social Sciences (which includes Law), with only 9%.

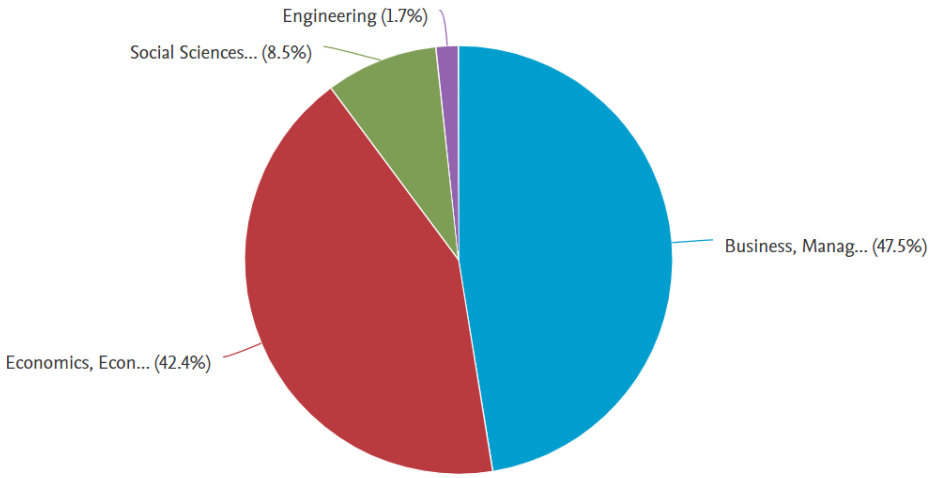


Figure 6 - Total Publications of "Empirical Corporate/Firm Bankruptcy" at Scopus by area of research (2000-2020) - Final sample of 37 articles.
Source: Scopus.

Figure 7 shows the number of papers on empirical corporate bankruptcy in the top6 journals regarding the number of publications in our final sample between 2000-2020. We may note that the publications are mainly concentrated after the year 2008 (subprime crisis) and are dispersed in the journals.

Figure 7 - Number of Papers on "Empirical Corporate/Firm Bankruptcy" published in the Top6 Journals in terms of number of publications on the topic (2000-2020) - Final sample of 37 articles.
Source: Scopus.

Overview of the SLR Results on Data Codification and Summarization of the selected articles

In our research design strategy based on the PRISMA framework, after selecting the articles throughout the screening process, we codified and summarized the selected empirical papers in several attributes to perform our in-depth critical review.

We designed an integrated template, and we filled it with the information extracted from each selected article, consisting of seven discrete research attributes (categories), namely: (1) Conceptual Perspective; (2) Focus; (3) Method; (4) Sample period length; (5) Sample country/ region; (6) Sample population (Level of Analysis); (7) Statistical Technique. **Table 3** reports the categories, their sub-categories, how representative each sub-category is in the categories (%), and the absolute number of selected papers per each sub-category.

Table 3 - Integrated Template (Table of Attributes) Summary: Categories and Sub-Categories - Final sample of 37 articles.

Category	Sub-categories	% Sub-categories in the category	Number of Selected Papers
Conceptual Perspective	Bankruptcy Prediction Models	35%	13
	Bankruptcy Outcomes [Micro]	32%	12
	Bankruptcy Outcomes [Macro]	3%	1
	Bankruptcy Spillovers	8%	3
	Institutional and Legal Environment	3%	1
	Decision´s choices for corporate bankruptcy court-supervised proceedings	5%	2
	Other Topics / Perspectives	14%	5
Focus	Debtor	73%	27
	Creditor	3%	1
	Employees	5%	2
	Management (CEO)	3%	1
	Government (inc. Institutional Environment)	3%	1
	Rivals / Competitors	3%	1
	Other Stakeholders	11%	4
Method	Qualitative	3%	1
	Quantitative	94%	35
	Cases	-	-
	Survey	3%	1
Sample period length	Up to 1 year	14%	5
	1 to 5 years	19%	7
	5 to 10 years	22%	8
	10 to 20 years	30%	11
	More than 20 years	14%	5
Sample country/ region	United States	54%	20
	Belgium	8%	3
	Japan	5%	2
	Multi-country	11%	4
	Other countries	22%	8
Sample population (Level of Analysis)	Municipalities/ States	3%	1
	Sector/ Industry	-	-
	Firm	89%	33
	Others	8%	3
Statistical Technique	OLS	19%	7
	IV	5%	2
	Logit/Probit Regressions	54%	20
	GMM	5%	2
	Multiple Regression	8%	3
	Descriptive Analysis (only)	3%	1
	Mean / Median Tests	8%	3
	Panel Regression	8%	3
	Others	19%	7

Note: The lack of data on specific categories or the identification of more than one sub-category in a relevant article (more pronounced in the category "statistical technique" may result in differences in the sum of the absolute number of selected papers per category. For the category 'Conceptual Perspective' we must classify the article in a sole sub-category.

The codification of the article's attributes brings interesting information on the state of the art of empirical corporate bankruptcy reorganization and liquidation. First, research has been focused on the empirical evidence in predictive models. It comprises the papers from both the 'Bankruptcy Prediction Models' and the 'Bankruptcy Outcomes [Micro]' sub-categories. The first sub-category aims to identify specific associations between firm features or external factors and the likelihood of filing for bankruptcy reorganization and liquidation. The second category examines the determinant factors for 'bankruptcy success', such as emergence from reorganization. In our final sample, many papers investigate how corporate governance and corporate social responsibility affect bankruptcy, suggesting an integrative view of business management, ethics, and law & economics.

The SLR shows a high density of studies analyzing bankrupt firms (73%). Research examining other economic agents connected to a bankruptcy event (creditors, competitors, and management) is scarce. The data suggests that academics have overseen links between different agents in bankruptcy. In addition, the selected papers use data based on various period lengths. Our final sample shows a range from 1 year to 31 years. On the one hand, an extended period length provides additional data and observations for examining corporate bankruptcy issues. On the other hand, data from long ago may not provide the current situation or effects, blurring the analysis of the bankruptcy phenomenon.

Finally, we observe that logit and probit regressions are by far the statistical technique most employed in the papers of our SLR final sample. Logit and probit models are used in prediction studies that primarily apply dichotomous dependent variables. Since the studies predicting the likelihood of filing for bankruptcy or emerging from bankruptcy reorganization are dominant in our sample, it is not surprising that these statistical techniques are prevalent in our sample. We also notice scant research on designing empirical strategies that employ models for causal inference (e.g., Instrumental variables).

Appendix 1.3 presents the fulfilled integrated template (table of attributes) of the data codification used in this systematic literature review, providing detailed information on each selected article.

1.5 Analysis & Discussion on Empirical Corporate Bankruptcy Research

In this Section **1.5,** we develop our in-depth critical review of the selected papers based on Creswell (2009). We analyze and discuss the articles per category of our proposed empirical corporate bankruptcy conceptual framework. We design a brief theoretical overview in each category since it provides the background to link the empirical research to the foundations, arguments, and motivations identified in the literature. We then point out the state of the art, limitations, pitfalls, and gaps of the previous empirical research on each category and propose a future agenda for research.

Bankruptcy Theoretical Research

The theoretical research on bankruptcy has provided several theories, models, ideas, and arguments, that underpin the empirical research and discussion on the topic. The theoretical

background comes from a variety of fields, like business management, law, finance, accounting, and economics. There are also various approaches to developing the field, such as those form a quantitative framework (economic models) or a qualitative basis (social and law theories). Despite being a field of research for decades, bankruptcy theoretical research is still a growing area. We present below some main theories and arguments that underpin the empirical research on bankruptcy reorganization and liquidation.

The foundation economic theory of bankruptcy argues that the legal procedures of reorganization or liquidation should provide an efficient screening to remove inviable firms, reallocate the resources (assets) to more efficient use, as well as preserve those firms that are economically viable (White, 1989; Araujo & Funchal, 2006; Altman et al., 2019). The social costs of bankruptcy should be minimized through an optimal law design that provides circumstances for an efficient interpretation of the norm ex-ante and ex-post (Aghion et al., 1994; Berkovitch & Israel, 1999). Several papers in the past decades exploited alternative bankruptcy reorganization and liquidation proceedings designs and streamlined the balance between the different bankruptcy outcomes (Aghion et al., 1994; Berkovitch et al., 1997; Araujo & Funchal, 2006; Broadie et al., 2007).

The right balance of incentives and rights protection between shareholders, managers, creditors, and other related parties is critical to bankruptcy efficacy. Before filing for bankruptcy, a debtor firm (usually the management) or a creditor (the last, conditional on the bankruptcy law) might evaluate the expected outcomes of the mechanisms for resolving corporate crises. The mechanisms are bankruptcy liquidation, bankruptcy reorganization, or out-of-court private workouts. Nevertheless, the optimal allocation of firms' resources might be constrained by economic and legal frictions of bankruptcy (Campello et al., 2019).

The theoretical literature identifies several frictions that affect bankruptcy reorganization and liquidation. Many theoretical models also examine how these frictions impact the efficiency of the resolutions (Hotchkiss et al., 2008; Campello et al., 2019; Wang, 2022). First, incomplete contracts allow for strategic decisions of the contractual parties. Since it is hard to forecast all contingencies, there are gaps in efficiently enforcing many contracts in legal practice. Also, the quality of the judicial system enforcement accounts for this friction.

Second, information asymmetry is substantial. Shareholders, and managers, in particular, have access to private (internal) information that may not be available to external parties, like suppliers, banks, and other creditors. More precise information on the value of assets as a going concern or sold as piecemeal could reduce the hindrance between the debtor and creditors (Li & Li, 1999; Hotchkiss et al., 2008). Third, conflicts of interest may arise. The wrangling on the rights, claims, and assets distribution between the parties affects the efficiency of the mechanisms, particularly in reorganization proceedings. For instance, the managers of the debtor firm usually file for bankruptcy on behalf of the firm shareholders. Thus, managers may be biased toward situations (reorganization) where they expect a redistribution of resources from creditors to equity, or even just the maintenance of their jobs, ignoring creditors' losses in the decision process (White, 1989). Debates on managerial fiduciary duties may also emerge (Becker & Strömberg, 2012).

Forth, coordination problems appear in situations of dispersed claimants, diversity of debt nature, and multiple creditors' interest, making it more challenging to achieve an all-claims agreement in out-of-court negotiations (Hotchkiss et al., 2008). In addition, creditors holdout and free rider problems may arise before and even during a court-supervised proceeding,

affecting the bargaining positions of creditors (Brown, 1989; Gilson et al., 1990; Wang, 2022). Last, a more recently acknowledged friction concerns judicial biases and enforcement efficiency and how it affects bankruptcy liquidation and reorganization outcomes (Rachlinski et al., 2006; Boughanmi & Nigam, 2017; Wang, 2022).

The business management literature brings theoretical reasons and arguments that explain bankruptcy filings regarding external and mainly internal firm factors, like poor operating performance, high financial leverage, liquidity shocks, unexpected liabilities, inefficient acquisitions, lack of technological innovation, and deregulation of key industries (Slatter & Lovett, 1999; Altman et al., 2019). Moreover, the life-cycle theory proposes that firms follow an expected development path from an introductory stage until a decline stage, the last occurring through private exit or restructuring, or via formal bankruptcy liquidation or reorganization. The entrance and exit of firms are natural characteristics of business markets (Gort & Klepper, 1982; Dickinson, 2011; Altman et al., 2019).

The economic and legal literature shows that there are many benefits of an in-court bankruptcy restructuring to the debtor, compared to both private workouts and bankruptcy liquidation. Although different bankruptcy regimes provide diverse norms, the benefits discussed at this point are substantially present in most jurisdictions. Compared to bankruptcy liquidation, court-supervised reorganization provides an opportunity for the continuation of a firm as a going concern. Moreover, in many jurisdictions, incumbent management maintains control to run the business, suggesting a close relationship with shareholders (Altman et al., 2019). Third, reorganization provides a system that generally allows for negotiations and deviations from the absolute priority rule (APR), distributing part of the proceeds that would be distributed to the creditors in liquidations to the equity holders (Bebchuk, 2002).

Compared to out-of-court restructuring, bankruptcy reorganization eases and reduces coordination costs. The court-supervised centralized proceeding usually encompasses most of the claims, reducing bilateral renegotiations, and it establishes assistance from trustees and creditor committees. Second, the automatic stay rule (ASR) hinders individual creditor foreclosures on the debtor's assets, especially from secured claimants. Additionally, the ASR suspends all payments on prepetition debt subject to the court-proceeding until plan approval, giving a break to the debtor to catch a breath on cash payments (Altman et al., 2019).

Last, several theories in the domain of Law ground the discussions and empirical research on corporate bankruptcy. In general, the theories are a branch of one of the two dominant streams of bankruptcy law theory, as argued by Baird (1998): traditionalists and proceduralists. The traditionalist approach defends the view of extended goals in bankruptcy, including the interest of stakeholders, and emphasizes the preservation of firms and jobs. Moreover, the traditionalists rely on the idea of judges' broader discretionary powers and the rights and needs of the multiple parties. On the other hand, the proceduralists argue that bankruptcy goals should be restricted to the parties linked to the legal proceedings and that both liquidation and reorganization can be positive outcomes. In addition, this approach recognizes the importance of the bankruptcy *ex-ante* effects, the constrained role of courts in ensuring integrity and transparency of the procedure, and the need to give more power to claimholders to decide the future of the debtor firm (Baird, 1998; Mooney, 2004).

In the strand of proceduralists, according to the foundation of the prevailing Creditors' Bargain Theory (CBT)[22], the interpretation of bankruptcy is deemed as the hypothetical (counterfactual) bargaining agreement that creditors would achieve if they were negotiating similar debts in an *ex-ante* position, before the filing for bankruptcy by the debtor (Jackson, 1986). Two potential limitations of CBT concern models taking into account only credit rights originated outside the bankruptcy procedures and restricting the focus only on the firms' assets instead of also considering the relationships among parties, claims, and assets (LoPucki, 2003). Casey (2020) proposed an alternative constrained view of bankruptcy goals as solely solving the incomplete contracting problem and providing a uniform solution to all the parties.

There are other relevant theories in this school. Schwartz (1998) proposes a contract theory approach on bankruptcy based on pursuing the goal of maximizing the value of bankrupt estates. In this sense, alternative bankruptcy systems in which the parties could choose and binding creditor minorities to private contracts are pivotal normative implications of his analysis. Also, Mooney Jr. (2004) presents the "procedure theory", emphasizing that the recoveries of the bankruptcy procedures must be due to holders of legal entitlements ('rightsholders') and not broad stakeholders, such as at-will employees. The theory also relies on the arguments that substantive rules of other systems (outside bankruptcy, like civil and labor laws) should also be provided within the formal bankruptcy proceedings and on the importance of consistency in judges' decisions between different courts.

Regarding the traditionalist school, Korobkin (1991) exploits the "value based theory". The theory addresses the bankruptcy system not only as a mere debt collection procedure or maximizer of economic outcomes but as a mechanism to reduce frictions, primarily information asymmetry, providing more informed and complete solutions to corporate crises. Moreover, noneconomic outcomes, social and political aspects, fundamental fairness, nonbankruptcy rights, and case-specific context are all substantial issues that a multi-dimensional bankruptcy regime for an optimal resolution should observe.

In short, there is still relevant theories, arguments, models, and discussion on theoretical corporate bankruptcy to find an optimized regime. Economic frictions, institutional environment, bankruptcy determinants, firms' features, managerial behavior, agency costs, and externalities are examples of topics that empirical research has shed light on in the past years. We next discuss the categories of our proposed empirical bankruptcy conceptual framework in depth.

Bankruptcy Prediction Models

The body of literature covering the field of bankruptcy prediction models is extensive. Over the past decades, beginning from the papers of Beaver (1966) and Altman (1968), several papers exploited different methods, definitions, and samples to predict bankruptcy. The evolution of technology allowed for designing more complex models based on advanced statistical techniques that require computational power. In this survey, we divide the research on the topic into two streams. The first stream is mainly concentrated on the methodological issues of prediction models. Thus, discussing the methods and statistical techniques to predict

[22] The Creditors' Bargain Theory is also classified as contractarian but, as noted by Mooney Jr. (2004), embraces most of the principles of the proceduralists classification of Baird (1998).

the event is of the essence[23]. The second stream is related to many previous studies on corporate bankruptcy focusing on identifying the determinants of a firm to file for bankruptcy reorganization or liquidation. The investigation is primarily on the effects of a relevant variable on the likelihood of bankruptcy instead of the method itself. Several accounting data, internal debtors' factors, contractual features, corporate governance attributes, institutional and legal characteristics, industry conditions, and macroeconomic factors are deemed as variables of interest in these papers.

It is worth noting that we excluded from our survey all papers classified in the first stream, focused on methodological issues. First, we identified several literature reviews on bankruptcy prediction models centered on methods (Appiah et al., 2015; Shi & Li, 2019). Second, our discussion looks for contributions to theoretical perspectives from the empirical literature. Research examining these determinant factors applies to that goal. Third, the number of methodological papers is substantial and might be more appropriate to perform individual studies (as done by referred previous works). In this research, from the initial sample of 315 selected articles, 74 papers (23,5%) were excluded in the screening process (title and abstract review) based on their classification as a methodological prediction model research.

Extracting from our SLR sample, we shed light on Fich & Slezak's (2008) paper that analyzes how corporate governance affects a firm's ability to avoid filing for bankruptcy. The authors gathered data from 1992-2000 on distressed firms (classified based on Altman-Z score and Interest Coverage Ratio) that filed for Chapter 11 bankruptcy and employed hazard models for estimations. The results indicate that cross-sectional differences in governance features explain approximately 25–30% of the variation in filing for bankruptcy. Board characteristics affect the likelihood of bankruptcy. Smaller and independent boards with a higher ratio of non-inside directors and with larger ownership stakes of inside directors are more effective at avoiding bankruptcy once distress is recognized. The critical caveat of the paper regards the small sample of only 25 bankruptcies filings used in the research.

Lin & Dong (2018) examine how prior corporate social responsibility (CSR) history affects the likelihood of a financially distressed firm filing for bankruptcy. The final sample consists of 1117 distinct firms in the period 2000-2014. The authors employ logit regression models to estimate the probability of filing for Chapter 7 (liquidation) or Chapter 11 (reorganization). The main findings suggest that firms with higher prior history of positive CSR engagement are less likely to file for bankruptcy once distressed. These firms are also associated with faster recovery from the crisis. Moreover, moral capital (representing benevolent or philanthropic activities) reduces the probability of bankruptcy for large firms. Conversely, exchange capital (representing the brand name, loyalty, and other relationship capital) diminishes the bankruptcy likelihood for firms with high intangible asset levels and in a litigious business environment.

We observe that most empirical research focusing on specific variables of interest still uses classical statistical models or applies multivariate analysis (mainly OLS). Furthermore, the empirical research is concentrated on samples from advanced economies. Data availability

[23] Primary models and methods include classical statistical models (discriminant analysis, logit regressions, probit regressions, multivariate analysis, and Z-score) and machine learning and artificial intelligence models (neural network, support vector machine, decision tree, genetic algorithm, fuzzy, and data mining) (Shi & Li, 2019).

might be a differential in performing empirical research on these countries when compared to emerging markets. Finally, Altman et al. (2019) indicate that the use of prediction models has also been extended to active financial management as an attempt to avert formal bankruptcy. Once the management identifies the condition, corrective measures are applied instead of just accepting that the dismal fate of the firm will be to fill for bankruptcy.

Bankruptcy Outcomes

Bankruptcy regimes are designed to provide formal resolutions to corporate crises. An efficient screening of viable firms and an appropriate balance of the parties' rights and duties are essential to contribute to the best allocation of resources and effective outcomes (Altman et al., 2019). The bankruptcy norms and proceedings affect *ex-ante* and *ex-post* outcomes (Cornelli & Felli, 1997; Araujo & Funchal, 2006). The *ex-ante* effects consist of the (des)incentives on the decisions of the economic agents connected to regular firms (not distressed or bankrupt firms) and how they act in the business market in general (Bebchuk, 2002; Agrawal et al., 2019). The *ex-post* effects refer to the influence of the event of a bankruptcy reorganization or liquidation on the post-bankruptcy performance of the relevant firm or other linked parties and on real outcomes (Bernstein, Colonnelli, Giroud, et al., 2019).

In short, the literature on bankruptcy outcomes investigates the effects of reorganization or liquidation proceedings on various economic factors and indicators. The research in this field has been at the core of several studies in the past decades. The main goals are typically examining the success of the bankruptcy regime and understanding the channels and mechanisms that contribute to the relevant outcomes. Based on the previous studies, we identify two strands of outcomes for research: microeconomic outcomes and macroeconomic outcomes.

Regarding the microeconomic outcomes, investigating factors that may affect successful bankruptcy reorganization proceedings is central. For instance, examining how bankruptcy procedures' attributes affect procedural costs and recovery rates (Weiss, 1990; Bris et al., 2006; Jupetipe et al., 2017), plan confirmation rates (Warren et al., 2009), time to emerge (Dahiya et al., 2003), and bankrupt firms' survival rates (LoPucki & Doherty, 2014). The channels from which differentials in resolutions arise is also an essential field for investigation. Identifying and understanding the factors driving successful legal reorganizations is pivotal. Dahita et al. (2003) also analyze how DIP financing influence the likelihood of emerging from Chapter 11, and Höwer (2016) examines the role of bank relationship in successful resolutions.

The post-bankruptcy performance of firms emerging from formal reorganization accounts for the maximization of the value of the firm (going-concern value) (Araujo & Funchal, 2006). Wruck (1991) argues that disruptive innovation and management replacement due to corporate financial crises can lead to rising performance. The benefits of debt to firms on imposing discipline and monitoring (Jensen, 1986; Wruck, 1991), especially DIP financing, may affect the likelihood of a quick and efficient reorganization procedure. One dimension for measuring post-emergence performance exploited in the literature is the excess stock return of former bankrupt firms (Eberhart et al., 1999). Evaluating the operational and financial efficiency or whether the firm emerging from bankruptcy reorganization has been acquired by another company (sold as a going-concern) are alternative ways to investigate post-bankruptcy performance (Altman et al., 2019). The rate and features of firms emerging

from and refiling for bankruptcy reorganization also reveal post-emergence performance (LoPucki & Whitford, 1993; Chang et al., 2010).

The ex-ante effects of bankruptcy on economic agent behavior in situations of normality (prior or not connected to bankruptcy) is a growing strand of research. Well-design legal systems, including bankruptcy norms, should foster mechanisms to guide managerial decisions towards streamlining performance. Examining improvements on firms' capital structure and financial management (Agrawal et al., 2019) is relevant research topic.

Regarding the research on macroeconomic bankruptcy outcomes is essential to understand the influence of bankruptcy regimes on real outcomes. Policymakers and academics usually discuss how efficient bankruptcy reorganization and liquidation procedures can alleviate the negative impacts of corporate crises in the macroeconomy. Investigating the influence of bankruptcy and the relevant judicial framework on the credit market (Araujo et al., 2012; Barbosa et al., 2017; Ponticelli & Alencar, 2016), labor market (Graham et al., 2019; Fonseca & Doornik, 2019), and investments level (Ponticelli & Alencar, 2016) has been in the area research agenda and provide evidence to real effects. The influence of bankruptcy systems can be direct or indirect. For instance, the level of creditors right's protection of a bankruptcy norm may affect credit availability for firms and, consequently, have implications for the labor market (employment level) or the credit market (cost of debt) (Araujo et al., 2012; Fonseca & Doornik, 2019).

The asset allocation evaluation is also at the core of analyzing macroeconomic outcomes of bankruptcy reorganization and liquidation. A preference of incumbent managers for reorganization over liquidation delays the movement of assets from less productive to more productive uses (White, 1989). On the other hand, the ability of an economy to reallocate assets better exerts influence on national productivity and the speed of recovery after bankruptcy events (Bernstein, Colonnelli, & Iverson, 2019).

In our SLR, the paper of Thorburn (2000) is closely related to the category of bankruptcy outcomes once it provides empirical evidence of the liquidation (auction) proceeding in Sweden. The sample consists of 263 auction cases from 1988-1991 for small firms with at least 20 employees. Briefly, the author found that 75% of firms survive the bankruptcy auction as going concerns (similar to the U.S. Chapter 11 survival rate), and that secured creditors recover around 70% of debts on average (while junior unsecured creditors recover almost nothing). In sum, the author emphasizes Swedish auctions as an efficient restructuring mechanism, substantially quicker, cheaper, and with lower deviations from the absolute priority rule.

Leyman et al. (2011) analyze the likelihood of business failure and time to failure of firms on court-supervised reorganization in Belgium. Based on a sample of 190 confirmed reorganization plans from 1998 to mid-2004, the authors employ a probit regression model to estimate failure during the court-supervision post-confirmation stage. In summary, the findings reveal that less viable firms are more likely to fail and do faster. Moreover, the results show indebtedness to highly secured banks and high sums of unpaid taxes as other determinant factors of the likelihood of bankruptcy liquidation (failure).

