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Loan Guarantees as Committed Credit Lines: Testing Liquidity Insurance Theory

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Abstract

This dissertation investigates the role of corporate credit lines as liquidity insurance, addressing the empirical gap between theoretical models and the reality of state-contingent marketplace credit lines. While corporate finance theory, notably Holmström and Tirole (1998), posits that fully committed credit lines provide optimal liquidity insurance, empirical testing is often confounded by the presence of restrictive covenants. To overcome this limitation, this study uniquely exploits public loan guarantees provided by the Portuguese *Sociedade de Garantia Mútua* (SGM) as an uncontaminated empirical proxy for fully committed credit lines. Because the SGM scheme mandates ex-ante commitment fees and first-demand payouts, it effectively forces the guarantor to finance ex-post negative Net Present Value (NPV) transactions, ensuring liquidity provision even in adverse states. To establish causal inference and neutralize pre-contractual adverse selection, the research employs a Regression Discontinuity Design (RDD) centred on a strict administrative threshold that transitions firms from "Micro" to "Small" certification, triggering an exogenous doubling of the maximum guarantee limit. Utilizing a Two-Stage Least Squares (2SLS) approach and a dynamic Difference-in-Differences (DiD) framework on matched firm-level data from *Banco Português de Fomento* and *Banco de Portugal*, the study yields four principal findings. First, financially constrained firms increase precautionary liquidity when given a loan guarantee. Each €1 guarantee increases liquidity in €0.94 . Second, ex-post NPV estimations support that the public guarantor absorbs the expected negative-NPV losses. Third, treated firms exhibit higher activation and default frequencies, providing suggestive evidence of moral hazard and rejecting the hypothesis that larger safety nets uniformly increase firm resilience. Finally, a cost analysis reveals that implicit interest rate subsidies outweigh default commission penalties, structurally incentivizing riskier ex-post behaviour, and that the scheme is economically efficient.

Keywords: Liquidity Insurance, Loan Guarantees, Credit Lines, Corporate Liquidity, SMEs, Moral Hazard

Resumo

Esta dissertação investiga o papel das linhas de crédito corporativo como seguro de liquidez, colmatando a lacuna empírica entre os modelos teóricos e a realidade das linhas de crédito do mercado. Embora a teoria (Holmström e Tirole, 1998) postule que linhas de crédito totalmente comprometidas fornecem um seguro ótimo, o teste empírico é dificultado por cláusulas restritivas (*covenants*). Para contornar esta limitação, este estudo explora as garantias de crédito do sistema português de Sociedade de Garantia Mútua (SGM) como proxy empírica não contaminada para linhas totalmente comprometidas. Exigindo comissões ex-ante e pagamentos à primeira solicitação, o esquema da SGM força o garante a financiar transações de Valor Atual Líquido (VAL) ex-post negativo, assegurando liquidez em cenários adversos. Para estabelecer inferência causal e neutralizar a seleção adversa, aplica-se um *Regression Discontinuity Design* (RDD) no limiar administrativo que transita empresas de "Micro" para "Pequena", o qual duplica exogenamente o limite da garantia. Utilizando modelos *Two-Stage Least Squares* (2SLS) e *Difference-in-Differences* (DiD) dinâmico em dados do Banco Português de Fomento e do Banco de Portugal, o estudo destaca quatro conclusões. Primeiro, empresas com restrições financeiras aumentam a liquidez de precaução quando obtêm garantias (cada 1€ de garantia gera 0,94€ em liquidez). Segundo, as estimativas do VAL ex-post apoiam que a SGM absorve as perdas esperadas. Terceiro, as empresas tratadas apresentam maiores frequências de ativação e falência, sugerindo risco moral e rejeitando a hipótese de que maiores redes de segurança aumentem uniformemente a resiliência. Por fim, uma análise de custos revela que os subsídios implícitos nas taxas de juro superam largamente as sanções de incumprimento, incentivando estruturalmente este comportamento ex-post mais arriscado, e que o programa é economicamente eficiente.

Palavras-chave: Seguro de Liquidez, Garantias de Crédito, Liquidez Empresarial, PME, Risco Moral

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1. Introduction

The management of corporate liquidity is a fundamental determinant of firm survival, particularly during periods of financial distress. In a frictionless world, firms would be able to seamlessly access external capital markets to finance viable projects or endure temporary cash-flow shocks. However, the presence of frictions, driven by asymmetric information, agency costs, and macroeconomic volatility, frequently leads to credit rationing. To mitigate this risk, firms must proactively secure liquidity ex-ante. While hoarding cash provides a straightforward buffer, it is an inefficient and costly strategy that forces capital to remain unused (Acharya et al., 2010). Consequently, corporate finance theory, most notably the seminal framework of Holmström and Tirole (1998), suggests that the optimal solution to liquidity management is the acquisition of liquidity insurance through fully committed credit lines. By paying an upfront fee, firms secure the right to drawdown funds during adverse states of the world, theoretically preventing the inefficient liquidation of economically viable projects.

The actual role of credit lines in corporate liquidity management, however, remains the subject of extensive and ongoing academic debate. Demiroglu and James (2010) review an extensive empirical literature and argue that private marketplace credit lines are typically subject to strict covenants and revocation risks, implying that access may be restricted precisely when firms face acute liquidity needs. In contrast, Ivashina and Scharfstein (2009), Acharya and Steffen (2020), and Li et al. (2020) provide evidence that firms are frequently able to draw on committed facilities during macroeconomic shocks, suggesting that credit lines do, in fact, offer liquidity insurance.

These contrasting views raise fundamental concerns regarding the empirical applicability of theoretical models that strictly interpret credit lines as insurance against liquidity shocks. As emphasized by Sufi (2009, p. 1069), "the contingent lines of credit that exist in the marketplace are distinct from the committed lines of credit that are described in the theoretical literature." Consequently, the theory of credit lines as liquidity insurance, most notably the framework developed by Holmström and Tirole (1998), remains empirically difficult to test directly (Demiroglu and James, 2010).

One methodological way to resolve this empirical gap is to focus on institutional settings in which credit commitments are not subject to ex-post covenant renegotiation or revocation.

Building directly on the foundational work by Grilo et al. (2026), who conceptualized state-backed guarantees as contingent insurance claims, this dissertation exploits such an institutional setting. By analysing public loan guarantees provided by the Portuguese Mutual Guarantee System (Sociedade de Garantia Mútua, hereafter SGM) as fully committed credit lines, this research operates in a setting structurally consistent with the insurance framework developed in the theoretical literature. Because the SGM scheme requires an ex-ante commitment fee (the premium), involves a collateralized requirement (the deductible), and executes payouts to banks on a first-demand basis upon default (the claim), it effectively forces the guarantor to finance the ex-post negative-NPV transaction, guaranteeing liquidity provision even in the worst states of the world.

The contribution of this research is twofold. First, it provides a direct empirical test of the insurance role of credit lines as formalized in theory. Second, it disentangles this specific insurance function from the secondary roles of marketplace credit lines, such as bank monitoring or contingent relationship lending, thereby allowing for a cleaner causal identification of the underlying economic mechanisms.

Furthermore, this approach addresses a critical dimension that has received limited empirical attention in the corporate credit literature. Because conventional insurance contracts are inherently subject to informational frictions, manifested in the form of adverse selection and moral hazard, and fully committed credit lines function identically to insurance against liquidity shocks, they are theoretically vulnerable to the same incentive problems. By utilizing an identification strategy that neutralizes pre-contractual sorting, this dissertation brings standard insights from the theory of insurance under asymmetric information to bear on the analysis of credit line utilization and ex-post firm behaviour.

To establish this causal inference and neutralize adverse selection, this study employs a Regression Discontinuity Design based on the strict administrative thresholds used to classify Portuguese enterprises. Specifically, the analysis focuses on a narrow bandwidth of firms employing between 8 and 11 workers, capturing the cutoff where a firm transitions from a "Micro" to a "Small" certification. This transition triggers an exogenous doubling of the maximum guarantee limit (from €18,750 to €37,500). By combining proprietary application data from Banco Português de Fomento with comprehensive corporate balance sheet and credit registry panel data from Banco de Portugal, the causal effects of the expanded guarantee are estimated utilizing a Two-Stage Least Squares Instrumental Variable

approach, complemented by a dynamic Difference-in-Differences framework to trace the temporal evolution of firm behaviour and a set of statistical demonstrations.

The empirical findings yield primary contributions to the literature on corporate finance and liquidity management. First, the analysis supports that when constrained firms are granted access to a larger credit line, they opt for balance sheet resilience, utilizing the funds almost exclusively to increase precautionary liquidity ratios. Second, ex-post NPV estimations validate the Holmström and Tirole (1998) model, proving that the SGM guarantee absorbs ex-post negative-NPV losses. Third, this dissertation suggests evidence of moral hazard, while rejecting evidence of adverse selection. Contrary to the hypothesis that larger safety nets reduce firm failure, treated firms exhibit a statistically significant increase in default frequencies. Finally, a decomposition of the net financial benefits reveals that the implicit interest rate subsidies provided by the larger guarantee outweigh the implicit penalties of default, thereby structurally incentivizing the observed shift toward riskier ex-post behaviour. From an economic perspective, the guarantee scheme is efficient, exhibiting a positive surplus.

The remainder of this dissertation is organized as follows. Section 2 reviews the existing literature on fully committed versus contingent credit lines, as well as the imperfect substitutability of cash and credit. Section 3 details the theoretical foundation based on the Holmström and Tirole (1998) model, generating the core testable implications outlined in Section 4. Section 5 draws the conceptual equivalence between credit lines, loan guarantees, and conventional insurance contracts. Section 6 provides the institutional details of the Portuguese SGM scheme. Section 7 describes the data construction and variables, while Section 8 outlines the RDD and 2SLS econometric methodology. Section 9 presents the empirical results and dynamic treatment effects. Section 10 conducts a costs and benefits analysis of the guarantee structure, and Section 11 concludes.

2. Literature review

The literature on corporate credit lines can be first divided into two main strands. The first considers fully committed credit lines, whereas the second examines contingent credit lines. These strands reflect different views regarding the reliability of credit lines as liquidity insurance instruments, particularly during periods of financial stress. They are reviewed separately. Finally, this debate generates a third secondary strand in the literature dedicated to examining the imperfect substitutability of credit lines and cash and for what is used each instrument.

Fully Committed Credit Lines

This first strand of the literature studies credit lines as commitment-based liquidity instruments that provide firms with reliable access to funding during adverse states. Early theoretical work by Boot et al. (1987) highlights the advantages of loan commitments under risk neutrality, establishing their role as fully committed contractual devices that allow firms to secure funding ex-ante against future liquidity needs.

Consistent with the full commitment interpretation, empirical literature documents that firms actively rely on these lines during episodes of financial stress. For instance, Ivashina and Scharfstein (2009) show that firms pre-emptively drew down credit lines during the 2008 financial crisis, with even high-default-risk borrowers accessing committed liquidity on relatively favourable terms. While covenant violations can theoretically restrict these drawdowns (Sufi, 2009), empirical evidence suggests these constraints frequently fail to bind in practice. For example, many loans originated prior to the 2008 crisis were "covenant-lite" (Ivashina and Scharfstein, 2009), and lenders rarely invoked Material Adverse Change clauses[1] due to reputational concerns (Boot et al., 1993, Berger and Udell, 1995). Expanding on this, Santos and Viswanathan (2020) demonstrate that borrowers are often able to extensively draw down funds well before banks enforce internal downgrades or credit cuts. This delayed enforcement is largely driven by the strategic value of relationship lending, in accordance with Berger and Udell (1995). Lead banks in syndicates frequently honour commitments, and even absorb the shares of failing syndicate members, to preserve long-

[1] MAC clauses allow one of the parts to suspend an agreement, or some of its obligations, in the case of an unexpected event that has a material adverse effect or negatively impacts the financial conditions of the other part.

term borrower relationships. Ultimately, these massive, pre-emptive drawdowns serve as a vital corporate lifeline, though they carry macroeconomic consequences by depleting banks' subsequent lending capacity. More recently, Acharya and Steffen (2020) observed a similar pre-emptive "dash for cash" during the COVID-19 pandemic, noting that while firms heavily utilized credit lines, the simultaneous hoarding of cash served as a positive market signal of firm resilience.

