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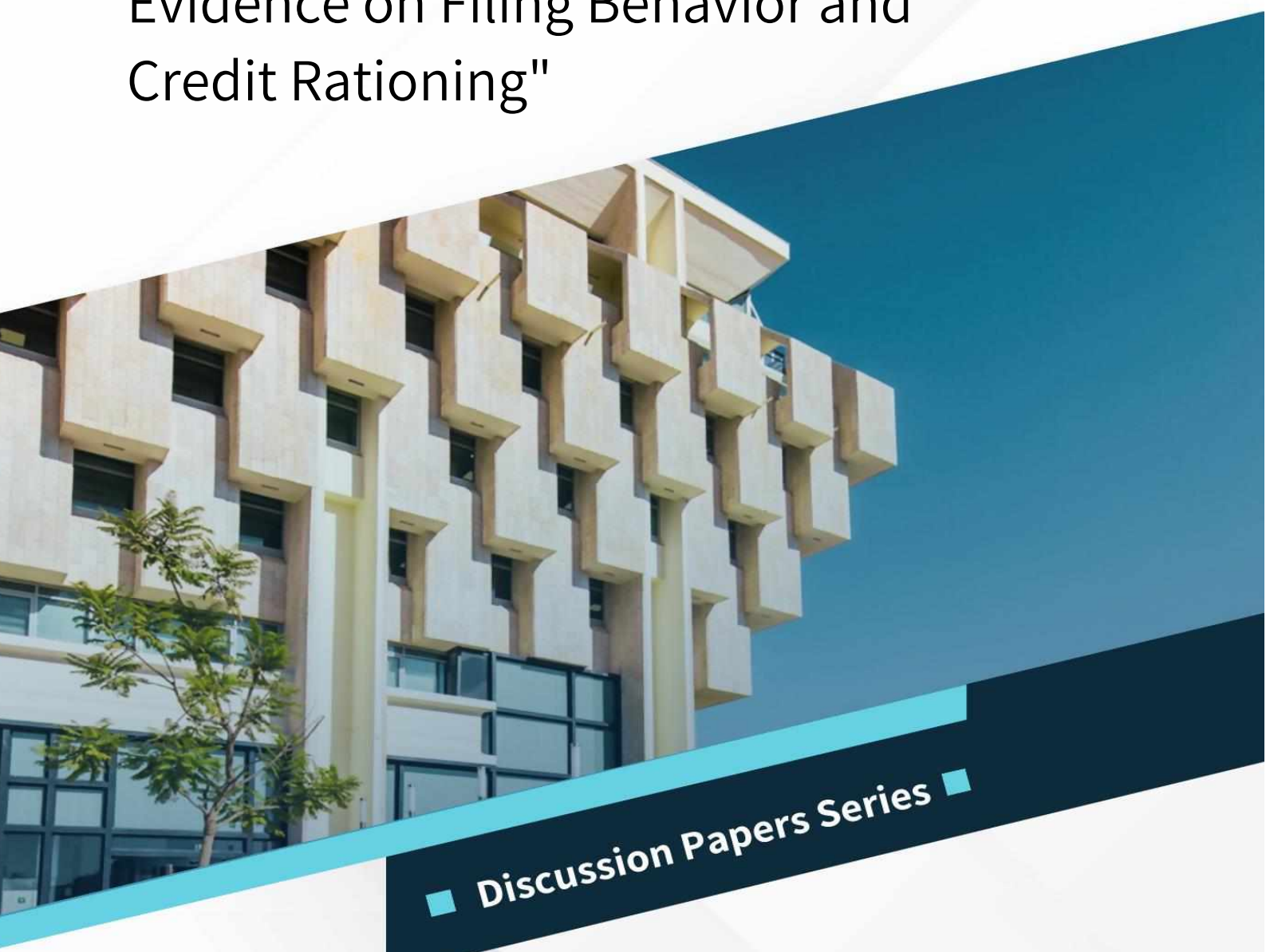
"Personal Bankruptcy Reform and Credit Markets: Cross-Country Evidence on Filing Behavior and Credit Rationing"



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"Personal Bankruptcy Reform and Credit Markets: Cross-Country Evidence on Filing Behavior and Credit Rationing"*

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Abstract

Personal bankruptcy regulation embodies a core trade-off between offering debtors a "fresh start" and preserving credit market supply. This study examines how reforms in personal bankruptcy law affected bankruptcy filings and household credit markets in 13 European countries and Israel between 2001 and 2020. We measure debtor-friendliness through a composite Leniency Index and apply Local Projection models to capture dynamic effects over five years and more. Our findings show that more lenient legislation increases bankruptcy filings in the short-to-medium term, peaking after three to four years, but the effect fades within six to seven years. In contrast, leniency exerts persistent negative effects on household credit growth, with lenders tightening credit supply. Effects are dimension-specific: stigma and procedural complexity primarily drive filing behavior, while discharge conditions and procedural features significantly affect credit supply. These results underscore that debtor-friendly reforms improve individual rehabilitation but may trigger persistent credit tightening, implying that bankruptcy design must balance social protection against the risk of credit rationing and that reforming different legal dimensions can affect debtors and credit markets in fundamentally different ways.

JEL classification: G21, K35, E51

Keywords: Personal bankruptcy, Debtor protection, Bankruptcy filings, Household credit supply, Credit tightening, Regulatory anticipation, Local projections.

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רפורמה בחדלות פירעון יחידים ושווקי אשראי: עדויות בין-לאומיות על התנהגות הגשת בקשות והקצבת אשראי

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תקציר

רגולציה בדיני פשיטת רגל של יחידים משקפים פשרה מרכזית בין הרצון לאפשר לחייבים "התחלה חדשה" לבין הצורך לשמור על היצע אשראי תקין בשוק. מחקר זה בוחן כיצד רפורמות בדיני פשיטת רגל של יחידים השפיעו על היקף הבקשות לפשיטת רגל ועל שוק האשראי של משקי בית ב-13 מדינות אירופיות ובישראל בין השנים 2001–2020. מידת הידידותיות של החקיקה מנקודת מבטם של החייבים נמדדת באמצעות מדד "היד הרכה" (Leniency Index) וההשפעה מוערכת באמצעות מודלי Local Projection לאורך אופק של חמש שנים ואף מעבר לכך. הממצאים מראים כי חקיקה מקלה יותר מובילה לעלייה במספר הבקשות לפשיטת רגל בטווח הקצר והבינוני, כאשר העלייה מגיעה לשיאה לאחר שלוש עד ארבע שנים, אך נחלשת ונעלמת בתוך כשש עד שבע שנים. לעומת זאת, להקלות בדין יש השפעה שלילית ומתמשכת על צמיחת האשראי של משקי הבית, כאשר המלווים מצמצמים את היצע האשראי. ההשפעות אינן אחידות בין היבטי החקיקה השונים: גורמים כמו סטיגמה חברתית ומורכבות ההליך מניעים בעיקר את הנטייה להגיש בקשות לפשיטת רגל, בעוד שתנאי מחיקת החוב ומאפיינים פרוצדורליים משפיעים באופן משמעותי על היצע האשראי. ממצאים אלה מדגישים כי רפורמות המקלות עם חייבים עשויות לשפר את יכולת השיקום הכלכלי של יחידים, אך במקביל להביא להידוק ממושך של האשראי. לפיכך, חקיקת דיני פשיטת הרגל מחייבת איזון בין הגנה חברתית על חייבים לבין הסיכון לצמצום בהיצע האשראי וכן הבנה כי שינוי בממדים שונים של החקיקה עשוי להשפיע בדרכים שונות ומהותיות הן על חייבים והן על שוק האשראי.

סיווג JEL: G21, K35, E51

מילות מפתח: רגולציה והשלכות מדיניות, הליכי חדלות פירעון של יחידים, אשראי משקי הבית, נתוני פאנל ומודל LP.

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1. Introduction

Personal bankruptcy law constitutes the institutional framework through which the debts of insolvent individuals, households, and self-employed business proprietors are adjudicated and resolved. The design of bankruptcy systems has emerged as a critical policy issue in modern economies, as governments seek to balance the competing objectives of debtor rehabilitation and creditor protection. The development of personal bankruptcy systems has come into focus over the past two-to-three decades, as sixteen EU member states have enacted specific personal bankruptcy regimes, and almost twenty major reforms have been implemented, moving predominantly toward more lenient approaches that facilitate faster economic rehabilitation for distressed debtors. These reforms reflect a growing recognition that overly punitive bankruptcy systems may hinder economic recovery and entrepreneurship, while simultaneously acknowledging the need to maintain credit market functionality and financial discipline.

The theoretical foundation (e.g. Athreya, 2006; Spooner 2017) for these reforms rests on the premise that efficient bankruptcy systems should provide a certain degree of a "fresh start" for debtors in financial distress, while preserving appropriate incentives for responsible borrowing and lending behavior. However, this conceptual framework masks a fundamental tension: the potential trade-off between increasing leniency toward debtors and the corresponding effects on credit market dynamics. As bankruptcy laws become more lenient toward debtors, creditors may respond by tightening lending standards and reducing credit availability to compensate for heightened default risks and reduced recovery prospects.

Existing empirical research on bankruptcy reforms has predominantly focused on either single-country analyses, examining the direct effects of specific legislative changes on bankruptcy filing rates, debtor outcomes, entrepreneurial activity, or the differences among state laws in the United States. While these studies have provided valuable insights into the immediate consequences of a specific reform or differences in some elements of the systems, they have not systematically explored the dynamics and the broader equilibrium effects on credit markets across different institutional and economic contexts.

This study addresses these gaps by providing the first comprehensive cross-country panel analysis of how personal bankruptcy reforms that alter the leniency of the legal framework affect both personal bankruptcy filing patterns and credit market outcomes. Using panel data spanning multiple countries and time periods, we examine the impact of reforms that modified the established "Leniency Index" in the literature on both the number of bankruptcy filings and the volume and availability of credit extended by the financial system. In this paper we use the Leniency Index, introduced by Walter and Krenchel (2021), which evaluates personal bankruptcy laws across seven dimensions usually examined by the literature for comparative analyses: accessibility, eligibility, costs, complexity, process, discharge conditions, and stigma.

We hypothesize that greater leniency is associated with a significant increase in the number of bankruptcy filings, particularly in the short run, and with a decrease in credit availability.

Our analysis provides a novel contribution to the literature by illuminating the previously unexplored trade-off between facilitating debtor rehabilitation and maintaining credit market liquidity and availability. Specifically, we investigate the long-term cross-country effects of reforms that increase the leniency of bankruptcy systems on both the number of new bankruptcy filings and the volume of credit markets. This examination allows us to estimate whether more individual debtors pursue economic rehabilitation while overall credit availability simultaneously becomes constrained as financial institutions adjust their lending practices in response to altered risk-return profiles. The theoretical framework suggests a transmission mechanism, in which leniency reforms lead to increased filing incentives, which result in higher creditor losses, ultimately causing credit market adjustment. However, the cross-country analyses and the dynamic timing of these effects remain unexplored in the existing literature. The studies reviewed later typically examine static relationships or focus on immediate post-reform effects in one country, without tracing how the transmission mechanism unfolds over time. This research question is particularly relevant considering recent global trends toward more debtor-friendly bankruptcy regimes and growing concerns about credit access and financial inclusion in various economies.