We discuss in depth the part of these externalities on the business market (macroeconomic outcomes) that are more pronounced in specific other parties in the following sub-section of bankruptcy spillovers. Moreover, one may notice that the microeconomic outcomes are

closely related to the notions of bankruptcy ex-post effects[24] and mainly concentrate attention on bankruptcy reorganization. On the other hand, although the macroeconomic outcomes research is more pronounced for ex-ante effects, it also refers to ex-post effects once the implications for real outcomes tend to be ex-post for a specific bankruptcy case and ex-ante for the general balance of production factors.

Finally, two issues come to light from our survey. First, the caveat on the definition of "bankruptcy success" for both microeconomic and macroeconomic outcomes. For instance, Warren et al. (2009) use the reorganization plan approval rate as a proxy for success. However, inefficient firms should follow a liquidation procedure and shut down in an efficient bankruptcy regime. Critics arise to studies using dubious proxies for success and shed light on the need for a deeper discussion on the topic. Second, designing a counterfactual scenario and looking for causal inference appears to be challenging because of data availability.

Bankruptcy Spillovers

The literature on bankruptcy spillovers has grown in the past decades. This research category may be considered a subset of the overall bankruptcy outcomes but more focused on specific linked externalities. The first body of research on the contagion of bankruptcy filings and announcements focused mainly on intra-industries effects (Warner, 1977; Lang & Stulz, 1992). The effects of bankruptcy liquidation and reorganization in competitors may occur through the contagion effect, negative externality in the industry based on the consumers' and lenders' perceptions of the increased intra-industry risk, or the competitive effect, positive externality in rivals due to a potential reduction in competition and increase in rivals' market share (Lang & Stulz, 1992; Helwege & Zhang, 2016). The indirect subsidies to bankruptcy filing firms, especially in reorganizations, like the cease of interest payments between the file for bankruptcy and the plan acceptance, may affect the intra-industry competition. The maintenance of inefficient firms because of the benefits from subsidies may put pressure on rivals to also file for bankruptcy to get the subsidies (White, 1989).

The spillovers from bankruptcy reorganization and liquidation might be positive or negative conditional on the procedure, the environment, and the affected party. Warren et al. (2009) claim for the positive externalities of formal reorganization through preserving employment and advancing community stability. On the other hand, several papers highlight negative externalities, such as reducing local plant occupancy and employment, which are more pronounced in bankruptcy liquidation than reorganization (Bernstein, Colonnelli, & Iverson, 2019), and decreasing supplier's stock price (Hertzel et al., 2008). Since bankruptcy affects external parties via the link and ripple effects (Fujiwara, 2008), understanding the contagion of corporate crises across geographically proximate firms (Bernstein et al., 2019; Moraes, 2019) and economic networks is pivotal for local and national economic stability (Acemoglu et al., 2012; Carvalho, 2014).

A recent trend in the field focuses on the discussion and investigation of bankruptcy spillovers on firms' internal aspects, mainly personal. The channels and consequences of bankruptcy filings on board, management, and employee turnover and compensation are central to the debate. On the one hand, keeping the management and the key employees signals the aim to

[24] The ex-ante effects of bankruptcy on economic agent behavior in situations of normality (prior or not connected to bankruptcy is one exception.

preserve firm-specific experience and reduce search and training replacement costs (Altman et al., 2019). On the other hand, formal bankruptcy may negatively affect current and futures opportunities and remuneration of internal staff (Graham et al., 2019), being a trigger to job turnover and replacement.

From the selected papers of our SLR, we highlight the work of Helwege & Zang (2016) that explores in depth the contagion effects on financial firms based on a sample of 142 bankruptcies from 1980-2010. The authors conduct two event studies: the first considering the creditors of the bankrupt financial firm to examine the counterparty contagion effect and the second with competitors (peer firms) to investigate information contagion. The authors use the abnormal equity returns (ARs) and the cumulative abnormal returns (CARs) of creditors and rivals' stocks to estimate the effects. The results show that counterparty exposures are small, especially among banks that face diversification regulations, and the contagion is more significant in cases of riskier financial firms and larger and more complex exposures. Conversely, information contagion is stronger for competitors in the same markets, and the effects are larger before the formal filing for bankruptcy (in financial distress). Because of data availability, one caveat of the paper is concentrating the analysis of counterparty effects only on the top20 unsecured creditors. Since the size of the credit exposure between financial institutions might be correlated to the size of the creditor bank, the research lacks the investigation of these effects on likely smaller banks.

Regarding the growing body of studies on bankrupt firms' internal effects, Eckbo et al. (2016) investigate chief executive officer (CEO) career and compensation changes for large firms filing for Chapter 11. Based on a sample of 322 U.S. bankrupt firms during the period 1996-2007, the authors track the data on CEO turnover and compensation from year -3 to the year +1 of emergence from reorganization or the year of the event for liquidated or sold firms (607 incumbent and replacement CEOs). The main results reveal that in most bankruptcies, there are departing CEOs (86%), and 32% of the incumbent CEOs maintain executive employment one year after emergence in the restructured firm or another company. In addition, the research found a negative association between CEOs likelihood of leaving the bankrupt firm and CEO share ownership and firm profitability. Also, control rights affect the likelihood of remaining CEOs. More creditor controls are linked with higher CEO career change.

Lastly, concerning the caveats of this field of research, it is worth noting the comments of Hertzel et al. (2008) on the challenges of disentangling the spillover effects of financial distress and legal bankruptcy[25]. The authors argue that a corporate crisis is typically known before the formal filing for bankruptcy. Extending an analysis to the period leading up to bankruptcy might convey a broader view of the contagion effects. Actions by the distressed firm and the linked firms before the filing event might already affect other parties.

Bankruptcy Costs

Bankruptcy regimes should provide efficient and cost-effective solutions to corporate crises (World Bank, 2021). The costs of bankruptcy reorganization and liquidation procedures can be substantial, and understating and quantifying these costs are pivotal (Bris et al., 2006; Wang, 2022). In short, bankruptcy costs are classified as direct or indirect costs.

[25] These challenges of disentangling the effects of financial distress, insolvency, bankruptcy, and other stages of corporate crises apply to all the categories of studies on empirical corporate bankruptcy reorganization and liquidation.

The direct costs include mainly a diversity of fees and out-of-pocket expenses: legal & administrative fees of the judicial system, trustee's remuneration, lawyers and consultants' fees from the parties, expenses on arranging creditors meetings, and other expenses to provide information to the participants of the proceedings (Wruck, 1991; Bris et al., 2006). The indirect costs regard the indirect losses of a firm filing for formal bankruptcy and are closely related to the "opportunity costs"[26], such as the value of forgone investment opportunities, loss of costumers, sales, and profits, tightened credit terms with suppliers and lenders, the fire sale of assets, management's diversion from running the business, timing under bankruptcy, loss of key employees, reduction of firm estate's value (White, 1989; Jensen & Meckling, 1976; Bris et al., 2006; Altman et al., 2019; Wang, 2022).

Moreover, the literature indicates that indirect costs are typically larger than direct costs. The magnitude of professional fees and administrative expenses generally affects a firm's financial performance less than the loss of opportunities (sales, investments) and time spent on the proceedings (Wang, 2022). Also, practitioners and academics have observed scale effects on bankruptcy costs. The costs of bankruptcy reorganization for small firms may be prohibitive and lead to liquidation, sometimes even exceeding any remaining firm value (Altman et al., 2019).

A challenge for empirical research is the difficulties in measuring both direct and indirect costs. In most countries, there is a lack of centralized administrative or private sources listing bankrupt firms and their direct bankruptcy costs, limiting the studies to samples of cases when documentation is available (Altman et al., 2019). Because of their unobservable characteristics, indirect costs are more difficult to estimate empirically, and the measures typically indicate just a fraction of the costs (Hotchkiss et al., 2008).

From our systematic survey on empirical corporate bankruptcy, we shed light to the paper of Singhal & Zhu (2013) that examine how firm diversification affects bankruptcy reorganization costs. Based on a sample of 769 bankruptcy filings between 1991 and 2007, the findings reveal higher bankruptcy costs as measured by time spent in Chapter 11 for diversified firms. The authors reinforce that spending more time within a formal procedure may result also in higher direct costs and decline in operating performance because of the dispersed focus. Additionally, Thorburn (2000) also investigates the direct bankruptcy costs of auctions (liquidation) proceedings in Sweden and finds that the direct costs are found to decrease with size (average 6.4% for the total sample and 3.7% for the one-third largest), relatively lower costs than the proceedings on the U.S. bankruptcy regime. However, in both papers, the authors also designed other primary specifications for investigating bankruptcy likelihood (Singhal & Zhu, 2013) or survival and recovery rates (Thorburn, 2000).

Institutional and Legal Environment

[26] The theoretical literature wonders if most of the indirect costs of bankruptcy reorganization, or even liquidation, are from financial distress and not from the filing for Chapter 11 or similar procedures abroad the U.S.. A substantial share of the indirect losses in value, like those due to the risk of loss of valued future amenities for customers, employee replacement, and forgone opportunities, applies to the distressed firm even before the legal bankruptcy initiates (Altman et al., 2019). Thus, it is of the essence to appropriately disentangle the effects of financial distress (the initial stage of corporate crisis) from formal bankruptcy filing (the extreme stage of the crisis).

Legal and institutional environments play an important role in resolving corporate financial crises. The bankruptcy law sets the basic framework of the reorganization and liquidation procedures. The attributes of the national legal system (like the level of protection of creditors' rights, court enforcement quality, judicial decision's consistency, and degree of judicial bias) and the provisions typically of corporate, tax, and procedural laws, also contributes to giving (des)incentives to the debtor firms, creditors, managers, and other economic agents. The regulatory quality, maturity of the capital markets, economic competition protection, and corporate credit markets accessibility, are also sources of impact (variation) of the bankruptcy regime efficiency.

Based on this variation between jurisdictions, one field of research is cross-countries studies that examine differences in bankruptcy law aiming to identify and disentangle the effects of legal and institutional factors and attributes that are correlated to measures of efficiency and efficacy (Davydenko & Franks, 2008; Djankov et al., 2008). The efficiency, specialization, and biases of courts may also affect case outcomes, and a growing body of research focuses on these potential judges' and courts' differences (Wang, 2022). One recent and popular strategy design uses the random assignment of judges to bankruptcy cases as a source of variation, providing paths to apply the Instrumental Variables-Two Stage Least Squares (IV-2SLS), a robust statistical design method.

The investigation of legal reform's effects on economic outcomes is also one of the main fields linking bankruptcy to institutional and legal environments. The use of law overhauls as a source of exogenous variation to estimate *ex-ante* and *ex-post* impacts is well-grounded in the literature (as *quasi-natural* experiments) and contributes to causal empirical strategy designs. The legal reforms may affect specific agents (*e.g.*, claimholders), the bankruptcy reorganization or liquidation proceeding, or the local or macroeconomy.

From our systematic literature review, an example is the work of Ponticelli & Alencar (2016). The authors use an instrumental variable strategy that exploits Brazilian state laws on judicial organization centering on the differences in court congestion across otherwise similar neighboring municipalities located across judicial district borders (to instrumentalize court enforcement). This setting provides the opportunity to examine how court enforcement affects the impact of a bankruptcy legal reform on firms' access to finance, investment, and size.

Moreover, Gutiérrez et al. (2012) investigate the effects of bankruptcy law on firms' performance and value (proxied as Tobin's Q). The authors compare the bankruptcy regime in four European countries (France, Germany, the United Kingdom, and Spain) and the United States. Based on a sample of more than 3000 firms in the period of 1990-2002, the authors apply System-GMM to dynamic panel data to estimate the effects on firms' value of several bankruptcy law characteristics. The main results reveal the *ex-ante* effects of the bankruptcy regime. There is a decrease in the value of firms filing for bankruptcy in creditor-oriented systems (Germany and the United Kingdom).

Decision's choices for corporate bankruptcy court-supervised proceedings

The legal regime to resolve corporate crises on debt contracts includes provisions from bankruptcy law and norms on out-of-court mechanisms (Hotchkiss et al., 2008). Once a firm defaults on its debt payments, managers must choose how to overcome the crisis. There are two main strands of research in this category, and both typically relate to bankruptcy reorganization only. The first strand compares the benefits and drawbacks of resolving

insolvency through out-of-court proceedings or court-supervised procedures (formal bankruptcy). The second strand analyses how firm' internal characteristics and external factors affect the likelihood of a firm choosing in-court or out-of-court procedures.

The provisions on creditors protection, absolute priority rule, incurred costs, and allocation of control over the firm in crisis, among other attributes, affect the managers' willingness to choose private workouts or formal bankruptcy. It is worth noting that even for firms that decide to reorganize in-court or out-of-court, the bankruptcy liquidation procedure sets the bargaining framework (White, 1989). After all, the extreme step of liquidation occurs if the debtor and creditors are unable to achieve a private agreement or approve a formal restructuring plan.

On the one hand, there are substantial benefits on court-supervised proceedings. First, the bankruptcy court supervises, at least partly, managerial decisions, likely preventing occasional abuses (White, 1989). Second, creditor coordination problems that are pronounced in private workouts are mitigated in legal bankruptcy. The court-supervised centralized proceeding usually encompasses most of the claims, reducing bilateral renegotiations, and it establishes assistance from trustees and creditor committees. The nature of the debts, the number and heterogeneity of claimants, and the conflicts of interest that may arise, have implications for the managers' decisions. For instance, the share of secured lenders (over or under collateralized) affects the incentives for an in-court deal *versus* out-of-court (Hotchkiss et al., 2008; Altman et al., 2019). Holdout problems of creditors that hold substantial claims and do not signal an intention to agree on private workouts and empty creditors problems related to those claimants holding credit default swaps (CDS) that have a strong incentive not to negotiate are also reduced in bankruptcy reorganizations (Altman et al., 2019).

Forth, the debtors' ability to issue DIP financing is another key advantage of formal reorganization (Wruck, 1991). The new creditor priority over pre-bankruptcy filing claimants is an incentive to foster this funding modality. Another positive point of in-court procedures is the automatic stay rule that hinders individual creditor foreclosures on the debtor's assets, especially from secured claimants (Altman et al., 2019). In addition, formal bankruptcy reorganization generates indirect subsidies from creditors and the government, such as temporary cease of interest payments and beneficial tax implications on the accounting earnings from debt forgiveness of settled liabilities (White, 1989).

On the other hand, formal bankruptcy reorganizations have relevant drawbacks compared to private workouts. First, direct costs (professional fees and administrative expenses) and indirect costs (time spent on courts, management's diversion, reputational damage, loss of sales, and key employees) are typically higher in formal reorganization procedures (Bris et al., 2006; Wang, 2022). High bankruptcy costs can significantly impede a firm's ability to succeed in a legal reorganization, especially small-sized firms. Moreover, there are several instruments to restructure the debts out-of-court that may apply to a firm's need, mainly medium-sized and large companies, like recapitalization via a capital injection, a tender offer, or an exchange offer (Altman et al., 2019).

Another pivotal drawback is the occasional discretion and biases of judges that may generate uncertainty in the in-court procedures (Rachlinski et al., 2006; Altman et al., 2019; Wang, 2022). Finally, a disadvantage of private workouts is that managers face a higher risk of losing their jobs in legal bankruptcy proceedings because of the higher possibility of control change. Thus, there is generally a managerial preference towards out-of-court restructuring

and job security (White, 1989; Singhal & Zhu, 2013).. This bias may prevent better assert reallocation and indicate a conflict of interest with shareholders since the best outcome could be even liquidating the firm privately.

The second strand of studies sheds light to the firm internal characteristics and external factors influencing managers' decision to file for bankruptcy. This strand is partly connected to the first in considering attributes from debt contracts and creditors. However, the main differential and focus are about internal characteristics of the firm that looks for the best choice for succeeding in the reorganization between in-court and out-of-court proceeding.

The assets' features influence the managerial decisions. Firms with more significant current and future values of intangible assets are more prone to private workouts. The risk of destroying more value of intangible assets in a bankruptcy reorganization or liquidation procedures are higher (Gilson et al., 1990; Wruck, 1991). Moreover, firms with higher leverage may face greater coordination problems, conflicts of interest, and challenges to propose haircuts. Thus, managers are more likely to file for bankruptcy in high leverage firms (Gilson et al., 1990). Similarly, situations of a large number and dispersed creditors, resulting in a complex and costly reorganization, reduce the likelihood of private workouts (Wruck, 1991).

The size of the firm also influences the likelihood of the way to solve corporate crises. Small to medium-sized firms' debt typically comprise bank loans and trade debt. The negotiations are mainly for maturity extensions or refinancing of the loans. On the other hand, large firms have a more complex debt structure and negotiate with holders of many classes of debt. Thus, small to medium-sized firms tend to opt for out-of-court proceedings (Altman et al., 2019). The high costs of court-supervised proceedings also affect the likelihood of small firms filing for bankruptcy (Bris et al., 2006; Waisberg et al., 2019).

From our SLR, the paper of Donoher (2004) highlights accounting and internal firm characteristics that affect the decision to file or not to file for bankruptcy reorganization. Based on a sample of 110 bankrupt firms and 110 equally leveraged firms that avoided bankruptcy from 1990 to 1996, and applying a hierarchical logit regression, the author finds that governance and capital structure characteristics influence the filing decision. Firms with high levels of inside equity ownership and secured indebtedness file in poorer financial condition than peer firms. Conversely, firms with high levels of outside equity ownership and short-term indebtedness file for bankruptcy reorganization in relatively better financial condition.

Other Research Topics (Miscellaneous)

Despite the efforts to provide a conceptual framework that could categorize all types of empirical research on corporate bankruptcy, there are still bodies of research that lack a sufficient number of studies to be individually classified or that require more solid theoretical background. We classified two research fields within our miscellaneous topic: valuation of bankrupt firms and conflict of interest (bargaining) in bankruptcy.

The literature on corporate bankruptcy valuation recognizes the challenges of applying standard valuation models such as the Discounted Future Cash Flows (DFC) and industry-multiples for bankrupt firms (Altman et al., 2019). Historical performance of bankrupt firms is less predictable, bringing more uncertainty in developing cash flow models. Identifying

comparable transactions and the effects of occasional industrywide distress are additional obstacles to valuating these firms. The discussions on the underlying assumptions of the DFC models are intensified in bankrupt firms since information asymmetry and conflict of interest are higher than in non-bankrupt firms' negotiations. The value of the bankrupt firm is essential for debtors and creditors to negotiate the expected proceeds and be appropriately informed to compare the bankruptcy outcomes – reorganization or liquidation. There is scant but relevant literature on corporate bankruptcy valuation. The acceptance by partitioners of valuation methods for bankrupt firms, which has shown to be successful in academic studies may contribute to increasing the research on the topic.

The literature on conflicts of interest and bargaining applies primarily to bankruptcy reorganization. Bankruptcy reorganization proceedings mainly concern creditor distribution negotiation (Jackson, 1982), even following rules of *par conditio creditorum* (Sullivan et al., 1983) and of fairly and equitably treatment of creditors. On the other hand, bankruptcy liquidation must follow a court-supervised procedure with scant or no place for negotiations and deviation from the absolute priority rule (APR)[27]. Wruck (1991) emphasizes the conflicts over how reorganization policies distribute wealth across managers, creditor, and shareholders. For instance, the wrangling on the rights and assets distribution may affect managerial towards job security instead of procedural or corporate efficiency (White, 1989; Singhal & Zhu, 2013). Creditors holdouts and free rider problems may also arise within the proceedings. The bargaining arena of formal reorganization is a rich context for empirical research.

From the selected articles of the final sample of our SLR, Gilson et al. (2000) compare the market value of firms that reorganize in bankruptcy with estimates of value based on management's published cash flow projections. The final sample consists of 63 publicly traded firms emerging from bankruptcy reorganization in the period 1979-1993. The authors consider three valuation methods: capital cash flow (CCF) model, comparable company multiples, and fresh start accounting information, related to values implied by the cashflow forecasts in their reorganization. The valuation error equals the natural log of the *ratio estimated value / market value*. The results indicate that valuation methods of firms emerging from formal reorganization generally yield unbiased estimates of value. However, the dispersion of valuation errors is very wide (from less than 20% to greater than 250%). The variation in these errors is related to empirical proxies for claimholders' incentives to overstate or understate the firm's value (strategic distortion). The small sample and the subjective assumptions of sensitivity analysis are caveats and flaws of the relevant research.

General Discussion on the Empirical Corporate Bankruptcy Research and Agenda for Future Research

The survey on empirical corporate bankruptcy reorganization and liquidation allows us to identify the state of the art, flaws, caveats, and gaps from the prior literature on the topic. We provided a brief overview of each category of our proposed conceptual framework. The

[27] The Absolute Priority Rule (APR) establishes that all claims subject to the bankruptcy liquidation proceeding must be paid in a particular order. A priority creditor must receive in full before the payment of a creditor ranked lower in priority. Furthermore, the APR specifies that secured creditors must receive the value of the lien independently of any other priority. Any remaining credit of the secured claimant will be classified as an unsecured claim (White, 1989).

systematic literature review based on our final sample of empirical papers adds data and information to support our discussions and suggestions for future research.

The empirical research on corporate bankruptcy has made significant progress since the beginning of the 21st century. Not only due to an increase in the number of published peer-reviewed articles since 2000 but rather because data availability and the quantitative methods applied to the empirical studies have improved. Nevertheless, we observe a substantial difference in the numbers and data of articles from advanced economies (especially the U.S.) and emerging countries. Thus, extending the research to more dispersed bankruptcy regimes and capital market stages (especially emerging markets) should enhance the knowledge in the field. Including these emerging markets in empirical cross-country studies is also a stream for new studies.

As expected, the law literature is more focused on theoretical discussions, although legal academics have performed important empirical studies since the 1970s. Economic and Law theories are sources of new findings and provide potential directions for future studies. Multidisciplinary work is still a challenge for bankruptcy research and a source of opportunities.

From our systematic literature review, the conceptual framework category "Bankruptcy Outcomes" is one of the most prominent in our sample of selected papers. The attention to the post-bankruptcy performance seems to be an essential issue for practitioners and academics since providing evidence of the results of emerging from bankruptcy reorganization is critical to an optimal bankruptcy regime design (Aghion et al., 1994). The empirical papers focus more on firm-level analysis and mainly shed light on the bankrupt firm. We notice a growing body of literature emphasizing the effects of bankruptcy on other parties like creditors, rivals, managers, and local markets. Understanding occasional connections between economic agents linked to a bankruptcy event is a path for new research.

A caveat of our SLR on empirical corporate bankruptcy is that it is based on a specific and non-extensive final sample. On the other hand, our SLR survey design based on the PRISMA framework ensures methodological transparency and replicability. Thus, expanding our survey through alternative keywords combination design, such as adding new secondary words like distress, insolvency, failure, and crisis, may add information to the field. Alternative specifications could consider the primary word "bankruptcy" only in searching within article titles.

The progress of data science allows for applying new technologies such as web scraping, data mining, and text-matching, among others, for gathering data from legal procedures, firms' statements, and personal information. In addition, in the past years, finance and economic researchers have been increasing the use of more advanced empirical strategies, looking for causal effects. In our sample of the SLR, most papers use logit/probit regression models in the empirical estimation, although since 2015, some studies have adopted IV (instrumental variables) and grounded the empirical specification in an exogenous variation. Nevertheless, increasing and improving the use of instrumental variables approach, regression discontinuity design (RDD), other non-experimental methods for causal inferences, and non-parametric models emerges as an avenue for future research.

On the other hand, we observe that the selected articles are highly concentrated on quantitative methods and missed evidence from qualitative, survey, and case studies. One path

for new studies is also focusing on alternative approaches to provide empirical evidence. For instance, employing methods of surveys on corporate finance and economics like the ones used by Campello et al. (2010) or Djankov et al. (2008).

Finally, despite not being directly linked to empirical research, one substantial void in the field concerns the need for an accurate and multidisciplinary accepted definition of "bankruptcy". Although corporate bankruptcy is a topic that has been researched for many decades, the interchangeable use of other words like financial distress, insolvency, and failure, among others, especially in Finance and Economics, challenges a clear boundary of the empirical research. This caveat affects the proxies and measures of bankruptcy employed in empirical research and hinders disentangling the effects of different stages of corporate crisis. The need for an accurate definition also applies to other dimensions of the empirical research, such as the concept of "success" in bankruptcy, as we discussed in the sub-section of bankruptcy outcomes.

From our conceptual framework category analysis and general discussions, it comes to light how future studies can fill some research gaps and overcome limitations and flaws from previous papers. We consolidate our proposed agenda for future empirical research in **Table 4**.