The availability of credit lines also influences corporate investment. Guney et al. (2017) show that utilized credit lines exert a positive and significant impact on R&D investments, an effect that is especially pronounced for small and young firms. Along the same lines, Ribeiro (2025) and Custódio et al. (2024) also demonstrate how credit lines positively impact internationalization processes. However, the ability of credit lines to sustain such investments depends on their maturity structure, particularly during periods of financial stress. Highlighting this vulnerability, Zhang (2025) demonstrates that firms whose pre-crisis credit lines were scheduled to mature precisely during a macroeconomic shock were forced to significantly reduce investment relative to comparable firms with longer-dated commitments. This demonstrates the impact of credit lines' structure on investment.

Adopting an insurance approach to corporate liquidity, Acharya et al. (2010) posit that banks create liquidity for firms by pooling their idiosyncratic risks. Consequently, bank lines of credit become excessively costly for firms with high aggregate risk, forcing these firms to rely on cash hoarding despite the associated liquidity premiums. Within this strand, a substantial body of literature focuses on the supply-side dynamics of credit lines during both normal economic conditions and aggregate shocks. Kashyap et al. (2002) identifies synergies between deposit-taking and credit line provision, a finding later confirmed by Gatev and Strahan (2006) regarding commercial paper backup lines. However, as Ippolito et al. (2016) suggest, providing liquidity to both depositors and corporate borrowers exposes banks to the severe risk of simultaneous double-runs on their assets and liabilities. Consistent with Acharya et al. (2010), banks actively manage this dual exposure ex-ante by selectively rationing credit lines to firms most likely to demand liquidity during a crisis. Therefore, understanding the true insurance value of credit lines requires examining how double-run vulnerabilities hold up empirically when aggregate shocks hit the economy.

Empirical evidence illustrates how these credit lines' supply constraints and institutional buffers operate during severe macroeconomic shocks. During the COVID-19 pandemic, Li

et al. (2020) document that banks were able to successfully accommodate credit lines pre-emptive drawdowns due to a combination of strong pre-shock capital, coincident deposit inflows, and unprecedented liquidity injections from the Federal Reserve. Finally, geographic and institutional contexts condition drawdown behaviour during such shocks. While U.S. data often highlights large firms dominating credit access, Campello et al. (2011) demonstrate that during the 2008 financial crisis, in Europe, restricted firms, namely those that are small, private, non-investment-grade, and unprofitable, drew more funds from their credit lines than their large, public, and profitable counterparts. Further highlighting this institutional context, Amberg (2023) demonstrates that when the Swedish commercial-paper market froze during COVID-19, large issuers successfully substituted lost funding by drawing down backup lines. Crucially, because Swedish banks were exceptionally well-capitalized and flush with deposits, they honoured these massive drawdowns without crowding out smaller firms. This highlights the importance of a healthy banking system for marketplace credit lines to function as liquidity insurance.

Ultimately, credit lines can be considered to be fully committed under specific conditions that either allow or force the borrower to support the drawdowns.

Contingent Credit Lines

This second strand treats the use of credit lines as contingent on both lenders' and borrowers' characteristics. As consequence, this instrument does not have the role of liquidity insurance.

Boot et al. (1993) and Nikolov et al. (2018) provide the theoretical foundation for the existence of credit lines with covenants, showing that discretionary clauses and financial covenants allow banks to condition liquidity provision on borrower performance, making credit lines state-contingent. Berger and Udell (1995) take on a perspective based on relationship lending. Since asymmetric information is a problem that particularly affects small firms, the terms of their credit lines are heavily dependent on their borrowing history. Relationship lending generates valuable information about borrower quality over time, leading to less restrictive clauses, such as covenants in credit lines' contracts.

In line with the previous paper, Chodorow-Reich et al. (2021) show that the degree of commitment embedded in credit lines varies systematically across firms. Relative to large firms, small and medium-sized enterprises obtain credit lines that are more frequently demandable or shorter in maturity, require greater collateral, exhibit higher utilization rates,

and carry higher spreads even after controlling for observable characteristics. These features reflect an intentional contractual design that preserves lender discretion, implying that credit line availability is more fragile for smaller firms, particularly during periods of financial stress.

Credit lines' availability is also related to the borrower's financial health. Sufi (2009) shows that credit line availability is conditioned by cash flow–based covenants, and a firm's ability to meet performance thresholds. In this framework, obtaining a credit line itself serves as a sign of financial strength, reflecting lenders' willingness to extend funding only to healthy firms. Consistent with this mechanism, Chodorow-Reich and Falato (2021) show that loan covenant violations trigger a shift in control rights from borrowers to lenders, allowing banks to restrict access to credit lines precisely when the firm's financial health deteriorates.

On the other hand, access to credit lines also depends on the lenders' financial health, as well. May (2014) shows that lender constraints can directly impair the credibility of committed credit lines, documenting that firms that had credit lines issued by Lehman Brothers experienced significant negative abnormal stock returns following its bankruptcy, reflecting the sudden loss of promised liquidity. Chodorow-Reich and Falato (2021) show that lenders in weaker financial condition are less likely to grant covenant waivers and more likely to reduce loan commitments after violations, effectively tightening credit supply when borrower access is most valuable. Finally, Acharya et al. (2020) document that banks exposed to liquidity shocks during the 2007-2008 collapse of the asset-backed commercial paper market renegotiated credit line terms more aggressively, reducing limits, increasing spreads, and demanding additional collateral, particularly for borrowers in breach of covenants.

Beyond managing existing distress, bank's capital constraints influence the origination of new credit lines. Acharya et al. (2021) show that credit line origination is highly cyclical, as negative shocks to bank capital reduce banks' ability to honour drawdowns and transmit financial stress to the real economy through a contraction in liquidity insurance. Consistently, Greenwald et al. (2025) show that large drawdowns during the COVID-19 crisis led banks to restrict other forms of lending, crowding out credit to smaller firms, which subsequently reduced investment. They further highlight that differences in utilization patterns across firms shape the effectiveness of credit lines as liquidity buffers, with smaller firms holding less unused capacity and therefore benefiting less from committed liquidity during downturns. Ultimately, this limits the effectiveness of credit lines as a form of insurance and a more efficient alternative to cash.

Finally, credit lines and cash end up having different purposes and not being substitutes as theorized by Holmström and Tirole (1998). Lins et al. (2010) explores the idea that cash and credit lines end up fulfilling different purposes: while firms use cash to hedge against negative cash flow shocks (such as cost overruns), they use credit lines to exploit future business opportunities. Providing further empirical evidence, Acharya et al. (2014) formalize this concept, viewing credit lines as a form of monitored liquidity insurance to fund future good investment opportunities. This idea, explored in more detail in the next strand, is tightly tied to the conclusion that credit lines are strictly contingent.

Taken together, this strand of literature shows that credit lines are not fully committed liquidity insurance instruments. Instead, their availability depends on borrower characteristics, covenant compliance, and lender conditions, particularly during downturns when liquidity insurance is most valuable.

The Imperfect Substitutability of Cash and Credit Lines

Building on the lack of full commitment of credit lines discussed previously, this strand of literature delves deeper on the imperfect substitutability of cash and credit lines.

The decision to substitute cash holdings with a bank credit line represents a balance between a firm's internal demand for liquidity and the external constraints imposed by lenders. From a firm's perspective, this choice is fundamentally driven by exposure to cash-flow volatility and liquidity risk, representing overall financial constraints (Sufi, 2009; Demiroglu and James, 2010; Acharya et al., 2014) as well as the existence and timing of investment opportunities (Lins et al., 2010; Acharya et al., 2014). Firms that are less financially constrained and that have good investment prospects opt for credit lines more. On the contrary, if a firm is more financially constrained and doesn't have good investment opportunities, they are more likely to rely on cash. A manager's preference is further shaped by internal dynamics, such as corporate governance and agency costs (Yun, 2009; Demiroglu and James, 2010), the strategic desire to protect a consistent dividend policy (Lins et al., 2010), and whether the firm utilizes derivative hedging to manage risk (Disatnik et al., 2013; Acharya et al., 2014). In a frictionless world, a credit line would seamlessly substitute for costly cash hoarding to serve these needs.

However, this substitution is rarely perfect due to the risk of lender insolvency and the asymmetric information lenders face regarding borrowers (Berger and Udell, 1995; Lins et

al., 2010). Because lenders cannot perfectly observe a firm's true underlying risk, physical and financial characteristics play a critical role in credit allocation. Smaller firms lacking collateral (Nikolov et al., 2018) or those with lower pledgeable income, measured by size, credit rating, or tangible assets, face heavily restricted access to credit lines (Acharya et al., 2014). To further manage risk, banks enforce strict monitoring through financial covenants (Sufi, 2009; Nikolov et al., 2018) and heavily weigh a borrower's default or prior default status (Jiménez et al., 2009). These frictions mean that securing committed liquidity is rarely guaranteed for more constrained firms.

Finally, the viability of credit lines as a substitute for cash is dictated by broader macroeconomic realities. Banks manage their own exposure to liquidity risk ex-ante by selectively granting fewer credit lines to firms identified as more likely to draw down liquidity during crises (Ippolito et al., 2016). When systemic shocks do occur, broader macroeconomic factors such as aggregate systematic risk (Acharya et al., 2013) combined with the significant cost wedge of external financing (Campello et al., 2011) ultimately incentivize the hoarding of cash, forcing vulnerable firms to rely on internal liquidity rather than contingent bank commitments.

Consequently, the imperfect substitutability of cash and credit lines reflects a structural market segmentation: vulnerable firms are denied contingent liquidity and forced to rely on costly cash hoarding.

Ultimately, the literature on credit lines shows that, empirically, these are not a reliable source of liquidity insurance. Because their availability is contingent upon specific borrower and lender conditions, cash and credit lines remain strictly imperfect substitutes. More importantly it highlights the need of an instrument free of covenants and other frictions to rigorously test the theoretical implications of credit lines.

3. Model

The theoretical foundation of this dissertation is built upon the Holmström and Tirole (1998) model of corporate liquidity management and Grilo et al. (2026) specific framework. The framework operates across three distinct stages (t=0, 1, 2) to map the lifecycle of an investment project and the entrepreneur's strategy for managing interim liquidity needs. To isolate the mechanics of liquidity, the model assumes a risk-neutral environment where the project yields constant returns to scale, and the risk-free interest rate is normalized to zero. Crucially, because the outside investors (banks) operate in a perfectly competitive market, they offer liquidity insurance at an actuarially fair price. Consequently, the entrepreneur is able to appropriate the full economic surplus of the project, provided they can successfully secure financing across all three periods.

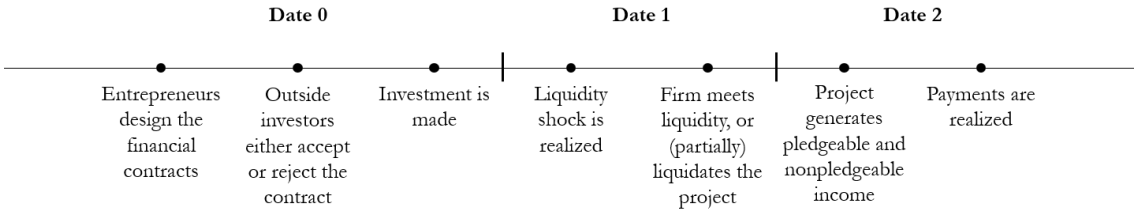

Figure 1: ***Timeline of the Liquidity Management Model.*** *The figure depicts the sequence of events across the three stages of the theoretical framework. Sources are Grilo et al. (2026) and Holmström and Tirole (1998).*

At date 0, firms choose a determined project dimension $I \in [0, \infty)$. In date 1, the firm experiences a liquidity shock ρ proportional to the project's dimension. At this point, the firm must pay that amount to continue the project and receive its returns. The liquidity shock may be low ρ_L, medium ρ_M, or high ρ_H (Grilo et al., 2026). The firm must decide how much of the project to save, choosing a continuation scale i (where $0 \leq i \leq I$). At date 2, the project yields a return based on that continuation scale. Per unit of investment i, the total return is ρ_1 that can be split into two parts: a pledgeable income ρ_0, that can be promised to outside investors, and non-pledgeable income $\rho_1 - \rho_0$, the private benefit that is kept by the entrepreneur.

The wedge between the total return ρ_1 and the pledgeable return ρ_0, driven by the need to leave the entrepreneur with a private benefit to prevent moral hazard, creates a market failure at the refinancing stage in date 1.