Our empirical approach leverages variation in bankruptcy reform timing and content across countries to identify the effects of changes in the Leniency Index on both bankruptcy outcomes and credit market equilibrium. We employ a Local Projections model (Jordà and Taylor, 2025) to extract the dynamic impact of reforms over time. By employing a panel framework, we can control for country-specific institutional factors and time-varying economic conditions that might otherwise confound our estimates. This methodology allows us to provide the first systematic evidence on whether the benefits of increased bankruptcy leniency come at the cost of reduced credit market accessibility and availability, thereby informing the ongoing policy debate surrounding optimal bankruptcy system design.

We conclude that more lenient personal bankruptcy legislation leads to higher bankruptcy filings but negatively affects the rate of consumer credit growth. As bankruptcy legislation becomes more debtor-friendly, more debtors will choose to wait for the new legislation, while credit providers respond by reflecting heightened risk awareness. Moreover, changes in the Leniency Index exert a positive and statistically significant cumulative effect on bankruptcy filings over an extended four-year period following the initial policy shock, peaking in the fourth year. When examining longer horizons (seven years), the effect diminishes after year four, with filing numbers showing convergence toward pre-reform levels, though coefficients in later years lack statistical significance. Lenient reforms reveal that regulatory shocks have a persistent negative effect on credit growth rates across a five-year horizon. The effect proves more persistent than on the number of filings. Whereas filings return to pre-reform levels over time, the effect on credit growth rates remains even in the long run. Our results suggest that such reforms lead to temporary changes in the dynamics of filings, but result in lasting structural shifts in credit market dynamics rather than short-term adjustments. These conclusions also carry important policy implications, suggesting that policymakers face a fundamental tension when designing personal bankruptcy systems.

Our contributions are thus multifaceted: (i) the first dynamic cross-country evidence linking leniency to both filings and credit supply; (ii) identification of credit market responses based on alternative reform timing (parliamentary approval vs. implementation); (iii) credit market equilibrium responses beyond debtor behavior;

(iv) distinguishing reform magnitude from mere occurrences; and (v) decomposition of leniency effects by dimension, revealing differential impacts on filing decisions versus credit supply.

In the following sections, we summarize the relevant literature on personal bankruptcy in relation to leniency levels and their association with filings, macroeconomic variables and credit markets. We then introduce the data, descriptive statistics, and methodology applied, followed by the results of the multivariate analyses. Finally, we discuss the findings, draw conclusions, and formulate policy recommendations.

2. Literature review

According to White's (2007b) conceptualization, personal bankruptcy law refers to the legal framework designed to settle the debts of individuals and small business owners who have become insolvent. Although the institutional arrangements and legal procedures differ substantially across jurisdictions, these systems share certain fundamental principles. Once the eligibility requirements are fulfilled, the debtor typically enters a structured repayment scheme, in which outstanding obligations are settled over a predetermined period through the use of nonexempt income and assets. Upon completion of this process, the remaining unpaid debts are discharged, allowing the debtor to achieve a financial "fresh start".

As this legislation provides over-indebted individuals with a safety net, personal bankruptcy laws were framed as a form of social insurance (e.g. Spooner, 2017 or Feibelman, 2005). Such laws provided debt relief to over-indebted individuals when traditional safety nets proved inadequate. This system functioned as compulsory, state-governed insurance, in which certain risks and costs were shifted from debtors to creditors. While this transfer could have been welfare enhancing for individuals by insuring them against costly adverse events, it simultaneously imposed costs on creditors, which increased in tandem with the leniency of the legislation.

Leniency denotes the debtor-friendly orientation of personal bankruptcy law. Narrowly, it concerns the terms of restructuring and relief, the availability of discharge, and the prospect of a fresh start, including measures such as payment deferrals, reduced debt service, and partial or full discharge. More broadly, it captures

how the system treats defaults by individuals and unlimited-liability entrepreneurs, how accessible a fresh start is in practice, and the severity of any residual post-bankruptcy stigma.

Lenient changes in some dimensions of the legislation have been analyzed in various forms in the literature. Much of the literature examines single policy shocks—such as the introduction of a fresh-start or major reforms—and their effects on employment, entrepreneurship, bankruptcy filings, and credit market outcomes (access, supply, interest rates, and defaults). Empirically, two settings dominate: the 2005 U.S. BAPCPA (Bankruptcy Abuse Prevention and Consumer Protection Act) conservative reform and cross-state variation in homestead exemptions, both used to link leniency to state-level outcomes and market data. However, the heavy reliance on single-country and single-case analyses limits the external validity of these findings, as they do not account for cross-country institutional differences or temporal variations that may shape the relationship between leniency reforms and economic or social outcomes.

Furthermore, only a limited number of studies have constructed composite indicators to measure and compare the leniency levels of different legal systems. These studies were mainly built on some comparative studies of personal bankruptcy systems. In one such comparative study, Heuer (2014) classified consumer bankruptcy regimes into 15 advanced economies around the world. White (2007a) also analyzed the systems of some selected countries based on seven categories, comparing the bankruptcy policies based on the trade-off between providing insurance to debtors and punishing default. Graziano et al., eds. (2019) presented and compared the legislations of 30 European countries based on the same characteristics and various dimensions. These studies primarily sought to identify, compare, and group the key features of personal bankruptcy regulations across different systems, and, by setting the comparative features, they allowed other studies to measure the leniency level of the regulations. In measuring leniency, Armour and Cumming (2008) scored six bankruptcy-related indicators to evaluate the effects of different systems on self-employment across countries. However, the study relied on only limited features of the systems. Taking over the main categories and dimensions of previous comparative studies, Walter and Krenchel (2021) developed a composite Leniency Index that

captures the most salient comparative dimensions of bankruptcy legislation, including eligibility criteria, procedural complexity, costliness, discharge conditions, and stigmatizing effects. It consisted of seven main dimensions and 35 indicators to compare EU member states' legislations. This index was subsequently adapted by Walter et al. (2022) to analyze the relationship between leniency changes and entrepreneurship developments in the EU, and by Ofir et al. (2023) and Berzani and Stein (2023) to examine personal bankruptcy developments in Israel. Nevertheless, empirical research examining how complex changes in leniency affect debtor behavior, creditor behavior, the financial markets, the economy, and society has remained largely concentrated in the United States, and little evidence has been found from other jurisdictions.

Besides comparing different systems and examining the different effects of reforms, the literature has also examined the behavioral and financial implications of system changes for both debtors and creditors. The introduction of a new system or a more lenient reform within a country may trigger multiple, potentially opposing effects through complex transmission mechanisms. Moreover, the responses of debtors and creditors do not necessarily occur simultaneously or with the same intensity. These effects and reactions can be analyzed from both the debtor's and the creditor's perspective. From the creditor's standpoint, the literature substantiates the intuitive proposition of the suspected mechanism: debtor-friendly legal changes raise credit losses, thereby prompting compensatory restrictive responses by lenders. Next, we review the elements of this mechanism and the relevant literature. It must be noted that, to our knowledge, there is no integrated framework in the personal bankruptcy literature that jointly models the timing of debtor responses and feedback effects from creditor anticipation.

Angel and Warum (2024) pointed out the mechanism through which lenient policy measures operate. Such measures could raise creditors' actual and expected losses in three ways. First, more generous debt relief prompted more debtors to file for bankruptcy. Second, when filing became easier and more accessible, borrowers appeared more willing to take higher risks and accumulate greater debt, leading to moral hazard. Third, debtor-friendly changes in regulation resulted in a larger

redistribution of value and recovery within the procedure transferring benefits from creditors to debtors. Conversely, as debtor-friendly measures imposed costs and higher expected losses on creditors, the creditors responded with restrictive measures like withholding credit supply and raising interest rates (credit rationing). Within this framework, borrowers—the beneficiaries of the stricter conditions—effectively bear the cost of the special debtor protection.

The literature examines the three potential expected loss factors in detail, often in conjunction with creditor responses. In our study, we focus on the first factor—an increase in filings—and briefly outline the other two factors thereafter.

This first factor, an increase in filing volumes, is central to our analysis. The most relevant studies presented below cluster around two focal themes: the effects of the 2005 BAPCPA reform, and evaluations of state-level asset exemption provisions in the United States. Empirical studies focusing on non-U.S. contexts are scarce.

In examining the conservative BAPCPA reform, most research investigated the number of filings alongside the development of default rates across various credit segments (such as student loans, credit cards, and mortgages) and other macroeconomic factors influenced by the reform. Many of the studies (e.g. White, 2007a; Athreya et al., 2015; Mitman, 2016; Gross et al., 2021; Albanesi and Nosal, 2025) confirmed the phenomenon that the number of filings rose steadily until 2005 and declined following the reform. Taken together, these studies confirm the association between the development of bankruptcy filings and the reform. However, they rely primarily on descriptive time-series evidence and do not provide deeper analytical insight into the underlying mechanisms. Nakajima (2017) also confirmed with a life-cycle model that the reform achieved its goal of reducing the number of filings, but overall negative welfare effects dominated. However, we must note that in BAPCPA studies, the statute's effect is entangled with concurrent macroeconomic, financial, and other time-specific events that could not be fully purged.

Studies focusing on differences in asset exemption levels (e.g., Gropp et al., 1997; Athreya, 2006; Pattison and Hynes, 2020) generally reached similar conclusions: More generous, higher exemption limits led to higher filing rates. However, these studies also relied primarily on comparing filing statistics without providing further analytical

depth. Li et al. (2022) approached the question differently but also concluded similarly: Exemption levels of bankruptcy policies had a significant effect on the likelihood of filing. Indarte (2022) presented a partly opposing conclusion, also considering creditors' reactions, arguing that the credit rationing effect tended to dominate in the long run. While debt relief provisions may have initially led to higher bankruptcy filings, the credit rationing effect ultimately resulted in lower levels of unsecured debt and, in turn, a reduced number of filings. This strand of analysis, however, established a connection between filing behavior and credit rationing effects, yielding new empirical insights. Though informative, U.S. homestead-exemption results may reflect confounding state-level heterogeneity beyond the exemption itself, and could be interpreted as U.S.-only evidence.

The number of studies analyzing the development of bankruptcy filings from any leniency perspective outside the United States is very limited. Angel and Warum (2024) examined the determinants of bankruptcy filings in Austria as a country case study. They used detailed time-series data and suggested that the debtor-friendly reform of 2017—without measuring the extent of the reform—led to an increase in filings. However, it was followed by a correction over time. Allen and Basiri (2016) analyzed time-series data and the 2009 reform in Canada, finding a negative correlation between an increase in the cost dimension of the procedure and the number of personal bankruptcy filings, but relying on only one specific indicator of the leniency dimensions. In the literature, no cross-country studies were identified in this field. This lack of broader evidence leaves open important questions about whether similar patterns hold in other institutional and economic contexts.