Table 4 - Agenda for future empirical research on corporate bankruptcy reorganization and liquidation

	Flaws, Limitations & Gaps	Opportunities for future research
1	Lack of studies in emerging countries context and comparison of bankruptcy regime of emerging markets to the ones of advanced economies.	Studies on emerging markets context and cross-country research.
2	Need to understand the links between economic agents (other than the bankrupt firm) in a bankruptcy reorganization or liquidation.	Research focusing on occasional links between other economic agents connected to a bankruptcy event (creditors, competitors, management, local activity).
3	Lack of systematic literature review on corporate bankruptcy & specific and non-extensive sample of the current SLR.	Expanding our SLR survey through alternative keyword combination designs.
4	Few studies apply statistical methods and empirical design that allow inferring causality.	Improving and increasing the use of methods for causal inferences in empirical research, such as employing IV and RDD.
5	Scarcity of qualitative, survey, and case studies for providing empirical evidence on corporate bankruptcy.	Survey research with practitioners and other economic agents linked to bankruptcy reorganization and liquidation cases
6	Need for accurate definition of "bankruptcy" or other related terms of empirical research on the topic.	Theoretical or meta-analysis studies to provide a more accurate definition or at least indicate the ones most used in the literature.

1.6 Conclusion

The empirical research on corporate bankruptcy reorganization and liquidation has significantly increased since 2000. We addressed the need for summarizing and analyzing most of what has been published in the past decades. We proposed a conceptual framework for empirical corporate bankruptcy to ease the categorization and understanding of previous empirical studies and guide future research. The theoretical literature overview gives the foundations for empirical research.

Our systematic literature review based on a standard framework ensures methodological transparency and replicability. We partly fill the gap of the lack of SLR on empirical corporate bankruptcy by summarizing, synthesizing, and critically analyzing empirical studies published between 2000-2020. Our approach integrates findings from law, business management, finance, economics, and accounting literature, which expands our review reach. We deem that this SLR contributes to legal and business practices as we summarize evidence-based findings of prior research, which may support legal reform discussions, influence bankruptcy norms' interpretation, and affect managerial decisions.

While we fulfill the goals of our SLR, there remains much to learn and synthesize about the channels, variation, motivations, incentives, and effects in general of corporate bankruptcy reorganization and liquidation on social, legal, and economic outcomes in multiple legal systems worldwide. We expect this SLR and the conceptual framework to encourage additional empirical research on the stirring area of corporate bankruptcy.

Appendix 1.1

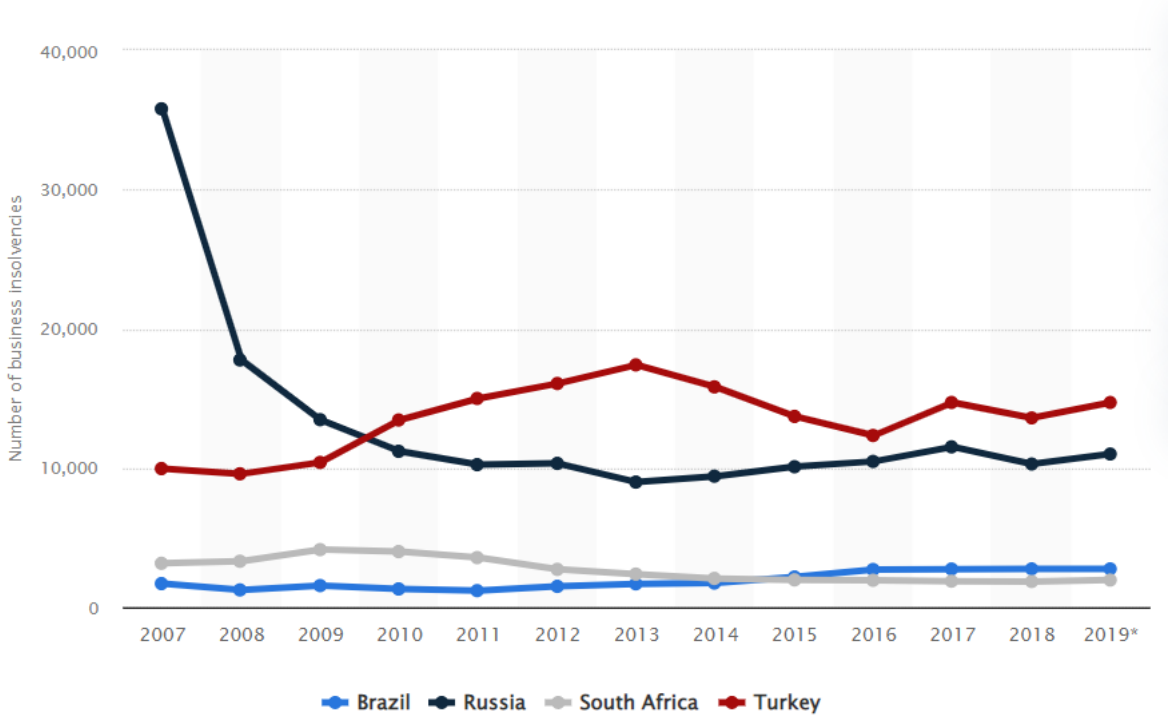
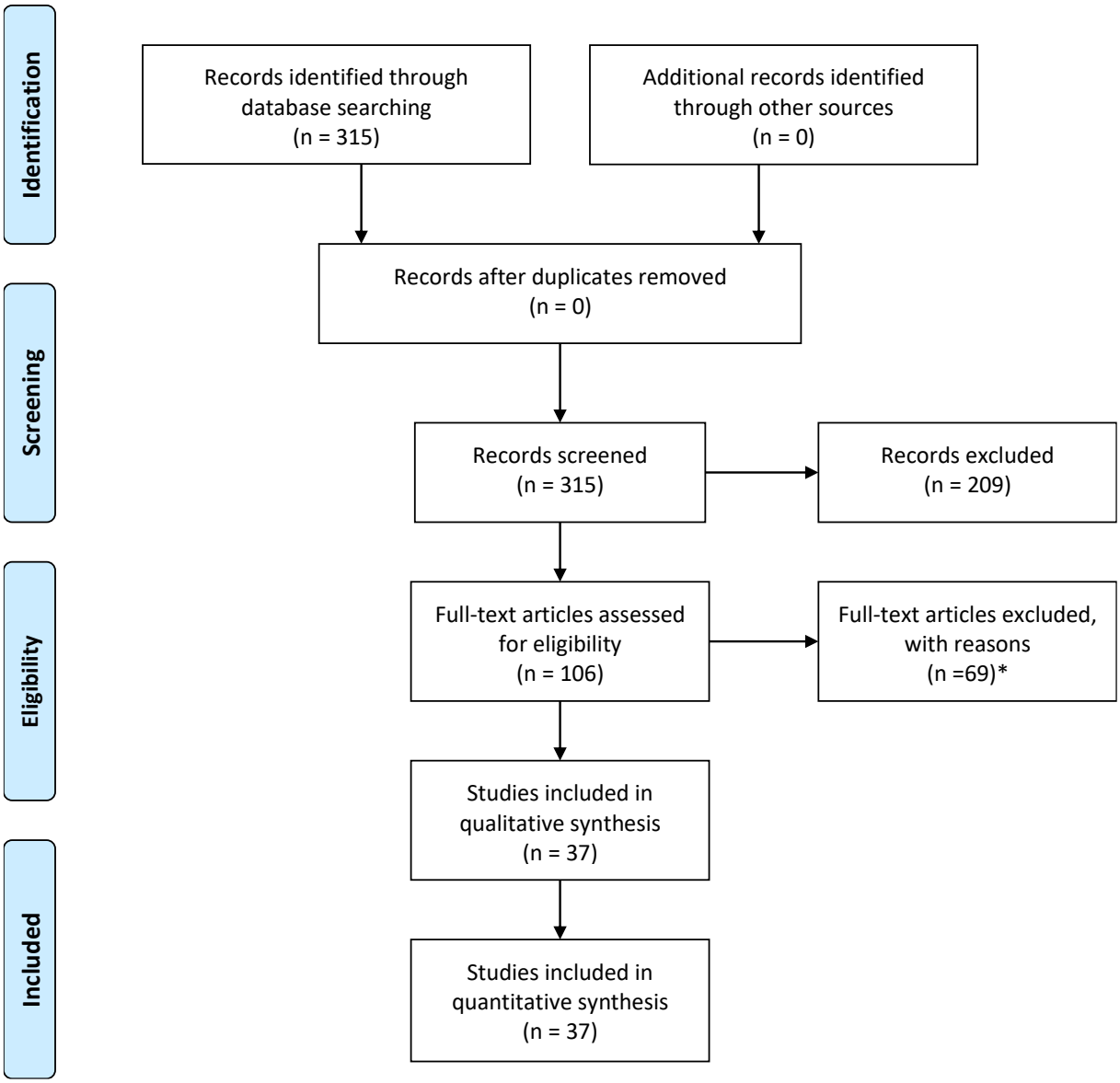


Figure 8 - Business insolvencies in selected major developing economies (2007-2019).
Source: Statista (2020).

Appendix 1.2



Note: * 58 articles excluded before full-text analysis, based on the citation criterion (Scopus citations greater or equal to 10).

Figure 9 - PRISMA diagram flow of our Systematic Literature Review on Empirical Corporate Bankruptcy. [28]

[28] Original PRISMA Flow Diagram: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097. Available at: http://www.prisma-statement.org/.

Appendix 1.3

Table 5 - Systematic Literature Review Data Codification and Summarization Integrated Template (Table of Attributes).

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
1	Thornhill S., Amit R.	2003	Learning about Failure: Bankruptcy, Firm Age, and the Resource-Based View	Organization Science	What lead firms at different ages to failure.	Bankruptcy Prediction Models	Debtor	1996	Canada	Firm	OLS	Firm age at time of bankruptcy
2	Thorburn K.S.	2000	Bankruptcy auctions: Costs, debt recovery, and firm survival	Journal of Financial Economics	Investigation to the Swedish auctions bankruptcy system efficiency	Bankruptcy Outcomes [Micro]	Debtor	1988-1991	Sweden	Firm	Probit & OLS	Prepack, Survival & Costs
3	Carter R., Van Auken H.	2006	Small firm bankruptcy	Journal of Small Business Management	Investigation of causes of failure / bankruptcy	Bankruptcy Prediction Models	Debtor	2003	United States	Firm	Mean/ Median/ X^2 Tests & Logit	Bankruptcy (reorganization or liquidation)
4	Fich E.M., Slezak S.L.	2008	Can corporate governance save distressed firms from bankruptcy? An empirical analysis	Review of Quantitative Finance and Accounting	Investigation of how corporate governance affects a firm's ability to avoid filing for bankruptcy.	Bankruptcy Prediction Models	Debtor	1992-2000	United States	Firm	Hazard regression models	Time from initial distress to bankruptcy reorganization filing.
5	Gilson S.C., Hotchkiss E.S., Ruback R.S.	2000	Valuation of Bankrupt Firms	Review of Financial Studies	Comparison of the market value of bankrupt firms with estimates of value based on management's published cash flow projections.	Other Topics / Perspectives	Debtor	1979-1993	United States	Firm	OLS & Sensitivity analysis	Valuation Error
6	Platt H., Platt M.	2012	Corporate board attributes and bankruptcy	Journal of Business Research	Examines how the composition and characteristics of corporate boards affects the likelihood ok bankruptcy	Bankruptcy Prediction Models	Debtor	1998-2019	United States	Firm	Mean Tests	Not applicable

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
7	Callaghan J., Parkash M., Singhal R.	2009	Going-concern audit opinions and the provision of nonaudit services: Implications for auditor independence of bankrupt firms	Auditing	Investigation of the influence of nonaudit and other fees on going-concern opinions of bankrupt firms by independent auditors	Other Topics / Perspectives	Other Stakeholders	2001-2005	United States	Others	Logit	Going Concern Opinion
8	Benedettini O., Swink M., Neely A.	2017	Examining the influence of service additions on manufacturing firms' bankruptcy likelihood	Industrial Marketing Management	Examination of the influence of service additions on manufacturing firms' bankruptcy likelihood	Bankruptcy Prediction Models	Debtor	1986-2013	United States	Firm	Logit	Bankruptcy
9	Ponticelli J., Alencar L.S.	2016	Court enforcement, bank loans, and firm investment: Evidence from a bankruptcy reform in Brazil	Quarterly Journal of Economics	Law reform effects on investment, finance, and size	Bankruptcy Outcomes [Macro]	Government (incl., Institutional Environment)	2003-2008	Brazil	Municipalities	OLS & IV-2SLS	Financial and Real Outcomes (Secured Loans per Firm, Firm Investment, and Firm Size)
10	Balcaen S., Manigart S., Buyze J., Ooghe H.	2012	Firm exit after distress: Differentiating between bankruptcy, voluntary liquidation and M&A	Small Business Economics	Examination of firm characteristics that influence the way to exit the market after economic distress (voluntary liquidation, M&A, and bankruptcy)	Decision´s choices for corporate bankruptcy court-supervised proceedings	Debtor	1998-2000	Belgium	Firm	Nested Logit	Out-of-court exit versus court driven exit
11	Darrat A.F., Gray S., Park J.C., Wu Y.	2016	Corporate Governance and Bankruptcy Risk	Journal of Accounting, Auditing and Finance	Examination of how firm characteristics affect the relationship between corporate governance and the risk of bankruptcy	Bankruptcy Prediction Models	Debtor	1996-2006	United States	Firm	Logit	Bankruptcy filing
12	Eckbo B.E., Thorburn K.S., Wang W.	2016	How costly is corporate bankruptcy for the CEO?	Journal of Financial Economics	Investigation of CEO career and compensation changes for large firms filing for formal	Bankruptcy Spillovers	Management (CEO)	1996-2007	United States	Firm	Logit	Variants of CEO turnover and compensation

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
					reorganization.							
13	Clarke J., Ferris S.P., Jayaraman N., Lee J.	2006	Are analyst recommendations biased? Evidence from corporate bankruptcies	Journal of Financial and Quantitative Analysis	Testing whether a bias exists in analyst recommendations for firms that file for bankruptcy	Other Topics / Perspectives	Other Stakeholders	1995-2001	United States	Others	Abnormal returns & Mean/ Median tests & Logit	Analyst Recommendation
14	Mayr S., Mitter C., Aichmayr A.	2017	Corporate Crisis and Sustainable Reorganization: Evidence from Bankrupt Austrian SMEs	Journal of Small Business Management	Examination of elements of sustainable reorganization of bankrupt SMEs that ensure long-term survival and competitiveness.	Bankruptcy Outcomes [Micro]	Debtor	2004-2006	Austria	Firm	Partial least squares path modeling (PLS-PM)	Sustainable reorganization
15	Evans J.D., Green C.L.	2000	Marketing strategy, constituent influence, and resource allocation: An application of the miles and snow typology to closely held firms in chapter 11 bankruptcy	Journal of Business Research	Investigation whether successful emergence from Chapter 11 is associated with managers proposed strategies.	Bankruptcy Outcomes [Micro]	Debtor	1994	United States	Firm	Logit	Emergence from Chapter 11
16	Lajili K., Zéghal D.	2010	Corporate governance and bankruptcy filing decisions	Journal of General Management	Examination of the nature and extent of potential linkages between corporate governance characteristics and bankruptcy filing decisions.	Bankruptcy Prediction Models	Debtor	2001-2003	United States	Firm	Logit	Bankruptcy filing

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
17	Routledge J., Gadenne D.	2000	Financial distress, reorganization and corporate performance	Accounting and Finance	Investigation whether companies that reorganize can be distinguished from those that liquidate & identification of variables that are associated with reorganization success.	Bankruptcy Outcomes [Micro]	Debtor	1993-1995	Australia	Firm	Logit	Reorganization
18	Helwege J., Zhang G.	2016	Financial Firm Bankruptcy and Contagion	Review of Finance	Examination of counterparty and information contagions of bankruptcy on financial institutions.	Bankruptcy Spillovers	Rivals / Competitors	1980-2010	United States	Firm	AR & CAR regressions	Abnormal equity returns (ARs) & cumulative abnormal returns (CARs)
19	Lin K.C., Dong X.	2018	Corporate social responsibility engagement of financially distressed firms and their bankruptcy likelihood	Advances in Accounting	Investigation of the effects of firms' corporate social responsibility (CSR) on the likelihood of filing for bankruptcy	Bankruptcy Prediction Models	Debtor	2000-2014	United States	Firm	Logit	Bankruptcy (filing for Chapter 7 or Chapter 11)
20	De Maere J., Jorissen A., Uhlaner L.M.	2014	Board capital and the downward spiral: Antecedents of bankruptcy in a sample of unlisted firms	Corporate Governance: An International Review	Examination of proxies for board incentives and board capital and its influence on bankruptcy filings of unlisted firms.	Bankruptcy Prediction Models	Debtor	2008-2009	Belgium	Firm	Logit	Bankruptcy
21	Singhal R., Zhu Y.E.	2013	Bankruptcy risk, costs and corporate diversification	Journal of Banking and Finance	Investigation of the impact of diversification on probability and costs of bankruptcy reorganization	Bankruptcy Outcomes [Micro]	Debtor	1991-2007	United States	Firm	Logit & OLS & Random Effects	Bankruptcy & Time on bankruptcy

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
22	Lukason O., Laitinen E.K.	2019	Firm failure processes and components of failure risk: An analysis of European bankrupt firms	Journal of Business Research	Extraction of firm failure processes (FFPs) and understand the failure risk contributor for different stages of FFPs.	Bankruptcy Prediction Models	Debtor	Not indicated	Europe	Firm	Clustering methods	Bankruptcy
23	Stolbov M., Shchepeleva M.	2020	Systemic risk, economic policy uncertainty and firm bankruptcies: Evidence from multivariate causal inference	Research in International Business and Finance	Investigation of causal relationships between systemic risk, economic policy uncertainty and firm bankruptcies, conditional on global volatility.	Bankruptcy Prediction Models	Debtor	2008-2018	Multi-region	Firm	Granger causality & multivariate convergent cross mapping	Bankruptcy, Capital shortfall measure (SRISK); EPU index; VIX.
24	Shimizu K.	2012	Bankruptcies of small firms and lending relationship	Journal of Banking and Finance	Investigation of the role of small banks in enhancing recovery rate from financial distress and reduce bankruptcy ratio of small firms	Bankruptcy Prediction Models	Debtor	1998-2006	Japan	Firm	Multivariate regressions & GMM	Bankruptcy ratio
25	Fujiwara Y.	2008	Chain of firms' bankruptcy: A macroscopic study of link effect in a production network	Advances in Complex Systems	Investigation of the "link effect" of a creditor-debtor relationship when a firm goes into a stage of bankruptcy	Bankruptcy Spillovers	Creditors	1995-2004	Japan	Firm	Cumulative probability and degree distributions	Not applicable
26	Xia J., Dawley D.D., Jiang H., Ma R., Boal K.B.	2016	Resolving a dilemma of signaling bankrupt-firm emergence: A dynamic integrative view	Strategic Management Journal	Examining how predicting the emergence of bankrupt firms relies on firm signals (stigma-related dilemma).	Bankruptcy Outcomes [Micro]	Debtor	1992-2007	United States	Firm	Hazard models (event history technique)	Bankruptcy firm delisting

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
27	Donoher W.J.	2004	To file or not to file? Systematic incentives, corporate control, and the bankruptcy decision	Journal of Management	Investigation of the distinctions between bankrupt firms and equally leveraged firms that avoid bankruptcy.	Decision´s choices for corporate bankruptcy court-supervised proceedings	Debtor	1990-1996	United States	Firm	Hierarchical logistic regression	Bankruptcy Decision (bankruptcy filing)
28	Ellul A., Pagano M.	2019	Corporate leverage and employees' rights in bankruptcy	Journal of Financial Economics	Examination of the impact of employees' rights in bankruptcy on firms' leverage.	Bankruptcy Outcomes [Micro]	Employees	1988-2015	Global	Firm	Panel regression & Maximum likelihood & IV estimations	Book leverage & Debt issuance
29	Campa D., Camacho-Miñano M.-D.-M.	2014	Earnings management among bankrupt non-listed firms: Evidence from Spain	Revista Espanola de Financiacion y Contabilidad	Examination of the practice of managing financial statements by bankrupt firms.	Other Topics / Perspectives	Debtor	2010	Spain	Firm	OLS	Cash flows from operation & sales and production cost manipulation.
30	Leyman B., Schoors K.J.L., Coussement Peter P.	2011	Does court-supervised reorganization work? Evidence from post-confirmation firm failure	International Review of Law and Economics	Analysis of the likelihood of business failure and time to failure of firms on court-supervised reorganization	Bankruptcy Outcomes [Micro]	Debtor	1998-2004	Belgium	Firm	Probit	Failure during the court-supervision post-confirmation stage
31	Laitinen E.K.	2011	Assessing viability of Finnish reorganization and bankruptcy firms	European Journal of Law and Economics	Assessing the viability of Finnish firms filed for reorganization and bankruptcy.	Bankruptcy Outcomes [Micro]	Debtor	2004	Finland	Firm	Logit	Business Viability

	Authors	Year	Title	Journal	Description	Conceptual Framework Perspective	Focus	Sample period length	Sample country/ region	Sample population (Level of Analysis)	Statistical Technique	Dependent Variable
32	Gutiérrez C.L., Olmo B.T., Azofra S.S.	2012	Firms' performance under different bankruptcy systems: A Europe-USA empirical analysis	Accounting and Finance	Analyses of the effects that the bankruptcy law has on firms' performance based on its financial situation.	Institutional & Legal Environment	Other Stakeholders	1990-2002	Multi-country	Firm	System-GMM estimation (dynamic panel data)	Tobin's Q
33	Cepec J., Grajzl P.	2020	Debt-to-equity conversion in bankruptcy reorganization and post-bankruptcy firm survival	International Review of Law and Economics	Investigation of debt-to-equity conversion in bankruptcy reorganization and its effect on post-bankruptcy firm survival.	Bankruptcy Outcomes [Micro]	Debtor	2008-2018	Slovenia	Firm	Maximum-likelihood methods.	Firm Failure
34	Cooper E., Uzun H.	2019	Corporate social responsibility and bankruptcy	Studies in Economics and Finance	Examination of how corporate social responsibility (CSR) influence the likelihood of corporate bankruptcy.	Bankruptcy Prediction Models	Debtor	2007-2014	United States	Firm	Logit	Bankruptcy filing & Emergence from Chapter 11
35	Ayotte K., Morrison E.R.	2018	Valuation disputes in corporate Bankruptcy	University of Pennsylvania Law Review	Examination of valuations disputes comprising parties and experts opinions and flaws/ caveats of DCF method.	Other Topics / Perspectives	Other Stakeholders	1990-2017	United States	Others	Descriptive	Not applicable
36	Goyal V.K., Wang W.	2017	Provision of management incentives in bankrupt firms	Journal of Law, Finance, and Accounting	Examination of the use of key employee retention and incentive plans (KERPs) in bankrupt firms.	Bankruptcy Outcomes [Micro]	Employees	1996-2013	United States	Firm	Multinomial Logit & Logit & Tobit Models	KERP adoption & Emergence from bankruptcy
37	Bogan V.L., Sandler C.M.	2012	Are firms on the right page with chapter 11? An analysis of firm choices that contribute to post-bankruptcy survival	Applied Economics Letters	Investigation of which characteristics of firm performance and Chapter 11 bankruptcy are linked to successful emergence upon reorganization.	Bankruptcy Outcomes [Micro]	Debtor	1997-2002	United States	Firm	OLS & Probit	Time spent on bankruptcy & Bankruptcy outcome

2. BEYOND THE DEBTORS' EDGE: AN ANALYSIS OF BANKRUPTCY SPILLOVER EFFECTS ON CORPORATE CREDITORS

Abstract: This essay investigates bankruptcy spillover effects on corporate creditors. We employ a difference-in-differences matching estimator strategy to compare the performance of bankrupt firms' creditors (treated group) and similar firms without any business relationship with a bankrupt firm (control group). We implement a propensity score sample matching to obtain our control group from the population of nontreated firms. Our implicit hypothesis concerns that the treated group might underperform the control group after the bankruptcy event. We create a novel dataset on hand-collected bankruptcy proceedings judicial data from the State Court of São Paulo (TJSP) matched to Brazilian employer-employee administrative data (RAIS). We adopt the number of employees and the total remuneration of employees as proxies for performance to examine the effects of a bankruptcy event on corporate creditors. Our main results indicate that the contagion effects of bankruptcy reach both the treated group (corporate creditors) and control group (similar firms with no direct link to a bankruptcy reorganization event). There is little evidence that the impact is different between the two groups. Moreover, we assume that the adverse spillover effects on both groups are mainly from bankruptcy reorganization cases converted to liquidation. Together the findings suggest that a more profound corporate crisis leading to a liquidation may spill substantially more over other firms linked to the bankrupt firm but also in the local economy or related industries. The findings may extend the current bankruptcy literature to better understand the boundaries of a corporate crisis and contribute to the formulation of legal reforms.

Keywords: Corporate Bankruptcy. Spillover Effects. Contagion. Corporate Creditors.

2.1 Introduction

Legal and institutional environments are widely believed to underpin economic development. Bankruptcy regimes play an important role in the economy and in society. They establish coordinated proceedings to resolve problems of firms that are unable to serve their debts. Bankruptcy norms and their interpretation provide institutional solutions to corporate crises through liquidation or reorganization. They also guide how economic agents act in the business market during and before the onset of corporate crisis.