If the firm is hit by a low liquidity shock $\rho_L < \rho_0$, the cost to continue is smaller than the pledgeable income, meaning the firm can easily raise funds on the spot market. However, if the firm experiences a medium or high liquidity shock, the costs fall into a critical zone:

$$\rho 0 < \rho M < \rho H < \rho 1 \tag{3.1}$$

In this scenario, continuing the project is economically efficient from a social perspective because the total return still exceeds the maximum cost of the shock $\rho_H < \rho_1$. However, spot market lenders will refuse to provide funds if the cost of the shock exceeds what they can recover, that is $\rho > \rho_0$. For the bank, providing liquidity at date 1 represents a guaranteed loss, a negative NPV transaction (Holmström and Tirole, 2011). Consequently, without prior arrangements, the firm is forced to scale down or liquidate the project.

To resolve this credit rationing, firms must secure liquidity insurance at Date 0. Rather than hoarding costly cash reserves, the optimal solution is to contract a fully committed credit line. By paying an upfront commitment fee, the firm purchases the right to draw down funds at Date 1, even when the shock falls into the negative-NPV zone ρ_M or ρ_H. The intermediary honours these negative-NPV drawdowns because the ex-ante fees compensate for the ex-post losses, they are computed at an actuarially fair price, allowing the insurer to break even in expectation.

4. Testable Implications

This framework yields four important testable implications regarding credit lines.

1. **Banks finance projects with ex-post negative NPV: "If the high shock occurs, the firm will draw down the full line of credit, which has a negative net present value" (Holmström and Tirole, 2011, p. 34)**

Financing a firm that faces severe (medium and high) liquidity shocks represents a negative NPV transaction for the lender at the time the shock occur. Because private marketplace credit lines incorporate covenants to avoid these ex-post losses, they frequently fail to provide firms with true liquidity insurance. Therefore, in order for a credit line to function as genuine liquidity insurance, its mechanism must force the lender (or guarantor) to finance this ex-post negative-NPV transaction to ensure project continuation.

2. **Consistent with models of asymmetric information in insurance markets, there should be a positive correlation between the size of the credit line (coverage) and the probability of its activation (accident frequency)**

Because fully committed credit lines function equivalently to conventional insurance contracts, their utilization is theoretically subject to identical informational frictions[2]. Consequently, if public loan guarantees operate as state-contingent liquidity insurance, models of asymmetric information predict a positive correlation between the size of the guarantee and its subsequent probability of default. Additionally, as demonstrated by Acharya et al. (2014, p. 290), corporate liquidity is also subject to an adverse selection problem: firms with inherently higher unobservable risk will self-select into demanding larger liquidity coverage ex-ante. Therefore, it is important to account for moral hazard and adverse selection when analysing the correlation between credit line size and activation frequency.

[2] As summarized by Grilo et al. (2026), this concept is widely applied throughout the empirical research on health and automobile insurance. By emphasizing that insurers provide a menu of contract options, Chiappori and Salanié (2000) and Chiappori et al. (2006) establish a theoretical positive correlation between the amount of coverage acquired and the frequency of claims. Research indicates this relationship also persists in dynamic environments (Abbring, Chiappori, et al., 2003; Abbring, Heckman, et al., 2003). Furthermore, Jorge and Kahn (2020) illustrate that a comparable contract menu dynamic emerges within corporate liquidity management, providing a strong justification for applying this theoretical framework to the analysis of corporate credit instruments.

3. Liquidity and scale are substitutes (Holmström and Tirole, 2011, p. 13, 30, 39)

One of the core predictions of the Holmström and Tirole (1998) model is that liquidity and scale are substitute goods. Due to the strict financial constraints faced by firms, resources cannot be deployed simultaneously to both margins. An entrepreneur must choose whether to deploy available funds toward securing ex-ante liquidity insurance (e.g., paying the commitment fee for a credit line) or toward maximizing the project's initial physical scale at date 0. Consequently, it is expected that firms securing larger credit lines will exhibit higher precautionary liquidity ratios, but slower growth in physical scale measurements.

4. Firms with more liquidity insurance are more resilient and don't default as much

A final implication derived from the Holmström and Tirole (1998) model relates to the firm's survival probability in the presence of liquidity insurance. If a credit line successfully provides liquidity insurance, the firm should be able to secure project continuation during adverse states of the world. Firms endowed with larger credit lines possess a greater capacity to absorb severe liquidity shocks. Therefore, these firms should demonstrate greater overall resilience, avoiding inefficient liquidation and exhibiting significantly lower rates of bankruptcy compared to uninsured firms.

5. Credit Lines, Loan Guarantees and Insurance

Credit Lines as Conventional Insurance Contracts

A fully committed credit line has the primary purpose of serving as liquidity insurance, designed to protect firms against unexpected cost overruns and to secure the financing of future high-value investment opportunities. Its contractual elements replicate the structure of a conventional insurance contract: firms pay a commitment fee ex-ante, equivalent to an insurance premium, in exchange for guaranteed access to funding ex-post, contingent on the occurrence of a liquidity shock.

In the seminal model of Holmström and Tirole (1998), when a liquidity shock occurs, specifically defined as a random cost overrun, firms may be unable to raise financing on spot markets, highlighting the need to secure liquidity ex-ante. This can be either done through hoarding cash, or through credit lines. The latter option is described to be more efficient if liquidity shocks are idiosyncratic, because banks can pool risks across firms and allocate funds only to those that actually experience shocks. By contrast, if firms self-insured through precautionary cash holdings, liquidity would remain inefficiently idle in firms that do not experience shocks while constrained firms would still face shortages. Similarly, in conventional insurance contracts, insurance companies pool individual risks across policyholders so that premiums collected in normal states can finance claims in adverse states, reducing the need for costly self-insurance by individual agents.

Crucially, Holmström and Tirole (2011) shows that continuation after a large liquidity shock requires financing that has negative NPV from the lender's perspective at the time the shock occurs. In other words, while the project is socially efficient to continue, it becomes unattractive for outside investors to finance ex-post, because of the distinction between pledgeable and non-pledgeable income. A fully committed credit line solves this problem by transferring resources across states of the world: firms prepay for the expected use of liquidity through commitment fees, allowing banks to supply funds even when continuation lending would otherwise be unprofitable. The prepayment is equivalent to the payment of a premium in a conventional insurance contract that forces the insurer to cover a claim, even though this event has a negative NPV for the insurance company.

In practice, however, credit lines available in the marketplace often fall short of this theoretical insurance benchmark because they are not fully committed. As shown by Sufi

(2009), covenant violations allow lenders to restrict access to credit precisely when firms become riskier or macroeconomic conditions deteriorate, that is, when credit lines' drawdowns are likely to be negative-NPV from the lender's perspective. This weakens their insurance function relative to the fully committed contracts envisioned in theory. Concluding, the marketplace credit lines may not provide the ideal empirical setting to test fully committed credit lines.

Public Loan Guarantees as Credit Lines

In order to provide a solution to this empirical limitation, I will now argue that loan guarantees, specifically the SGM instrument, provide the accurate characteristics of a credit line as described by Holmström and Tirole's (1998) theory. This instrument gives firms access to bank loans, guaranteeing loan repayment in case of a firm's loan default, fulfilling the role of liquidity insurance. To secure the access to the loan guarantee, firms pay a guarantee commission ex-ante, just like the upfront fee a firm pays to contract a credit line. The activation of the guarantee that covers loan repayment is equivalent to a credit line drawdown. Because guarantors are required to compensate lenders even in adverse states, representing a negative-NPV for the guarantee issuer, guarantee schemes implement the state-contingent transfers necessary to sustain project continuation and therefore closely resemble liquidity insurance contracts as in fully committed credit lines.

Public Loan Guarantees as Conventional Insurance Contracts

Simultaneously, loan guarantees, specifically the one described above, can be compared to conventional insurance, using the same rationale that compares credit lines to insurance contracts. Grilo et al. (2026) argue that a public loan guarantee, more than its standard bank loan feature, contemplates a contingent claim that provides insurance in bad states of the world. Firms pay an upfront premium in exchange for a contingent claim. So, when a liquidity shock occurs, the guarantee covers loan default. As in most insurance contracts, loan guarantees can also feature deductibles. In this specific setting, the deductible acts as an upfront financial deposit. The firm locks in this capital at the start of the contract and recovers it when the loan expires, losing the funds only if it defaults on the loan repayments and forces the guarantor to pay.

The table below summarizes the comparisons between conventional insurance contracts, credit line, and loan guarantees, exemplifying with the specific SGM case.

Conventional Insurance Contract	Credit Line	Loan Guarantee	SGM Loan Guarantee
Premium	Upfront fee	Guarantee Commission	The ex-ante and non-retrievable payment to secure future liquidity or coverage. For the SGM scheme, it's the quarterly payment of the guarantee fee.
Deductible			Ex-ante payment that is irretrievable if the guarantee is activated. In the Portuguese case it's the acquisition of SGM shares equivalent to 2% of the guaranteed amount. These shares can be resold upon the termination of the guarantee, if the guarantee is not activated.
Accident/Claim payout	Drawdown	Guarantee Activation/Loan Default	First-demand obligation feature on the guarantee conditions.

Table 1: ***Conceptual Equivalence of Liquidity Insurance Mechanisms.*** *This table maps the structural parallels between conventional insurance contracts, corporate credit lines, generic loan guarantees, and the specific institutional features of the SGM scheme.*

This comparison between instruments and subsequent comparison to the SGM scheme, shows the importance of looking at the latter through an insurance lens. By providing this novel framework that views conventional insurance as an instrument equivalent to a credit line, which in turn is equivalent to a loan guarantee, this dissertation aims to solve the empirical limitations prevalent in literature so far. This framework allows the application of classical insurance predictions, such as the presence of adverse selection and moral hazard in credit line contracts. Hence, the set of testable implications relevant to this work that was mentioned in the previous section.

6. Institutional Details of the SGM Loan Guarantee Scheme

Portugal's loan guarantee system features three key-players: borrowing firms, commercial banks, and an intermediary, the SGM. The typical transaction is initiated by the borrowing firm that submits a loan proposal to a bank. The bank in turn evaluates the project deeming it viable or not, forwarding the application for a guarantee to the SGM, on behalf of the firm. Finally, the SGM role is to mainly verify the formal eligibility criteria. If approved, the bank issues the loan. This loan is characterized by a 4-year maturity period, with quarterly payments and interest rates following the specific SGM guidelines (see Annex). The analysis in this section will be focusing on the "Linha de Crédito PME Crescimento", specifically the "Linha Micro e Pequenas Empresas", the chosen instrument for empirical testing.

Recalling the previous section, the SGM loan guarantees scheme has three base elements: the payment of quarterly guarantee commissions, the ex-ante but retrievable acquisition of SGM shares, that work as a collateralized deductible (see Appendix 1) in case of guarantee activation, and the claim, in the event of the activation of the guarantee.

Naturally, access to this guarantee is contingent upon securing a commercial loan. The maximum loan amount is €25,000 or €50,000 for "Micro" and "Small" enterprises, respectively. The guarantee covers exactly 75% of the loan obtained, meaning that the guarantees have a maximum of €18,750 or €37,500 for "Micro" and "Small" enterprises, respectively.

To access a public loan guarantee, a firm must first secure an official SME certification from IAPMEI, an independent public agency. As detailed by Grilo et al. (2026), this size certification relies on a two-step historical assessment. First, a firm's size category for a given year is calculated using mandatory employment figures (less than 10 or 50 for Micro or Small firms, respectively) combined with either total assets or annual sales figures (less or equal to €2 million or €10 million for Micro or Small firms, respectively). A firm's final official certification, Micro or Small, is not based on contemporaneous data. This analysis is restricted to firms that maintain the same size classification for two consecutive years within a three-year lookback period. Consequently, for this application, a firm's certification status is typically established well before it applies for a loan guarantee, which is essential for the identification strategy later employed.

If a firm suffers a severe liquidity shock and fails to meet its debt obligations, a loan default occurs. Since the guarantee is activated on an autonomous first-demand basis, once the firm defaults on its loan repayments, the bank executes the guarantee payment and receives money from the SGM. The payment is meant to cover exactly 75% of the outstanding capital at the moment of default. This standalone stage should represent a negative-NPV action for the SGM, as argued in the previous section. The remaining 25% of the outstanding capital is borne by the bank, ensuring it maintains "skin in the game", so the lender is expected to initiate usual recovery procedures.