Research on the second factor of moral hazard and risk-taking that increases creditor risk presents more nuanced findings. Earlier studies (White, 1998; Wang and White, 2000; Feibelman, 2005; Pottow, 2007) showed that generous bankruptcy policies could increase moral hazard by encouraging strategic filings and raising creditor losses. However, Li et al. (2022) concluded that effects varied across debtor groups while Indarte (2023) found the moral hazard effects to be minor. Extending bankruptcy protection to entrepreneurs revealed further dynamics: Debtor-friendly regimes, through higher exemption levels or reforms, tended to stimulate

entrepreneurship (Fan and White, 2003; Agarwal et al., 2005; Landier, 2005). Cross-country analyses using leniency measures confirmed this positive link (Armour and Cumming, 2008; Walter et al., 2022).

The third and final factor, namely the redistribution of value and recoveries between creditors and debtors due to legislative changes, was thoroughly analyzed in comparative studies mentioned above.

The expectation of higher credit losses from the three potential risk factors and channels detailed above incentivize lenders to take opposing actions to protect their interests. These actions could include raising interest rates, reducing the supply of credit, and lowering equilibrium lending. As we show below, this mechanism is better established in the corporate market but remains comparatively understudied in the personal loan market.

The reactions of credit markets to changes in creditors' rights in the corporate loan market are well documented in the literature through cross-country analyses. Although these studies had different focal points and covered various countries, their main conclusions were consistent: Legal and institutional differences in firm-level lending across countries shaped the terms and conditions of loans (Qian and Strahan, 2007); banks responded to more lenient legislation with stricter lending requirements (Davydenko and Franks, 2008); and enhancing creditor rights led to increased bank lending (Haselmann et al., 2010). Taken together, these findings firmly suggest that banks reacted to debtor-friendly measures by tightening their corporate lending policies.

While firm-level lending has been extensively studied, the reactions of consumer loan markets and banks to changes in personal bankruptcy regulation have not been analyzed as comprehensively. As stated, such studies have largely been limited to the effects of the BAPCPA reform and to differences in state-level asset exemptions in the United States.

When the BAPCPA reform was examined, it was generally found that the conservative reform resulted in a significant increase in the volume of revolving household debt (White, 2007a). Gross et al. (2021) concluded that a more generous consumer

bankruptcy system provided greater insurance against financial risks but could also raise the cost of credit, whereas the BAPCPA reform lowered credit card interest rates. Alexandrov and Jimenez (2017) reached a slightly different conclusion from most studies. They found that the BAPCPA reform did not have a significant effect on the price of student loans for individuals with the lowest credit scores. These studies, however, share the usual limitations: Their findings are largely specific to the U.S. economy and financial markets; they refer to a conservative reform, and they do not necessarily capture the effects of a lenient reform.

Similar studies were based on differences in homestead exemptions among U.S. states, and reached similar conclusions. Gropp et al. (1997) found that bankruptcy exemptions redistributed credit from low-asset households toward borrowers with high assets in states with more lenient regulation. Indarte (2022) showed that the level of homestead exemptions was correlated with the level of unsecured credit across U.S. states. Lin and White (2001) documented a positive association between homestead exemptions and mortgage credit rationing, measured by higher mortgage denial rates, which they attribute to added foreclosure costs in bankruptcy. All studies discussed are subject to a common limitation: In addition to their exclusive focus on the United States, they capture leniency only through one specific indicator—the level of homestead exemptions.

Outside the United States, evidence on creditor-side responses to personal bankruptcy reforms is extremely limited. To our knowledge, one notable exception is Fossen (2014), who studied a German reform and showed that debtor protection might affect borrowing costs (interest rates) and entrepreneurial entry.

In summary, the literature converges on the view that debtor- and creditor-friendly changes and cross-state differences affect bankruptcy filing volumes, although the evidence is drawn predominantly from the U.S. system. These effects were identifiable whether leniency is proxied by a single dimension or captured around a discrete reform event. Lenient changes increased creditors' current and expected risk, prompting defensive adjustments in credit markets. However, there has been very little quantitative research examining the effects of changes in personal bankruptcy regulation outside the United States and considered time-specific economic variables.

The literature identified partial effects but lacks a unified, cross-country framework to assess how institutional leniency dynamically propagates through both debtor and creditor channels over time. This gap is evident when analyzing the relationship among complex lenient reforms, the development of bankruptcy filings, and creditor reactions.

This study addresses this research gap by examining 14 countries using a comparative dataset to analyze the long-term effects of legal reforms from 2001 to 2020 on the development of bankruptcy filings and loan markets. Our study also contributes by combining multidimensional measures of debtor protection measured by a composite Leniency Index with dynamic modeling of filings and credit responses.

We formulated the following hypotheses:

H1: Leniency changes in personal bankruptcy regulation are positively associated with the number of filings in the long term.

H2: Leniency changes in personal bankruptcy regulation are negatively associated with the growth rate of household credit in the long term, reflecting banks' credit tightening effect.

3. Data

This study employs a comprehensive panel dataset spanning multiple countries and years. Our dataset incorporates three key variables of interest: the Leniency Index, which captures the degree of debtor-friendliness in personal bankruptcy legislation; the number of filings initiated annually, reflecting the intensity of using the legal protection; and household credit trends, measured as the three- and one-year growth rates of the credit to GDP ratio, to capture dynamic credit expansion patterns. To control for macroeconomic conditions that may influence both regulatory behavior and credit markets, we include standard economic indicators such as GDP growth rate, inflation, unemployment, stock returns[1], population size, and short-term interest rates. In selecting these variables, we reference panel regression studies on leniency effects on entrepreneurship by Parker and Robson (2004), Armour and Cumming (2008), and Walter et al. (2022). This comprehensive data structure helps us isolate

[1] Detailed information regarding the specific stock market indices selected for each country is presented in Appendix 2.

the specific effects of regulatory leniency while accounting for broader economic cycles and structural factors that typically drive credit market dynamics.

Our dataset encompasses 14 countries spanning the period 2001–2020, with all countries experiencing at least one major reform and change in the Leniency Index[2] during the observation period. It reveals considerable heterogeneity in the timing and frequency of leniency adjustments across jurisdictions. The Czech Republic exhibits four distinct changes in regulatory policy that affected the leniency level, occurring in 2008, 2014, 2017, and 2019, while other countries demonstrate one or two notable policy shifts. Notably, 2015 emerges as a pivotal year with four countries (Greece, Ireland, Poland, and Sweden) implementing leniency modifications, followed by 2017 when three countries (Austria, Czech Republic, and Latvia) adjusted their regulatory stance.

The Leniency Index values for European countries were obtained from calculations conducted in Walter and Krenchel's (2021) study, which computed and published the index for the period 2000–2020. This Leniency Index, as a composite index, comprises seven main dimensions of personal bankruptcy legislation[3]: (1) accessibility, including the existence of straight bankruptcy; (2) eligibility; (3) costs; (4) complexity; (5) process; (6) conditions for discharge in debt restructuring; and (7) stigma. These dimensions are further broken down into 35 specific indicators. The index scores range from 0.0 to 2.0 representing the balance of the seven leniency dimensions. A score of 0.0 indicates that no specific personal bankruptcy system exists in the country allowing discharge of debt or a fresh start for individual debtors, while higher scores reflect the existence of such legislation with varying degrees of leniency. A higher score indicates a greater overall level of leniency, weighting the different indicators and dimensions. Years of introductions and reforms for each country can be seen in Table 1.[4]

[2] We define a major change and reform in the regulation as one in which there was a change in at least one underlying indicator in the Leniency Index.

[3] The index is calculated based on the legislation, but the data reflect the implementation of the legislation. This means that, for example, when a change in legislation alters the index, we record the change in the year the law is actually implemented.

[4] For Israel's data, index values before 2019 are calculated based on the methodology of Walter and Krenchel (2021). We use the leniency index values for 2019–2020 after the reform from Berzani and Stein (2023).

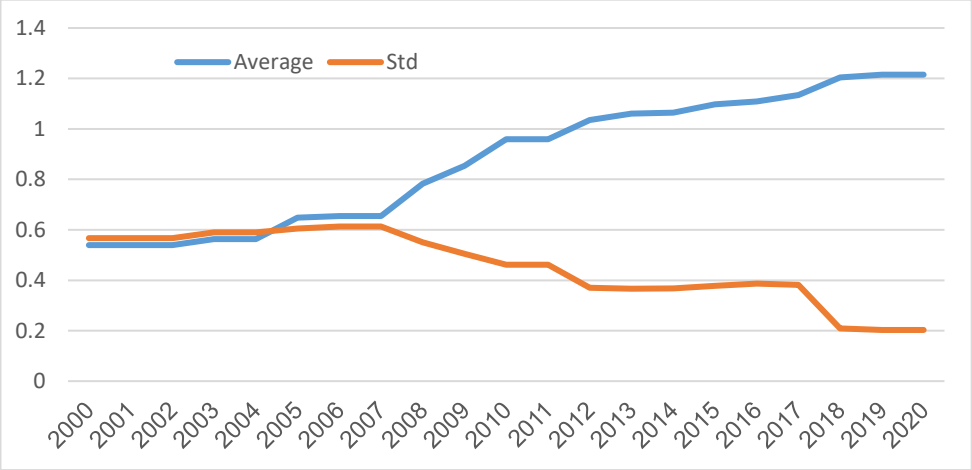
Table 1. Timeline of the Implementation of Personal Bankruptcy Law Reforms by Country (2001–2020)

Country	Year(s) of Leniency Change, introductions (i) and reforms (r)
Austria	2017(r)
Czech Republic	2008(i), 2014(r), 2017(r), 2019(r)
Denmark	2005(r)
France	2003(r), 2010(r)
Germany	2013(r)
Greece	2010(i), 2015(r)
Ireland	2013(i), 2015(r)
Israel	2019(r)
Latvia	2008(i), 2017(r)
Netherlands	2008(r)
Poland	2009(i), 2015(r)
Romania	2018(i)
Spain	2004(i), 2013(r)
Sweden	2006(r), 2016(r)

Note: *The year the legislation entered into force.*
Source: Walter and Krenchel (2021); Berzani and Stein (2023)

Figure 1 shows that the average regulatory Leniency Index demonstrates a clear upward trajectory from 2001 to 2020, increasing from 0.497 to 1.215 (a 144% increase over the 20-year period). The standard deviation was stable at 0.6 in 2006–2007, indicating substantial cross-country differences in regulatory approaches. However, the standard deviation declined markedly from 2008 onwards, falling to 0.2 by 2020, suggesting regulatory convergence among countries.

Figure1. Average Leniency Index, 2000–2020



Notes: *This figure shows the average Leniency Index and its cross-country standard deviation for the period 2000–2020. The sample includes European countries and Israel. Higher index values indicate more debtor-friendly bankruptcy legislation.*

SOURCE: Walter and Krenchel (2021) and Berzani and Stein (2023).

Table 2 presents the distribution of reforms across the seven dimensions of bankruptcy law for our 14-country sample, showing which specific aspects of legislation changed in each country. The results reveal substantial reform activity across most dimensions. The most frequently reformed dimensions of the composite index are "conditions of discharge" and "process", each changed in 12 countries (86% of the sample), followed closely by "stigma" reduction and "eligibility" reforms (11 countries each). Even the least frequently reformed dimension, "cost", was implemented in 7 countries, representing half of our sample.