The role of bankruptcy regimes may be strengthened in emerging markets. These markets are characterized by weaker institutions and higher volatility. Since mid-2014, the Brazilian economic and political crises have led to an increase in the number of insolvent firms[29–30]. The *Covid-19* outbreak had also negatively impacted the local economy and the Brazilian firms' financial health. Consequently, scholars and legal practitioners have intensified the debate about the adequacy of the Brazilian bankruptcy law (Law 11.101/2005) to provide efficient

[29] Serasa Experian's (2022) data indicates that the number of delinquent firms in December 2019 was around 6,1 million. At the beginning of the time series (March 2016), the number of delinquent firms was 4,2 million.

[30] Bankruptcy liquidation is just one way for firms to exit the market. Because of tax liabilities, bankruptcy norms, and procedural costs, anecdotal evidence suggests that most insolvent firms in Brazil exit the market without a regular administrative or legal process. The firms' formal registration in a governmental or regulatory authority subsists, sometimes with related due debts, but without any economic activity. Regarding reorganization bankruptcy, out-of-court proceedings are also an alternative from initiating a legal proceeding.

solutions to a sustainable corporate business market[31]. **Figure 10** shows the number of requested bankruptcy liquidations and court-supervised reorganizations in Brazil from 2010 to 2019 (before the impact of the global pandemic).

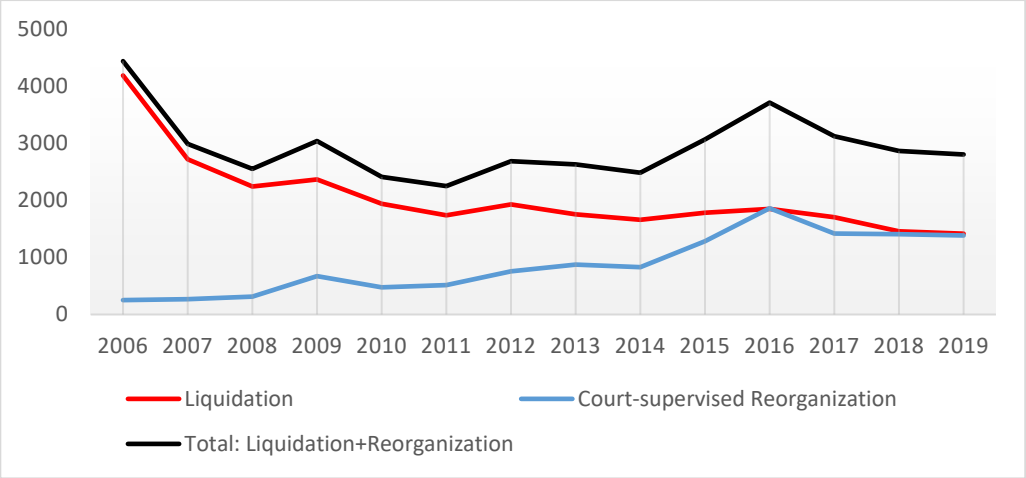


Figure 10 – Bankruptcy liquidation and court-supervised reorganization requests in Brazil (2010-2019).
The figure shows the yearly number of bankruptcy liquidation and reorganization requests in Brazil during the period 2010-2019. The data is extracted from the *Serasa Experian* Bankruptcy Index[32].

Most of the empirical bankruptcy literature focuses on the effects of bankruptcy proceedings' attributes on its outcomes (Warren et al., 2009; LoPucki & Doherty, 2014) or its costs (Weiss, 1990; Bris et al., 2006; Jupetipe et al., 2017), on the ex-post effects on the bankrupt firms itself (Bernstein, Colonnelli, & Iverson, 2019), or the ex-ante effects on the business market, including the influence on capital production factors, such as labor and credit markets (Cornelli & Felli, 1997; Ponticelli & Alencar, 2016; Agrawal et al., 2019).

However, bankruptcy liquidations and reorganizations often generate negative externalities to other firms (Altman et al., 2019). The effects of corporate bankruptcy play a central role in the financial situation of bankrupt firms' claimholders. The postponement or ceasing of scheduled payments may worsen the creditors' financial health. Thus, the financial difficulties of an insolvent firm may spill over into its creditors[33]. In an efficient bankruptcy regime, spillover effects should be unimportant. Despite its relevance, to the best of our knowledge, there is scarce empirical literature on bankruptcy spillover effects, especially in emerging markets context. We intend to partly fill this research void by empirically evaluating the impact of bankruptcy reorganization and liquidation on bankrupt firms' creditors in Brazil.

To examine the existence of bankruptcy spillover effects on corporate creditors, we employ a difference-in-differences matching estimator strategy to compare the performance of bankrupt firms' creditors (treated group) and similar firms that have not claimed a debt repayment under a bankruptcy proceeding (control group). We implement a propensity score sample matching that incorporates observable firm characteristics (industry, age, location, legal form,

[31] The Brazilian National Congress recurrently discussed a new bankruptcy law reform. In December 2020, the Brazilian bankruptcy law was overhauled with substantial changes. Nevertheless, the lawmaking discussion lacked proper empirical appraisal of the bankruptcy law in force.

[32] SERASA EXPERIAN. *Bankruptcy Index*. 2022. Available at: <https://www.serasaexperian.com.br/amplie-seus-conhecimentos/indicadores-economicos>.

[33] Bankruptcy liquidation and reorganization effects may also span to other economic agents, such as employees, shareholders, government, local firms, and even competitors.

profit tax regime, and employees' education level and gender) to obtain our control group from the population of nontreated firms. Our implicit hypothesis concerns that the treated group might underperform the control group after the bankruptcy event. Thus, we assume that treated and control firms' expected differential performance is solely caused by bankruptcy spillover effects on corporate claimholders. Both treated and control firms would perform similarly in the absence of these spillover effects.

To conduct our research, we create a novel dataset on hand-collected bankruptcy lawsuit data from the State Court of São Paulo (TJSP) matched to Brazilian employer-employee administrative data (RAIS)[34]. Because of limited access to financial data of private-held firms, we use the percentage change in the number of employees (firm's net hiring) and the percentage change in the total remuneration of employees (firm's net labor costs) to proxy for the firm's performance. We claim that an increase (decrease) in performance should be correlated to higher (lower) levels of net hiring and labor costs. We follow both treated and control firms' data over time, beginning three years before up to three years after the bankruptcy filing, depending on data availability.

To investigate additional evidence on bankruptcy spillover effects, we also examine if the type of bankruptcy proceeding, reorganization or liquidation, imposes different impacts on corporate creditors' performance. In an efficient bankruptcy regime and frictionless market, both bankruptcy proceedings should lead to similar outcomes (Bernstein, Colonnelli, & Iverson, 2019), since both reorganization and liquidation approaches should provide the best level of outstanding debts repayment. On the other hand, frictions and inefficiencies may not lead to the best use of bankruptcy proceedings.

Reorganization proceedings may provide bankrupt firms with mechanisms to overcome the financial difficulties for later repayment of debts. The maintenance of economically viable businesses may also contribute to creditor suppliers' future revenue. However, the continuation of inefficient bankrupt firms may decrease its assets' value over time, potentially affecting creditors' recovery rate in later liquidations. Carrying on the supply of debtors' activity during reorganizations may also negatively affect creditors' performance in unsuccessful restructurings, even with post-repayment priority. Economic inefficient firms also prevent the efficient reallocation of assets that should generate positive externalities (Bernstein, Colonnelli, & Iverson, 2019). Still, liquidation proceedings may reflect the severity of the bankrupt firms' financial health and the potential negative impact on corporate claimholders. The disruption of the production of bankrupt firms and the lower local economic activity levels may also impose adverse shocks on creditors' future revenue (Bernstein, Colonnelli, & Iverson, 2019). Nevertheless, if the liquidation is of an economically inefficient firm, asset reallocation could increase corporate creditors' credit recovery. The efficiency of asset auctions is pivotal to mitigating potential spillover effects. Thus, we expect positive and negative effects of reorganization and liquidation, and we address the empirical issue of identifying the sum direction of these effects. Consequently, we evaluate the Brazilian corporate bankruptcy regime efficiency.

Our results evidence that the contagion effects of bankruptcy reach both the treated group (corporate creditors) and control group (similar firms with no direct link to a bankruptcy). There is little evidence that the impact is different between the two groups. Since we match

[34] *Relação Anual de Informações Sociais* (RAIS) is a Brazilian administrative dataset on employer-employee information. It is a mandatory annual survey filled out by all firms in Brazil.

the creditors to similar firms considering the microregion and industry, the findings suggest that the dynamics of bankruptcy may propagate the corporate crises to the local economy or related industries. The results indicate with minor statistical significance (at 10% level) that treated firms performed relatively slightly better than control firms, losing fewer employees in the sample period. The average size of treated firms, which are larger, may partially guide attenuating the negative externalities of bankruptcy when compared to the smaller control firms. Finally, the adverse spillover effects on both groups appear to be mainly from bankruptcy reorganization cases converted to liquidation. This finding indicates that a more profound corporate crisis leading to a liquidation may spill substantially more over other firms (linked or not to the bankrupt firm).

This research contributes to the empirical literature on corporate bankruptcy. First, we provide evidence of spillover effects on corporate creditors in an emerging market context. Other papers have investigated how bankruptcy effects spill over to the local economy (Bernstein et al., 2019; Moraes, 2019), instead of just focusing on immediate related agents like corporate creditors. Moreover, most of the previous studies explored developed markets. Second, we apply a difference-in-differences matching estimator strategy (DID-ME) to mitigate endogeneity concerns in our estimations of treated and control firms. Although the methodology does not apply for causality since it lacks an exogenous variation, the estimated models extend the current empirical literature on the topic and indicate potential future research agenda. Third, we test the distinct effects of reorganization and liquidation proceedings on corporate creditors' performance. Compared to previous literature findings that suggest higher negative externalities of liquidations relative to reorganizations (Bernstein et al., 2019), our results provide similar evidence of more significant negative spillover effects from bankruptcy reorganization cases converted to liquidation. Last, we extend the corporate bankruptcy literature to better understand the boundaries of a corporate crisis and contribute to the formulation of legal reforms and norms' interpretation.

The remainder of this essay proceeds as follows. Section 2 discusses the related literature. Section 3 describes the institutional features of the Brazilian bankruptcy law. Section 4 describes the data. Section 5 presents our empirical strategy (research design). Section 6 shows and discusses our results. Section 7 concludes.

2.2 Related Literature

The literature on the **optimal design of bankruptcy law** discusses the mechanisms to minimize the social costs of bankruptcy (Aghion et al., 1994; Berkovitch & Israel, 1999). The bankruptcy proceedings must strike the right balance of incentives and protection of rights between shareholders, managers, creditors, and other related parties[35]. The efficiency of a bankruptcy regime relies on its ability to screen out inviable businesses and to maintain economically viable businesses (Altman et al., 2019; Araujo & Funchal, 2006). An extensive theoretical literature has modeled optimal design of bankruptcy regimes (Aghion et al., 1994; Berkovitch & Israel, 1999; Araujo & Funchal, 2006). This essay intends to bring new evidence to the empirical literature on the topic (Djankov et al., 2008; Araujo et al., 2012; Ponticelli & Alencar, 2016; Bernstein, Colonnelli, & Iverson, 2019) by examining one dimension of efficiency of the Brazilian bankruptcy regimes related to mitigating negative externalities in corporate creditors.

[35] Principal-agent relationships and conflicts of interest are substantial during and before the onset of corporate crises (Jensen & Meckling, 1976; Berkovitch & Israel, 1999).

Closely related is the literature on **bankruptcy effects** that examines the *ex-ante* and *ex-post* consequences of bankruptcy (Cornelli & Felli, 1997; Bebchuk, 2002; Araujo & Funchal, 2006). The *ex-ante* effects consist of the influence of bankruptcy regimes on macroeconomic indicators and on how economic agents act in the business market before the onset of a corporate crisis. The empirical literature evaluates the impacts on the credit market (Araujo et al., 2012; Barbosa et al., 2017; Ponticelli & Alencar, 2016), labor market (Fonseca & Doornik, 2019; Graham et al., 2019), firms' financial management (Agrawal et al., 2019), and investments level (Ponticelli & Alencar, 2016). The *ex-post* effects are related to the frictions and the costs and benefits of bankruptcy proceedings on businesses' or firms' post-performance and real outcomes (Bernstein, Colonnelli, Giroud, et al., 2019). Previous empirical papers have examined how bankruptcy proceedings' attributes affect its outcomes, such as plan confirmation rates (Warren et al., 2009), bankrupt firms' survival rates (LoPucki & Doherty, 2014), and procedural costs and recovery rates (Weiss, 1990; Bris et al., 2006; Jupetipe et al., 2017). Most of the literature on bankruptcy effects focuses exclusively on the bankrupt firm (debtor) and overlook the impacts on other related parties, such as shareholders, managers, creditors, workers, and governments. This essay will complement the empirical literature by investigating bankruptcy *ex-post* effects on corporate creditors outcomes.

The growing literature on **bankruptcy spillover effects** relies on the idea that bankruptcy regimes may also produce substantial externalities (Warren et al., 2009; Skeel, 2014; Altman et al., 2019; Bernstein, Colonnelli, Giroud, et al., 2019). These externalities may be positive, such as protecting employment and advancing community stability (Warren et al., 2009), or negative, such as reducing local plant occupancy and employment (Bernstein, Colonnelli, & Iverson, 2019). The industry and the size of the bankrupt firm may be important determinants of the intensity of the contagion effects (Skeel, 2014). The recent empirical literature focuses on bankruptcy spillovers effects on several individuals, such as geographically proximate firms (Bernstein, Colonnelli, Giroud, et al., 2019; Moraes, 2019) and consumers (Shoag & Veuger, 2018), as well as on the propagation across economic networks (Acemoglu et al., 2012; Carvalho, 2014) and intra-industry (Jorion & Zhang, 2007). We aim to contribute to the literature by examining the contagion effects on corporate creditors in an emerging market context. We differ from prior studies since we will apply a difference-in-differences matching estimation procedure to support our identification strategy. It exploits differentials in the performance of bankrupt firms' corporate creditors and similar firms that have not claimed a debt repayment under a bankruptcy proceeding. Even if bankruptcy reorganization and liquidation affect the entire local market, we deem the effects would be more pronounced in creditors.

Finally, recent empirical research considers the **background of the Brazilian Bankruptcy Law (Law 11.101/2005)**. Most of the articles exploit the 2005 law reform as an exogenous source of variation that enhanced secured creditors' protection. Following a quasi-experimental approach, these papers examine the effects of the law reform on firms' debt financing, and cost of debt (Araujo et al., 2012), firms' investments level, access to finance, and size (Ponticelli & Alencar, 2016), and employment and earnings of high- and low-skilled workers (Fonseca & Doornik, 2019). Ponticelli and Alencar (2016) also exploit the variation in the congestion of civil courts across Brazilian municipalities to estimate the effects of court enforcement on firms' outcomes. Their identification strategy contributed to further research investigating the impacts of Brazilian court enforcement on banks' decision to file for a debtor to go into bankruptcy, resolutions of bankruptcy proceedings, and employment in firms geographically close to a bankrupt firm (Moraes, 2019). In contrast to these previous studies, this essay does not exploit the law reform background but focuses on an identification

strategy that applies a difference-in-differences approach through a matching estimation procedure (DID-ME). This essay also differs from most previous papers since it centers the attention of the bankruptcy effects on corporate creditors. Thus, we aim to disentangle the spillover effects on creditors and non-creditors proximate firms.

2.3 The Brazilian Bankruptcy Law

The going Brazilian bankruptcy law (BBL) entered into force in 2005 during a wave of bankruptcy law reforms influenced by the recommendations from the World Bank and the United Nations Commission on International Trade Law (UNCITRAL)[36]. The law reform sought to preserve the debtors' going-concern value, allocate assets to their best use, improve credit recovery, and strike a balance between bankruptcy liquidation and reorganization proceedings (Campana Filho, 2009; Uncitral, 2005). The Brazilian bankruptcy regime provides two main alternative legal proceedings: bankruptcy liquidation and bankruptcy reorganization (court-supervised reorganization)[37].

The bankruptcy liquidation is the legal proceeding to coordinate a debtor firm to an end and distribute the proceeds from the sale of its assets to creditors. Both the debtor (voluntary petition) and creditors (involuntary petition) have legal rights to initiate a bankruptcy liquidation proceeding[38]. In involuntary proceedings, the debtor firm may challenge the creditors' claim, pay the claimed debt, come to an out-of-court agreement, or file for a court-supervised reorganization proceeding. Once the legal requirements to file for bankruptcy are satisfied, the court appoints a trustee to manage the bankruptcy estate[39]. The trustee collects the debtors' assets, appraise their value, and provide the assets sales in court auctions to pay off the creditors. The distribution of the auctions' proceeds must follow the absolute priority rule order: (i) labor claims, (ii) secured claims, (iii) tax claims, (iv) unsecured claims; and (v) equity claims[40]. The debtor is discharged only after paying at least half of the unsecured claims, or after five years from the end of the liquidation proceeding. **Figure 11** summarizes the Brazilian bankruptcy liquidation proceeding.

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[36] In December 2020, the Act 14.112/2020 overhauled the Brazilian bankruptcy law (Law 11.101/2005) with substantial changes. Nevertheless, our research sample encompasses data from the period 2010-2017 and is not affected by the potential influence of the norms' alterations. We emphasize that the lawmaking reform discussion lacked proper empirical appraisal of the bankruptcy law.

[37] The Brazilian bankruptcy law also provides an out-of-court reorganization procedure, an analogous proceeding to prepackaged restructurings of other jurisdictions. The debtor firm privately negotiates creditors' acceptance of a proposed reorganization plan to further file for court ratification. It requires the approval of 3/5 of the secured and unsecured creditors (labor claimers are excluded). All creditors, even dissenting ones, are subjected to the plan if confirmed by the court.

[38] Debtors rarely file for bankruptcy liquidation in Brazil. In the case of involuntary petitions, legal requirements must be met. A debtor must be unable to repay outstanding debts at a value equivalent to 40 months of minimum wages, remain inert in an enforcement proceeding (no repayment or pledge of collateral), or act fraudulently within the prebankruptcy period.

[39] The BBL assures that buyers of assets sold in court auctions will not hold any debtor liabilities. The law also prioritizes the sale of the whole business, or as separate productive units, instead of individual assets, to mitigate business' value decrease and protect the going-concern value.

[40] Nevertheless, the law provides "superpriority" rules (claims that must be paid before the APR) to trustee fees, procedure administrative expenses, post-petition trade credits, and debtor-in-possession ("DIP") financing. Moreover, the law caps the priority repayment of labor or occupational accident claims to 150 minimum wages per creditor and secured claims to the collateral asset's value. The remainder of both claims is classified as unsecured. The priority position of tax claim exempts tax penalties, which are positioned after unsecured claims.

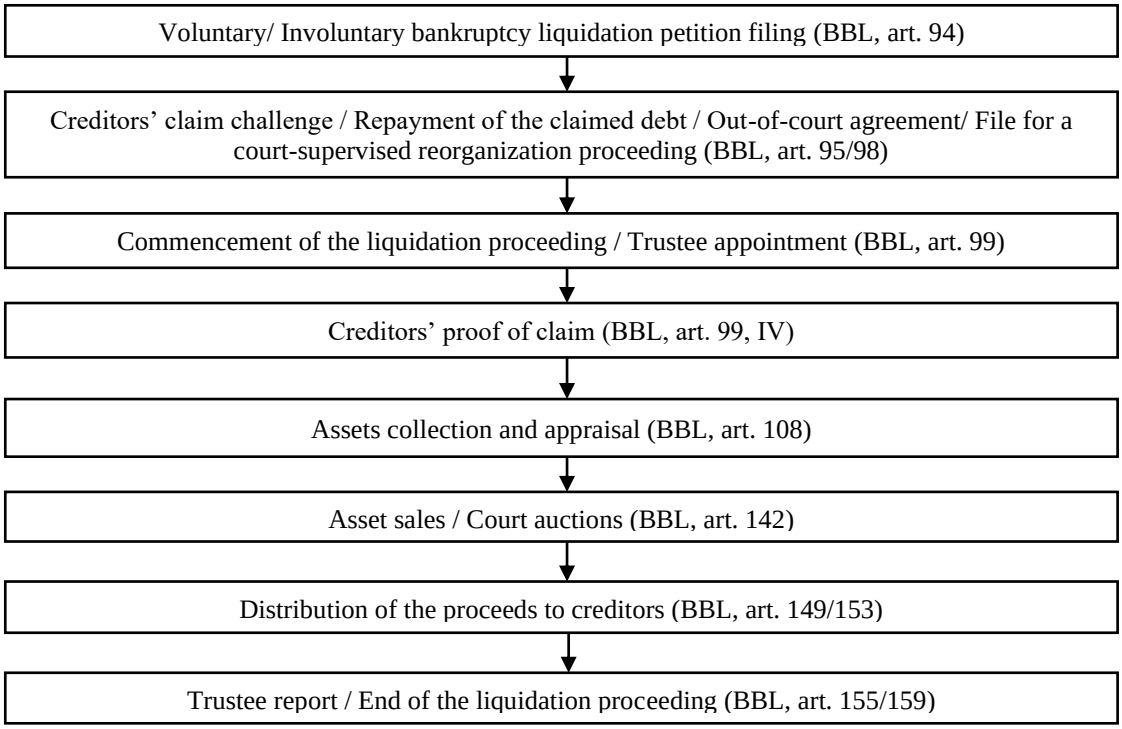

Figure 11 - Brazilian bankruptcy liquidation flowchart (before the 2020 BBL amendment).
Source: Adapted from Bezerra Filho (2018).

The Brazilian bankruptcy reorganization (court-supervised reorganization proceeding) is designed to preserve employment and viable firms' economic activity (going-concern value). The BBL determines that only debtors are allowed to initiate the reorganization proceeding (voluntary petition filing only)[41]. Once legal requirements are confirmed, the court grants the reorganization proceeding, appointing a trustee that oversees the debtor's activity (debtor in possession) and assists the court during the entire proceeding. An automatic stay period of 180 days on enforcement of actions by creditors applies. The reorganization plan must be submitted for creditors' approval within 60 days after the court accepts to initiate the bankruptcy proceeding[42]. If a single creditor poses objections to the plan, the court must schedule a general meeting of creditors to approve, modify, or reject the debtor restructuring plan. In the case of creditors` acceptance of the plan and ratification by the court, the plan binds all creditors, even dissenting ones[43]. According to the BBL, the reorganization case ends after two years of the plan confirmation by the court. **Figure 12** exhibits a simplified Brazilian court-supervised reorganization flowchart.

[41] In the BBL provisions before the recent 2020 law reform, although creditors were not entitled to file for reorganization bankruptcy or pose an alternative restructuring plan, they might propose a debtor's plan overhaul in the general meeting of creditors. The debtor's approval of the plan amendments was mandatory in these cases. The 2020 law overhaul allows creditors to submit an alternative restructuring plan if the creditors reject the debtor's plan or if the debtor does not file the reorganization plan in due course.

[42] Creditors are divided into four classes: labor claimers, secured claimers, unsecured claimers, and small-sized unsecured claimers. Tax liabilities, leasing loans, fiduciary ownership of real property, and exchange currency loans for exportations are not enrolled in reorganization proceedings.

[43] In the BBL, before the recent 2020 law reform, the court converted the reorganization proceeding into a liquidation proceeding in the case of the plan's rejection by the creditors. The amended law now allows creditors to submit an alternative restructuring plan before the conversion from reorganization to bankruptcy liquidation.

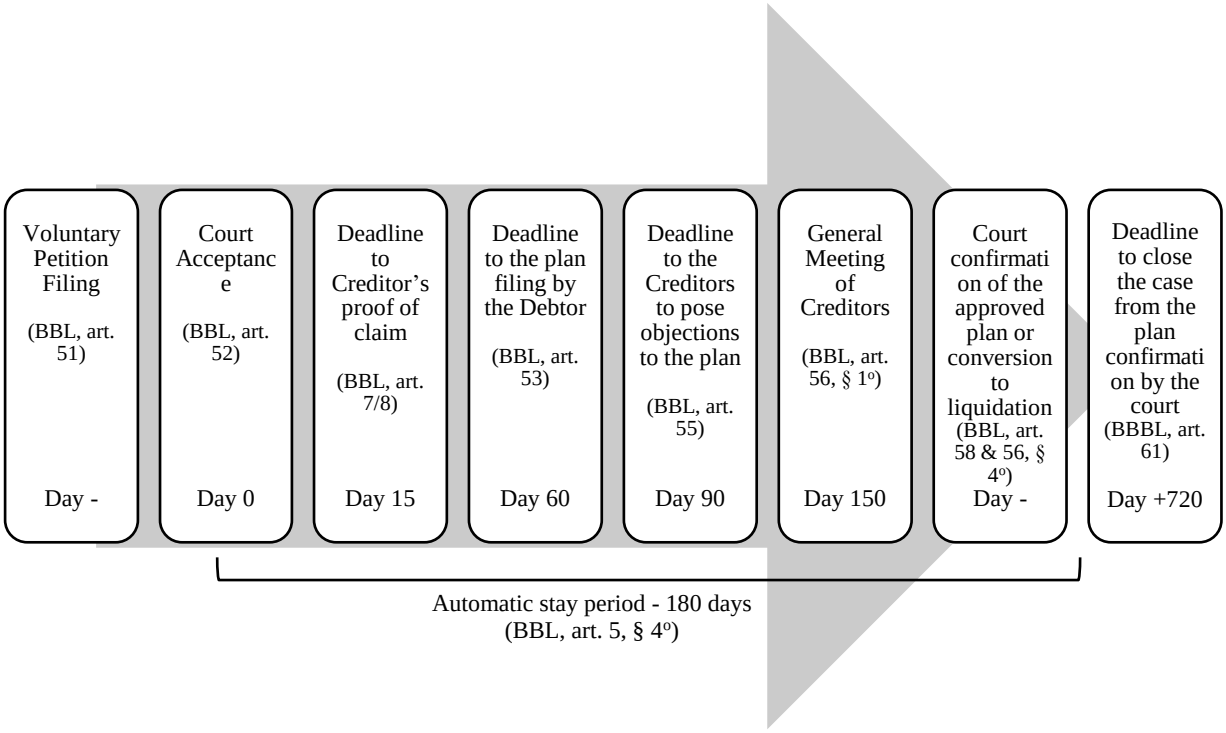

Figure 12 - Brazilian bankruptcy court-supervised reorganization flowchart (before the 2020 BBL amendment). Source: Adapted from Anapolsky and Woods (2013).