Following activation, the SGM assumes the position of a creditor for the compensated amount. First, the "Adesão ao Mutualismo" shares are retained by the SGM, precluding the defaulted firm from its right to resell the shares, since the guarantee is not extinguished. Accordingly, this acts as a seized collateralized deductible. Second, when, and if, any amount of the remaining outstanding capital is recovered, it is split on a pari passu basis: funds successfully recovered ex-post are distributed proportionally between the SGM (75%) and the bank (25%) until the losses are mitigated.

A detailed transcription of the fundamental elements of this guarantee scheme from the official disclosure document is provided in the Annex, with its corresponding translation to English.

7. Data and Variables

The dataset explored in this dissertation is composed by data from different sources. Relatively to loan guarantee data of Linha de Crédito PME Crescimento, Banco Português do Fomento has supplied all the application data between the dates 16 January 2012 and 14 July 2013. Since the focus of this dissertation relies on the Linha "Micro e Pequenas Empresas", it is employed about 72.1% of the 41,897 guarantee applications from micro and small firms. Specifically, this dataset has information on whether the guarantee was approved or not. If it is the first case, the data provides transaction-level details, including the approved guarantee value, bank loan value, interest rates, and whether the guarantee was eventually activated and its respective recovery value. There's also information regarding obtained guarantees outside the date's interval of 16 January 2012 and 14 July 2013 (see Table 2).

Complementing the information from the previous dataset, the guarantee data is merged with two micro-level databases from the Banco de Portugal Microdata Research Laboratory (BPLIM). The first database is Central Balance Sheet – Harmonized Panel (CBHP), which compiles annual accounting and financial data from 2006 to 2019 based on Informação Empresarial Simplificada (IES) reporting. This dataset provides the core variables for firm scale and liquidity from non-financial firms operating in Portugal. The second database is the Harmonized Central Credit Register (HCRC) which tracks monthly corporate credit accounts, between 2009 and 2019.

Following data cleaning procedures by Grilo et al. (2026), the datasets are merged, and observations that did not belong to the specific regulatory regime applicable to "micro" and "small" enterprises, lacked corresponding credit registry data (likely due to bank mergers) or failed to meet strict legal specifications were excluded. To ensure the same number of firms and guarantees, firms that obtained multiple guarantees across 2012 and 2013 are restricted to their first guarantee observation.

The final sample, which comprised of an unbalanced panel with 13,758 firms, was winsorized, removing the top and bottom 1 percentiles of each year present in the sample. This last step ensures that the effects of outliers are minimized (Grilo et al., 2026).

Variable wise, to test the theoretical implications defined for this dissertation, the empirical analysis utilizes several key variables categorized into scale and performance, and liquidity. In the scale category there is "firm output", calculated as the firm's value added (total sales

minus intermediate consumption), representing the income available for labour and capital contributions, in addition to other variables such as "fixed assets", "total assets", and "sales". For the liquidity category, the variable "cash" is measured as the sum of physical cash holdings and bank deposits. Variables "Liquidity" and "Liquidity (all guarantees)" are measured as a sum of "cash" with the contingent payment embedded in the first SGM guarantee and as a sum of "cash" with the contingent payment embedded in all outstanding guarantees the firm has received, respectively.

Since the certification of "micro" and "small" given by IAPMEI is not observed, Grilo et al. (2026) reconstructed this variable from the official rules. Due to any possible misclassification of "micro" and "small" firms, observations where a firm was classified as a "micro" firm but received a guarantee exceeding the legal cap of €18,750 were dropped from the sample.

To test the negative ex-post NPV implication, the ex-post NPV variable was constructed by summing the guarantee payout, deductible shares, and the recovery value. Since the timing of the recovery is not observed, the recovery amount is discounted at an assumed rate of 0%, which provides an upper bound for the estimated NPV.

The Missing Assets variable provides information on firms disappearing from the sample in the fifth year after the guarantee attribution, which will be used, in addition to activation data, as a proxy for firm default.

Detailed information regarding variables and its calculation are given in Appendix 2.

Table 2 reports a summary of descriptive statistics regarding the variables present in the sample. The data reveals that the average Portuguese firm in this sample is relatively small, with the majority employing up to 5 workers. Liquidity management wise, Portuguese firms rely heavily on debt, with "total liabilities" representing approximately 70% of total assets, and hold significant cash reserves, accounting for around 10% of total assets. The variable "previous guarantees" shows that few firms received guarantees before 2012. Lastly, the significant divergence between the mean and median values across variables indicates a highly skewed distribution. Consistent with this finding, the variable "value of guarantee" that measures the value of the SGM guarantee shows that the bottom 75% of the firms received a guarantee corresponding to a "micro" firm, suggesting that these firms represent most of the sample.

	Mean	P25	Median	P75	Std Dev
Total assets (€)	523 450	153 050	319 308	646 606	633 383
Fixed Assets (€)	153 684	17 061	57 006	169 460	295 245
Number of employees	7.76	3	5	10	7.21
Firm output (€)	157 329	50 598	100 751	205 817	169 201
Sales (€)	605 880	170 200	353 839	743 808	755 450
Exports (€)	43 085	0	0	704	200 517
Cash (€)	46 377	6 697	20 323	51 966	82 347
Value of guarantee (€)	21 562	18 750	18 750	18 750	8 088
Previous guarantees (€)	245	0	0	0	3 139
Total liabilities (€)	362 864	93 632	210 075	445 134	468 389
Current liabilities (€)	251 196	52 791	134 278	312 976	349 294
Subsidies (€)	2 444	0	0	0	32 029

Table 2: ***Descriptive Statistics.*** *This table outlines the core summary metrics for the variables analysed across the full dataset of 13,286 small and medium-sized enterprises (SMEs). The 25th and 75th percentiles are indicated by P25 and P75, respectively. With the exception of the guarantee amount, the reference timeline for all firm characteristics is the fiscal year immediately prior to the issuance of the credit guarantee. Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal, with the statistical framework from Grilo et al. (2026).*

8. Methodology

Following the same empirical strategy developed by Grilo et al. (2026), in order to test the effects of credit lines using data on loan guarantees, it is necessary to define a treated and a control group. To avoid self-selection problems related to firms with only good investment opportunities applying for guarantees as well as possibly comparing pools of firms with different ex-ante risk profiles, the groups have to be defined not by the existence of a guarantee, but by a difference in guarantee size. The identification strategy employed relies on the difference in guarantee received according to the "micro" (broadly speaking of less than 10 workers) or "small" (broadly speaking of 10 to 49 workers) certification. This specific design of the SGM guarantee scheme in use allows to define a treated group that receives an up to €37,500 guarantee and a control group that receives an €18,750 guarantee. This translates to the creation of a dummy variable that takes on a 0 and a 1 for the control and treated group, respectively. Furthermore, by restricting the analysis to a narrow bandwidth of firms employing between 8 and 11 workers, we can compare entities that are virtually indistinguishable in their unobservable characteristics and investment opportunities but still face an exogenous and significant difference in the amount of guarantee each firm receives.

Building on this Regression Discontinuity Design, the causal effects are estimated via a Two-Stage Least Squares Instrumental Variable (IV) approach, complemented by a dynamic Difference-in-Differences framework. A primary threat to this identification strategy would be if the size classification itself were endogenous to a firm's specific financing needs or growth prospects, which would violate the IV exclusion restriction.

Fortunately, both the institutional features of the guarantee scheme and the sample construction mitigate these endogeneity concerns. First, because the sample is strictly limited to firms that actively applied for and received a guarantee, baseline credit demand is held constant. This way, the analysis evaluates the intensive margin of the guarantee size (how much money each firm gets) rather than the extensive margin of seeking credit (if a firm demands money). Second, as detailed in Section 6, the size certification is inherently backward-looking, relying on a two-year historical data lag prior to the application. This regulatory delay prevents firms from retroactively manipulating their size classification in response to sudden liquidity shocks or investment opportunities. Finally, while theoretical concerns regarding threshold manipulation might persist, such as a firm with nine employees

intentionally hiring a tenth worker to unlock an additional €18,750 in guarantee coverage, such behaviour is economically irrational. The cumulative cost of hiring and maintaining a redundant employee at the minimum wage over the multi-year certification period (approximately €33,700) vastly outweighs the marginal financial benefit of the expanded credit limit. Consequently, the assumption of quasi-random assignment around the employment threshold holds itself.

Furthermore, the Holmström and Tirole (1998) model requires firms to be liquidity rationed. To replicate this, the sample will have an extra restriction by removing "micro" firms that request guarantees below the €18,750 cap and "small" firms that receive exactly €18,750, which are not financially constrained at that threshold.

Starting with the 2SLS procedure, it's first estimated the value of the guarantee received, since crossing the threshold grants access to a larger guarantee but does not perfectly dictate the final amount.

The first stage isolates the exogenous variation in the guarantee amount and estimates the exact guarantee amount:

$$G_i = \alpha_1 + \beta \times Treated_i + \gamma_1 X_i + \epsilon_{1,i} \quad (8.1)$$

Where G_i represents the exact value of the guarantee received by firm i. $Treated_i$ is the binary instrument equal to 1 for firms considered "small" and 0 for firms considered "micro". X_i is a vector of pre-treatment control variables (including assets, leverage, cash, and industry fixed effects).

The second stage regresses the change in the outcome variables on the instrumented guarantee value. To account for unobservable, time-invariant differences in initial firm levels, the specification is estimated in changes rather than absolute levels:

$$y_{i,t} - y_{i,0} = \alpha_2 + \delta \hat{G}_i + \gamma_2 X_i + \epsilon_{2,i} \quad (8.2)$$

Where $y_{i,t} - y_{i,0}$ represents the change in the outcome variable (e.g. liquidity-to-scale ratio, firm output) from the pre-treatment baseline year (t=0) to post-treatment years. The coefficient of interest, δ, captures the unbiased causal effect of an additional euro of guarantee on the firm's marginal behaviour.

To evaluate how the liquidity-scale trade-off evolves over time and to formally validate the identification strategy, a dynamic DiD estimator is employed. The dynamic evolution of the outcomes is estimated via the following equation:

$$y_{i,t} - y_{i,0} = \sum_{k=-3, k\neq 0}^{5} \delta_k \times Treated_i \times Year_t + \eta_t + \epsilon_{i,t} \quad (8.3)$$

Where η_t represents year fixed effects to control for macroeconomic shocks. This specification serves a dual purpose. First, the coefficients δ_k for periods $t \geq 1$ map the causal trajectory of the guarantee's impact. Second, the coefficients for the periods prior to the guarantee attribution ($k < 0$) provide a mathematical test of the parallel trends assumption. The parallel trends assumption is valid when firms demonstrate the same type of behaviour for the periods prior to treatment, which, in this scenario, corresponds to the attribution of the guarantee. Statistically insignificant estimates prior to $t = 0$ support that, conditional on the CEM matching and the RDD bandwidth, the treated and control groups exhibited identical trajectories prior to the guarantee attribution.

Because variables are expressed in changes, establishing a comparable counterfactual group is essential. Consequently, the sample is pre-processed using Coarsened Exact Matching (CEM) in equations (8.1) and (8.2), and in the DiD approach (8.3). Firms are sorted into narrow bins based on pre-treatment structural characteristics, including three-year average growth rates in assets and sales, leverage percentiles, and export status, ensuring each treated firm is matched to an identical control firm.

9. Empirical Results

This section details the empirical results of the guarantee scheme, and, consequently, credit lines, on firm behaviour and survival. The first and second stage from the 2SLS approach are the first to be analysed, followed by the DiD approach. Finally, a set of other tests regarding moral hazard and default were employed, based on the computation of the guarantee's financial components and statistical analysis.

First-Stage Running the First-Stage regression of the 2SLS approach, will help to understand if the RDD is working as expected and will contribute to ruling out possible adverse selection scenarios.

When evaluating insurance and committed credit lines, it is critical to address the informational frictions that predict a positive correlation between the size of the coverage and the probability of activation. In this context, self-selection can occur before applying to a loan guarantee, as firms facing severe liquidity constraints or with riskier profiles benefit more when applying for the guarantee program. Consequently, the baseline pool of applicants can inherently carry more risk. This highlights the importance of comparing within firms that had a guarantee instead of comparing firms with and without guarantees.