The average number of dimensions reformed per country exceeds 5, indicating broad-based legislative changes rather than narrow technical adjustments. Notably, only two countries—Germany and the Netherlands—implemented reforms in fewer than four dimensions, each with single-dimension changes.

These findings have important implications for our study. First, the widespread nature of reforms across multiple dimensions suggests that the Leniency Index effects we estimate capture comprehensive policy changes rather than single-aspect modifications. Second, the variation in reform intensity—from single-dimension changes to complete overhauls—provides rich variation for identifying the impacts of bankruptcy leniency.

Table 2. Changes in dimensions across countries

Country	Dimension change number	Stigma	Cond. Disch.	Pro-cess	Comp-lexity	Cost	Eligi-bility	Str. bank.
Austria	**4**	✓	✓	✓	✓	-	-	-
Czech Rep.	**7**	✓	✓	✓	✓	✓	✓	✓
Denmark	**5**	-	✓	✓	✓	-	✓	✓
France	**5**	✓	✓	✓	✓	-	-	✓
Germany	**1**	-	✓	-	-	-	-	-
Greece	**7**	✓	✓	✓	✓	✓	✓	✓
Ireland	**7**	✓	✓	✓	✓	✓	✓	✓
Israel	**6**	✓	✓	✓	-	✓	✓	✓
Latvia	**6**	✓	✓	✓	✓	✓	✓	-
Netherlands	**1**	-	-	-	-	-	✓	-
Poland	**7**	✓	✓	✓	✓	✓	✓	✓
Romania	**7**	✓	✓	✓	✓	✓	✓	✓
Spain	**7**	✓	✓	✓	✓	✓	✓	✓
Sweden	**4**	✓	-	✓	✓	-	✓	-
Number of countries with change in the dimension		**11**	**12**	**12**	**11**	**8**	**11**	**9**

The personal bankruptcy filings data across different countries were compiled from multiple sources, including central banks, reports and publications of insolvency and bankruptcy registries, Central Bureau of Statistics, parliamentary reports, and academic papers. Detailed information regarding the specific data sources for each country's insolvency statistics is provided in Appendix 1.[5]

The remaining data, including household debt and control variables, were obtained from consistent sources across almost all sample countries. Household credit data (as a percentage of GDP) were sourced from Eurostat for European Union countries and from the Bank of Israel for Israeli data. Additional control variables—Short-term interest rates[6], unemployment rate, Consumer Price Index, and GDP growth rate—were obtained from the OECD database for all countries in the sample.

The variation of the Leniency Index in countries with different legal origin aligns with the findings of La Porta et al. (1998), who argue that legal systems play a crucial role in shaping creditor protection. Their study of 49 countries finds that common law

[5]It is important to notice the substantial heterogeneity that exists across countries in reporting methodologies of a number of annual filings. Additional details are provided in the discussion section.

[6] Representing the rates at which financial institutions borrow or short-term government paper is issued or traded.

countries provide the strongest creditor rights, while French civil law countries offer the weakest. This correlates with our index, which shows that countries with more conservative creditor protection laws (such as those in common law systems) tend to have lower Leniency Index scores, reflecting weaker protection for debtors. Conversely, in French civil law countries, where creditor protection is weaker, the Leniency Index tends to be higher, indicating a greater focus on debtor protection.

Table 3. Descriptive Statistics (2001-2020, 14 Countries)

	Average	Min	Max
Leniency	0.9	0.0	1.6
Bankruptcy filings (number)	39,970	-	230,000
Bankruptcy filings rate*	0.076	0	0.352
Household Credit-to-GDP (three year rate of change)	0.15	-0.44	2.85
Household Credit-to-GDP (annual rate of change)	0.052	-0.28	1.55
GDP growth rate	0.021	-0.15	0.25
Inflation rate	0.019	-0.03	0.14
Unemployment rate	0.081	0.02	0.28
Annual Return on stocks	0.062	-0.65	0.69
Short-term interest rate	0.0207	-0.004	0. 131

Notes: *This table shows descriptive statistics for key variables in the analysis. The sample covers 14 countries from 2001–2020.*

**Bankruptcy filings rate is per 1,000 populations.*

Table 3 presents descriptive statistics for all variables in our analysis. The substantial heterogeneity across countries and time periods reflects diverse economic and regulatory environments, with our sample encompassing major economic cycles including the 2008 financial crisis, the subsequent unconventional monetary policy era (reflected in negative interest rates), and varying credit market conditions across jurisdictions.

4. Methodology

In this chapter, we develop our empirical strategy and present the applied methodology examining how debtor-favorable or restrictive legislative changes are associated with bankruptcy filings and household credit.

Our analysis of consumer credit developments investigates whether lenient legislation primarily affects demand-side channels, where borrowers face lower expected loss and are tempted to increase borrowing, or supply-side channels, where lenders tighten credit conditions and supply in response to increased debtor protection. Measuring only the number of filings would reveal the direct behavioral response to

leniency changes but miss the potential credit rationing effects. Conversely, examining only credit markets would show the supply-side channels but not confirm whether the underlying mechanism operates through altered debtor behavior. By analyzing both outcomes simultaneously, we can trace the transmission mechanism from bankruptcy reform to credit market equilibrium. This methodology allows us to test whether the theoretical trade-off between social protection and credit availability materializes empirically.

There are significant empirical challenges to identifying the causal effects of bankruptcy legislation changes. While legislative reforms constitute exogenous shocks to the economy, originating from the political rather than economic system, the legislative process involves extended parliamentary discussions, sometimes spanning several years before approval. The primary challenge comes from anticipation effects that begin after legislation and continue until implementation. There is typically a period of one to two years between the legislative decision and actual implementation. During this transition period, banks and consumers form expectations about forthcoming changes that influence their behavior. For instance, households considering filing for bankruptcy may delay filing to benefit from more favorable conditions under new legislation, while banks anticipating increased recovery risks may preemptively tighten lending standards.

Evidence from Israel's 2019 personal bankruptcy reform illustrates this problem. Ofir et al. (2023) showed a decline in filings as the implementation date of the more favorable law approached after which filing rates rose to a higher level.

Beyond this central identification challenge, our analysis faces several other empirical challenges. First, we lack comprehensive data on the total number of debtors, which limits our ability to estimate how lenient legislation specifically affected individuals already in financial distress. Second, the 2008 financial crisis poses a potential confounding factor, as it may have influenced both legislative changes and individual decision-making simultaneously. We address this concern by including macroeconomic controls, particularly GDP, to capture crisis-related effects.

Third, the financial crisis generated substantial variation in credit variables, particularly in countries most affected by the debt crisis such as Greece and Ireland. Such extreme fluctuations risk biasing overall results if sharp changes in one or two

countries disproportionately drive the findings. To mitigate this concern, we normalize credit variables within each country by measuring deviations from country-specific means. This approach isolates the impact of legislative changes while minimizing the influence of temporary, crisis-driven fluctuations in individual countries.

To address these challenges, we employ *Local Projection (LP) analysis with* a *fixed effects* framework. This approach controls for unobserved heterogeneity across countries and time periods while estimating dynamic responses of bankruptcy filings and consumer credit to legislative changes across multiple horizons. The LP framework offers several advantages for our analysis. It avoids restrictive assumptions about response timing or structure, allowing the data to reveal the dynamic pattern of effects. Second, Local Projections are particularly suited to capturing both the immediate behavioral responses of debtors and the longer-term equilibrium adjustments in credit markets.

An additional methodological consideration concerns the varying scale of cases across countries due to different regulatory regimes and population sizes. We address this heterogeneity in two ways. First, we normalize the number of filings by population size, calculating per capita filing rates to ensure comparability across countries with different demographic profiles. Second, our fixed effects specification controls for time-invariant cross-country differences while allowing us to estimate country-specific trends and responses to leniency changes.

5. Results

Building on these on this empirical framework, we examine dynamic effects over time using Local Projection methods for all of the 14 countries.[7] This estimation requires that particular attention be given to specific methodological considerations for cross-country heterogeneity and temporal dynamics.

The primary econometric concern shifts from cross-sectional dependence to within-country serial correlation over time. When a country changes its bankruptcy law, the

[7] Note: These equations were estimated using the entire sample, including countries with missing data and those that do not align with the economic interpretation. However, even when the equation is applied to the restricted sample, the results remain remarkably similar. The full list of countries: Austria, Czech Republic, Denmark, France, Germany, Greece, Ireland, Latvia, Netherlands, Poland, Romania, Spain, Sweden, and Israel.

effects are likely to persist and potentially evolve over several years, creating correlation in the error terms within each country across different time periods. To address this issue, we implement robust standard errors with clustering at the country level, using the Eicker-Huber-White heteroskedasticity-consistent covariance matrix estimator with country-level clustering[8] (see Appendix 3). This approach accounts for arbitrary patterns of correlation within each country's time series while maintaining the assumption of independence across countries. Our results show that robust standard errors are substantially larger than conventional standard errors (increasing by 50–97% across different horizons), indicating that conventional methods would indeed lead to overconfident inference. Despite this correction, our main findings remain statistically significant, suggesting robust policy effects.

In the first part of our LP analysis, we focus on bankruptcy filing dynamics after implementation. We examine the dynamic impact of Leniency Index changes over a five-year horizon following policy shifts. Our approach utilizes long difference measurement to capture cumulative effects from the shock period to each subsequent time point. Specifically, for each horizon *h*, we estimate the total change in filing rate relative to the initial shock period, providing a comprehensive view of policy transmission dynamics.

The long difference specification measures cumulative effects as:

$$\Delta Y_{t+h} = Y_{t+h} - Y_t \qquad (1)$$

where ΔY_{t+h} represents the cumulative change in the normalized Filing Rate (Z-score) from shock period t to horizon h, Y_{t+h} is the outcome variable at time $t + h$, and Y_t is the baseline value at the shock period.

The local projection estimation equation for the bankruptcy filings model is:

$$\Delta Y_{t+h} = \alpha_h + \beta_h \cdot leniency\_Z_t + \gamma_h \cdot X_t + \delta_i + \lambda_t + \varepsilon_{i,t+h} \qquad (2)$$

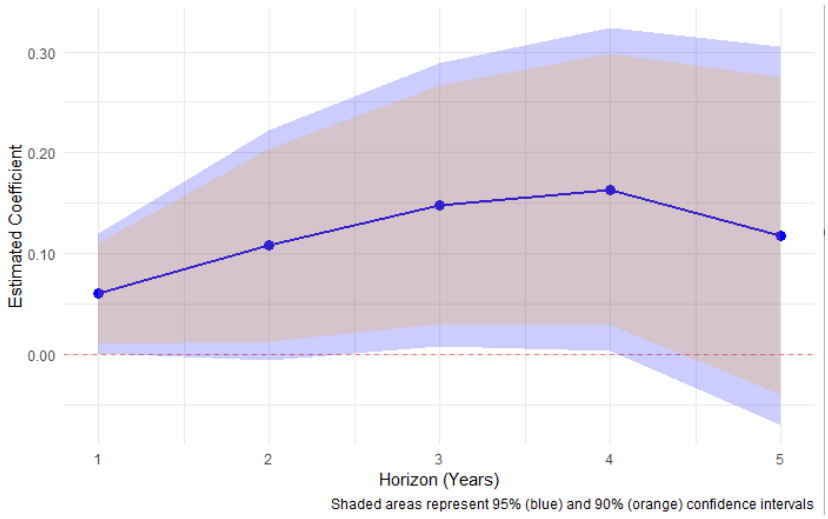
where $leniency\_Z_t$ is the normalized Leniency Index (Z- score), X_t includes control variables: GDP growth rate, short-term interest rate, annualized one-year rate of change of total household credit-to-GDP (Z score), annual rate change of the Consumer Price

[8] To ensure the robustness of our findings, we also estimated the LP models for both the filing rate and credit using the wild bootstrap cluster method. The results remain significant (see the robustness chapter).