2.4 Data

Brazilian bankruptcy lawsuit data

Although Brazil is a federalist nation, most laws and legal codes encompass the entire country. It is the case of the Brazilian bankruptcy code (Law 11.101/2005). The civil judicial system is divided into federal and state courts. Legal demands regarding corporate and bankruptcy laws follow legal channels on one of the 27 state courts. The BBL provides that the debtor (or creditor) must file for bankruptcy liquidation or reorganization in the judicial district of the debtor's main establishment[44]. In most judicial districts, general civil courts handle bankruptcy proceedings. However, larger commercial cities (like São Paulo and Rio de Janeiro) created corporate or bankruptcy specialized courts.

To conduct our research, we create a novel dataset on hand-collected bankruptcy lawsuit data from the State Court of São Paulo (TJSP). We accessed data on a list of 630 bankruptcy reorganizations filings in the state of São Paulo between January 2010 and July 2017. Based on the bankruptcy case registration number, we extracted case information details available at the State Court of São Paulo website. It includes the debtor name, creditors name, other related agents name (trustees, third parties, tax collector), filing date, judicial district, judge, bankruptcy proceeding type, total claims value, and procedural steps up to April 2020.

A caveat of our extracted lawsuit data concerns the lack of firm's tax identification number (*Cadastro Nacional de Pessoa Jurídica - CNPJ*). Therefore, we match our bankruptcy lawsuit data to our administrative employer-employee data by firms' name (*razão social*).

[44] Bankruptcy forum shopping is not allowed. The Brazilian bankruptcy reorganization proceeding is voluntary petition filing only (exclusively for the debtor).

Brazilian employer-employee data (RAIS)

The Annual Social Information Report (*Relação Anual de Informações Sociais - RAIS*) is an administrative dataset on employer-employee information. The data covers all those individuals formally employed from private and public sectors. It is a mandatory annual survey filed by all organizations (including firms) in Brazil, even those with no hiring or firing in the relevant year. Since there are severe penalties for incomplete or late information, there is a high degree of compliance, which leads to an almost complete coverage of the formal sector (Fonseca & Doornik, 2019).

The data includes information on employers (firms), such as opening date, industry, municipality, profit tax regime[45], and number of employees. It also includes information on demographic, occupational, and income characteristics of employees. For instance, RAIS reports workers' age, gender, race, educational level, occupation, monthly earnings, and number of hours worked. Moreover, it covers the labor force movement (hiring and firing balance), month by month.

We match our bankruptcy lawsuit data to RAIS data by firms' names (*razão social*) since the lawsuit data lacks firm's tax identification number (*Cadastro Nacional de Pessoa Jurídica - CNPJ*).

2.5 Empirical Strategy

To examine the existence of bankruptcy spillover effects on corporate creditors, we employ a difference-in-differences matching estimator strategy (DID-ME). The potential difference across the performance of bankrupt firms' creditors and the performance of firms with no bankruptcy claims after the event of a debtor filing for bankruptcy reorganization gives the desired scenario to estimate the sensitivity of a creditor to a legal court-supervised bankruptcy reorganization or liquidation proceeding[46].

Our identification strategy relies on the performance comparison of bankrupt firms' creditors (treated group) and similar firms that do not hold bankruptcy claims (control group). Our assumption holds up on the argument that both creditors and control firms would have similar performance in the absence of the debtor's bankruptcy event. The control group provides a counterfactual scenario.

We expect the treated group to underperform the control group only after the bankruptcy event. Thus, we assume (and test) that treated firms and control firms may behave very similar before the event of bankruptcy, following *parallel trends*. Post-bankruptcy's expected

[45] In Brazil, there are three different corporate profit tax regimes: real profit regime, presumed profit regime, and a simplified tax regime for small businesses (*Simples Nacional*). Conceição et al. (2018) report that more than 70% of micro and small enterprises opt for the *Simples Nacional* since it reduces and simplifies the tax burden.

[46] One research caveat relies on the lack of information about the amount owed by each creditor within a bankruptcy case (we did not have access to the debtor's or trustee's creditor list). Data on revenue or profits of private-held firms is neither available. Thus, we could not calculate the ratio of a creditor's amount owed in a court-supervised bankruptcy proceeding to the creditors' revenue or profit. If available, it would be possible to evaluate the effective impact of the relevant debt on creditors financial health. Our empirical strategy accounts for creditors regardless of the potential financial impact of complete or partial credit loss.

differential performance should be solely caused by bankruptcy spillover effects on corporate claimholders[47–48].

Because of limited access to financial data of private-held firms, we use data from RAIS to estimate the log of the change in the number of employees (firm's net hiring) and the log of the change in the total remuneration of employees (firm's net labor costs) to proxy for firms' performance. We claim that an increase (decrease) in performance should be correlated to higher (lower) levels of net hiring and labor costs[49]. Upon data availability, we evaluate the potential spillover effects for one and up to three years after the bankruptcy filing year to also estimate the 'duration' of the spillover effects on corporate creditors.

We consider in our final sample only firms from the State of São Paulo, since our data encompass only bankruptcy lawsuit from the State Court of São Paulo (TJSP). Moreover, since the number of employees is our proxy for performance, we exclude all firms registered with zero employees in the entire sample period in the employer-employee dataset (RAIS).

Control group selection- propensity score matching

To estimate our difference-in-difference specification, we implement a propensity score sample matching to obtain our control group from the population of nontreated firms. Thus, we draw control firms from the entire population of non-excluded firms which are not bankrupted nor holds claims in a liquidation or reorganization bankruptcy proceeding[50]. This strategy involves selecting control firms that best match treated firms in multiple observable characteristics, restricting our sample of counterfactuals.

Our criteria to match bankrupt firm's creditors to firms of the non-treated population consider observable firm characteristics available in RAIS dataset, namely, industry[51], age, location

[47] A caveat of this assumption is that a debtor bankruptcy proceeding may also indirectly affects a control firm through its possible effects on competitors, other firms of the same industry, local market firms, and other stakeholders. For instance, it may occur when a control firm is a creditor of a bankrupt firm's competitor, and this competitor (industry) is indirectly affected by the bankruptcy. The impact could be through the rise of the industry's interest rates because of the industry's increased risk or rating downgrade. Nevertheless, if that is the case, our estimations would be the lower bound effect. These situations reinforce the potential bankruptcy contagion on other economic agents.

[48] Since we acknowledge arguments that our empirical strategy may lack an exogenous variation (debtor filing for bankruptcy may not apply as exogenous to creditors), we may not address causality in this study.

[49] One concern may be the variation in the number of employees or the total remuneration of employees because of changes in the firms' labor productivity. If that is the case, deviation in labor productivity and bankruptcy spillovers could result in confounding effects. For instance, a decrease in the number of employees would rather represent productivity gains than performance downtrend or financial difficulties. However, we argue that breakthrough technologies may affect treated and control firms' net hiring and labor costs in longer terms than sudden debtor bankruptcy crises.

[50] One identification strategy caveat is that our control firms could be creditors of a bankrupt firm in another restructuring or liquidation venue rather than the State of São Paulo. Since we have not yet been able to gather information about bankruptcy proceedings in other Brazilian states, this situation may noise our estimations. It would be the case foremost for medium- and big-sized firms that may have business relationships with firms from other Brazilian states or firms located close to a state border. Nevertheless, if that is the case, our estimations of the spillover effects would be biased downwards.

[51] We use the National Classification of Economic Activities (CNAE) at the 2-digit code level.

(microregion), profit tax regime[52], and employees' demographic, occupational, and income characteristics. We aim to mitigate selection bias and ensure that our treated and control firms have similar distributions along all the covariates. The matching estimator corroborates the strategy to compare treated and control firms within the same industry with very close characteristics, underpinning the argument that these firms would behave similarly in the absence of bankruptcy spillover effects of bankrupt firms.

Almeida et al. (2015) emphasize some potential advantages of the matching estimator methodology over a standard OLS approach. The matching estimator reduces the problem of poor distributional overlap of covariates across treated and control firms, which may affect OLS regression effectiveness, by selecting the closest covariate values when defining the firms in the control group. Moreover, it mitigates potential outliers' problems that affect OLS estimates, once the outliers are not selected to form the control group.

We implement a Mahalanobis propensity score matching to form our control group from non-treated firms. The underlying assumption is that conditional on the covariates, the fact of being a creditor of a bankrupt firm is orthogonal (independent) of the outcomes of interest. Once a control group is selected from all non-treated firms, we then estimate the average effect of the treatment on the treated (ATT), following the specification on **Equation 1**. The central aspect of this identification strategy is that we compare the deviation in employment level (or total remuneration) across the treated and control groups after the treatment (the event of a debtor bankruptcy reorganization), instead of just comparing the employment level of treated and control firms itself. This strategy mitigates the potential bias concerning uncontrolled firm-specific differences before the bankruptcy event (Almeida et al., 2012).

Empirical Model Specification

Our primary difference-in-difference regression model specification is represented by **Equation 1**.

$$\boldsymbol{log(Y_{jt}) = \beta_0 + \beta_1 * After_{ijt} + \beta_2 * Treated_j + \beta_3 * After_{ijt} * Treated_j + \delta + \varepsilon_{ijt}}$$

Equation 1 - DID-ME regression model specification.

where Y is the log of the outcome of interest (number of employees or total remuneration of employees) that varies across creditor firms and time. The subscript *i* identifies bankrupt firms, *j* identifies creditor firms, and *t* identifies time. The dummy $After_{it}$ captures the timing (*t*) of the filing for bankruptcy reorganization by the bankrupt firm *i* (it equals 0 before the bankruptcy event and 1 after the bankruptcy filing). The dummy $Treated_j$ captures if the firm *j* is a creditor of a bankrupt firm *i* (it equals 1 if it is a creditor firm - "treated group" and 0 if it is a similar firm that does not hold any bankruptcy claims - "control group"). We also control for fixed effects of firm, microregion and year of the bankruptcy event (δ) in our various specifications.

The main coefficient of interest β_3 captures the performance differences (log of the change of the number of employees or total remuneration of employees) between treated and control

[52] The dummy variable equals 1 if the firm opted for the simplified tax regime for small businesses (*Simples Nacional*), and 0 if the firm did not choose the simplified tax regime.

firms after the onset of a reorganization or liquidation bankruptcy proceeding. The differential performance estimates the bankruptcy spillover effects.

Sample and Summary Statistics

The empirical design discussed previously requires merged lawsuit data from the State Court of São Paulo (TJSP) and administrative data from the Annual Social Information Report (RAIS). **Table 6** provides the sampling procedure and the summary statistics for bankruptcy reorganization cases in the state of São Paulo. Although we have accessed TJSP data on bankruptcy filings between January 2010 and July 2017, our employer-employee data (RAIS) covers only the period of 2011-2017. Since we need corporate data in the year prior to the bankruptcy event (Year -1) and at least one year after the bankruptcy (year+1) for our estimations, our TJSP lawsuit data sample consists of cases filed from 2012-2016.

Table 6 – TJSP lawsuit data: summary statistics.
The table reports the sampling procedure and summary statistics. The final sample contains 2126 corporate creditors listed in no more than one bankruptcy reorganization filing in the state of São Paulo (single-case creditors) from 2012-2016 (374 cases). Panel A summarizes the sample selection process. Panels B reports the sample case distribution by year. Panel C indicates the bankruptcy resolution as of April 2020. TJSP is the State Court of São Paulo.

TJSP lawsuit data		
Panel A - Sample Selection (Creditors)	Obs.	
Creditors from 2012 to 2016	22985	
Identified in RAIS	5691	
From the State of São Paulo (SP)	3830	
From SP with 1 or more employees	2943	
From SP with 1 or more employees and single case	2357	
Propensity score sample (final sample)	2126	
Panel B - Bankruptcy reorganization cases		
	Reorganization cases from 2012 to 2016	Reorganization cases in our final sample
Number of cases		
Total	521	374
2012	47	31
2013	114	82
2014	94	72
2015	131	97
2016	135	92
Creditors by case		
Average	53,84	71,61
S.D.	109,05	124,11
Median	23	35,5
Total Claims (in BRL)		
Average	12.300.267,21	16.008.220,87
S.D.	80.767.949,02	94.491.223,42
Median	100.000,00	100.000,00
Panel C - Bankruptcy resolution		
Reorganization	398	281
Liquidation	123	93

Table 6, Panel A, outlines the sample selection procedure. The sampling starts with 22985 creditors-case observations from 521 bankruptcy reorganization filings in the State Court of São Paulo from 2012-2016. This first sample comprises individuals (employees), corporate creditors, public administration, and municipalities. We then merged the data to RAIS and identified 5.691 corporate creditors[53]. We dropped firms registered outside the state of São Paulo and considered only creditors connected to single bankruptcy cases to avoid confounding effects of various events[54]. Our final sample consists of the 2126 creditor firms peered to firms not linked to any bankruptcy event through a propensity score matching method. Panel B displays the distribution for the initial and final samples. We observe a slight concentration of bankruptcy filings in our final sample in the years of 2015-2016. Panel C indicates the bankruptcy resolution as of April 2020. The data reveals that 25% of the bankruptcy reorganization cases were converted to a bankruptcy liquidation proceeding.

Table 7 presents summary statistics for the variables extracted from RAIS for the two groups of firms of our empirical design: control firms and treated firms (bankrupt firm's creditors)[55]. It also shows mean-comparison tests (t-tests). The control group comprises 2114 peered firms with no link to a bankruptcy event. The propensity score matching uses the variables Negative RAIS, Simples, Branch, Firm age, Industry (CNAE at 2-digit code level), employee education level, employees' gender, microregion (location), and legal form to peer the firms from the non-treated population.

The t-tests of the summary statistics reveal that although we employed the propensity score matching to identify similar firms of our treated group, there are still statistical differences in three critical variables. The average and median values of the total number of employees for the treated group (control group) are 325 (179) and 31 (16), respectively. The average of the total yearly remuneration of employees is BRL 834,480.00 for the treated group and BRL 446,730.00 for the control group. The t-tests (p-value 0.00) on these variables provide evidence of a statistically significant difference in the size of the firms from the treated and control groups. The economic variance in the number of employees and total remuneration between the groups also seems relevant. The data suggest that treated firms employ more workers and have higher yearly total remuneration than control firms[56]. These findings may mitigate the potential causal inference from our multivariate estimations.

The t-test also shows the statistical difference in the mean values of firm age (p-value 0.03). However, the economic impact does not appear to be relevant since the mean (median) of firm age for the treated group is 20.4 (17.3) and for the control group is 19.5 (16.4). There is no difference in the mean tests for the other variables (which are all dichotomous). Treated

[53] The substantial decrease in the number of identified creditors when we match the TJSP data to the RAIS data is due to the significant number of labor-related claimholders (individuals whose names are missing in RAIS, since the dataset is on firm-level).

[54] We deem that creditor firms that have been subject to sequential bankruptcies will likely face confounding effects of different lawsuits, hindering the implementation of our empirical strategy through the comparison to a control firm (counterfactual).

[55] The comparison between non-treated and treated firms' characteristics showed statistically significant mean differences in several variables. It reinforces that our matching estimator approach may best fit our research proposal, mitigating endogeneity.

[56] Part of the higher yearly total remuneration of treated firms is mechanically because of the higher numbers of workers.

and control firms present similar characteristics regarding the tax regime (*Simples*), industry, and employees' education level, among others.

Table 7 – Propensity score matching (on RAIS data): summary statistics.
This table provides summary statistics of the data from RAIS based on the two groups of firms (treated and control). The statistics are measured at the end of year -1. Year 0 denotes the year of bankruptcy reorganization filing. All variables are defined in **Table 10** (**Appendix 2.1**). The final sample (treated group) contains 2126 corporate creditors listed in no more than one bankruptcy reorganization filing in the state of São Paulo (single-case creditors) from 2012-2016 (374 cases). The control group comprises 2114 peered firms with no link to a bankruptcy event. The propensity score matching uses the variables Negative RAIS, Simples, Branch, Firm age, Industry (CNAE at 2-digit code level), employee education level, employees' gender, microregion (location), and legal form to peer the firms. RAIS is the Annual Social Information Report.

	Control				Treated				Mean difference (ttest)	
	(1)				(2)				(1)-(2)	
Variable	mean	sd	p50	count	mean	sd	p50	count	Diff	p-value
Total number of employees	179,61	909,19	16,00	2114	325,69	1347,56	31,00	2126	-146,08	0,00
Total remuneration	446729,40	2266919,00	28701,11	2114	834480,80	3889457,00	71499,29	2126	-387751,40	0,00
Average monthly wage	2444,08	3145,49	1849,33	2037	2592,99	1821,71	2107,32	2081	-148,92	0,06
Negative RAIS	0,02	0,14	0	2114	0,02	0,14	0	2126	0,00	0,98
Simples	0,19	0,39	0	2114	0,18	0,39	0	2126	0,01	0,47
Branch	0,36	0,48	0	2114	0,38	0,49	0	2126	-0,01	0,33
Firm age	19,47	13,45	16,39	2114	20,40	14,03	17,33	2126	-0,93	0,03
Industry										
Manufacturing	0,33	0,47	0	2114	0,33	0,47	0	2126	-0,01	0,67
Construction	0,04	0,20	0	2114	0,04	0,20	0	2126	0,00	0,97
Service	0,29	0,45	0	2114	0,28	0,45	0	2126	0,00	0,77
Commerce	0,32	0,47	0	2114	0,32	0,47	0	2126	0,00	0,90
Agriculture	0,01	0,12	0	2114	0,01	0,12	0	2126	0,00	0,88
Public administration	0,02	0,12	0	2114	0,02	0,13	0	2126	0,00	0,92
Employee education										
Incomplete primary education	0,01	0,05	0	2114	0,02	0,06	0	2126	0,00	0,01
Complete primary education	0,06	0,12	0	2114	0,07	0,12	0,018237	2126	-0,01	0,03
Lower secondary education	0,11	0,18	0,05	2114	0,12	0,18	0,06	2126	-0,01	0,35
Incomplete upper secondary education	0,07	0,11	0,03	2114	0,07	0,12	0,04	2126	-0,01	0,15
Complete upper secondary education	0,53	0,28	0,53	2114	0,49	0,27	0,50	2126	0,04	0,00
Post-secondary education	0,22	0,27	0,11	2114	0,23	0,27	0,13	2126	-0,02	0,06
Male	0,67	0,27	0,73	2114	0,67	0,27	0,73	2126	0,00	0,88

2.6 Results & Discussion

This section presents the results from our empirical specifications. We analyze and discuss the main diff-in-diff estimations and the findings of our empirical strategy.

Baseline specification regressions

Table 8 reports the estimations for four specifications of our baseline regression, progressively saturated with fixed effects (year, microregion, and firm). We applied a propensity score matching method to partly account for endogeneity and functional form misspecification. We reached a final sample of 2126 treated firms and 2114 control firms. All regression models are estimated using difference-in-differences regressions with robust standard errors clustered by firm. In Panel A, we account for the number of employees as the dependent variable. In Panel B, we consider the log of the number of employees. We estimated the effects of a bankruptcy reorganization event on corporate creditors for one year (Year + 1) and an average of one, two, or three years, upon data availability (Up to Year +3).

In the regressions shown in **Table 8**, Panel A, Column 1, which does not include fixed effects, establishes the basic pattern of our estimations. Panel A holds a level-level regression coefficient estimates interpretation. For both sample lengths (Year + 1 and Year + 3), our main coefficient of interest (*Treated*After*) captures that treated firms lose, on average, approximately 10 employees more than control firms after an event of bankruptcy reorganization filing by a debtor[57–58]. However, the coefficient is not statistically significant. We add year and microregion fixed effects in Columns 2 and 3, and the estimations remain the same. We note that the significant initial differences in the average number of employees between treated and control firms (see **Table 7**) provide arguments for a higher absolute loss of employment in large firms. We can also observe this initial difference in the coefficient estimations of β_1 (Treated) in Columns 1-3, which are positive and statistically significant. Column 4, which includes firm fixed effects, accounting for unobservable firms' characteristics, corroborates with the previous models showing a more significant absolute loss of workers for treated firms. Nevertheless, also statistically not significant. In contrast to the other models, in Column 4, the coefficient of After is negative, suggesting a decrease in the number of employees for both control and treated firms after bankruptcy events.

Table 8, Panel B provides estimations for the log of the number of employees (which applies for a log-level regression coefficient estimate interpretation). The estimations for both sample lengths (Year + 1 and Year + 3) are essentially similar. Columns 1 to 4 show a reduction in the log of employees for all groups after the bankruptcy reorganization event. The variable *After* is constantly negative in our specifications. These findings indicate a negative externality of the bankrupt firm not only to linked firms but also to control firms not directly connected to the bankruptcy. The statistical significance is slightly greater in the first year after the bankruptcy event (Year + 1), suggesting immediate effects. Finally, Column 4, our more robust model specification, which considers firm fixed effects, surprisingly reveals that

[57] Tread group: the average number of employees is 325. Control group: the average number of employees is 179.

[58] The bankruptcy reorganization costs to corporate creditors include not only the defaulted debt but also other direct costs, such as fees paid to claimants' lawyers and consultants. Moreover, creditors also bear indirect bankruptcy costs, like management's diversion from running the business (e.g., time spent on bankruptcy negotiation and travels to attend general meetings of creditors) (Bris et al., 2006; Wang, 2022).

treated firms perform relatively better than control firms after an event of bankruptcy reorganization. Analyzing the primary coefficient of interest (*Treated*After*) and the negative variable *After*, we argue that treated firms slightly lose fewer employees than control firms. Nonetheless, the estimation is statistically significant only at the 10% level and for the length Year + 1.

Table 8 – Diff-in-diff baseline regression models.
This table shows coefficient estimates from difference-in-differences regressions for examining bankruptcy spillover effects on corporate creditors. Year 0 denotes the year of bankruptcy reorganization filing. The dependent variable is the number of employees (Panel A) and the logarithm of the number of employees (Panel B). The dependent variables are calculated by the differences between the [log of] total number of employees before (in Year -1) and after (Year +1 or the average of Year +1, +2, or +3, upon data availability) the bankruptcy reorganization filing year. The final sample (treated group) contains 2126 corporate creditors listed in no more than one bankruptcy reorganization filing in the state of São Paulo (single-case creditors) from 2012-2016 (374 cases). The control group comprises 2114 peered firms with no link to a bankruptcy event. We progressively add fixed effects (year, microregion, and firm) in Specifications 2, 3, and 4. Standard errors (in brackets) are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Panel A: Number of employees				
Year + 1				
Treated	146.1***	146.1***	146.2***	
	(35.29)	(35.29)	(35.20)	
After	4.476	19.14	31.20	-2.821
	(4.873)	(30.41)	(32.69)	(4.648)
Treated*After	-9.697	-9.648	-8.706	-6.890
	(7.864)	(7.895)	(7.998)	(7.571)
Observations	8,347	8,347	8,347	8,214
R-squared	0.004	0.004	0.015	0.989
Up to Year + 3				
Treated	146.1***	146.1***	146.4***	
	(35.29)	(35.28)	(35.16)	
After	9.608	25.59	37.12	-5.796
	(10.68)	(38.47)	(40.31)	(6.836)
Treated*After	-9.506	-9.480	-9.366	-5.814
	(17.72)	(17.77)	(17.81)	(10.04)
Observations	13,543	13,543	13,543	13,429
R-squared	0.003	0.003	0.015	0.979
Panel B: Log Number of employees				
Year + 1				
Treated	0.598***	0.598***	0.598***	
	(0.0580)	(0.0580)	(0.0566)	
After	-0.151***	-0.133**	-0.0861	-0.214***
	(0.0190)	(0.0525)	(0.0534)	(0.0166)
Treated*After	0.00612	0.00596	0.00751	0.0415*
	(0.0256)	(0.0257)	(0.0254)	(0.0227)
Observations	8,347	8,347	8,347	8,214
R-squared	0.025	0.027	0.073	0.966

Up to Year + 3				
Treated	0.598***	0.598***	0.598***	
	(0.0580)	(0.0580)	(0.0566)	
After	-0.189***	-0.102	-0.0551	-0.278***
	(0.0242)	(0.0633)	(0.0635)	(0.0175)
Treated*After	-0.0224	-0.0224	-0.0224	0.0374
	(0.0337)	(0.0338)	(0.0335)	(0.0241)
Observations	13,543	13,543	13,543	13,429
R-squared	0.023	0.024	0.072	0.951
Year FE	no	yes	yes	no
Microregion FE	no	no	yes	no
Firm FE	no	no	no	yes

Figure 13 depicts the logarithm of the number of employees from the time to the bankruptcy event (before -3 and after +3). It provides additional visual evidence of the negative effects of bankruptcy reorganization filings for both treated and control firms. The lines depicting the evolution of the log of the number of employees regarding the time to the bankruptcy reorganization event may suggest parallel trends of treated and control groups.