Thanks to the institutional design of the studied guarantee scheme, the RDD effectively neutralizes adverse selection, since firms can't self-select into bigger guarantees if they are riskier ex-ante. Guarantee size is determined by a deterministic administrative certification score rather than by the firms' unobservable preferences or private risk information.

Table 3 supports the validity of the assignment mechanism, indicating a sharp discontinuity in the value of the guarantee exactly at the certification threshold. The first-stage estimates in Column (1) reveal that treated firms receive, on average, a guarantee that is €17,855 larger than control firms, which almost perfectly mirrors the statutory €18,750 difference between the two eligibility caps. This supports that firms cannot manipulate the running variable to secure treated status. Furthermore, comparing Columns (2) and (3) reveals no economically meaningful differences in ex-ante guarantee demand between activating and non-activating firms. This is fundamentally tied to the institutional design of the SME certification, which relies on a two-year backward-looking assessment. Additionally, the fact that some firms actively request guarantees below the €18,750 cap suggests that banks likely screen out extreme risks prior to the SGM application. Consequently, the treated and control groups

situated around the cutoff are structurally equivalent ex-ante, refuting the adverse selection hypothesis and ensuring that subsequent variations in ex-post behaviour are driven by the treatment itself.

	(1) Value of guarantee (all firms)	(2) Value of guarantee (firms did not activate)	(3) Value of guarantee (firms activated)
Treated$_i$	17854.9***	18047.09***	17859.89***
	(285.84)	(330.01)	(2756.87)
Employees	-25.02	-91.86	-34.80
	(109.57)	(110.00)	(981.60)
Total Assets	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)
Sales	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)
Fixed Assets	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
Cash	0.00	0.00	0.01
	(0.00)	(0.00)	(0.02)
Leverage	898.56	1251.40	-2649.76
	(568.257)	(568.72)**	(5165.91)
Exports	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Industry fixed effects	Yes	Yes	Yes
Adjusted R-squared	0.933	0.938	0.837
Observations	634	588	46

Table 3: ***First-Stage Regression Estimates.*** *This table presents the estimated coefficients (β) for the Treated$_i$ variable as defined in Specification (9). The Treated$_i$ term serves as a dummy variable, taking a value of 1 exclusively for firms granted access to a bigger credit guarantee. Standard errors, adjusted for robustness, are displayed in parentheses, with statistical significance indicated by *, **, and *** for the 10%, 5%, and 1% thresholds, respectively. The analysis is segmented into three columns: Column (1) encompasses the full sample, while Columns (2) and (3) isolate firms that refrained from activating and those that executed their guarantees, respectively. The sample across all columns is restricted to firms positioned near the eligibility threshold (roughly 8 to 11 employees). Furthermore, Column (1) incorporates k-to-k matching based on exporter status, leverage, and the three-year mean annual growth rates for total assets, sales, fixed assets, and employee count. Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal, with the empirical methodology from Grilo et al. (2026).*

Second-Stage Moving on to analysing the Second-Stage regression results to evaluate how credit lines affect firm resource allocation, by regressing the outcome variables on the predicted guarantee values from first-stage, as well as other control variables. This would give us the causal effects of guarantees. A core theoretical prediction is that for constrained firms, liquidity and scale operate as substitute goods. An entrepreneur must choose whether to deploy available funds toward either securing ex-ante liquidity insurance or maximizing initial physical scale.

The empirical evidence supports the theoretical substitution effect between scale and liquidity. As presented in Table 4, the short-run estimates of the coefficients for firm output and fixed assets, proxies for scale, are statistically insignificant. There are two possible explanations for the insignificant results in scale. First, instead of expanding physical scale, constrained managers route the resources provided by the larger credit line predominantly toward precautionary buffers. Specifically, a one-euro increase in the guarantee raises the main liquidity measure (comprising cash plus the contingent payment embedded in the guarantee) by €0.94. This nearly one-to-one transmission is slightly below unity likely due to the mechanical amortization of the underlying bank loan during the initial two-year window. Second, the lack of response in fixed assets is particularly illustrative, as traditional capital expenditure often fails to other scale investments, such as marketing and supply chain expansions, typically recorded as operating expenses rather than tangible assets. Ultimately, this supports that firms actively prioritize balance sheet resilience and liquidity insurance over immediate capacity expansion.

	(1) Firm output	**(2) Fixed assets**	**(3) Cash**	**(4) Liquidity**
Value of guarantee	-0.402 (0.577)	-0.237 (0.710)	0.314 (0.448)	0.941** (0.451)
Employees	2 750.523 (3 391.677)	681.637 (4 175.682)	-580.073 (2 634.557)	-528.507 (2 651.948)
Total Assets	-0.016* (0.009)	0.024** (0.011)	0.002 (0.007)	0.001 (0.007)
Sales	0.004 (0.005)	0.010 (0.006)	0.003 (0.004)	0.003 (0.004)
Fixed assets	0.022 (0.017)	-0.091*** (0.021)	-0.006 (0.013)	-0.005 (0.013)
Cash	0.016 (0.039)	0.019 (0.048)	-0.158*** (0.030)	-0.150*** (0.031)
Leverage	-30 074.965* (17 479.948)	-14 000.101 (21 520.534)	-15 333.124 (13 577.922)	-16 392.064 (13 667.548)

Exports	0.004 (0.014)	0.008 (0.017)	0.021* (0.011)	0.022** (0.011)
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	634	634	634	634

Table 4: ***Second-Stage Regression Estimates (Two-Year Horizon).*** *This table details the coefficient estimates (δ) corresponding to the instrumented guarantee value $\widehat{G}_i$, based on Specification (10) measured at t = 2 across various dependent variables. Robust standard errors are provided in parentheses. Significance levels of 10%, 5%, and 1% are denoted by *, **, and ***, respectively. The evaluated sample is constrained to firms situated close to the employee cutoff margin (approximately 8 to 11 workers). The estimation employs a k-to-k matching procedure utilizing leverage, exporter classification, and the three-year average annual growth trajectories of sales, fixed assets, total assets, and workforce size. Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal, with the econometric framework from Grilo et al. (2026).*

Differences-in-Differences To ensure the robustness of the baseline findings and to examine the temporal evolution of the treatment effect, a dynamic DiD framework was employed. In Figures 2 and 3, the visual evidence of flat pre-trends prior to treatment validates the identification strategy by supporting the parallel-trends assumption for both the output and liquidity-to-output ratio. Post-treatment, the dynamic coefficients for firm output remain flat, supporting the absence of scale expansion. Conversely, examining the liquidity-to-output ratio provides a direct test of the theoretical substitution effect. This ratio exhibits a sizable increase in the first two years following the guarantee issuance. The visual evidence is consistent with firms actively substituting scale for liquidity when granted access to a larger credit line.

Finally, extending the analysis over a five-year horizon evaluates how these effects evolve as the guarantee reaches maturity. The results for scale remain consistent, persistently demonstrating no statistically significant expansion. Regarding liquidity, the positive effect observed in the short run is no longer statistically significant over the five-year horizon, gradually converging toward the baseline cash benchmark. This indicates that the insurance effect dissipates after the guarantee reaches its maturity (four years). Ultimately, this structural, time-bound shift in the balance sheet supports that constrained managers actively trade off immediate project scale to secure ex-ante liquidity insurance while the guarantee remains active.

While dynamic estimates for fixed assets and other liquidity variables were also computed, figures were omitted due to pronounced pre-trend differences that complicate causal interpretation, as well as the fixed assets' limitations as a noisy proxy for true economic scale.

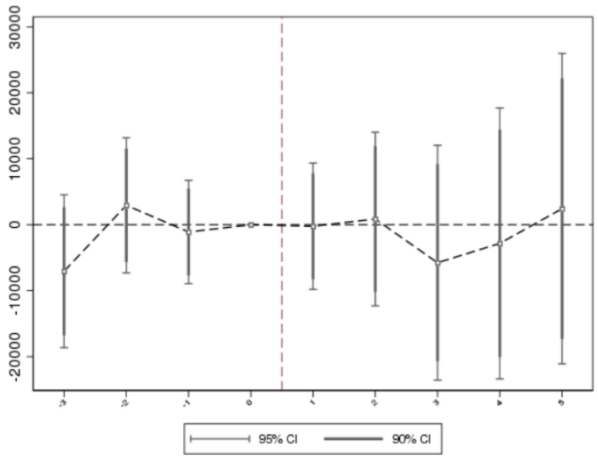

Figure 2: ***Dynamic Treatment Effects on Firm Output****. This figure visualizes the point estimates alongside their 90% and 95% confidence intervals for the* δ_k *coefficients tied to the Treated$_i$ indicator, based on Equation (5), specifically analysing firm output and fixed assets. The x-axis maps the timeline in years relative to the issuance of the credit guarantee (marked by the vertical dashed line), where t=0 denotes the fiscal year immediately preceding the origination. Values on the y-axis express the absolute difference, measured in euros, between the treatment and control cohorts. Within this framework, the treated cohort consists of firms securing guarantees of €37,500, whereas the control cohort comprises firms with €18,750 guarantees. The plotted estimates restrict the sample to enterprises clustered near the eligibility threshold (roughly 8 to 11 employees). The empirical design utilizes a k-to-k matching procedure grounded in exporter status, leverage, and the three-year historical average growth trajectories of fixed assets, sales, total assets, and workforce size. The observational window spans from 2008 to 2017. Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal, with the empirical methodology from Grilo et al. (2026).*

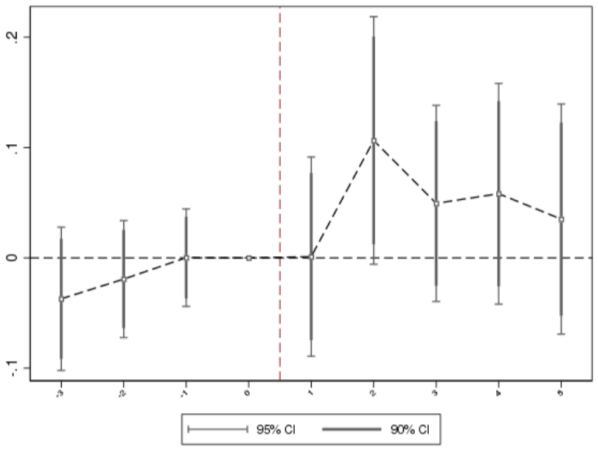

Figure 3: ***Dynamic Treatment Effects on Liquidity-Output Ratio.*** *This figure presents the estimated* δ_k *coefficients, alongside their corresponding 90% and 95% confidence bounds, tied to the Treated$_i$ indicator from Equation (5) across multiple dependent variables. The x-axis illustrates the timeline in years relative to the guarantee's issuance (marked by the vertical dashed line), establishing t=0 as the fiscal year immediately preceding the intervention. The y-axis quantifies the absolute monetary difference, expressed in euros, between the treatment and control samples. For this estimation, the treated cohort consists of firms securing a €37,500 guarantee, while the control cohort comprises entities receiving an €18,750 guarantee. The plotted estimates across all panels are restricted to enterprises clustered near the eligibility threshold (approximately 8 to 11 employees). The empirical design applies a k-to-k matching procedure based on exporter classification, firm leverage, and the three-year historical average growth trajectories of fixed assets, sales, total assets, and workforce size. The observational window spans from 2008 through 2017. Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal, with the empirical methodology from Grilo et al. (2026).*

Ex-Post NPV Next, the premise that credit line activation leads to the credit line provider being bound to fund project continuation even when it represents an ex-post negative NPV transaction is analysed. To empirically test this implication, the expected ex-post NPV was calculated from the perspective of the guarantor for all firms that activated the loan guarantee (see Appendix 2). The empirical results in Table 5 provide strong evidence of this implication. Across both the narrow and wide bandwidths, the average ex-post NPV for the guarantor is negative. Within the broader sample (firms with 5 to 14 employees), the average ex-post NPV upon default is -€390.60 for the control group and -€1,237.47 for the treated group. This outcome remains consistent for the score around the cutoff, yielding an average ex-post NPV of -€291.82 for the control group and -€1,266.67 for the treated group. The difference between the values for the control and treated groups reflects the difference of guarantee sizes. Ultimately, these negative valuations prove that the SGM scheme operates as a fully committed credit line. By honouring these negative-NPV drawdowns (transactions that private marketplace lenders would typically avoid through covenant revocation) the SGM successfully provides the state-contingent liquidity insurance described in the theoretical literature. Additionally, the relatively small NPV relative to the guarantee size seems to be inconsistent with strategic default. Because the realized losses remain low, whether due to significant loan amortization prior to activation or successful ex-post recovery by the SGM, the evidence suggests that firms exhaust these guarantees strictly as a last resort in good faith, rather than as a mechanism for opportunistic capital extraction.