Index, and annual stock index return with δ_i and λ_t representing country and time fixed effects, respectively.

The long difference estimation (Figure 2) reveals that Leniency Index changes exert a positive and statistically significant cumulative effect on the volume of bankruptcy filings over an extended four-year period following the initial policy shock. The cumulative impact exhibits a clear temporal pattern, with the magnitude of the effect progressively intensifying, reaching its peak in the third and fourth years following the shock. By the fifth year, the cumulative effect begins to moderate, remaining positive but statistically slightly insignificant. The increasing magnitude of the effect through year four indicates that the full impact of leniency changes materializes gradually, possibly reflecting the time required to influence behavior of individual debtors to incentivize them to access bankruptcy proceedings. In terms of the magnitude of the effect, an increase of one standard deviation in the Leniency Index is associated with a maximum increase of 0.16 in the filing rate.

Figure 2. Local Projections of Leniency Shock on Bankruptcy Filing Rates[9]



Notes: *This figure presents Local Projection estimates of the cumulative impact of regulatory leniency shocks on normalized bankruptcy filing cases over a five-year horizon. The analysis employs a long difference measurement methodology using panel data from 14 countries: Austria, Czech Republic, Denmark, France, Germany, Greece, Ireland, Latvia, Netherlands, Poland, Romania, Spain, Sweden, and Israel. Standard errors are clustered at the country level to account for within-country correlation.*

[9] Normalized, with robust standard errors, clustered by country.

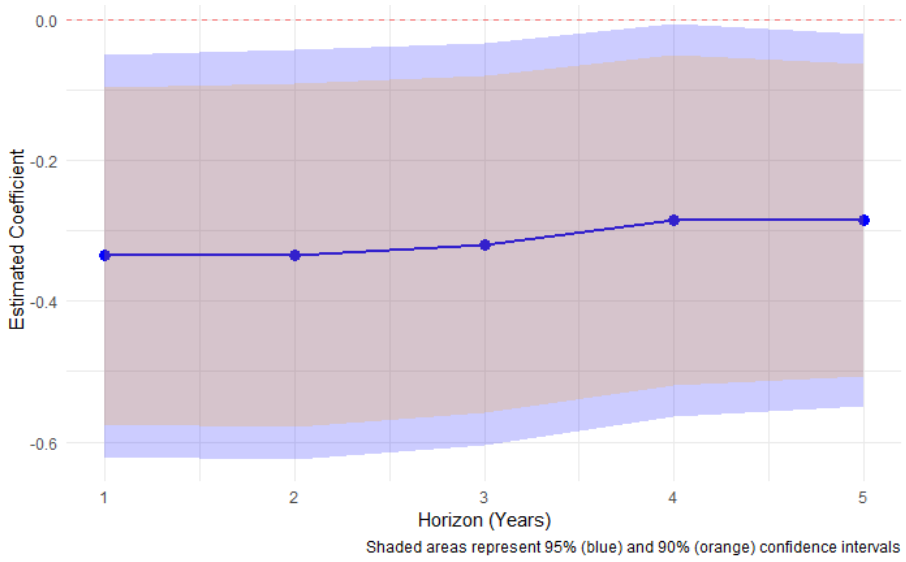
We also estimate the impulse response of Leniency Index changes on consumer credit dynamics over a five-year horizon. Unlike the bankruptcy filings model, we employ a level specification for credit growth rather than long differences, as our dependent variable already captures a three-year change rate. The estimation equation follows the standard local projection format:

$$CG3\_Z_{i,t+h} = \alpha_h + \beta_h \cdot leniency\_Z_{i,t} + \gamma_h \cdot X_{i,t} + \delta_i + \lambda_t + \varepsilon_{i,t+h} \quad (3)$$

where $leniency\_Z_t$ is the normalized Leniency Index (Z-score), $X_{i,t}$ includes contemporaneous controls: GDP growth rate, short term interest rate, CPI, index return, and unemployment, with δ_i and λ_t representing country and time fixed effects.

As Figure 3 shows, the impulse response reveals that regulatory shock has a persistent negative effect on credit growth rates across the entire five-year horizon. The effect reaches its peak magnitude at the two-year horizon and remains statistically significant and negative throughout the remaining periods, suggesting that while the maximum impact of leniency changes on credit occurs in the medium term, the underlying market discipline mechanism persists over the long run. In terms of the magnitude of the effect, the results show that an increase of one standard deviation in the Leniency Index is associated with a decrease of up to 0.33 standard deviations in the three-year credit-to-GDP growth rate. This finding suggests that the effect of changes in the Leniency Index is nearly twice the magnitude of its impact on the filing rate. The economic interpretation reveals that when personal bankruptcy legislation becomes more lenient, credit providers become more conservative in their lending practices. Banks may compensate for less creditor-friendly legislation by tightening their credit supply.

Figure 3. Local Projections of Leniency Shock on Credit Growth[10]



Notes: *This figure presents local projection estimates of the impact of regulatory leniency shocks on consumer credit three-year change rates over a five-year horizon. The analysis uses panel data from 14 countries: Austria, Czech Republic, Denmark, France, Germany, Greece, Ireland, Latvia, Netherlands, Poland, Romania, Spain, Sweden, and Israel. Standard errors are clustered at the country level. The dependent variable measures the three-year rolling change rate in total consumer credit.*

6. Decomposing the Leniency Effect

The Leniency Index employed in this study comprises seven dimensions. Changes in the index may be due to variation in a single dimension or any number of dimensions simultaneously. Most legislative reforms across countries indeed target specific dimensions rather than comprehensively revising all aspects of bankruptcy law. Understanding the heterogeneous effects of individual dimensions is essential, both for theoretical purposes and for policymakers seeking to identify which legislative aspects most significantly influence filing behavior and credit supply. Table 3 in Section 3 presents the distribution of reforms across seven dimensions of bankruptcy law for our 14-country sample, and Table 4 reports the dimension-specific effects on filing rates and credit markets.

Estimating the effect of individual dimensions presents a methodological challenge, in that not all countries reformed the same dimensions. When countries reformed their bankruptcy laws, they typically changed multiple dimensions simultaneously, but different countries changed different combinations of dimensions at different times.

[10] 3-year rate of change, with robust standard errors, clustered by country.

This heterogeneity in reform patterns makes direct cross-country comparison of individual dimension effects problematic, as differences in outcomes could reflect either the true effect of a specific dimension or unobserved differences between countries that reformed different sets of dimensions.

To address this challenge, we focus on five dimensions that were reformed in most countries: stigma, conditions of discharge, process, complexity, and eligibility. We then construct country-dimension combinations in which all countries within each combination reformed all the same dimensions. This ensures that when comparing the magnitude of effects across dimensions within a given combination, we are comparing countries that experienced identical reform patterns, isolating the differential impact of each dimension.

This approach involves a tradeoff. As we include more countries in a combination, we must restrict the analysis to fewer dimensions (since fewer countries reformed all dimensions). Conversely, analyzing more dimensions requires limiting the sample to fewer countries. We therefore estimate three different combinations, varying in the number of countries and dimensions included. By examining whether the relative effects of dimensions remain consistent across these different combinations, we can verify that our findings are robust and not driven by the specific sample composition. We then estimate fixed effects regressions for each dimension within that country group, using the specification of the LP models but replacing the aggregate Leniency Index with dimension-specific indicators (lagged one period).

For filing rates:

$$Y_t = \alpha_h + \beta_h \cdot dimension\_Z_{t-1} + \gamma_h \cdot X_t + \delta_i + \lambda_t + \varepsilon_{i,t} \qquad (4)$$

For credit growth rate:

$$CG3\_Z_{i,t} = \alpha_h + \beta_h \cdot dimension\_Z_{i,t-1} + \gamma_h \cdot X_{i,t} + \delta_i + \lambda_t + \varepsilon_{i,t} \qquad (5)$$

The results show that, with respect to bankruptcy filing, stigma and procedural complexity have the strongest effect on individuals' decisions to file. These dimensions are the only significant factors in the first combination and remain the most influential in terms of both statistical significance and explanatory power (R^2) across all combinations.

With regard to the credit market, the results indicate that conditions for discharge and the process have the strongest negative effect on consumer credit growth, with the largest coefficients, highest significance levels, and greatest explanatory power. The dimensions capturing debtor reliefs, restrictions, settlement options, asset liquidation, enforcement mechanisms, and discharge conditions are the aspects most relevant to credit providers' risk assessments. The findings suggest that reforms favoring debtors in these areas increase perceived risk for lenders.

Table 4. Dimension-Specific Effects on Bankruptcy Filings and Credit Markets

Variable (t-1)	Complexity	Process	Cond. Disch.	Stigma	Eligibility
Combination 1[11] : 8 Countries N=155, n=8					
Bankruptcy Filings	0.3***	0.069	-0.063	0.125	-0.001
Credit Growth	-0.19*	-0.29	-0.48***	-0.13	-0.18*
R^2 (Filings)	0.194	0.077	0.075	0.097	0.07
R^2 (Credit)	0.088	0.125	0.206	0.076	0.08
Adj. R^2 (Filings)	-0.018	-0.165	-0.168	-0.14	-0.17
Adj. R^2 (Credit)	-0.14	-0.096	0.006	-0.157	-0.15
Combination 2[12]: 10 Countries N=195, n=10					
Bankruptcy Filings	0.29***	0.14*	0.092	0.14*	
Credit Growth	-0.145	-0.26**	-0.3***	-0.017	
R^2 (Filings)	0.172	0.079	0.065	0.08	
R^2 (Credit)	0.051	0.082	0.1	0.06	
Adj. R^2 (Filings)	-0.005	-0.116	-0.133	-0.11	
Adj. R^2 (Credit)	-0.143	-0.106	-0.085	-0.13	
Combination 3[13]: 12 Countries N=235, n=12					
Bankruptcy Filings	0.26***	0.15*	0.097		
Credit Growth	-0.122	-0.21*	-0.22**		
R^2 (Filings)	0.14	0.076	0.06		
R^2 (Credit)	0.05	0.068	0.07		
Adj. R^2 (Filings)	-0.013	-0.091	-0.11		
Adj. R^2 (Credit)	-0.12	-0.096	-0.088		

[11] Combination 1: The 8 countries with changes in all five dimensions are: Czech Republic, Greece, Poland, Romania, Spain, Israel, Latvia, Ireland.