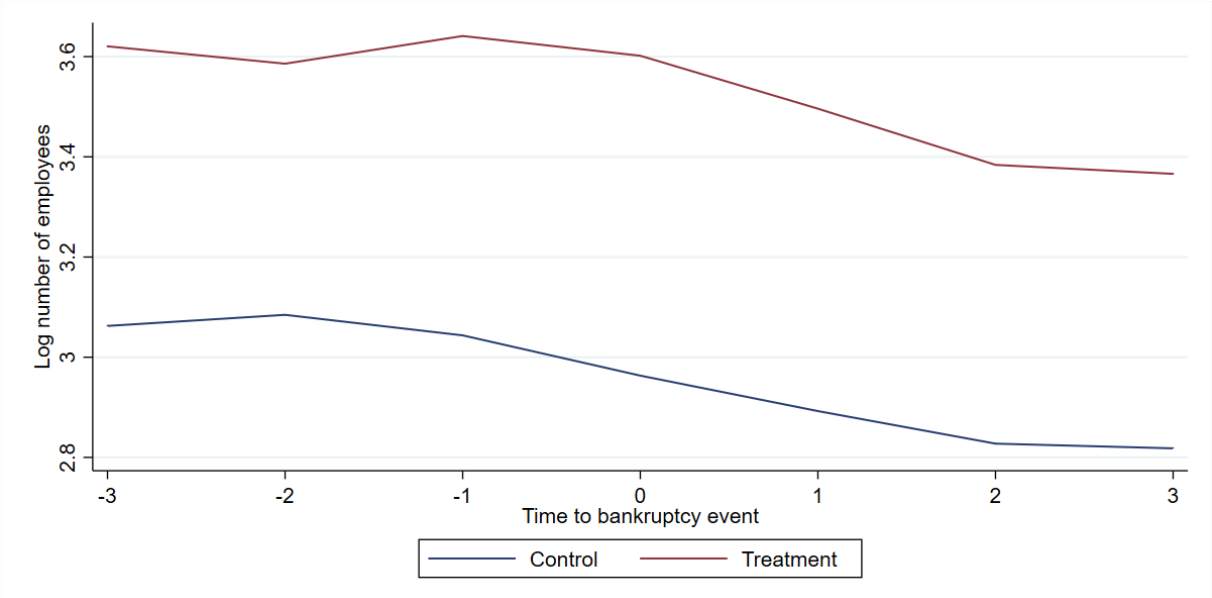

Figure 13 – Logarithm of corporate creditors' number of employees regarding time to the bankruptcy event.

Bankruptcy resolution specification regressions

To provide additional evidence on bankruptcy spillover effects, we examine if the type of bankruptcy proceeding outcome, reorganization or liquidation, imposes different impacts on corporate creditors' performance. We divided our sample into two sub-samples based on the bankruptcy reorganization outcome as of April 2020. This strategy is like adding a dummy variable that indicates the type of bankruptcy resolution.

Table 7 shows in the summary statistics that 93 out of 374 bankruptcy reorganization cases were converted into a liquidation proceeding (25% of our final sample). This division allows for testing the effects of the different bankruptcy resolutions on the (log) number of

employees of treated *versus* control firms. **Table 9** reports the estimations in similar specification models as of our baseline regressions displayed in **Table 8**. We present the estimations only for the extended sample length considering the average of one, two, or three years, upon data availability (up to Year +3). The results only one year after the bankruptcy event (Year + 1) are equivalent.

Table 9, Panel A, provides three interesting pieces of information on the specifications considering the number of employees (level-level). First, the spillover effects on bankruptcy (based on the variable After) appear to be solely from bankruptcy reorganization cases converted to liquidation. Shedding light on our more robust specification (Column 4), which includes firm fixed effects, we note an economically large and statistically significant at a 5% level of the variable After. It suggests that a bankruptcy liquidation event reduces, on average, 20 employees, considering both treated and control firms (it represents 6% of the mean of treated only). Second, the significant initial differences in the average number of employees between treated and control firms are more pronounced in the cases that still as a bankruptcy reorganization. The coefficient estimations of β_1 (Treated) for Columns 5-7 or reorganization as the resolution is statistically significant. Third, the main variable of interest (*Treated*After*) is not statistically significant in any specification split by bankruptcy resolution. The estimations reinforce the previous results in **Table 8**, despite the different directions of the economic effects between the bankruptcy resolutions.

Table 9, Panel B, examines the specifications of the logarithm of the number of employees (log-level). In this context, both firms ending in liquidation or reorganizing show statistical differences in the size of the firms. Moreover, analyzing Columns 4 and 8, the estimations corroborate with a decline in employment for treated and control firms after a bankruptcy event, which can be associated with an impact on the local economy (Bernstein et al., 2019). The absence of statistical significance for treated firms after the event may suggest low counterparty effects of bankruptcy reorganization (Helwege & Zhang, 2016).

Table 9 – Diff-in-diff Regression models by bankruptcy resolution (liquidation or reorganization).
This table shows coefficient estimates from difference-in-differences regressions for examining bankruptcy spillover effects on corporate creditors by bankruptcy resolution (liquidation or reorganization). Year 0 denotes the year of bankruptcy reorganization filing. The dependent variable is the number of employees (Panel A) and the logarithm of the number of employees (Panel B). The dependent variables are calculated by the differences between the [log of] total number of employees before (in Year -1) and after (average of Year +1, +2, or +3, upon data availability) the bankruptcy reorganization filing year. The treated group contains 2126 corporate creditors listed in no more than one bankruptcy reorganization filing in the state of São Paulo from 2012-2016. The control group comprises 2114 peered firms with no link to a bankruptcy event. We add year, microregion, and firm fixed effects in Specifications 2, 3, and 4. Standard errors (in brackets) are robust and clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Bankruptcy resolution: liquidation				Bankruptcy resolution: reorganization			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Number of employees								
Up to Year + 3								
Treated	134.8	135.0	137.9		149.3***	149.3***	148.9***	
	(95.09)	(95.05)	(95.17)		(36.40)	(36.39)	(36.18)	
After	-12.13	-167.1**	-185.0**	-21.68**	14.84	73.66	95.89*	-0.997
	(11.60)	(79.25)	(92.16)	(9.672)	(13.67)	(48.21)	(51.62)	(8.403)
Treated*After	7.396	6.683	3.637	18.27	-14.60	-14.58	-14.08	-13.07
	(37.52)	(37.71)	(38.03)	(23.80)	(19.39)	(19.47)	(19.40)	(10.94)
Observations	3,260	3,260	3,260	3,236	10,283	10,283	10,283	10,193
R-squared	0.002	0.004	0.018	0.984	0.004	0.005	0.021	0.976
Panel B: Log Number of employees								
Up to Year + 3								
Treated	0.685***	0.686***	0.690***		0.573***	0.573***	0.572***	
	(0.123)	(0.122)	(0.119)		(0.0658)	(0.0657)	(0.0639)	
After	-0.215***	-0.500***	-0.436***	-0.267***	-0.178***	0.0229	0.0955	-0.281***
	(0.0472)	(0.134)	(0.133)	(0.0366)	(0.0282)	(0.0746)	(0.0745)	(0.0200)
Treated*After	0.0249	0.0240	0.0272	0.0665	-0.0425	-0.0427	-0.0401	0.0287
	(0.0638)	(0.0642)	(0.0646)	(0.0495)	(0.0395)	(0.0397)	(0.0391)	(0.0276)
Observations	3,260	3,260	3,260	3,236	10,283	10,283	10,283	10,193
R-squared	0.034	0.039	0.111	0.948	0.020	0.024	0.083	0.951
Year FE	no	yes	yes	no	no	yes	yes	no
Microregion FE	no	no	yes	no	no	no	yes	no
Firm FE	no	no	no	yes	no	no	no	yes

Alternative Specifications & Robustness check

To check for the robustness of our results, we performed several alternative estimations. First, we conducted identical specifications for the (log) number of employees for Year +1 e up to Year + 3 using the total yearly remuneration of firms' employees instead of the number of employees to proxy for firms' performance. All results are substantially the same as the ones presented in **Table 8**. In general, the main estimations including firm fixed effects report lower or no statistical significance.

Second, we sort our final sample into two groups by firm age equal to or less than two years and more than two years to investigate a potential age effect and survival bias directing our results. Since the number of firm-observations equal to or less than two years is small, the results are mainly guided by firms with more than two years and are like the ones reported on our baseline specifications.

Third, we divided our sample by firms adopting the tax regime for small businesses (*Simples Nacional*) to proxy for firm size or not. In brief, we proxy for small-firms if the company opts for Simples[59] and medium-sized and large if the firm adopts another tax regime. We aim to allow for investigating an effect size on our results. The results from our baseline specifications are primarily directed by the results of firms not adopting the *Simples Nacional* (medium-sized and large) and corroborate the estimations reported in **Table 8**. Since treated firms are larger regarding the number of employees and, thus, more likely to not opt for the *Simples Nacional,* it provides evidence of consistency in our findings.

Lastly, we sort our sample into two groups by the date of the bankruptcy event. The first sub-sample comprises corporate creditors linked to bankruptcies events in 2012-2013. The second group consists of the creditors of bankruptcies that occurred in 2015-2016. We aim to disentangle our results from the Brazilian political and economic crisis. Since both periods (pre-crisis and during the crisis) show similar results, especially concerning the variable *After*, we deem that our results are not guided by macroeconomic context. Interestingly, the relatively better performance of treated firms (at 10% level), regarding losing fewer employees, seems to be directed only by the period of crisis. Since our treated group is, on average larger, it corroborates with the arguments that smaller firms (in our sample, control group) are more affected by macroeconomic shocks.

We provide the tables containing the coefficient estimates for the alternative specifications discussed in **Appendix 2.2**.

2.7 Conclusion

This research investigated bankruptcy spillover effects on corporate creditors in the Brazilian context using a novel dataset on hand-collected bankruptcy lawsuit data and employer-employee administrative data. Our empirical strategy employs difference-in-differences estimations comparing the labor performance of the bankrupt firms' creditors (treated group) to similar firms that are not connected to a bankruptcy reorganization proceeding (control group). We peered treated firms to control firms through a propensity score matching that

[59] Conceição et al. (2018) report that more than 70% of micro and small enterprises opt for the *Simples Nacional* since it reduces and simplifies the tax burden

incorporates observable firm characteristics. Our analysis focuses only on single-case creditors, mitigating the risk of confounding effects from different bankruptcy events.

Analyzing our main findings, the spillover effects of bankruptcy reached both the treated group (corporate creditors) and control group (similar firms with no direct link to a bankruptcy reorganization event). There is little evidence that the impact is different between the two groups. The results indicate with minor statistical significance (at 10% level) that treated firms performed relatively slightly better than control firms, losing fewer employees in the sample period. Even after applying our matching procedure, the average size of treated firms, which are larger, may partially guide the attenuated negative externalities of bankruptcy compared to the smaller control firms.

Since we match the creditors to similar firms considering the microregion and industry, the findings suggest that the dynamics of bankruptcy may propagate the corporate crises to the local economy or related industries. The trade credit bankruptcy propagation mechanism can be driven by both credit losses and demand shrinkage (Jacobson & von Schedvin, 2015) and may affect other firms through production link networks (Fujiwara, 2008; Acemoglu, Akcigit, & Kerr, 2016). Moreover, the adverse spillover effects on both groups appear to be mainly from bankruptcy reorganization cases converted to liquidation. This finding indicates that a more profound corporate crisis leading to a liquidation may spill substantially more over other firms (linked or not to the bankrupt firm), corroborating with findings of previous studies (Bernstein et al., 2019; Moraes, 2019).

Our research contributes to extending the current literature on corporate bankruptcy to better understand the boundaries of a corporate crisis. We provide evidence of spillover effects on corporate creditors and in an emerging market context, partly filling a gap in the empirical research on the topic. Our focus on the corporate creditor instead of the bankrupt firm provides empirical evidence on an economic agent that is less examined by the empirical literature. The findings may contribute to the discussion in the academic field and formulation of local legal reforms.

One caveat of our research concerns the lack of data on other bankruptcy reorganization and liquidation proceedings in the State of São Paulo and, especially, in other Brazilian States. Thus, our assumption to separate treated firms (linked to a bankruptcy event) and control firms (similar firms not listed in a bankruptcy procedure) may be weakened. Furthermore, because of limited data availability, we could not perform placebo tests to provide an additional check on the robustness of our results. The likely confounding effect of the Brazilian economic and political crisis (2015-2016) is also a caveat of our research. However, we deemed that the potential confounding effect was mitigated by using year and firm fixed effects in our regressions and performing a specification of the pre-Brazilian crisis (2012-2013) and post-Brazilian crisis (2015-2016).

Finally, there are several avenues for future research on bankruptcy spillover effects. First, extending our analysis through new studies addressing causal inference of formal bankruptcy externalities on claimants is still critical. Second, examining bankruptcy in emerging markets is an important opportunity for research. Expanding our sample to additional periods and mainly to more State Courts can supplement our research for the Brazilian context. Moreover, adding data from bankruptcy liquidation filings can also increase the examination of effects. Third, we focused on investigating spillover effects only on corporate creditors. Addressing the effects on other linked parties, such as banks, bondholders, and employees, is crucial to

better understanding the full effects. Last, there are vast opportunities to employ new approaches to gather and analyze data, such as machine learning for textual analysis of the legal process documentation.

Appendix 2.1

Table 10 – Variables Definition
This table provides the definitions of the variables used in this research for investigating bankruptcy spillovers on corporate creditors.

Variable	Definition	Source
Creditor Firm characteristics		
Total number of employees	Total number of employees registered at the end of the relevant year.	RAIS
Firm age	Firm age in years.	RAIS
Industry code	National Classification of Economic Activities (CNAE) at the 2-digit code level.	RAIS
Microregion	Dummy indicating the location (microregion) of the firm.	RAIS
Simples	Dummy indicating that the firm adopts the simplified tax regime for small businesses (*Simples Nacional*).	RAIS
Branch	Dummy indicating that the firm owns branch(es).	RAIS
Negative RAIS	Dummy indicating that the firm did not employ any worker in the relevant year.	
Employees characteristics		
Employees total remuneration	Total remuneration of firm's employees in the relevant year (in BRL).	RAIS
Employee average remuneration	Average of firm employees' monthly wage in the relevant year (in BRL).	RAIS
Employee gender	Dummy indicating the employee gender (male= 1; female= 0).	RAIS
Employee educational level	Dummy indication the employee educational level (6-level scale[60]).	RAIS
Bankruptcy Case data		
Court	Dummy indicating the judicial district of the case.	TJSP
Total claims	Total value of listed claims (in BRL).	TJSP
Number of corporate creditors	Number of corporate creditors listed (#).	TJSP
Liquidation	Dummy indicating if the bankruptcy reorganization has been converted to liquidation (as of April 2020).	TJSP

[60] Educational levels: incomplete primary education; complete primary education; lower secondary education; incomplete upper secondary education; complete upper secondary education; post-secondary education.

Appendix 2.2

Table 11 – Diff-in-diff regression models: dependent variable total remuneration and log of total remuneration.
This table shows coefficient estimates from difference-in-differences regressions for examining bankruptcy spillover effects on corporate creditors. Year 0 denotes the year of bankruptcy reorganization filing. The dependent variable is the total yearly remuneration of employees (Panel A) and the logarithm of the total yearly remuneration of employees (Panel B). Standard errors (in brackets) are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Panel A: Total Remuneration				
Year + 1				
Treated	387,751***	387,768***	387,542***	
	(97,713)	(97,677)	(97,358)	
After	95,896***	-24,402	-6,524	40,379**
	(21,172)	(80,862)	(85,228)	(17,843)
Treated*After	-21,565	-20,866	-15,585	-15,420
	(34,368)	(34,891)	(34,551)	(32,783)
Observations	8,097	8,097	8,097	7,714
R-squared	0.004	0.005	0.017	0.976
Up to Year + 3				
Treated	387,751***	387,770***	387,953***	
	(97,706)	(97,640)	(97,233)	
After	144,795***	2,866	16,876	66,725**
	(45,765)	(114,519)	(118,088)	(27,801)
Treated*After	-50,667	-50,449	-45,158	-12,180
	(66,197)	(66,384)	(67,027)	(39,821)
Observations	12,849	12,849	12,849	12,525
R-squared	0.003	0.004	0.016	0.966
Panel B: Log Total Remuneration				
Year + 1				
Treated	0.908***	0.908***	0.909***	
	(0.0888)	(0.0887)	(0.0867)	
After	0.180***	-0.0149	0.0458	-0.308***

	(0.0646)	(0.0971)	(0.0975)	(0.0487)
Treated*After	-0.151*	-0.152*	-0.142*	0.0478
	(0.0842)	(0.0844)	(0.0837)	(0.0644)
Observations	8,097	8,097	8,097	7,714
R-squared	0.020	0.023	0.071	0.868
Up to Year + 3				
Treated	0.908***	0.908***	0.909***	
	(0.0888)	(0.0887)	(0.0867)	
After	0.210***	0.0505	0.103	-0.387***
	(0.0598)	(0.0996)	(0.0992)	(0.0475)
Treated*After	-0.167**	-0.168**	-0.164**	0.0703
	(0.0775)	(0.0776)	(0.0770)	(0.0614)
Observations	12,849	12,849	12,849	12,525
R-squared	0.018	0.020	0.067	0.814
Year FE	no	yes	yes	no
Microregion FE	no	no	yes	no
Firm FE	no	no	no	yes

Table 12 – Diff-in-diff regression models by firm age.
This table shows coefficient estimates from difference-in-differences regressions for examining bankruptcy spillover effects on corporate creditors by firm age. We sort our sample into two groups: (1) firm age equal to or less than two years and (2) firm age more than two years. Year 0 denotes the year of bankruptcy reorganization filing. The dependent variable is the number of employees (Panel A) and the logarithm of the number of employees (Panel B). The dependent variables are calculated by the differences between the [log of] total number of employees before (in Year -1) and after (average of Year +1, +2, or +3, upon data availability) the bankruptcy reorganization filing year. Standard errors (in brackets) are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% level, respectively. The estimations for Year + 1 are similar to those reported up to Year + 3.

	Firms age: equal to or less than 24 months				Firms age: more than 24 months			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A: Number of employees								
Up to Year + 3								
Treated	177.4	177.1	193.7		145.2***	145.2***	145.1***	
	(140.1)	(140.0)	(150.9)		(36.11)	(36.10)	(35.97)	
After	14.13	-60.37	-86.29	49.13	9.536	30.00	43.69	-7.436
	(19.82)	(99.02)	(138.8)	(51.53)	(10.99)	(39.59)	(41.42)	(6.870)
Treated*After	-26.06	-23.49	-22.67	-81.64	-8.968	-8.903	-8.600	-3.520
	(105.1)	(104.9)	(107.7)	(83.01)	(17.98)	(18.04)	(18.07)	(10.03)
Observations	405	405	405	401	13,138	13,138	13,138	13,028
R-squared	0.008	0.011	0.044	0.895	0.003	0.003	0.015	0.981
Panel B: Log Number of employees								
Up to Year + 3								
Treated	0.293	0.287	0.276		0.607***	0.607***	0.607***	
	(0.298)	(0.294)	(0.287)		(0.0586)	(0.0586)	(0.0574)	
After	-0.255*	-0.654*	-0.764*	-0.226**	-0.187***	-0.0613	-0.0148	-0.279***
	(0.131)	(0.346)	(0.400)	(0.113)	(0.0246)	(0.0640)	(0.0643)	(0.0177)
Treated*After	0.0499	0.0604	0.0863	-0.0293	-0.0240	-0.0238	-0.0218	0.0394
	(0.228)	(0.230)	(0.233)	(0.197)	(0.0339)	(0.0340)	(0.0338)	(0.0241)
Observations	405	405	405	401	13,138	13,138	13,138	13,028
R-squared	0.013	0.028	0.178	0.868	0.024	0.026	0.070	0.952
Year FE	no	yes	yes	no	no	yes	yes	no
Microregion FE	no	no	yes	no	no	no	yes	no
Firm FE	no	no	no	yes	no	no	no	yes

Table 13 – Diff-in-diff regression models by the tax regime adopted (*Simples Nacional* or another).
This table shows coefficient estimates from difference-in-differences regressions for examining bankruptcy spillover effects on corporate creditors by the tax regime adopted (*Simples Nacional* or another). We sort our sample into two groups: (1) firms adopting the tax regime for small businesses (*Simples Nacional*), and (2) firms adopting another tax regime. This sort proxies for firm size. Year 0 denotes the year of bankruptcy reorganization filing. The dependent variable is the number of employees (Panel A) and the logarithm of the number of employees (Panel B). The dependent variables are calculated by the differences between the [log of] total number of employees before (in Year -1) and after (average of Year +1, +2, or +3, upon data availability) the bankruptcy reorganization filing year. Standard errors (in brackets) are robust and clustered at the firm level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% level, respectively. The estimations for Year + 1 are similar to those reported up to Year + 3.

	Simples 0				Simples 1			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A: Number of employees								
Up to Year + 3								
Treated	178.7***	178.7***	178.6***		-1.235	-1.229	-1.274	
	(42.91)	(42.90)	(42.80)		(4.890)	(4.878)	(4.730)	
After	11.01	26.58	38.85	-6.951	1.078	12.11	14.68	-0.524
	(12.98)	(46.33)	(48.06)	(8.332)	(2.476)	(8.731)	(9.223)	(0.870)
Treated*After	-10.55	-10.49	-10.65	-6.878	-1.776	-1.763	-1.501	-1.012
	(21.58)	(21.66)	(21.69)	(12.25)	(2.940)	(2.962)	(2.932)	(1.278)
Observations	11,081	11,081	11,081	10,999	2,462	2,462	2,462	2,430
R-squared	0.004	0.004	0.015	0.979	0.000	0.005	0.041	0.985
Panel B: Log Number of employees								
Up to Year + 3								
Treated	0.676***	0.676***	0.673***		0.242***	0.242***	0.244***	
	(0.0634)	(0.0634)	(0.0626)		(0.0778)	(0.0776)	(0.0743)	
After	-0.201***	-0.143**	-0.104	-0.286***	-0.154***	0.0444	0.0364	-0.240***
	(0.0273)	(0.0698)	(0.0695)	(0.0200)	(0.0410)	(0.0947)	(0.100)	(0.0339)
Treated*After	-0.00600	-0.00599	-0.00426	0.0524*	-0.0748	-0.0744	-0.0687	-0.0308
	(0.0373)	(0.0375)	(0.0373)	(0.0272)	(0.0597)	(0.0600)	(0.0603)	(0.0516)
Observations	11,081	11,081	11,081	10,999	2,462	2,462	2,462	2,430
R-squared	0.030	0.032	0.060	0.948	0.013	0.022	0.123	0.882
Year FE	no	yes	yes	no	no	yes	yes	no
Microregion FE	no	no	yes	no	no	no	yes	no
Firm FE	no	no	no	yes	no	no	no	yes

Table 14 - Diff-in-diff regression models by bankruptcy filing period.
This table shows coefficient estimates from difference-in-differences regressions for examining bankruptcy spillover effects on corporate creditors by the bankruptcy filing period. We sort our sample into two groups: (1) creditors linked to bankruptcies events in 2012-2013; and (2) creditors linked to bankruptcies events in 2015-2016. This sort proxies for periods of pre-crisis and during the crisis. Year 0 denotes the year of bankruptcy reorganization filing. The dependent variable is the number of employees (Panel A) and the logarithm of the number of employees (Panel B). The dependent variables are calculated by the differences between the [log of] total number of employees before (in Year -1) and after (average of Year +1, +2, or +3, upon data availability) the bankruptcy reorganization filing year. Standard errors (in brackets) are robust and clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The estimations for Year + 1 are similar to those reported up to Year + 3.