	Wide score (≈ firms with 5-14 employees)		**Score around the cutoff (≈ firms with 8-11 employees)**	
	Control Firms	**Treated Firms**	**Control Firms**	**Treated Firms**
Ex-Post NPV	-390.5969	-1237.4744	-291.8165	-1266.6723

Table 5: ***Ex-Post NPV Estimates.*** *This table presents the calculated ex-post Net Present Value for both control and treated firms. The estimates are reported across two sample bandwidths: a wide score encompassing firms with approximately 5 to 14 employees, and a restricted sample tightly clustered around the eligibility cutoff (approximately 8 to 11 employees). Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal.*

Moral Hazard Subsequent analysis of the ex-post outcomes reveals a significant divergence in guarantee activation frequencies between the treated and control group. Specifically, for firms between 8 and 11 workers, the activation rate for firms in the treated group rises to 9.69%, compared to 6.02% for the control group. As established in the preceding empirical tests, the deterministic nature of the administrative certification threshold precludes firms from systematically self-selecting into the higher treatment tier. By eliminating the adverse selection hypothesis in this setting, the observed positive correlation between coverage size

and default frequency can be attributed to a shift in ex-post behaviour. This divergence provides empirical evidence of moral hazard: when constrained firms are provided with a more generous financial safety net, their ex-post risk-taking incentives are altered. To assess this possibility, in Table 6, a two-proportions z-test was employed, comparing the activation rates between the treated and control groups, for both bandwidths. For the wide score bandwidth, the treated group exhibited a statistically significant higher rate of default, which supports that the provision of a larger guarantee alters ex-post risk-taking incentives, leading to higher activation frequencies. When restricting the bandwidth to the narrow matching one, the activation proportions are still comparable to the percentages obtained for the wider bandwidth. However, this difference is not statistically significant, which can be attributed to the smaller sample size. Despite this limitation, the results still yield economic significance. Ultimately, these findings corroborate the theoretical implication that committed credit lines and equivalent liquidity insurance instruments are susceptible to moral hazard frictions. While the higher activation frequencies support a shift in ex-post risk-taking behaviour driven by the expanded safety net, it is important to note that this moral hazard does not strictly imply inefficient value destruction. As highlighted by Grilo et al. (2026), this risk-shifting may come from firms pursuing high-variance, high-value projects, such as export market entry, also mentioned in Ribeiro (2025), where failure is a natural characteristic of the investment. Consequently, the observed moral hazard should be interpreted with nuance, as the increased default rate may reflect productive risk-taking rather than purely opportunistic or value-destroying behaviour.

	Wide score (≈ firms with 5-14 employees)		**Score around the cutoff (≈ firms with 8-11 employees)**	
	Control Firms	**Treated Firms**	**Control Firms**	**Treated Firms**
No Activation	2689	880	299	289
Activation	168	81	18	28
Share of Activations (%)	6.25%	9.20%	6.02%	9.69%
Z-Test of proportions statistic	-0.0255		-0.0315	
P-Value	0.0056		0.1258	

Table 6: ***Analysis of Guarantee Activations.*** *This table reports the absolute frequencies and proportional shares of guarantee activations across the control and treated groups. It includes a two-sample test of proportions to evaluate the statistical significance of the difference in activation shares, complete with the corresponding p-values. Results are segmented into a wide score sample and a restricted sample directly around the cutoff margin (approximately 8 to 11 employees). Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal.*

Fair Premium The ex-ante cost required to provide this liquidity coverage is captured by the actuarially fair premium (see Appendix 3). As expected, the premium computed in Table 7 reveals that the expected cost to the guarantor is higher for the treated cohort. Within the score around the cutoff, the fair premium increases from €257.35 for the control group to €1,152.64 for the treated group. While an increase is intuitive given that the maximum guarantee limit doubles from €18,750 to €37,500, the magnitude of the premium's increase is highly disproportionate. The calculated premium scales by nearly 350%. This mismatch indicates the existence of a behavioural effect, demonstrating that the inflated cost cannot be explained solely by the expansion of the available guarantee limit. Instead, this disproportionate scaling highlights a compounding of risks. The expanded coverage limit acts in accordance with the higher ex-post activation frequencies observed in the treated group. Because these firms show evidence of moral hazard, the expected ex-post net NPV of activation is driven down. This translates into larger expected losses for the guarantor upon default. Ultimately, by inflating the ex-ante cost of the guarantee, this observable risk-taking behaviour structurally corroborates the presence of ex-post moral hazard.

	Wide score (≈ firms with 5-14 employees)		**Score around the cutoff (≈ firms with 8-11 employees)**	
	Control Firms	**Treated Firms**	**Control Firms**	**Treated Firms**
Fair Premium	351.2710	1123.4385	257.3459	1152.6404

Table 7: ***Fair Premium Estimations.*** *This table details the calculated fair premium associated with the credit guarantees, providing a direct comparison between treated and control firms. The data is partitioned to display results for both the wider evaluation score (5 to 14 employees) and the narrow bandwidth concentrated around the employee cutoff margin (approximately 8 to 11 employees). Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal.*

Default and Resilience Finally moving on to testing the resilience hypothesis related to default in the presence of credit lines or loan guarantees. To empirically test this resilience hypothesis, a reliable proxy for severe default must be established, as explicit bankruptcy filings are not directly observed. This analysis utilizes firms that exit from the sample as a proxy for firm failure: specifically, firms that permanently disappear from the balance sheet panel while simultaneously recording a guarantee activation are classified as firm defaults. Conversely, firms that exit the sample without triggering the guarantee are assumed to have done it due to standard corporate events, such as mergers and acquisitions, rather than liquidity-driven bankruptcy. According to this hypothesis, larger safety nets, as it is the case of the guarantee, would enhance a firm's capacity to absorb liquidity shocks, leading them into being more resilient and defaulting less. When examining the proportion of firms that were considered to have defaulted, in Table 8, the percentages go from 3.43% in the control

group to 5.41% in the treated group within the wider bandwidth, and doubles from 2.84% to 5.68% at the narrow bandwidth. To validate these observational differences, two-proportion tests were conducted. The 1.98 percentage point increase in the treated group's default rate within the wider score yields a highly significant p-value of 0.0062, statistically significant at the 1% level. At the narrow bandwidth, the doubled default rate yields a 0.0767 p-value, statistically significant at the 10% level, demonstrating the same behaviour across the different samples. Ultimately, these results systematically reject the resilience hypothesis and expose the reach of moral hazard behaviour. If the larger guarantee functioned as true liquidity insurance, the treated firms would have utilized the additional funds to secure project continuation, resulting in lower default rates. Instead, the data demonstrates that the larger financial safety net did not act as a stabilizing buffer; but altered the incentive structure, strongly suggesting that firms engaged in riskier behaviour. In conclusion, it cannot be said that larger credit lines lead to firms defaulting less and being more resilient.

	Wide score (≈ firms with 5-14 employees)		**Score around the cutoff (≈ firms with 8-11 employees)**	
	Control Firms	**Treated Firms**	**Control Firms**	**Treated Firms**
Missing and Activation (default)	98	52	9	18
Missing and No Activation	82	15	11	5
Not Missing and Activation	70	29	9	10
Not Missing and No Activation	2607	865	288	284
Share of Default (%)	3.43%	5.41%	2.84%	5.68%
Test of proportions	-0.0198		-0.0284	
P-Value	0.0062		0.0767	

Table 8: ***Default and Activation Cross-Distribution.*** *This table categorizes firms based on their missing data status and guarantee activation (default) outcomes. It calculates the aggregate share of defaults for both treated and control cohorts and provides a statistical test of proportions with associated p-values to evaluate the differences. The metrics are evaluated across both a wide score and a restricted sample centred around the threshold of 8 to 11 employees. Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal.*

10. Costs and Benefits

The loan guarantee gives access to a bank loan. This loan has an inherent interest rate defined in the disclosure document of the guarantee (see Annex). When comparing the average market interest rate for loans issued in the same period, for non-financial institutions, below €1 million, there's a noticeable difference when compared to the loan backed by a guarantee. The latter enjoys a reduced interest rate on the overall operation. Since 75% of the loan is guaranteed, the reduction in risk is priced accordingly, resulting in a lower interest rate. The difference in interest rate is an implicit benefit for the borrowing firm but can, however, be outweighed by the guarantee commission payment, an explicit cost. As this commission is fully financed by FINOVA (see Annex), for the period considered in this analysis, it has no effect on a private costs analysis. Consequently, a simple private cost and benefit analysis of the guarantee for the firm can be done, by comparing the payment profiles of a loan priced at the average market rate and a loan priced at the interest rate determined by the SGM, in Table 9. If the discounted payments are compared, there's an implicit interest subsidy (see Appendix 4) of €1482.86 and €2894.46, on average, for the control and treated groups, respectively, at the narrow score. This difference between groups most possibly reflects the difference in loan amount limit, which doubles for the treated group.

There is, however, one contractual detail that complicates this ex-ante calculation: the commission deduction penalty (see Appendix 5). If a firm activates the guarantee upon default, it forfeits the FINOVA guarantee commission subsidy for the remainder of the loan's maturity, representing an implicit ex-post private cost. For the narrow score in Table 9, this deduction represents an average penalty of €437.24 for the control group and €1,579.03 for the treated group.

The forfeiture of the guarantee commission subsidy can be interpreted as a contractual penalty, instead of a merely revocation of a benefit. By forcing the firm to bear an ex-post cost upon default, this mechanism can also act as a financial disincentive against strategic default. If borrowers internalize a fraction of the downside risk, it aligns incentives and discourages excessively risk taking behaviour.

To evaluate the ex-ante incentive, one must compute the Net Private Benefit (Interest Subsidy minus the Commission Penalty). After computation, for the control group, the initial subsidy (€1,482.86) easily offsets the average penalty (€437.24), yielding a net positive

expected benefit of roughly €1,045. However, for the treated group, this incentive is even more pronounced: the expanded initial subsidy (€2,894.46) vastly outweighs the higher average penalty (€1,579.03), leaving a highly positive net expected benefit of €1,315. Comparing both groups, in relative terms, the penalty increases more than the subsidy as the guarantee increases. However, despite this, the absolute magnitude is eclipsed by the bigger size of the initial subsidy, making the Net Benefit larger for the treated group. The same interpretation also holds for the wide score sample (€996.39 and €1352.53 net benefit for the control and treated groups, respectively). These findings provide evidence that, if viewed as such, the contractual penalty is insufficiently calibrated to deter excessive risk-taking. Ultimately, because the financial reward of the larger credit line heavily exceeds the expected cost of default, the architecture of the guarantee creates an incentive for the ex-post moral hazard behaviour observed in the treated group.

	Wide score (≈ firms with 5-14 employees)		**Score around the cutoff (≈ firms with 8-11 employees)**	
	Control Firms	**Treated Firms**	**Control Firms**	**Treated Firms**
Interest Subsidy	1482.7118	2889.6937	1482.8567	2894.4561
Variation (%)	94.89%		95.19%	
Commission Penalty	486.3230	1537.1648	437.2437	1579.0319
Variation (%)	216.08%		261.13%	
Net Benefit	996.3888	1352.5288	1045.6130	1315.4242

Table 9: ***Decomposition of Net Financial Benefits.*** *This table quantifies the financial advantages conferred by the credit guarantee, breaking them down into respective interest subsidies and commission penalties. It reports the absolute monetary values alongside the percentage variation between control and treated firms, ultimately calculating the overall net benefit. These measures are provided for both the wide employee score and the restricted sample surrounding the cutoff (approximately 8 to 11 employees). Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal.*

Adding on to the private cost and benefit analysis, the fair premium (see Appendix 3) represents the cost of the guarantee scheme for the SGM and can, therefore, be considered the public cost. As such, it can be compared to the Net Private Benefit to see if, at least in a reduced perspective, the private benefits excel the public costs.