[12] Combination 2: The 10 countries with changes in all four dimensions are: Austria, Czech Republic, France, Greece, Poland, Romania, Spain, Israel, Latvia, Ireland.

[13] Combination 3: The 12 countries with changes in all three dimensions are: Austria, Czech Republic, Denmark, France, Greece, Poland, Romania, Spain, Sweden, Israel, Latvia, Ireland.

7. Robustness

To validate the reliability of our main findings, we conduct several robustness tests. Our robustness analysis employs alternative specifications and varying time periods to ensure the stability of our results.

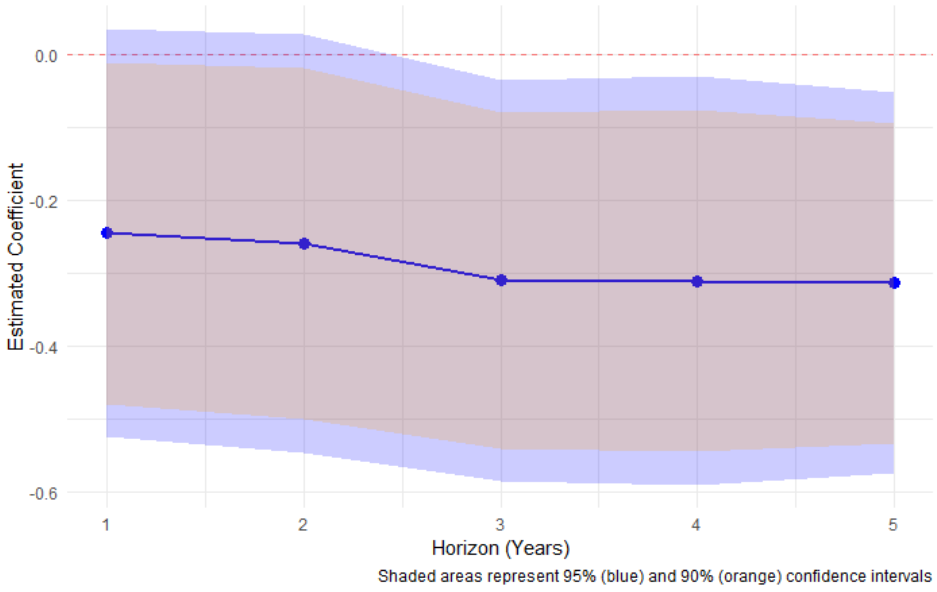
7.1 Alternative Reform Dating: Parliamentary Approval vs. Implementation

We begin our robustness analysis by examining reform effects during periods preceding implementation. This pretreatment analysis serves two objectives: understanding the timing of reform effects and identifying behavioral responses that occur before legislation takes effect.

We test whether timing reforms based on parliamentary approval rather than implementation affects our results. Parliamentary approval typically precedes implementation by 0–3 years (average: one year). This alternative dating captures credit suppliers' responses to legislative certainty rather than to actual enforcement. Conducting this analysis for bankruptcy filing rates is problematic because many countries, particularly in Eastern Europe, recorded zero on the Leniency Index for extended periods due to the complete absence of bankruptcy legislation. This creates a fundamental identification problem: For reforms in these jurisdictions, pre-reform filing volumes were consistently zero, making it impossible to conduct this alternative dating analysis. We therefore restrict this analysis to credit growth rate estimation.

For this analysis, we date reforms to parliamentary approval rather than implementation. Using the same local projection specification from Section 5 (Equation 3), Figure 4 shows that effects begin one year after parliamentary approval and increase over time, reaching their maximum at year three. These findings demonstrate that credit suppliers respond to leniency changes immediately following parliamentary approval rather than waiting for official implementation. Notably, when we estimate the model based on the timing of initial parliamentary discussions, we find no significant effects until three years after the shock. This suggests that credit providers begin adjusting their behavior only after legislation passes parliament, and that mere discussion without approval has no significant effect on credit provision.

Figure 4. Local Projections of Leniency Shock on Credit Growth (reform dated to parliamentary approval; country-clustered standard errors)



Notes: *This figure shows local projection estimates of leniency reform effects on three-year household credit-to-GDP rates of change, from 1 year to 5 years after parliamentary approval. The shaded area represents 95% confidence intervals with robust standard errors clustered by country.*

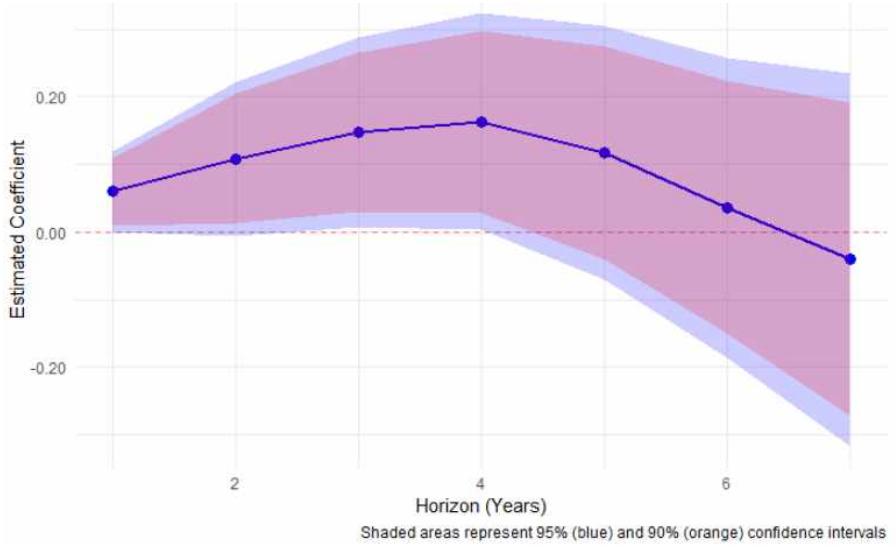
7.2 Estimation of the long-term effect (7-years)

A critical question this study aims to address is whether leniency reforms create permanent changes in bankruptcy filing patterns or merely temporary effects that dissipate over time.

Figure 5 presents the long-term difference impulse response function for bankruptcy filings following a leniency shock over a seven-year horizon (Equation 4). The results reveal an intriguing pattern: While initial years show the expected positive response to reform, the effect begins to diminish by years six and seven. Notably, filing rates in these later periods decline to levels slightly below their pre-reform baseline, though these coefficients are not statistically significant.

These findings suggest that leniency shocks generate transitory rather than permanent effects on bankruptcy behavior. The apparent convergence toward pre-reform levels after seven years indicates that legislative changes may not fundamentally alter the underlying economic equilibrium but rather create a temporary adjustment period before filing rates stabilize at levels consistent with long-term economic fundamentals.

Figure 5. Local Projections of Leniency Shock on Filing Rates[14] in the Long Term

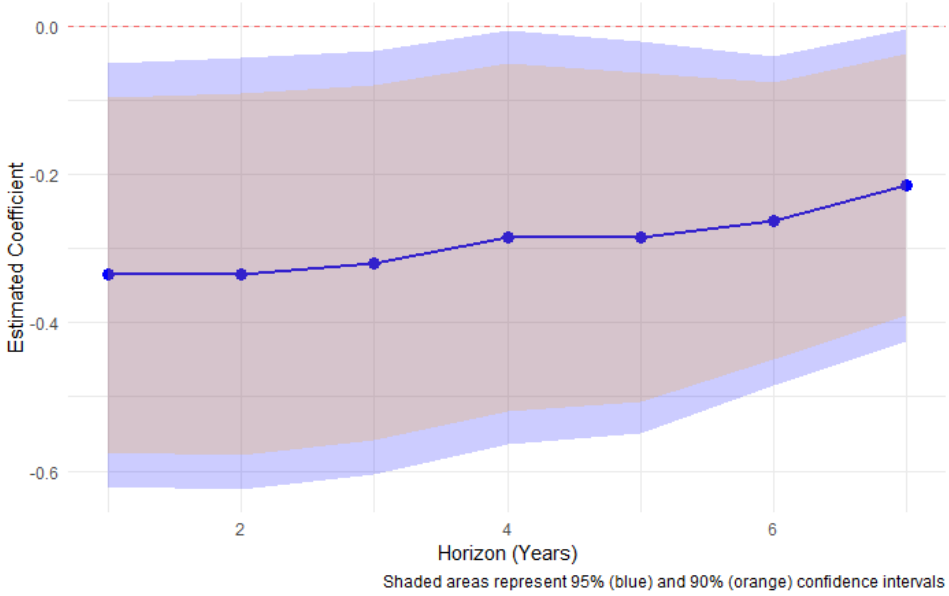


Notes: *This figure displays the impulse response function from local projection estimates examining the dynamic effects of leniency shocks on normalized bankruptcy filings over a seven-year horizon. The blue line represents point estimates of the leniency effect at each horizon, while the shaded area indicates 95% confidence intervals. Standard errors are clustered by country to account for within-country correlation.*

The dynamic effects on consumer credit exhibit a strikingly different pattern than bankruptcy filings, underscoring the persistent nature of leniency reform impacts on credit markets. Figure 6 demonstrates that the credit contraction reaches its peak magnitude within 1–2 years following the shock, with the three-year rate of change declining. However, unlike the bankruptcy filing response, this negative effect on credit persists over time, remaining negative and statistically significant, without returning to pre-shock levels. While the temporary disruption in bankruptcy filings fully dissipates by years six and seven, the credit contraction exhibits lasting characteristics, with growth rates remaining subdued even after six and seven years. This divergent temporal pattern – temporary for filings but persistent for credit – provides compelling evidence that leniency shocks generate asymmetric effects. While debtor filing behavior normalizes over the medium term, the credit supply response exhibits more permanent features, suggesting structural changes in lender risk assessment and underwriting practices following the reform.

[14] Normalized, with robust standard errors, clustered by country.

Figure 6. Local Projections of Leniency Shock on the CG3 Rate[15] in the Long Term



Notes: *This figure displays the impulse response function from local projection estimates examining the dynamic effects of leniency shocks on consumer credit three-year change rates over a seven-year horizon. The blue line represents point estimates of the leniency effect at each horizon, while the shaded area indicates 95% confidence intervals. Standard errors are clustered by country.*

7.3 Measuring Reform-Specific Effects Excluding Initial Legislative Impact

Our main LP estimation presented in this paper measures all countries across the full sample period. During this period, some countries enacted their first bankruptcy legislation, meaning that for part of the duration, both the Leniency Index and bankruptcy filing values equal zero. Other countries maintained existing legislation throughout the entire period, with changes occurring only through reforms over time. Consequently, our estimation captures both the effects of reforms on existing legislation and the effects of initial legislation implementation.