	2012 - 2013				2015 - 2016			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A: Number of employees								
Up to 3 periods								
Treated	112.7*	112.9*	111.7*		152.1***	152.1***	150.2***	
	(66.53)	(66.52)	(65.28)		(45.30)	(45.30)	(44.96)	
Time	16.58			6.438	-5.505			-17.33***
	(18.45)			(17.55)	(8.309)			(6.278)
Treated*time	-11.71	-11.52	-9.777	-8.752	-14.26	-14.25	-14.18	-10.90
	(21.65)	(21.68)	(21.84)	(20.70)	(15.14)	(15.14)	(15.23)	(12.05)
Observations	4,773	4,773	4,773	4,749	5,292	5,292	5,292	5,228
R-squared	0.002	0.003	0.037	0.970	0.005	0.005	0.032	0.981
Panel B: Log Number of employees								
Up to 3 periods								
Treated	0.580***	0.581***	0.578***		0.617***	0.617***	0.614***	
	(0.105)	(0.105)	(0.100)		(0.0830)	(0.0829)	(0.0803)	
Time	-0.136***			-0.227***	-0.273***			-0.326***
	(0.0356)			(0.0317)	(0.0337)			(0.0253)
Treated*time	-0.0409	-0.0398	-0.0355	0.0134	0.0145	0.0143	0.0222	0.0679*
	(0.0477)	(0.0480)	(0.0479)	(0.0436)	(0.0466)	(0.0467)	(0.0457)	(0.0352)
Observations	4,773	4,773	4,773	4,749	5,292	5,292	5,292	5,228
R-squared	0.020	0.026	0.110	0.946	0.028	0.029	0.098	0.952
Year FE	no	yes	yes	no	no	yes	yes	no

Microregion FE	no	no	yes	no	no	no	yes	no
Firm FE	no	no	no	yes	no	no	no	yes

3. SMALL BUSINESS CREDITORS ON BANKRUPTCY REORGANIZATIONS: THE IMPACT OF THE 2014 BANKRUPTCY LAW AMENDMENT (LC 147/2014)

Abstract: Following the evidence-based law literature, this essay examines the effects of the bankruptcy law amendment (by Complementary Law 147/2014) on the potential increase of small business creditors' bargaining power in bankruptcy reorganizations. The law amendment modified the creditors' class-based voting procedure by splitting part of the unsecured creditors class into a new class of small-sized unsecured claimholders. We exploit the law reform as a source of variation and employ mean t-tests and mean difference model specifications. We use a novel dataset on hand-collected bankruptcy proceedings judicial data from the State Court of São Paulo (TJSP) matched to two additional datasets: hand-collected data on court-supervised reorganization cases' attributes provided by the Jurimetrics Brazilian Association (ABJ) and the Brazilian employer-employee administrative data (RAIS). We use two types of outcomes to examine the effects of the 2014 bankruptcy law revamp on creditors' bargaining power. Case-level outcomes regarding debtors' reorganization plan attributes (creditors' haircuts and tenor for repayment) and a firm-level outcome (creditors' number of employees). Our results reveal that the law reform, in which a new class of small-sized unsecured creditors was created, produced little effect on the ex-ante negotiation practice in bankruptcy reorganizations. Empirical evidence shows that debtors generally propose equal haircuts to both unsecured creditors (class III) and the new class of small-sized unsecured creditors (class IV). On the other hand, small-sized unsecured creditors got relatively better terms regarding a shorter time for repayment (on average, 27 months less). However, the average repayment tenor for the small-sized unsecured creditor class is almost ten years, mitigating the economic significance. The findings may provide empirical evidence on legal reforms' economic effects and contribute to evaluating legislative effectiveness.

Keywords: Corporate Bankruptcy. Reorganization. Evidence-based Law. Creditor's bargaining power.

3.1 Introduction

The growing literature on evidence-based law demands clear evidence on legal aspects that underpin policymakers decisions in an evidence-based legal system (Rachlinskit, 2011; Van Gestel & Poorter, 2016). The proper evaluation of a law's efficacy and efficiency should then support lawmaking discussions. The current Brazilian bankruptcy law (BBL) entered into force in 2005 during a wave of bankruptcy law reforms influenced by the recommendations from the World Bank and the United Nations Commission on International Trade Law (UNCITRAL). Until December 2020, when Law 14.112/2020 substantially overhauled the BBL, minor bankruptcy law amendments took place in the Brazilian legal system. Although recent empirical research considered the background of the 2005 bankruptcy law reform (Araujo et al., 2012; Ponticelli & Alencar, 2016), there is little or no empirical evidence on these past minor bankruptcy law amendments.

The Brazilian bankruptcy law establishes a bankruptcy reorganization proceeding designed to preserve employment and viable firms' economic activity. Conflicts of interest between the parties may arise during the reorganization proceeding. Ultimately, bankruptcy reorganization proceedings mainly concern distribution negotiations between creditors and the debtor (Colonnello et al., 2019) and claimholders disputes to define credit recoveries (Gilson et al.,

2000; Jackson, 1982). Thus, creditors' bargaining power may influence the level of creditors' recoveries.

In this context, the bankruptcy law amendment (by the Complementary Law LC 147/2014) modified the creditors' class-based voting procedure by splitting part of the unsecured creditors class into a new class of small-sized unsecured claimholders. The legislators aimed to mitigate conflicts of interest within the class and rebalance creditors' bargaining power by increasing small-sized creditors' power. Legal practitioners affirmed that debtors used to oversee small business creditors in the negotiations to plan approval because of its reduced relative hold of claims within the class of unsecured creditors.

A legal reform is a rich context for investigating effects since it can be considered a source of variation in the creditors' bargaining power balance. We exploit the 2014 bankruptcy law amendment as a source of variation and employ mean t-tests and mean difference model specification to investigate the effects on the potential increase of small business bargaining power in the bankruptcy reorganization proceedings.

We use two types of outcomes on creditor bargaining power. Case-level outcomes regarding debtors' reorganization plan attributes (creditors' haircuts and tenor for repayment) and a firm-level outcome (creditors' number of employees[61]). For an effective legislative intervention, we would expect that the small-sized unsecured creditors would increase their outcomes after the law overhaul.

To conduct our research, we use a novel dataset on hand-collected bankruptcy proceedings lawsuit data from the State Court of São Paulo (TJSP) matched to two additional datasets: hand-collected data on court-supervised reorganization cases' attributes provided by the Jurimetrics Brazilian Association (ABJ) and the Brazilian employer-employee administrative data (RAIS). We opt to proxy for firms' performance by using the case-level and firm-level outcomes.

Despite the relevance of corporate bankruptcy reorganizations (**Figure 14** shows the increased number of court-supervised reorganizing requests in Brazil from 2010 to 2019), to the best of our knowledge, there is no empirical research on evaluating minor legal amendments of the Brazilian bankruptcy law. In the international literature on the topic, we identified a scarcity of evidence-based law studies on creditor bargaining powers. Challenges of data availability, methods of evaluation, and causal relations are substantial.

[61] Because of limited access to financial data of private-held firms, we adopt the percentage change in the number of employees (firm's net hiring) to proxy for firms' performance.

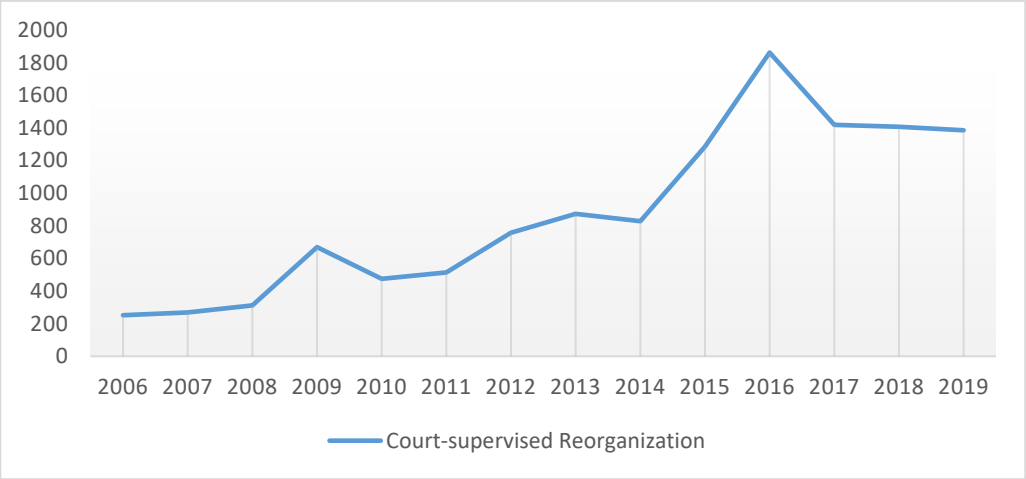

Figure 14 - Court-supervised reorganization bankruptcy requests in Brazil (2010-2019)[62].

We partly fill this gap by subjecting the 2014 Brazilian bankruptcy law amendment assumptions to empirical scrutiny. Our main findings reveal that the BBL reform, in which a new class of small-sized unsecured creditors was created, produced little effect on the negotiation practice in bankruptcy reorganizations. Our empirical evidence shows that debtors generally propose similar financial terms (haircuts and repayment tenor) to both unsecured creditors (class III) and the new class of small-sized creditors (class IV). For the case-level outcomes, there is clear evidence that proposed haircuts are not different between classes III and IV (no statistical significance and small economic coefficient). On the other hand, small-sized unsecured creditors got relatively better financial conditions regarding a shorter time for repayment (on average 27 months less). However, the average repayment tenor for the small-sized unsecured creditor class is almost ten years. Concerning the effects at the firm-level (number of employees), we did not find statistical significance for the effect of differentials in haircuts or tenors in the firms' performance (proxied as the labor force). We deem that both the extended tenors and similar haircuts level mitigates the ability of the model specification to evaluate for differences in short term effects (one year after the bankruptcy filing – Year + 1).

This research contributes to the empirical literature on corporate bankruptcy reorganization. First, we provide empirical evidence of legal reform effects on economic outcomes contributing to the growing literature of evidence-based law. By exploiting the Brazilian bankruptcy regime background, we address an emerging market context, rarely studied. Second, we identify that the only effective change for small-sized creditors (proxied as the firms opting for the simplified tax regime Simples Nacional) is a shorter payment tenor. There is, thus, little economic effect of the bankruptcy law amendment. Last, we provide additional arguments for the importance of empirical evidence to assist policymakers and lawmakers in avoiding overseeing legal practices, misinterpreting the norms, and misguiding legal reforms.

The remainder of this essay proceeds as follows. Section 2 discusses the related literature. Section 3 describes the institutional features of Brazilian bankruptcy law. Section 4 describes the data. Section 5 presents our research design. Section 6 shows and discusses our results. Section 7 concludes.

[62] SERASA EXPERIAN. *Bankruptcy Index*. 2022. Available at: <https://www.serasaexperian.com.br/amplie-seus-conhecimentos/indicadores-economicos>.

3.2 Related Literature

The growing literature on **evidence-based law** aims to provide clear evidence on legal aspects that underpin policymakers decisions in an evidence-based legal system (Rachlinskit, 2011). The legislative interventions should consider a rational approach, mitigating decisions guided exclusively by political or ideological reasons through scientific and empirical findings that underline expected legislative effectiveness (Van Gestel & Poorter, 2016). Furthermore, evidence-based law applies to both the legislative process and the application of the law (Stanek, 2017). Different fields of legal studies may implement this scientific approach, like in designing and implementing an ethics-related administrative law to reduce corruption in public administration (Michael et al., 2015) or critically examining the role of courts in assessing the reliability of the scientific evidence used by legislators (Van Gestel & Poorter, 2016). This research adds to this literature by empirically investigating a bankruptcy law amendment. We look for evidence of whether the legislators' goals of modifying the creditors' bargaining power balance were effectively achieved.

Closely related is the literature on the **effects of legal reforms** on economic outcomes. Bankruptcy law overhauls may create *ex-ante* and *ex-post* consequences for related agents and the macroeconomy (Araujo & Funchal, 2006). The empirical literature evaluates the impacts of bankruptcy law reforms on the credit market (Barbosa et al., 2017; Ponticelli & Alencar, 2016; Rodano et al., 2016), labor market (Fonseca & Doornik, 2019; Graham et al., 2019), and investments level (Ponticelli & Alencar, 2016; Rodano et al., 2016). The effects are also related to improvements in bankruptcy proceedings effectiveness (Gine & Love, 2010). Moreover, corporate legal reforms may affect the business market, including bankruptcy, through the efficiency of the (re)allocation of resources (Calomiris et al., 2017). This essay complements the empirical literature on legal reforms by examining the effects of a minor bankruptcy law amendment on corporate creditors' outcomes, both at the microsystem of bankruptcy (case-level) and employment-related outcomes (firm-level).

The literature also encompasses studies on **creditors' bargaining power**. Bankruptcy reorganization proceedings mainly concern creditor distribution negotiation (Jackson, 1982), even following rules of *par conditio creditorum* (Sullivan et al., 1983) and of fairly and equitably treatment of creditors. The violations of the absolute priority rule (APR) may occur only in reorganizations since it is an accepted field for negotiations (Araujo & Funchal, 2006), and claimholders disputes may define the credit recoveries in a court proceeding (Gilson et al., 2000). Furthermore, creditors also bargain with bankrupt firm shareholders, influencing reorganization outcomes and ex-ante incentives (Colonnello et al., 2019). The bankruptcy ex-post efficiency accounts for the maximization of the value of the firm (going-concern value) and a consequential greater level of creditors' recovery rate (Araujo & Funchal, 2006). We contribute to this literature by examining the effects of a bankruptcy law amendment in the potential change of balance of small-sized and medium and large corporate creditors' bargaining power.

Finally, recent empirical research considers the **background of the Brazilian Bankruptcy Law (Law 11.101/2005).** Most articles exploit the 2005 law reform as an exogenous source of variation that enhanced secured creditors' protection. Following a quasi-experimental approach, these papers examine the effects of the law reform on firms' debt financing, and cost of debt (Araujo et al., 2012), firms' investments level, access to finance, and size (Ponticelli & Alencar, 2016), and employment and earnings of high- and low-skilled workers (Fonseca & Doornik, 2019). Other strands of research examine the effects of court

enforcement on firms' outcomes (Ponticelli & Alencar, 2016), bank's decision to file for a debtor to go into bankruptcy, resolutions of bankruptcy proceedings, and employment in firms geographically close to a bankrupt firm (Moraes, 2019). On the other hand, Silva and Saito (2018) adopt an empirical strategy focused on the microsystem of bankruptcy. The authors explored fine-grained data on court-supervised reorganization plans to identify plan attributes that affect approval likelihood. Like most previous studies, we exploit a law overhaul as an exogenous variation to follow a quasi-experimental strategy. Conversely, we investigate the effects of a minor bankruptcy law amendment (LC 147/2014) that affected creditors' bargaining power balance instead of considering the substantial 2005 bankruptcy law overhaul. We also concentrate our analysis on case-level and firm-level outcomes instead of macroeconomic outcomes.

3.3 Brazilian Bankruptcy Law

Court-Supervised Reorganization

The enactment of the 2005 Brazilian bankruptcy law (BBL), much inspired by the recommendations from the World Bank and the United Nations Commission on International Trade Law (UNCITRAL), sought to preserve the debtors' going-concern value and employment as ones of its primary goals (Campana Filho, 2009; Uncitral, 2005; Warren et al., 2009). The bankruptcy reorganization (court-supervised reorganization) is the leading legal bankruptcy proceeding to provide solutions to severe corporate crises as an alternative to liquidation in Brazil[63].

As a brief overview, the BBL bankruptcy reorganization proceeding aims to preserve employment and viable firms' economic activity. Only the debtor might commence the reorganization proceeding (creditors involuntary petition filings are not allowed)[64]. Once legal requirements are ratified, the court grants the reorganization proceeding to the debtor firm, appointing a trustee that oversees the debtor's activity (debtor in possession) and assists the court during the entire proceeding. An automatic stay period of 180 days on enforcement of actions by creditors applies. The debtor must submit the reorganization plan for creditors' acceptance within 60 days after the court confirms to initiate the bankruptcy proceeding. If a single creditor poses objections to the plan, the court must schedule a general meeting of creditors to approve, modify, or reject the debtor restructuring plan. In the case of plan approval by creditors and confirmation by the court, the plan binds all creditors, even dissenting ones. The court converts the reorganization proceeding into a liquidation proceeding in the case of the plan's rejection. According to the BBL, the reorganization case ends after two years of the plan confirmation by the court. **Figure 15** exhibits a simplified Brazilian court-supervised reorganization flowchart.

[63] The Brazilian bankruptcy law also provides an out-of-court reorganization procedure, an analogous proceeding to prepackaged restructurings of other jurisdictions. The debtor firm privately negotiates creditors' approval of a proposed reorganization plan to further file for court confirmation. It requires the acceptance of 3/5 of the secured and unsecured creditors (labor claimers are excluded). All creditors, even dissenting ones, are subjected plan if ratified by the relevant court.

[64] In the BBL provisions before the recent 2020 law reform, although creditors were not entitled to file for reorganization bankruptcy or pose an alternative restructuring plan, they could propose a debtor's plan amendment in the general meeting of creditors. The debtor's acceptance of the plan amendments was mandatory in these cases. Conversely, the 2020 law overhaul allows now creditors to submit an alternative restructuring plan if the creditors reject the debtor's plan or if the debtor does not file the reorganization plan in due course.

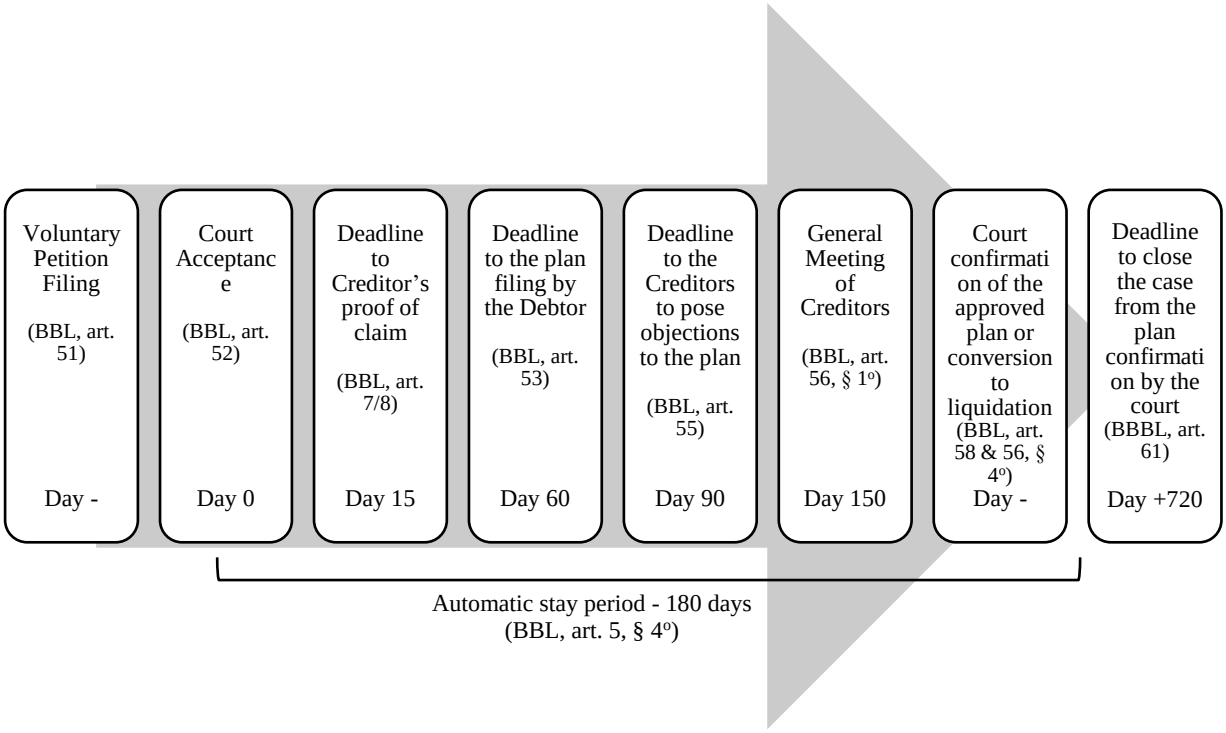

Figure 15 - Brazilian bankruptcy court-supervised reorganization flowchart (before the 2020 BBL amendment). Source: Adapted from Anapolsky and Woods (2013).

Creditors class-based voting procedure

In the BBL, creditors play a significant role in negotiating and voting for the reorganization plan (Araujo et al., 2012). The plan may disclose the means of reorganization from a broad and non-exhaustive list of approaches displayed in the bankruptcy law. For instance, granting special terms and conditions for payment of overdue obligations (haircuts, longer terms for repayment, and lower interest rates), change in corporate control, reduction of wages, reduction of labor hours, and partial sale of debtor's assets.

Moreover, the restructuring plan reports the creditors' payment schedule. The BBL divides creditors into classes, and the plan must follow the rule of *par condictio creditorum* and the principle of treating fairly and equitably creditors of different classes. Although court-supervised proceedings adhere to these principles, bankruptcy reorganization mainly concerns creditors' distribution negotiation (Jackson, 1982).

If a creditor objects to the restructuring plan, the court must settle a general meeting of creditors to submit the reorganization plan for approval or rejection, following a creditor's class-based voting quorum. The original content of article 35 of the BBL divided creditors into three classes: Class I – labor-related claims; Class II - secured claims; and Class III - unsecured claims[65].

In class I (labor-related claims), the approval quorum requires the simple majority of claimholders attending the meeting, regardless of the amount of their claims. For classes II (secured claims) and III (unsecured claims), in addition to the simple majority of creditors present at the meeting, the norm requires the approval of creditors holding more than 50% of

[65] Tax liabilities, leasing loans, fiduciary ownership of real property, and exchange currency loans for exportations are not enrolled in reorganization proceedings. The 2014 Law Amendment (LC 147/2014) does not affect these exclusions.

the credits within each class. All classes must accept the plan to the subsequent courts' ratification of the court-supervised reorganization proceeding[66]. Although the extreme heterogeneity of class III creditors affected their relative bargaining power, all unsecured claimers voted in the same class in the original provisions of the BBL.

The 2014 bankruptcy law amendment (LC 147/2014) split part of class III (unsecured creditors) into a new class of small-sized unsecured claimholders (class IV)[67]. The legislators aimed to increase small-sized creditors' bargaining power and mitigate conflicts of interest within the class of unsecured claims. Legal practitioners affirmed that debtors used to oversee small-sized creditors in the negotiations to get the plan acceptance because of their reduced relative hold of claims within class III. Larger unsecured creditors may have more substantial bargaining power and benefit from a closer relationship with the debtor through out-of-court negotiations and future business partnerships (mainly financial institutions)[68].

The 2014 bankruptcy law amendment did not revamp any provisions concerning the old class-based approval quorum, except that it provides the new class of small-sized unsecured claimholders (class IV) the same rules as class I (labor-related claims). The class IV voting quorum requires the simple majority of creditors attending the meeting, regardless of the amount of their credits. **Table 15** displays the original and the new composition of creditor classes and the required quorum for plan approval.

Table 15 - Brazilian Bankruptcy Law claimholders' classes (before and after the LC 147/2014).

Law 11.101/2005 (art. 35 - original content)	**Law 11.101/2005 (art. 35 - amended by LC 147/2014)**	**Voting approval quorum per class (for original & amended content)**
Class I: Labor-related creditors	Class I: Labor-related creditors	Simple majority of creditors
Class II: Secured creditors	Class II: Secured creditors	Simple majority of creditors + creditors holding more than 50% of credits
Class III: Unsecured creditors	Class III: Unsecured creditors	Simple majority of creditors + creditors holding more than 50% of credits
	Class IV: Small-sized unsecured creditors	Simple majority of creditors

[66] The original content of the cramdown provision (BBL, art. 58, § 1º) set that courts may impose cramdown in the cumulative case of (i) plan approval by holders of claims that represent over half of the amount of all credits attending the meeting; (ii) plan approval by at least two classes of creditors (in the case of only two voting classes, one must approve the plan); (iii) within the class(es) that reject the plan the approval of at least one-third of creditors. The recent 2020 bankruptcy law amendment modified only item (ii), adding the requirement of plan approval by at least three classes (in the case of only three, at least two must approve the plan, and in the case of only two voting classes, one must approve the plan).

[67] In Brazil, courts must immediately apply procedural legal overhauls to court proceedings. Thus, theoretically, from the enactment of the LC 147/2014 on August 7th, 2014, all courts should have enforced the new class division in voting on the reorganization plans.

[68] Bezerra Filho (2015) strongly criticizes the law bankruptcy amendment by the LC 147/2014. The author argues that the new class was created based on the firms' nature (type of register and revenue). However, the original class division was based on the credit nature (labor-related and collateral). Thus, the law overhaul overlaps two distinct criteria. Moreover, the amendment lacks provisions in case a small business creditor is also classified as a secured creditor.