Looking at the trade-off between liquidity insurance and economic efficiency in Table 10, it's possible to notice that, across all specifications, the Net Private Benefit exceeds the Public Cost (Fair Premium). The positive Net Surplus means that this program is economically efficient. However, when comparing the treated and control groups, the Net Surplus decreases for Treated Firms, for both cohorts. This can attributed mostly to the evidence of moral hazard that drives up the fair premium. The results suggest that the guarantee is less

efficient for bigger amounts, highlighting the need to implement mechanisms that can mitigate moral hazard.

	Wide score (≈ firms with 5-14 employees)		Score around the cutoff (≈ firms with 8-11 employees)	
	Control Firms	**Treated Firms**	**Control Firms**	**Treated Firms**
Net Private Benefit	996.3888	1352.5288	1045.613	1315.4242
Public Cost	351.271	1123.4385	257.3459	1152.6404
Net Surplus	645.1178	229.0903	788.2671	162.7838

Table 10: ***Evaluation of Net Economic Surplus.*** *This table assesses the economic efficiency of the credit guarantee scheme by comparing the Net Private Benefit extracted by the borrowing firms against the explicit Public Cost incurred by the guarantor. It reports the absolute monetary values for these components and calculates the resulting overall Net Surplus for both control and treated groups. These measures are provided for both the wide employee score and the restricted sample surrounding the cutoff (approximately 8 to 11 employees). Sources: Institutional data provided by Banco Português de Fomento and Banco de Portugal.*

While these analyses effectively isolate the private financial incentives driving ex-post moral hazard and attempts to compute the economic trade-offs, they are limited in scope. A comprehensive cost-benefit analysis[3] would typically weigh the net fiscal costs of the program against the broader macroeconomic benefits generated, such as aggregate job creation, investment growth, and total factor productivity gains. Because the current framework restricts its focus strictly to the borrowing firm's private incentives versus the direct public cost of the guarantee, it does not capture the broader societal spillover effects of this loan guarantee and, by extension, credit lines. Although the analysis demonstrates that the contract's structure is insufficient to deter opportunistic risk-taking and shows the economic efficiency of the guarantee scheme, it cannot be utilized to evaluate the broader macroeconomic impact or aggregate societal welfare generated by the program.

[3] Bonfim et al. (2023) cost-benefit analysis is used as a reference for comparison.

11. Conclusion

This dissertation demonstrates that when corporate credit lines function as fully committed liquidity insurance, financially constrained firms prioritize balance sheet resilience over physical scale expansion; however, this expanded financial safety net fundamentally alters ex-post risk-taking behaviour. By exploiting the institutional architecture of the SGM as an uncontaminated empirical proxy, this research overcomes the empirical limitations of state-contingent marketplace credit lines to directly test the foundational predictions of Holmström and Tirole (1998).

The empirical findings cleanly validate the mechanics of the established liquidity insurance framework. Utilizing a RDD around strict administrative employment thresholds, the analysis supports a substitution effect: an exogenous expansion of the credit line limit channels resources into precautionary liquidity rather than spurring growth in fixed assets or output. Furthermore, ex-post NPV calculations verify that the credit line provider effectively absorbs the negative-NPV transactions that conventional credit lenders typically shun, successfully resolving the credit rationing failure of spot markets. Yet, the theoretical expectation that such insurance increases firm resilience is rejected by the data. Treated firms exhibited higher default frequencies, exposing a moral hazard evidence, possibly driven by an incentive structure where the implicit interest rate subsidy outweighed the implicit penalty of default.

These conclusions carry significant implications for both corporate finance theory and public policy. For theoretical and empirical literature, the findings explain why private marketplace credit lines are filled with restrictive covenants: unmonitored liquidity insurance induces risk-shifting. For policymakers, this highlights a tension in the design of state-backed guarantee schemes. While public interventions successfully bridge macroeconomic market failures in credit supply, their pricing structures must be calibrated. Without proportional ex-post penalties, state-backed liquidity insurance risks subsidizing inefficient corporate moral hazard rather than buffering exogenous macroeconomic shocks. Still, data suggests that the guarantee scheme is economically efficient.

Looking beyond the scope of this paper, promising routes for future research emerge. First, to definitively evaluate the pure survival benefits of liquidity insurance, future empirical designs should find a mechanism to cleanly isolate moral hazard from credit line access. By

neutralizing the incentive for risk-shifting, researchers could conduct a direct, uncontaminated test of the increased resilience hypothesis. Second, theoretical predictions regarding the insurance role of credit lines suggest that these liquidity dynamics should be notably more evident in industries characterized by high sunk costs, where the penalty for premature project liquidation is most severe (Rajan and Zingales, 1998). Future research could leverage the financial dependence framework established by Rajan and Zingales (1998) to analyse how access to fully committed liquidity influences long-term, high-sunk-cost corporate strategies, such as market internationalization efforts or extensive R&D investments.

Appendices

1. Standard vs Collateralized Deductibles

Deductibles are a standard feature of insurance contracts and play a central role in mitigating moral hazard by ensuring that policyholders retain part of the risk. A collateralized deductible represents a specific variant of this mechanism, distinguished primarily by its cash-flow structure.

Under a standard deductible, the insured makes an ex-post payment: if a covered loss occurs, the policyholder pays the predetermined deductible amount at the time of the claim. If no claim is filed during the coverage period, no payment is required.

In contrast, a collateralized deductible requires an ex-ante payment. The insured posts the deductible amount at the inception of the contract, and the insurer holds these funds as collateral until the end of the coverage period. Two outcomes are possible:

1. Insurance is triggered: The insurer uses the pre-funded deductible to offset part of the claim.

2. Insurance is not triggered: The insurer returns the collateral to the insured at contract maturity.

Thus, the fundamental distinction between these two forms of deductibles lies in the timing and structure of cash flows. From an economic standpoint, a collateralized deductible can be viewed as a bundled financial instrument, combining (i) a risky loan from the insured to the insurer, repaid only if no claim occurs, and (ii) a conventional deductible payment obligation.

In the context of the Portuguese loan guarantee scheme, the "Adesão ao Mutualismo" component can be interpreted as an institutional implementation of a collateralized deductible. In order to access the guarantee, the borrowing firm must subscribe shares of the SGM corresponding to 2% of the guaranteed amount. This contribution is paid ex ante and held by the SGM throughout the life of the guaranteed loan. If the borrower defaults on an instalment, the guarantee is automatically triggered and used to cover the payment. In this event, the "Adesão ao Mutualismo" contribution is forfeited by the firm, effectively absorbing part of the loss. Conversely, if the guarantee period ends without being activated, the firm retains ownership of the subscribed shares and may either sell them, typically to the

SGM or to another mutual member, or keep them to support future operations. In economic terms, this mechanism closely resembles a collateralized deductible: the firm posts funds upfront that serve as a first-loss buffer in case of default, thereby aligning incentives and mitigating moral hazard within the guaranteed system.

2. Variable Construction Details

This information is retrieved from Grilo et al. (2026), except the information regarding ex-post NPV construction. Codes in parentheses refer to the specific variable designations within the *Central Balance Sheet – Harmonized Panel Data* (CBHP) dataset provided by *Banco de Portugal*.

Firm Output

Firm output is calculated as the maximum between zero and the difference between the Value of Production (VBP) and Intermediate Consumption (CI):

VBP = Turnover (D001) + Variation in production (D006)} + Capitalized production (D007) + Supplementary income (DL043) + Operating subsidies (D005)

CI = Costs of goods sold and material consumed (D025) + Supplies and external services (D026) + Indirect taxes (DL047)

Firm output = max[VBP - CI, 0]

Sales and Exports

- **Sales:** Turnover (D001)
- **Exports:** Sales EU market (MG004) + Services EU market (MG005) + Sales Extra-EU market (MG007) + Services Extra-EU market (MG008)

Balance Sheet and Employment Variables

- **Total assets:** (B001)
- **Total liabilities:** (B080)
- **Current liabilities:** (B089)

- **Number of employees:** (E001)
- **Long-term bank credit:** (B085), defined as bank loans with a maturity larger than one year.
- **Subsidies:** Operational subsidies (D005)

Financial Ratios

Leverage = Total liabilities/Total assets

Eligibility Score (Running Variable)

The administrative score determining the firm's classification is calculated as:

$$\text{Score} = \max\left\{E001 \times 5, \frac{min\{D001, B001\}}{40000}\right\} - 50$$

This score variable is normalized to establish a cutoff precisely at zero for comparative purposes. Within this framework:

- **"Score around the cutoff"** designates a score ∈ [-10, 10), which translates to an employee count of E001 ∈ [8, 12).
- **"Wide score"** designates a score ∈ [-25, 25), which approximately translates to an employee count of E001 ∈ [5, 15).

Ex-Post NPV

From the credit line provider's point of view,

$$Expected\ ExPostNPV = -Guarantee\ Payout + Deductible + \frac{Recovery}{(1+r)^t}$$

Where:
Guarantee Payout = Outstanding Loan * 75%
Deductible = Initial Guarantee Amount * % SGM shares acquisition (2%)
r = Discount Rate
t = Years to Recovery

Finally, in instances where the calculated NPV yielded a value greater than zero, the variable was systematically capped at €0.00. This manual adjustment is necessary because unadjusted positive values are largely an artifact of accumulated default interest inherently captured

within the gross recovery amounts, rather than representing genuine economic profit. Furthermore, because the SGM operates as a mutual guarantee society rather than a for-profit debt investor, extracting a positive economic return from a defaulted corporate operation fundamentally contradicts its institutional mandate. Therefore, capping the NPV at zero ensures the metric accurately reflects a full recovery of the principal without artificially distorting the guarantor's financial position.

3. Fair Premium

The Fair Premium is calculated by incorporating the time value of money through an applicable risk-free rate corresponding to the interest rate inherent in the loan + guarantee operation, $r_f = 5.5194\%$. The computation begins by determining the relative frequency of guarantee activation, $f_{s,g}$, and the corresponding Ex-Post NPV across each activation year, $s = 0, 1, 2, 3, 4$, and grace periods, $g=0, 3, 6$. To determine the expected loss, the relative frequency of activation is multiplied by the corresponding negative of the Ex-Post NPV for each period. This product is subsequently discounted back to its present value, using r_f, establishing the final actuarially fair premium required to cover the expected losses for both the control and treated groups.

$$Expected\ Fair\ Premium\ = \sum_{s=0}^{4} \sum_{g} \frac{f_{s,g} \times (-ExPostNPV_{s,g})}{(1 + r_f)^s}$$

4. Interest Subsidy

The Interest Subsidy computation relies on a standardized baseline calculation applied to every €100 of the loan amount. This baseline, B, is established by comparing the present values of the scheduled quarterly payments under a standard market annual interest rate, $r_m = 6.9033\%$ against those required under the lower interest rate of the loan + guarantee operation, $r_f = 5.5194\%$. The difference between these payment schedules yields a base Interest Subsidy per €100 of loan amount. Because amortization structures differ, this base subsidy is calculated independently for loans across various grace periods, $g = 0, 3, 6$.

To determine the true expected subsidy, these standardized baseline values are proportionally scaled by the specific loan amounts, L, granted to the control and treated groups across their respective grace periods, g,and activation years, $s = 0, 1, 2, 3, 4$. Finally, these size-adjusted values are multiplied by the relative frequency of guarantee activation, $f_{s,g}$, and summed to quantify the total expected ex-ante interest subsidy for the treated and control groups.

$$Expected\ Interest\ Subsidy\ = \sum_{s=0}^{4}\sum_{g}\left(\frac{B_g}{100} \times L_{s,g} \times f_{s,g}\right)$$

5. Commission Deduction Penalty

At first glance, the guarantee commission appears to be a flat percentage subsidy applied to the ongoing operation. However, this financial benefit is strictly contingent upon the firm not activating the guarantee. If a firm defaults and activates the guarantee, the subsidy is immediately forfeited for the remainder of the loan's lifecycle, representing an implicit cost, the commission penalty, that must be deducted from the firm's net benefit.