In this section, we aim to isolate the specific effects of reforms on existing bankruptcy legislation. To do so, we estimate the LP models (Equations 2 and 3) on a subsample covering the period 2009–2020, excluding Romania and Ireland.[16]

Figures 7 and 8 present the dynamic effects of leniency shocks on the normalized number of bankruptcy cases and the 3-year credit rate of change, respectively. For

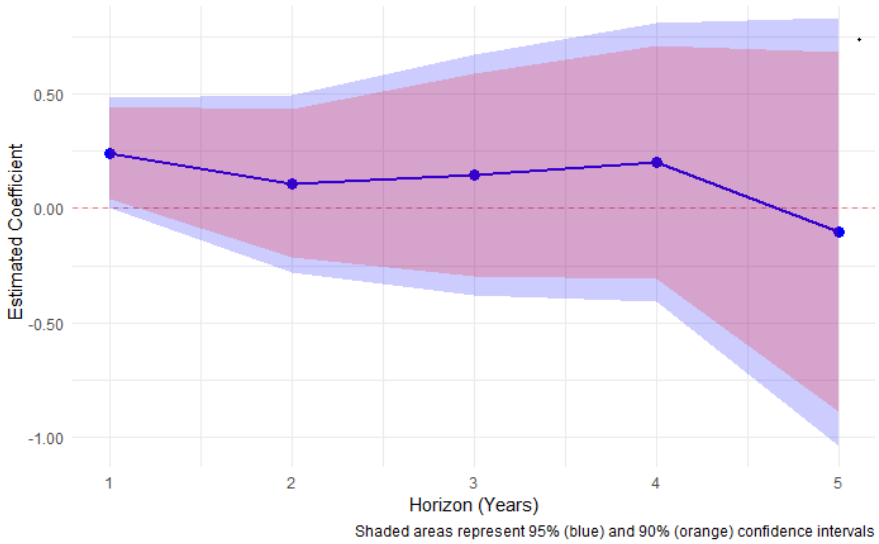
[15] Normalized, with robust standard errors, clustered by country.

[16] The year 2009 was chosen as the baseline to maximize the number of countries with existing personal bankruptcy legislation and to capture the majority of relevant reforms during the observation period. Romania and Ireland were excluded from this analysis because they introduced their first personal bankruptcy legislation only after 2009.

bankruptcy filings, only the first-year coefficient, one year after the leniency shock, is positive and statistically significant. Although coefficients remain positive through year four, they lack statistical significance beyond the initial year. These findings indicate that while leniency shocks affect existing legislation reforms, the magnitude is substantially smaller than in our baseline results.

The credit market response mirrors the full sample pattern but with diminished strength and robustness. While we observe the maximum effect at year three followed by an upward reversal, statistical significance is confined to only year 3 post-shock. As anticipated, the impact in countries reforming existing legislation is lower than in the full sample, which includes countries introducing bankruptcy frameworks.

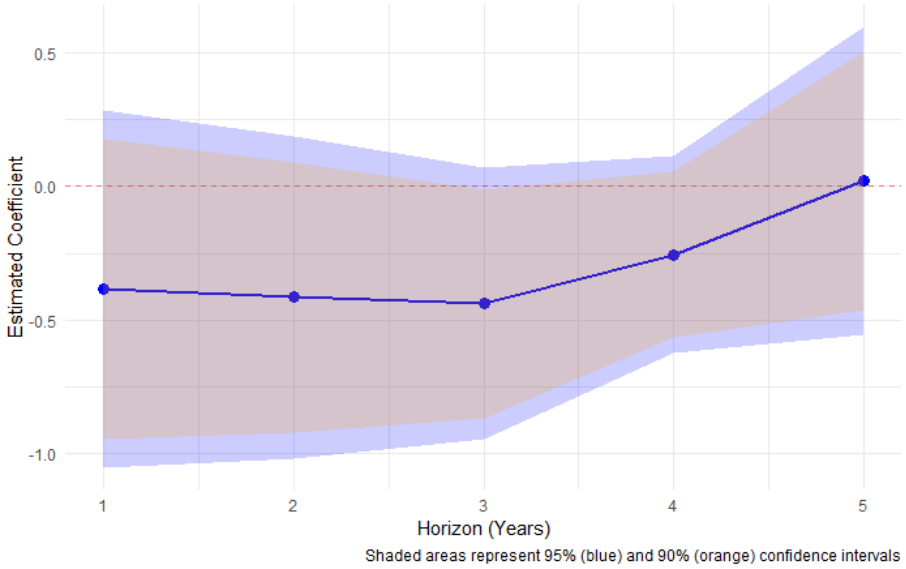
Figure 7. Local Projections of Leniency Shock on Existing Legislation, Impact on Filing Rates[17]



Note: This figure presents the local projections of a leniency shock on the normalized number of cases over a five-year horizon. The analysis is based on a subsample covering the years 2010–2020 and includes all countries except Ireland and Romania. The blue line represents the estimated coefficient at each horizon, while the shaded area indicates the 95% confidence intervals computed using robust standard errors clustered by country.

[17] Normalized, with robust standard errors, clustered by country.

Figure 8. Local Projections of Leniency Shock on Existing Legislation, Impact on 3-Year Credit Growth Rate[18]



Note: This figure presents the local projections of a leniency shock on the 3-year credit growth rate over a five-year horizon. The analysis is based on a subsample covering the years 2009–2020 and includes all countries except Ireland and Romania. The blue line represents the estimated coefficient at each horizon, while the shaded area indicates the 95% confidence intervals computed using robust standard errors clustered by country.

7.4 Wild cluster bootstrap analysis

Fixed Effects models with panel data from multiple countries often face a challenge when each country has limited observations. Standard error estimation may fail to account for within-country dependencies and cross-country residual correlation, leading to biased inference. Wild Cluster Bootstrap (Cameron et al., 2008) addresses this problem through a resampling technique, in which residuals from the fitted model are randomly sign-flipped (multiplied by +1 or −1), added back to fitted values to create simulated datasets, and this process is repeated (1,000 iterations) to generate robust standard errors. This method accounts for heteroskedasticity and autocorrelation across countries, improving inference reliability when countries share similar economic conditions.

Figure 9 presents the Local Projection results for filing rates (Equation 2) using Wild Cluster Bootstrap. While significance decreases slightly compared to the baseline estimation, the results remain significant at the 90% level. Notably, the peak effect

[18] Normalized, with robust standard errors, clustered by country.

shifts from four years post-reform in the baseline to three years here, after which it declines.

Figure 9. Local Projections of Leniency Shock on Filing Rates with Wild Bootstrap Standard Errors

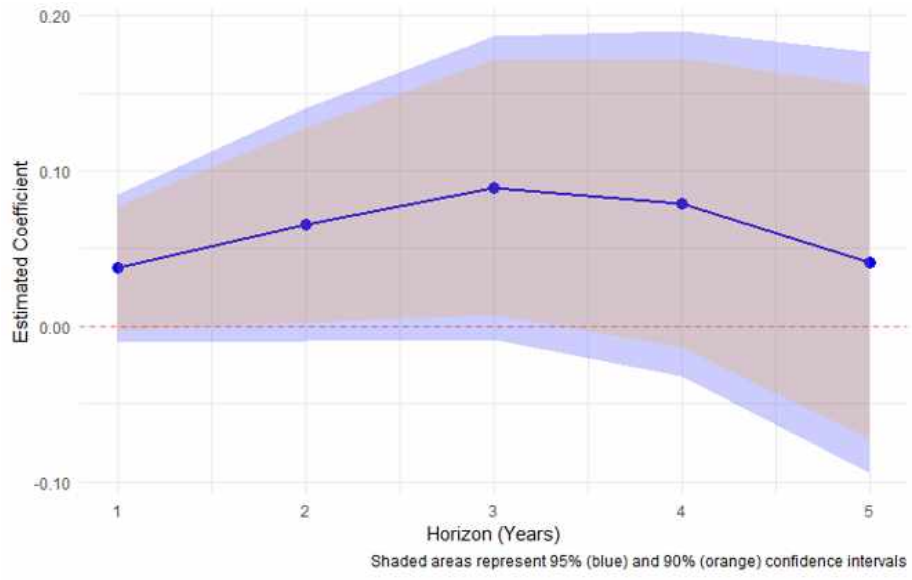
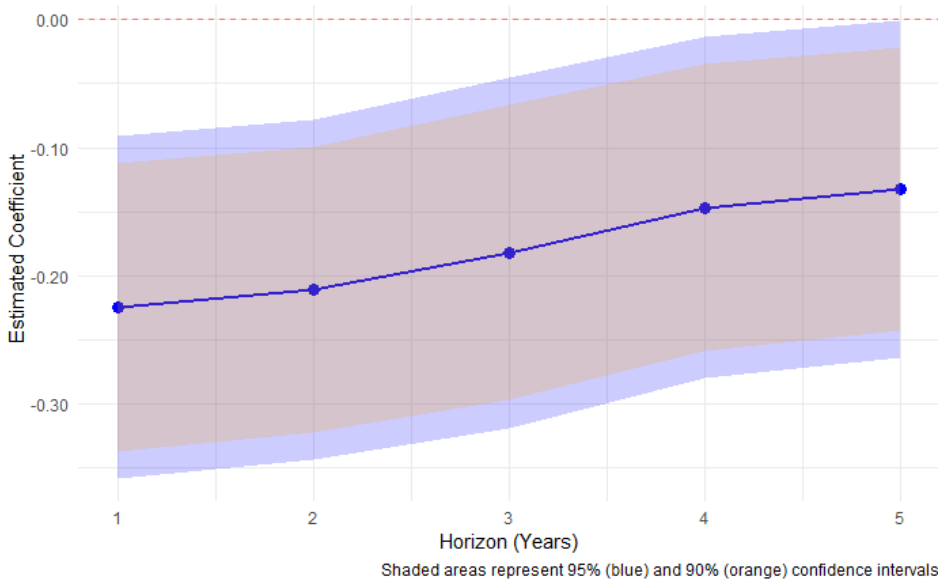


Figure 10 shows the credit growth estimation (Equation 3) with this method. The results maintain baseline significance levels and coefficient trends, with maximum effect observed one year post-reform, and followed by gradual decline. These findings confirm the robustness of our main estimations.

Figure 10. Local Projections of Leniency Shock on 3-Year Credit Growth Rate with Wild Bootstrap Standard Errors



7.5 Jackknife Sensitivity Analysis

To ensure the robustness of our findings and verify that the estimated effects are not driven by any single country in the sample, we conduct a Jackknife robustness test. This procedure involves systematically re-estimating our models while excluding one country at a time from the sample.

For each subsample (excluding country *j*), we estimate two-way fixed effects models, which follow the same specification as the local projections model. However, in this case, the Leniency Index is measured with a one-period lag, focusing exclusively on shocks with a one-year horizon:

Filing rates:

$$Y_t = \alpha_h + \beta_h \cdot leniency\_Z_{t-1} + \gamma_h \cdot X_t + \delta_i + \lambda_t + \varepsilon_{i,t} \qquad (6)$$

Credit growth rate:

$$CG3\_Z_{i,t} = \alpha_h + \beta_h \cdot leniency\_Z_{i,t-1} + \gamma_h \cdot X_{i,t} + \delta_i + \lambda_t + \varepsilon_{i,t} \qquad (7)$$

The results showed in Table 5 demonstrate remarkable stability in our main findings. When we systematically exclude each of the 14 countries from our sample, the coefficient on lagged leniency maintains its significance and direction in both models. These results provide strong evidence that our findings are not artifacts of any single country's experience. The consistency of coefficient signs and significance levels across all sample compositions confirms that the identified effects, increased bankruptcy filings and decreased consumer credit growth rate following leniency reforms, represent genuine systematic patterns across European bankruptcy systems rather than being driven by outliers or country-specific idiosyncrasies. While some variation in magnitudes is observed, particularly when excluding Germany or Israel from the credit market specification, the core findings remain robust.