3.4 Data

Brazilian bankruptcy lawsuit data

Although Brazil is a federalist nation, most laws and legal codes encompass the entire country. It is the case of the Brazilian bankruptcy code (Law 11.101/2005). The civil judicial system is divided into federal and state courts. Legal demands regarding corporate and bankruptcy laws follow legal channels on one of the 27 state courts. The BBL provides that the debtor (or creditor) must file for bankruptcy liquidation or reorganization in the judicial district of the debtor's main establishment[69]. In most judicial districts, general civil courts handle bankruptcy proceedings. However, larger commercial cities (like São Paulo and Rio de Janeiro) created corporate or bankruptcy specialized courts.

To conduct this research, we use a novel dataset on hand-collected bankruptcy lawsuit data from the State Court of São Paulo (TJSP). We accessed data on a list of 905 court-supervised reorganizations filings in the state of São Paulo between January 2010 and July 2017 shared by the Jurimetrics Brazilian Association (ABJ). Based on the bankruptcy case registration number, we extracted case information details available at the State Court of São Paulo website. It includes the debtor's name, creditors name, other related agents name (trustees, third parties, tax collector), filing date, judicial district, judge, bankruptcy proceeding type, total claims value, and procedural steps until April 2020.

A caveat of our extracted lawsuit data concerns the lack of firm's tax identification number (*Cadastro Nacional de Pessoa Jurídica - CNPJ*). Therefore, we match our bankruptcy lawsuit data to our administrative employer-employee data by firms' names (*razão social*).

Brazilian employer-employee data (RAIS)

The Annual Social Information Report (*Relação Anual de Informações Sociais - RAIS*) is an administrative dataset on employer-employee information. The data covers all those individuals formally employed from private and public sectors. It is a mandatory annual survey filed by all organizations (including firms) in Brazil, even those with no hiring or firing in the relevant year. Since there are severe penalties for incomplete or late information, there is a high degree of compliance, which leads to an almost complete coverage of the formal sector (Fonseca & Doornik, 2019).

The data includes information on employers (firms), such as opening date, industry, municipality, profit tax regime[70], and number of employees. It also includes information on demographic, occupational, and income characteristics of employees. For instance, RAIS reports workers' age, gender, race, educational level, occupation, monthly earnings, and number of hours worked. Moreover, it covers the labor force movement (hiring and firing balance).

[69] Bankruptcy forum shopping is not allowed.

[70] In Brazil, there are three different corporate profit tax regimes: real profit regime, presumed profit regime, and a simplified tax regime for small businesses (*Simples Nacional*). Conceição et al. (2018) report that more than 70% of micro and small enterprises opt for the *Simples Nacional* since it reduces and simplifies the tax burden.

We match our bankruptcy lawsuit data to RAIS data by firms' names (*razão social*) since the lawsuit data lacks firm's tax identification number (*Cadastro Nacional de Pessoa Jurídica - CNPJ*).

Court-supervised reorganization cases' attributes (ABJ dataset)

The data on court-supervised reorganization cases' attributes is a private-held dataset provided by the Jurimetrics Brazilian Association (ABJ), and its updates have been used in recent papers and reports (Waisberg et al., 2019). The dataset is based on hand-collected bankruptcy lawsuit data extracted from the case records by associated researchers of ABJ. The data refers to a list of 905 court-supervised reorganization filings in the state of São Paulo between January 2010 and July 2017 and includes only case records available in electronic format.

The ABJ dataset comprises information on several court-supervised reorganization cases' attributes, including filing date, debtor's features (name, industry, last yearly revenue, assets & liabilities), trustee's remuneration, total claims value of listed creditors, attributes of the proposed restructuring plan[71] (haircuts, tenor for repayment, interest rates, and frequency of payments for each class), procedural steps (number of general meeting of creditors, extended stay period, occurrence of assets auctions), and the bankruptcy proceeding outcome as of April 2020 (reorganization or liquidation).

Using the bankruptcy case registration number, we merge our ABJ dataset to the matched dataset on bankruptcy lawsuit data (from TJSP) and employer-employee data (from RAIS).

3.5 Empirical Design

We employ an estimation on mean difference in the performance of small business unsecured creditors after a bankruptcy reorganization event. We compare firms that effectively changed their bargaining power in reorganizations (receiving different proposals than other unsecured creditors) with firms that could not change their bargaining power after the law amendment (LC 147/2014).

We focus on the bankruptcy events that occurred after the BBL amendment and in which debtors' reorganization plan attributes (creditors' haircuts and tenor for repayment) report data for the new class of small-sized unsecured creditors (class IV) and the former class of unsecured creditors (class III). We consider a dummy variable that is equal to 1 for the cases in which a plan attribute is different for small business unsecured creditors and other unsecured creditors. The dummy is 0 if the attribute is equal for both creditor's types. The strategy aims to classify the bankruptcy events that occurred after the law amendment in cases where the bargaining power of small creditors has effectivity changed and cases where it remained unchanged.

Because of limited access to financial data of private-held firms, we adopt data from RAIS to estimate the percentage change in the number of employees before and after the bankruptcy

[71] A caveat of the ABJ dataset concerns the possibility of reorganization plan amendments in due course of the lawsuit because of negotiations between debtor and creditors, especially in the general meeting of creditors for voting on the plan for acceptance or rejection. Occasional changes in the proposed restructuring plan are not identified in the ABJ dataset.

event to proxy for firms' performance. Also, we classify creditors as small businesses (small-sized creditors) if the firm opts for the simplified tax regime (*Simples Nacional*), according to RAIS dataset.

We then provide estimations on the mean difference in performance, following the specification of an OLS (Ordinary Least Square) in **Equation 2**. The central aspect of our estimate is that we aim to assess how differences in performance after the bankruptcy event can be explained by an effective change in the bargaining power (different haircut or tenor) of small-sized creditors.

Empirical Model Specification

Our regression model specification is represented by **Equation 2.**

$$\Delta \boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} * \boldsymbol{D_i} + \sum_{\boldsymbol{j=1}}^{\boldsymbol{N}} \boldsymbol{\beta_j} * \boldsymbol{Year_i} + \sum_{\boldsymbol{k=1}}^{\boldsymbol{N}} \boldsymbol{\beta_k} * \boldsymbol{X_{k,i}} + \boldsymbol{\varepsilon_{it}}$$

Equation 2 – Mean difference model specification.

Where the subscript i identifies creditor firms, and t identifies time. $\Delta \boldsymbol{Y_{it}}$ is the percentage change in the number of employees after the bankruptcy event $((\boldsymbol{Y_{it+1}} - \boldsymbol{Y_{it-1}})/\boldsymbol{Y_{it-1}})$. The dummy D_i captures the cases in which the plan attribute is different across creditor types (classes III and IV). It equals 0 if the plan attribute is equal for both classes. We establish two dummies for plan attribute: one for haircut and the other for tenor. We regress each dummy in separate models.

The dummies $Year_i$ are fixed effects for the year of the bankruptcy event. It encompasses the years of 2014, 2015 and 2016. Finally, X represents a vector of covariates (industry, age, existence of branches and employees' demographic characteristics.

The main coefficient of interest β_1 captures the performance differences (percentage change of the number of employees) between small-sized firms that effectively benefited from the law amendment and those in which the plan is unchanged.

It is important to highlight that this empirical strategy does not aim to estimate the causal effect of the law Amendment. Instead, it aims to estimate how the difference in the performance of small-sized creditors after the bankruptcy event can be explained by an effective take up of the law in the reorganization plans.

3.6 Results & Discussion

This section presents our results obtained from the descriptive (mean t-tests) and empirical specifications analysis. First. we present descriptive analysis that shows our sample characteristics and may suggest findings of our estimations. We then present, analyze, and discuss the main specifications and findings of our empirical strategy.

Sample, Summary Statistics & Descriptive Analysis

Table 16 Panel A provides the sample size of the ABJ-RAIS matched dataset of bankruptcy reorganization cases, depicting the number of cases containing case-level outcomes

information (class haircut and tenor for repayment). Our ABJ lawsuit data sample consists of bankruptcy reorganization cases filed from 2012-2016 in the State Court of São Paulo (TJSP). We need corporate data in the year prior to the bankruptcy event (Year -1) and at least one year after the bankruptcy (Year +1) for our estimations on firm-level outcomes (number of employees). We accessed RAIS data from 2011-2017. From our initial sample of 374 cases, we observe that only 122 furnish information on proposed haircuts and 82 on tenor for payment in the ABJ dataset.

Table 16 Panel B presents data on the attributes of the reorganization plan before and after the law amendment. We report the average haircut and tenor for the small-sized unsecured creditor and the unsecured creditors before and after the Brazilian bankruptcy law by the Act LC 147/2014. We also show the difference in means (t-test), indicating that the proposed payment conditions have remained relatively the same for small-sized creditors and unsecured creditors after the law reform. There is no difference in means, suggesting that the legal reform goal to provide more bargaining power to small-sized unsecured creditors appears not to be achieved. It is worth noting that we proxy for small-sized firms by considering those firms using the adoption of the tax regime Simples Nacional. In terms of the economic impact, the descriptive analysis reveals a difference of 3 p.p. after the law amendment but with no statistical significance.

Finally, **Table 16**, Panel C focuses only on data after the law amendment. First, it shows the number of bankruptcy cases that provide information on haircuts and tenors (84). The sample is sorted into two groups. The first group comprises cases in which reorganization plans expressly establish payment conditions to class III and IV separately (41 cases out of 84 for haircuts and 27 cases out of 66 for repayment tenor). The second group contains cases in which the reorganization plan does not provide separate conditions (which can be similar) to classes III and IV. Instead, these reorganization plans provide information on payment conditions only to class III, even after the law reform that created class IV (small-sized unsecured creditors). Second, Panel C compares haircuts and tenors between unsecured creditors (class III) and small-sized unsecured creditors (class IV). The mean-difference test reveals no statistical difference for the proposed haircuts for classes III and IV. The economic effect is less than 1 p.p.. On the other hand, the t-test of mean-difference reveals that the average proposed tenor for repayment of unsecured creditors (class III) is 27 months longer than the proposed tenor to small-sized unsecured creditors (class IV). The p-value of 0,021 indicates that this difference is statistically significant. Thus, after the law reform, small-sized creditors got relatively better financial conditions regarding a shorter time for repayment. One caveat is that our sample for tenor concerns only 27 cases.

Appendix 3.1 provides sample size and summary reorganization plan attributes regarding the entire ABJ dataset (not restricted to the cases in which we have identified at least one single-case creditor in the RAIS database). The mean-differences (t-tests) findings are mainly similar to the ones reported in **Table 16**. The only relevant contrast regards the results from Panel B. In the complete sample of the ABJ dataset, the average haircut for the small-sized unsecured creditor and the unsecured creditors is statistically different before (average haircut: 42,91%) and after (average haircut: 48,43% for class III and 48,19% for class IV) the BBL amendment.

Table 16 - ABJ-RAIS dataset: sample size & summary reorganization plan attributes
The table reports the sample size, statistics of the debtor's reorganization plan attributes, and the relevant difference in means of the matched ABJ-RAIS dataset (371 cases). Law amendment refers to the enactment of LC 147/2014 that modified provisions of the Brazilian bankruptcy law (BBL). Class III comprises unsecured creditors. Class IV comprises small-sized unsecured creditors. We proxy small-sized firms by the adoption of the tax regime *Simples Nacional*. Panel A displays the sample of bankruptcy reorganizations identified in RAIS and the relevant data from the ABJ dataset. Panel B reports the average haircut and tenor for repayment of unsecured and small-sized unsecured creditors before and after the BBL amendment. Panel C presents data on haircuts and tenors sorted by creditor class (III and IV) after the BBL amendment. ABJ is the Jurimetrics Brazilian Association. RAIS is the Annual Social Information Report.

	(1)	(2)
Panel A - Sample size		
	Before law amendment	**After law amendment**
Number of cases	153	218
Cases with haircut information	36	84
Cases with payment tenor information	19	66

Panel B - Attributes of the reorganization plan before and after the law amendment

	Before law amendment	**After law amendment**	**p-value (1)-(2)**
Average haircut for small-sized unsecured creditor	44,33%	47,00%	0,379
Average haircut for unsecured creditor	44,33%	47,60%	0,257
Average tenor for small-sized unsecured creditor	125,6	122,7	0,797
Average tenor for unsecured creditor	125,6	136,9	0,271

Panel C - Attributes of the reorganization plan: small-sized creditors (class IV) vs. unsecured creditors (class III) after the law amendment

	Class III and IV	**Class III only**	
Number of cases with haircut information	41	43	
Number of cases with tenor information	27	39	
Comparison of attributes by creditor type	**Unsecured creditors (Class III)**	**Small-sized unsecured creditors (Class IV)**	**p-value (1)-(2)**
Average haircut	46,54%	45,32%	0,729
Average tenor	147,2	119,8	0,021

Empirical Estimations

The descriptive analysis provided findings for case-level outcomes: creditor haircuts and tenor for repayment. How a bankruptcy law amendment affects variables of the micro process of bankruptcy, like reorganization plan attributes, is of the essence. We then look for effects on a second layer- firm-level outcomes. We proxy firms' performance by the percentage change in the number of employees (firm's net hiring) before (in Year -1) and after (Year +1) the

bankruptcy reorganization filing. We proxied small businesses creditors (small-sized creditors) if the firm opts for the simplified tax regime (*Simples Nacional*)[72].

The first three columns show the OLS regressions examining the influence of the haircut dummy on the creditors' labor performance. The last three columns display the coefficients for the impact of the tenor dummy. The Haircut (Tenor) dummy indicates that the proposed haircut (tenor) for the small-sized unsecured creditors (class IV) is different from the unsecured creditors (class III). It means that the debtor submitted different financial conditions for acceptance. The results reported in **Table 17** reveal that the haircut ratio and tenor for repayment are not statistically significant variables to explain the percentage change in the number of employees after the Brazilian bankruptcy law amendment (by the Complementary Law 147/2014). We performed several different specifications. We progressively added year fixed effects and a vector of covariates. The results maintain unchanged.

Since the univariate analysis indicated no mean differences between the proposed haircuts of small-sized creditors and unsecured creditors, we tested through our empirical strategy to confirm. Yet, the economic effect (1 p.p.) is too small to provide a financial deviation that could influence a second-level (at firm-level) outcome, such as the number of employees. Regarding the effects of different payments tenor, we identified the statistical significance of the mean-difference (the mean for class IV is 119 months and for class III is 147 months). However, economically, both tenors are so extended that the ability to evaluate for differences in short-term effects (one year after the bankruptcy filing – Year + 1) is mitigated. Although the results reveal no statistical significance for both tenor and haircuts, the negative economic signal indicates that higher haircuts and longer tenors are associated with lower firms' labor performance (which would be the expected direction).

After the law reform, almost half of the proposed plans still provide payment conditions only to class III. In addition, many reorganization plans that correctly divide the proposed payments to classes III and IV provide similar financial conditions (haircut and tenor) to both classes. Thus, not providing any source of variation and mitigating the expected effects of the law reform.

Table 17 - Baseline OLS regression model.
This table shows coefficient estimates from OLS regressions for examining the influence of debtors' plan reorganization attributes (case-level outcomes) on the firms' labor performance (firm-level outcome) of unsecured corporate creditors – class III and class IV. The law amendment refers to the enactment of Act LC 147/2014 that created the special class IV (of small-sized firms), providing minor changes in the Brazilian bankruptcy law (BBL). We use two reorganization plan attributes as the main independent variables. The Haircut dummy indicates that the proposed haircut for small-sized unsecured creditors (class IV) differs from the unsecured creditors (class III). The Tenor dummy indicates that the proposed tenor for repayment for small-sized unsecured creditors (class IV) differs from the unsecured creditors (class III). Firms' labor performance is proxied as the deviation (Δ) in the total number of employees before (in Year -1) and after (Year +1) the bankruptcy reorganization filing. We add year fixed effects in Specifications 2, 3, 5, and 6. We add the following covariates in Specifications 3 and 6: firm age, industry (at the one-digit IBGE classification), dummy of branches, and employees' educational level. Robust standard errors (in brackets). ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% level, respectively.

[72] In the relevant sample of 2126 creditor firms of 374 bankruptcy reorganization cases, only 385 firms opt for the simplified tax regime (*Simples Nacional*). From the final sample of cases (85 cases), we identified a small number of cases providing different proposals of payments (haircuts and tenor) for classes III (unsecured) and IV (small-sized unsecured).

Dependent variable: deviation (Δ) in the total number of employees						
	(1)	(2)	(3)	(4)	(5)	(6)
Haircut	-0.104	-0.0754	-0.0619			
	(0.156)	(0.166)	(0.235)			
Tenor				0.101	-0.0709	-0.302
				(0.173)	(0.285)	(0.269)
Constant	-0.322***	-0.324***	-0.637**	-0.296***	-0.243**	-0.391
	(0.0748)	(0.0756)	(0.276)	(0.0996)	(0.119)	(0.417)
Observations	49	49	39	42	42	34
R-squared	0.003	0.033	0.339	0.008	0.020	0.393
Year FE	No	Yes	Yes	No	Yes	Yes
Covariates	No	No	Yes	No	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Analyzing together the findings from our descriptive analysis (difference in mean t-tests) in case-level outcomes and our empirical estimations (OLS baseline specification) in firm-level outcomes, we argue that the law reform did not provide meaningful bargaining power to small-sized unsecured creditors. Other challenges may hinder a better negotiation position, like bankruptcy or distress specialization and associated direct and indirect costs (Altman et al., 2019; Waisberg et al., 2019; Wang, 2022). The legal reform focusing only on the bankruptcy reorganization proceeding may also curb the effect on small creditors' bargaining power. Since the minor law overhaul did not provide any change on bankruptcy liquidation proceedings, small-sized claimants still expect little payment levels in liquidation. Thus, the small creditors' bargaining power for alternative resolutions of corporate crises is still mitigated even with the law reform. The only statistically significant difference regards shorter tenors for repayment for small-sized unsecured creditors (class IV) compared to unsecured creditors (class III).

It is worth noting that we are examining the debtors' proposed plans, so we investigate the *ex-ante* effects of the law amendment regarding incentives for the debtor providing (or not) more favorable conditions to the special class IV. Other bargaining characteristics, such as the existence or absence of secured creditors, the number of creditors in each relevant class (III and IV), and the strategic importance of the creditor, among others, may influence the debtor's managerial decision. We question if the law reform simply brought more complexity to the voting-class procedure instead of real bargaining gains to small-sized creditors.

One pivotal caveat is the small number of available data regarding the proposed plan attributes. This lack of data applies to the period after the Brazilian bankruptcy law amendment by the Act LC 147/2014 that created the special class IV (of small-sized firms), providing minor changes in the BBL. The law provides the submission of a reorganization plan no later than 60 days after the court grants the reorganization proceeding to the debtor firm. However, in the ABJ dataset, several bankruptcy reorganization proceedings data on the proposed plan conditions are missing. Expanding the amount of information may contribute to better specifications and evaluate the results in a broaden sample.

3.7 Conclusion

A law reform is a rich context for empirical investigation since it can be considered a source of exogenous variation. The bankruptcy law amendment (by Complementary Law 147/2014) aimed to increase small businesses' bargaining power in bankruptcy reorganizations. The law amendment modified the creditors' class-based voting procedure by splitting part of the unsecured creditors class into a new class of small-sized unsecured claimholders.

Our findings suggest a small effect of the new class division on the case-level outcomes (haircut and tenor) and the firm-level outcomes (firm number of employees). It is worth noting that almost half of the proposed reorganization plans still provide payment conditions only to class III, even after the law reform. In addition, many reorganization plans that correctly divide the proposed payments to classes III and IV provide similar financial conditions (haircut and tenor) to both classes. Our descriptive analysis shows that small-sized unsecured creditors got relatively better financial conditions regarding a shorter time for repayment (on average, 27 months less) but no difference for haircuts. Despite the better tenor proposals, the average payment tenor for class IV is almost ten years.

Finally, our results of the outcomes at the firm-level (firm's net hiring) indicate that differentials of haircuts or tenors do not affect firms' performance. Thus, the law overhaul provided little to no indirect effects of an increase in bargaining power to streamline small-sized corporate creditors' performance. The similar level of average haircuts and the extended tenors may mitigate the ability of the model specification to evaluate for differences in short term effects (one year after the bankruptcy filing – Year + 1).

In summary, the bankruptcy law amendment has not substantially changed legal practices. Our results suggest that the expected increase in the bargaining power of small-sized unsecured creditors has been limited. We argue that the BBL amendment might have simply brought more complexity to the voting-class procedure instead of real bargaining gains to small-sized creditors.

Although the recent reform of BBL, dated December 2020, legal practitioners and academics still point out several aspects of the bankruptcy law that could and should be amended. The 2020 BBL reform lacked proper empirical appraisal of the bankruptcy law in force. Our research may provide evidence to support discussions to further bankruptcy law overhauls.

Appendix 3.1

Table 18 - ABJ dataset: sample size & summary reorganization plan attributes
The table reports the sample size, statistics of the debtor's reorganization plan attributes, and the relevant difference in means of the entire ABJ dataset (905 cases). Law amendment refers to the enactment of LC 147/2014 that modified provisions of the Brazilian bankruptcy law (BBL). Class III comprises unsecured creditors. Class IV comprises small-sized unsecured creditors. We proxy small-sized firms by the adoption of the tax regime *Simples Nacional*. Panel A displays the sample of bankruptcy reorganizations identified in RAIS and the relevant data from the ABJ dataset. Panel B reports the average haircut and tenor for repayment of unsecured and small-sized unsecured creditors before and after the BBL amendment. Panel C presents data on haircuts and tenors sorted by creditor class (III and IV) after the BBL amendment. ABJ is the Jurimetrics Brazilian Association.

	(1)	(2)	(3)
Panel A - Sample size			
	Before law amendment	**After law amendment**	
Number of cases	408	497	
Cases with haircut information	45	100	
Cases with payment tenor information	22	82	

Panel B - Attributes of the reorganization plan before and after the law amendment

	Before law amendment	**After law amendment**	**p-value (1)-(2)**
Average haircut for small-sized unsecured creditor	42,91%	48,18%	0,059
Average haircut for unsecured creditor	42,91%	48,43%	0,041
Average tenor for small-sized unsecured creditor	125,4	121,6	0,709
Average tenor for unsecured creditor	125,4	134,1	0,366

Panel C - Attributes of the reorganization plan: small-sized creditors (class IV) vs. unsecured creditors (class III) after the law amendment

	Class III and IV	**Class III only**	
Number of cases with haircut information	50	50	
Number of cases with tenor information	32	50	
Comparison of attributes by creditor type	**Unsecured creditors (Class III)**	**Small-sized unsecured creditors (Class IV)**	**p-value (1)-(2)**
Average haircut	47,16%	46,66%	0,871
Average tenor	143,6	118,6	0,022

CONCLUSION

This doctoral dissertation sheds light on empirical literature on corporate bankruptcy reorganization and liquidation. In our three essays (one systematic literature review and two empirical essays using Brazilian lawsuit and administrative data), we sought to contribute to this field, especially in an emerging market context.

The first essay was conducted through a systematic literature review to provide a systematization of the state of the art of empirical literature on corporate bankruptcy liquidation and reorganization, indicating relevant flaws, caveats, and voids in the literature and proposing paths for future research. It also provides a background to the theoretical discussions on the two following empirical essays.

Based on the growing literature of empirical legal studies and evidence-based law, we addressed gaps in the literature in the second and third essays, exploiting the Brazilian context and focusing on the bankrupt firms' creditors instead of the debtor firm. The SLR reveals that most papers (73%) focus primarily on the bankrupt firm, suggesting potential contributions from works emphasizing other linked economic agents.

In the second essay, we examined the bankruptcy spillover effects on bankrupt firms' creditors. We employed a difference-in-differences matching estimator strategy to compare the performance of bankrupt firms' creditors and similar firms not linked to a bankrupt firm. The contagion effects of bankruptcy reach both the corporate creditors and similar firms with no direct link to a bankruptcy reorganization event. Moreover, we assume that the adverse spillover effects on both groups are mainly from bankruptcy reorganization cases converted to liquidation.

Finally, in the third essay, we empirically investigated how a law overhaul intending to modify the bargaining powers within corporate creditors in bankruptcy reorganizations affected the proposed restructuring plans regarding creditors' haircuts and tenors for repayment. We deemed the Brazilian bankruptcy law amendment (by LC 147/2014) as a source of variation that affected creditors' bargaining power balance. We identified in descriptive analysis that the law reform's effects were uniquely on better payment tenor conditions, with negligible differences in haircuts. The law reform did not affect firms' labor performance.

Challenges of data availability, more prominent in emerging markets, are still one of the main reasons for the scant empirical research on corporate bankruptcy. We found complex and with a series of pitfalls the design of a novel dataset on hand-collected bankruptcy proceedings judicial data and its merge with the employer-employee administrative data. Confounding effects from other lawsuits and irregular closedown of businesses may also influence the reach of our results.

The three essays reveal the importance of empirical legal studies to provide evidence and critical information for evaluating and assisting legal reforms, public policy debates, legal practitioners' interpretations of the norms, and academic research. Despite the caveats, this doctoral dissertation substantially contributes to adding knowledge and evidence to support the activities of legal practitioners, policymakers, and academics. An avenue of opportunities for future research on corporate bankruptcy reorganization and liquidation is noticeable.

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