Table 5. Jackknife sensitivity of the leniency change effect on filing rates and consumer credit growth rate

Excluded Country	Bankruptcy Filings	Credit Change Rate
Austria	0.1502** (0.0455)	-0.3647*** (0.0801)
Denmark	0.1561*** (0.0451)	-0.3879*** (0.0787)
France	0.1237** (0.0434)	-0.3563*** (0.0755)
Germany	0.1857*** (0.0431)	-0.2699*** (0.0735)
Greece	0.1564*** (0.0440)	-0.4100*** (0.0860)
Netherlands	0.1444* (0.0566)	-0.3868*** (0.0812)
Romania	0.1516*** (0.0450)	-0.3624*** (0.0819)
Spain	0.1545*** (0.0446)	-0.3533*** (0.0815)
Sweden	0.1212** (0.0428)	-0.3540*** (0.0804)
Israel	0.1437** (0.0439)	-0.2169** (0.0680)
Czech Republic	0.0926** (0.0313)	-0.3329*** (0.0845)
Ireland	0.1394** (0.0455)	-0.3344*** (0.0879)
Poland	0.1617*** (0.0441)	-0.3439*** (0.0857)
Latvia	0.1310** (0.0436)	-0.3298*** (0.0791)

*Note: This table reports coefficient estimates for the Leniency Index effect on both bankruptcy filing rates and credit change rates from two-way fixed effects regressions, each estimated after excluding one country from the sample. * p < 0.10, ** p < 0.05, *** p < 0.01.*

8. Discussion and Conclusions

Concerning Hypothesis 1, our findings confirm that more lenient legislation significantly increases bankruptcy filings. This finding is consistent with research that analyzed the effects of the U.S. BAPCPA reform and state exemption differences on bankruptcy filing volumes. This is in line with the results reported by Mitman (2016), Nakajima (2017), Gross et al. (2021), and Albanesi and Nosal (2025) among others—although the U.S. literature primarily examined a creditor-friendly reform, with the opposite sign. Our results also align with studies such as Gropp et al. (1997), Athreya (2006), Pattison and Hynes (2020), and Li et al. (2022), which focused on state exemption differences in the United States and showed that more generous, higher exemption legislative differences led to higher filing rates or higher probability of filings. Finally, our conclusion is also consistent with the only two non-U.S. country cases we found: the Austrian debtor-friendly reform, which led to higher filings (Angel and Warum, 2024), and the effect of the 2009 Canadian reform, (Allen and Basiri, 2016).

As a new approach relative to these former studies we extend our analysis to examine dynamic effects over time. We find that the leniency changes exert a positive and

statistically significant cumulative effect on bankruptcy filings volume over an extended four-year period following the initial policy shock, but the effect exhibits a clear temporal pattern. After a 3–4-year-long period of intensification, the cumulative effect begins to moderate, and reverts back to the pre-shock level after 6–7 years. This temporary increase and the subsequent decline in the number of cumulative filings after a certain period clearly represent a novel finding, yet it is partly consistent with Indarte (2022), who found that greater leniency initially raised filing probabilities but later tightened credit supply, ultimately reducing filings.

Our dimension-specific analysis shows that reforms affecting complexity and stigma have the most significant impact in the effects on filings. This finding carries important regulatory implications indicating that the behavior of potential filers is materially shaped by which specific policy dimensions are relaxed or tightened over the course of reform.

Overall, Hypothesis 1 is only partially supported. While we confirm a statistically significant association between leniency measures and filing volumes, the effect of policy changes appears to diminish, or at least becomes statistically insignificant, in the long run.

With regard to Hypothesis 2 and the credit market effects, we find that the Leniency Index exerts a statistically significant negative influence on the consumer credit growth rate. This adverse relationship between debtor-friendly reforms and credit market supply reinforces the earlier findings of studies that analyzed the impact of the BAPCPA reform in the United States and documented negative effects on credit volume (White, 2007a), or on the cost of credit (Gross et al., 2021). The only partially diverging result is reported by Alexandrov and Jimenez (2017), who concluded that the BAPCPA reform had no significant effect on the pricing of student loans for borrowers with the lowest credit scores. Our results are also consistent with the substantial body of U.S.-based studies on exemption levels, which demonstrate that differences in exemption thresholds affect the redistribution of credit (Gropp et al., 1997), the availability of credit (Lin and White, 2001), and overall credit supply (Indarte, 2022). Finally, our results are also consistent with the only non-U.S. empirical evidence we identified, Fossen (2014), who documented a restrictive creditor-side response in the German context.

Compared with prior research, we incorporate additional dimensions. Besides our new approach of examining these effects across numerous countries, when we extend our analysis to examine dynamic effects over time, before and after the leniency changes, we find important discoveries.

The negative effect of lenient legislative measures on the three-year credit-to-GDP rate of change becomes statistically significant starting at the time of legislation, showing that the credit market starts to prepare for the shock before its eventually implementation. Looking at the long-term effects, our results show that credit contraction reaches its peak magnitude within 1–2 years, with effects persisting beyond 6–7 years. This hints at structural shifts in credit market dynamics and not just temporary changes.

Notably, our dimension-specific analysis reveals that the credit market effects are primarily driven by different dimensions of the reforms than in case of filings. The credit market is affected mostly by the bankruptcy process, the conditions of discharge, and repayment plan conditions, while changes of other dimensions—which were significant for filers—in exemption levels show more modest impacts. This offers an interesting scope for regulatory fine-tuning in the context of reform, depending on which side's behavior the regulator intends to influence more strongly. Overall, Hypothesis 2 is fully supported.

Identifying significant and robust dynamic associations on both the creditor and debtor sides yields substantial insight into market reactions and consequences. However, several limitations should be acknowledged. First, while we document strong associations between leniency reforms and both bankruptcy filings and credit markets, we do not establish causal links between creditor and debtor responses. Second, bankruptcy filing data vary considerably across countries in availability, reporting institutions, and definitions. We mitigate this by relying exclusively on new household filings from official sources, though some measurement error likely remains. Third, the absence of debtor-level data limits our ability to measure direct behavioral responses. Our reliance on macroeconomic variables may not fully capture the mechanisms through which reforms affect individual debtor decisions.

Our main findings reveal a fundamental tension in designing personal bankruptcy systems. While debtor-friendly reforms temporarily increase bankruptcy filings

(peaking in year 3–4), they create persistent negative effects on credit markets that extend beyond five years, with banks beginning to tighten credit standards even at the outset of the change. This requires policymakers to balance debtor rehabilitation benefits against broader credit market effects that constrain access for the entire population.

These findings have important policy implications. First, the optimal timing of bankruptcy reforms depends critically on economic context. Countries with healthy credit markets may better absorb debtor-friendly reforms, while implementing such reforms during credit contractions could amplify rationing effects. Second, anticipation effects suggest that transparent reform processes may trigger premature credit tightening. Third, while filing rates eventually return toward baseline, credit market effects persist, indicating lasting structural changes in lending behavior. Ultimately, the social insurance benefits of debtor protection may come at a higher long-term cost to credit accessibility than previously understood.

We also find that the effects of bankruptcy reforms are strongly dimension-specific, which also carries important implications for regulatory design. Reforms targeting stigma reduction and procedural complexity primarily shape individual filing behavior, suggesting that policymakers aiming to influence access to bankruptcy and debtor participation should focus on simplifying procedures and reducing post-bankruptcy stigma. In contrast, reforms affecting discharge conditions and procedural features have a substantially stronger impact on household credit supply, indicating that changes in these dimensions are more relevant when the policy objective concerns credit market outcomes and lender behavior. Taken together, these results imply that bankruptcy regulation is not a one-dimensional policy tool. Different reform components affect debtors and credit markets through distinct channels, requiring regulators to carefully align specific legal changes with their intended policy objectives.

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Appendix 1. Insolvency case data—sources for each country

Country	Source
Austria	Kreditschutzverband von 1870 (KSV)
Czech Republic	Surveilligence
Denmark	Paper - "The Long-Run Effects of Individual Debt Relief"
France	Bank de France
Germany	Destatis – Statistisches Bundesam
Greece	Bank of Greece
Ireland	Insolvency Service of Ireland
Israel	The Insolvency and Economic Rehabilitation Commissioner
Latvia	Paper-" CONDITIONS FOR THE BANKRUPTCY OF NATURAL PERSONS: WHICH BALTIC STATE IS THE MOST ATTRACTIVE FOR BANKRUPTCY?"
Netherlands	Bureau Wsnp
Poland	Poland Central Economic Information Bureau
Romania	National Bank of Romania
Spain	College of Property and Commercial Registrars of Spain
Sweden	Enforcement Authority of Sweden

Appendix 2. The stock market indices selected to calculate annual returns for each country

Country	**Index Name**	**Bloomberg code**
Austria	ATX (Austrian Traded Index)	ATX:IND
Czech Republic	PX Index	PX:IND
Denmark	OMX Copenhagen 20	OMXC25:IND
France	CAC 40	CAC:IND
Germany	DAX 40	DAX:IND
Greece	Athens General Index	ASE:IND
Ireland	ISEQ Overall Index	ISEQ:IND
Latvia	OMX Riga Index	OMXR:IND
Netherlands	AEX Index	AEX:IND
Poland	WIG20 (Warsaw General Index)	WIG:IND
Romania	BET Index	BET:IND
Spain	IBEX 35	IBEX:IND
Sweden	OMX Stockholm 30 (OMXS30)	OMXS30:IND
Israel	TA-35	TA-35:IND

Appendix 3. Estimating Country-Specific Policy Shocks: Challenges and Recommendations

Almuzara and Sancibrián (2024) provide crucial insights into the estimation and inference challenges when implementing local projections with panel data, particularly when dealing with macro shocks that affect all units simultaneously. Their Federal Reserve Bank of New York staff report demonstrates that conventional panel data regression models face significant issues when regressors of interest are aggregate shocks, as the regression scores exhibit strong cross-sectional dependence and limited serial correlation. The authors show that in such cases, standard errors computed using traditional methods severely underestimate uncertainty, leading to overconfident statistical inference. They recommend clustering standard errors at the time level rather than at the unit level, combined with lag augmentation and heteroskedasticity-robust inference. However, our research context differs fundamentally from the macro shock framework they analyze. In our study, we examine country-specific policy shocks rather than global shocks. Each country implements its own bankruptcy legislation at different times, creating variation in the leniency measure across both the cross-sectional (country) and time dimensions. Unlike pure macro shocks that simultaneously affect all units, our policy interventions are country-specific and do not exhibit the strong spatial dependence that characterizes aggregate economic shocks.