To compute this penalty, the deduction is calculated based on the executed guarantee value, E. For each activation year, $s=0, 1, 2, 3, 4$, and grace period, $g=0, 3, 6$, the executed value, $E_{s,g}$, is compounded by the commission rate, $c=1.875\%$, over the remaining fractional periods of the loan's maturity, Rem_s, and subsequently discounted back to its present value using the annual discount rate, $r_f = 5.5194\%$. It's assumed that the guarantee is activated exactly halfway through the activation year, which is reflected in Rem_s. Lastly, the values obtained so far are adjusted to the relative frequencies of each activation year and grace period case, $f_{s,g}$, and summed, obtaining the final values for each control and treated group.

$$Expected\ Commission\ Penalty\ = \sum_{s=0}^{4}\sum_{g} f_{s,g}\left[\frac{\left(E_{s,g} \times (1+c)^{Rem_s}\right)}{\left(1+r_f\right)^{T}}\right]$$

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Annex

Legal Framework of the SGM Loan Guarantee

This annex outlines the core legal and financial parameters governing the "PME Crescimento" loan guarantee, as established in the official disclosure document ("Linha de Crédito PME CRESCIMENTO Documento de Divulgação - Versão 1"). The original document is structured in two primary components: a synthesis and detailed annexes. The synthesis has sections A and B, which provide an overview of the general conditions. The document subsequently establishes the detailed regulatory framework within its annexes. Annex I strictly defines the eligible economic activities (CAEs). Annex II exhaustively details the program's terms and conditions, divided into specific chapters and separating the "Micro and Small Enterprises" line from the "General" line. These provisions dictate the guarantee commissions, benefits, penalties, and loan limits that serve as the fundamental assumptions for the analysis presented in this dissertation. To facilitate comprehension for an international audience, the key clauses have been transcribed in their original Portuguese, accompanied by English translations.

Síntese dos termos e condições da Linha de Crédito PME Crescimento/Synthesis of the terms and conditions of the PME Crescimento Credit Line

A - Condições Gerais da Linha de Crédito/General Conditions of the Credit Line

2. Condições a Observar pelas Empresas Beneficiárias - Condições genéricas	**2. Conditions to be Observed by the Beneficiary Firms - Generic conditions**
"Preferencialmente Micro, Pequenas e Médias Empresas (PME), certificadas pela Declaração Eletrónica do IAPMEI;"	Preferably Micro, Small and Medium Enterprises (SME), certified by the Electronic Declaration of IAPMEI;
"Localização (sede social) em território nacional;"	Location (registered office) in national territory;
"Desenvolvimento de actividades enquadradas na lista de CAEs (…);"	Development of activities framed in the list of CAEs;

"Sem incidentes não justificados ou incumprimentos junto da banca e sem atribuição de classe de rejeição de risco de crédito;"	Without unjustified incidents or defaults with the bank and without the attribution of a credit risk rejection class;
"Situação regularizada junto da Administração Fiscal e da Segurança Social à data da contratação do financiamento;"	Regularized situation with the Tax Administration and Social Security at the date of contracting the financing;
"Empresas que à data da propositura da operação detenham dívidas perante a Administração Fiscal e a Segurança Social, poderão contratar, junto do Banco proponente da operação, financiamentos intercalares, destinados única e exclusivamente à regularização destas dívidas, admitindo-se que, até 30% do crédito a conceder no âmbito da presente Linha, seja utilizado para amortização integral desses financiamentos intercalares."	Firms that at the date of the proposition of the operation hold debts before the Tax Administration and Social Security, may contract, with the Bank proposing the operation, bridge financings, intended solely and exclusively for the regularization of these debts, admitting that, up to 30% of the credit to be granted within the scope of the present Line, be used for the integral amortization of these bridge financings.
2. Condições a Observar pelas Empresas Beneficiárias - Condições específicas da Linha "Micro e Pequenas Empresas"	**2. Conditions to be Met by Beneficiary Firms - Specific conditions for the "Micro and Small Enterprises" Line**
"Micro ou Pequena Empresa pela Certificação Eletrónica do IAPMEI e com volume de negócios inferior a 10 milhões de euros"	Micro or Small Enterprise by the Electronic Certification of IAPMEI and with a turnover of less than 10 million euros
"Situação líquida positiva no último exercício e resultados líquidos positivos em dois dos últimos quatro exercícios, ou dois anos de resultados positivos se apenas tiver menos de quatro exercícios aprovados (não carecem de ser completos)"	Positive net situation in the last fiscal year and positive net results in two of the last four fiscal years, or two years of positive results if it only has less than four approved fiscal years (they do not need to be complete)
"Compromisso de manutenção do volume de emprego observado à data da	Commitment to maintain the employment volume observed at the date of contracting

contratação do empréstimo, durante a vigência do contrato de financiamento."	the loan, during the term of the financing contract.
3. Operações Elegíveis e Não Elegíveis - Operações elegíveis	**3. Eligible and Non-Eligible Operations - Eligible operations**
"Operações destinadas a investimento novo em activos fixos corpóreos ou incorpóreos (a realizar no prazo de 6 meses após a data da contratação), ou ao reforço do fundo de maneio ou dos capitais permanentes;"	Operations intended for new investment in tangible or intangible fixed assets (to be carried out within 6 months after the date of contracting), or for the reinforcement of working capital or permanent capital;
"Excepcionalmente, até 30% da operação poderá ser utilizada para liquidar dívidas contraídas junto do sistema financeiro nos 3 meses anteriores à data da sua contratação destinadas, exclusivamente, à regularização de dívidas em atraso à Administração Fiscal e Segurança Social."	Exceptionally, up to 30% of the operation may be used to settle debts contracted with the financial system in the 3 months prior to the date of its contracting intended, exclusively, for the regularization of arrears to the Tax Administration and Social Security.
3. Operações Elegíveis e Não Elegíveis - Operações não elegíveis	**3. Eligible and Non-Eligible Operations – Non-eligible operations**
Reestruturação financeira e/ou consolidação de crédito vivo;	Financial restructuring and/or consolidation of outstanding credit;
Operações destinadas a liquidar ou substituir de forma directa ou indirecta, ainda que em condições diversas, financiamentos anteriormente acordados com o Banco, excepto os referidos no ponto anterior;	Operations intended to settle or replace directly or indirectly, even under different conditions, financings previously agreed with the Bank, except those referred to in the previous point;
Aquisição de activos financeiros, terrenos, imóveis, bens em estado de uso, viaturas ligeiras que não assumam o carácter de "meio de produção" e veículos de transporte rodoviário de mercadorias adquiridas por transportadores rodoviários de mercadorias por conta de terceiros.	Acquisition of financial assets, land, real estate, used goods, light vehicles that do not assume the character of a "means of production" and road freight transport vehicles acquired by third-party road freight transporters.

Operações financeiras que se destinem a actividades relacionadas com a exportação para países terceiros e Estados-Membro, nomeadamente a criação e funcionamento de redes de distribuição.	Financial operations intended for activities related to export to third countries and Member States, namely the creation and operation of distribution networks.
8. Cúmulo de Operações	
"No caso da Linha Específica" Micro e Pequenas Empresas" apenas será permitida a apresentação de uma candidatura. O montante máximo acumulado de operações, considerando a operação proposta à Linha PME Crescimento e as operações contratadas em Linhas idênticas das Linhas PME Investe III, IV, V, VI e VI Aditamento, não pode exceder os 150.000 euros de financiamentos acumulados contratados;"	In the case of the Specific Line "Micro and Small Enterprises" only the submission of one application will be allowed. The maximum accumulated amount of operations, considering the operation proposed to the PME Crescimento Line and the operations contracted in identical Lines of the PME Investe III, IV, V, VI and VI Addendum Lines, cannot exceed 150,000 euros of accumulated contracted financings;
"As empresas poderão candidatar-se às duas Linhas Específicas."	Firms may apply to both Specific Lines.

Anexo II - Termos e condições da Linha de Crédito PME CRESCIMENTO/ Appendix II - Terms and Conditions of the PME CRESCIMENTO Credit Line

I - CONDIÇÕES GERAIS DA LINHA DE CRÉDITO/GENERAL CONDITIONS OF THE CREDIT LINE

8. Bonificação da Comissão de Garantia	**8. Guarantee Commission Subsidy**
(a) "A comissão de garantia aplicável pela SGM a cada uma das operações será integralmente bonificada pelo FINOVA, de acordo com a Tabela constante do Ponto VIII"	(a) The guarantee commission applicable by the SGM to each operation will be fully subsidized by FINOVA, according to the Table in Point VIII

(b) "As bonificações previstas nas alíneas anteriores são fixadas de acordo com as condições observadas no momento do enquadramento. As bonificações serão liquidadas pelo FINOVA às SGM trimestral e antecipadamente"	(b) The subsidies provided for in the previous subparagraphs are set according to the conditions observed at the time of framing. The subsidies will be paid by FINOVA to the SGMs quarterly and in advance
(c) "Caso, em resultado da aplicação do regime comunitário do auxílio de minimis, haja necessidade de reduzir o valor da bonificação, a empresa poderá vir a suportar a comissão de garantia."	(c) If, as a result of the application of the Community de minimis aid regime, there is a need to reduce the subsidy value, the company may have to bear the guarantee commission.
9. Contragarantia das SGM	**9. SGM Counter-Guarantee**
"As garantias emitidas pelas SGM ao abrigo da presente Linha beneficiam de uma contragarantia do Fundo de Contragarantia Mútuo (FCGM) em 80%..."	The guarantees issued by the SGMs under this Line benefit from an 80% counter-guarantee from the Mutual Counter-Guarantee Fund (FCGM)

II - OPERAÇÕES DE CRÉDITO/CREDIT OPERATIONS

5. Amortização de Capital	**5. Capital Amortization**
"Prestações constantes, iguais, trimestrais e postecipadas."	Constant, equal, quarterly instalments paid in arrears.
6. Taxa de Juro	**6. Interest Rate**
"Às operações será aplicado um dos seguintes métodos de determinação da taxa de juro:"	One of the following methods for determining the interest rate will be applied to the operations:
(a) "As operações vencem juros à taxa resultante da média aritmética simples das cotações diárias da Euribor a três meses do mês anterior ao período de	(a) The operations accrue interest at the rate resulting from the simple arithmetic average of the daily quotations of the 3-

contagem de juros, acrescida do spread previsto na Tabela constante do Ponto VIII;"	month Euribor of the month preceding the interest calculation period, plus the spread provided for in the Table in Point VIII;
(b) "As operações vencem juros à taxa de juro Euribor a três meses verificada no segundo dia útil anterior ao início de cada período de cálculo de juros acrescida do spread previsto na Tabela constante do Ponto VIII."	(b) The operations accrue interest at the 3-month Euribor interest rate verified on the second business day prior to the beginning of each interest calculation period, plus the spread provided for in the Table in Point VIII.
7. Juros a Cargo do Beneficiário	**7. Interest Borne by the Beneficiary**
"Os juros serão integralmente suportados pelas empresas beneficiárias e serão liquidados trimestral e postecipadamente (...)"	The interest will be fully borne by the beneficiary companies and will be settled quarterly and in arrears
8. Bonificação	**8. Subsidy**
"A comissão de garantia, sem prejuízo do previsto para os casos de incumprimento contratual, será bonificada pelo FINOVA, nos termos do número 8 do Capítulo I."	The guarantee commission, without prejudice to the provisions for cases of contractual default, will be subsidized by FINOVA, under the terms of number 8 of Chapter I.
9. Colaterais de Crédito	**9. Credit Collaterals**
(a) " Garantia autónoma à primeira solicitação, emitida pelas SGM, destinada a garantir até 50% do capital em dívida em cada momento do tempo, ou 75% no caso de operações enquadráveis na Linha Especifica 'Micro e Pequenas Empresas'"	(a) Autonomous first-demand guarantee, issued by the SGMs, intended to guarantee up to 50% of the outstanding capital at each moment in time, or 75% in the case of operations eligible under the Specific Line 'Micro and Small Enterprises' outstanding capital
(b) "O Banco poderá exigir outras garantias (…) sendo estas constituídas em pari passu também a	(b) The Bank may require other guarantees... which shall be constituted

favor da SGM, para garantia do bom cumprimento das responsabilidades (…), e do FINOVA, para efeitos de recuperação de montantes bonificados..."	pari passu also in favour of the SGM, to guarantee the proper fulfilment of the responsibilities, and of FINOVA, for the purpose of recovering subsidized amounts
(c) "Na vigência do contrato de financiamento, o Banco poderá solicitar garantias adicionais às empresas, devendo tais garantias ser constituídas, pari passu, a favor da SGM (…) e do FINOVA (…)"	(c) During the term of the financing contract, the Bank may request additional guarantees from the companies, and such guarantees must be constituted, pari passu, in favour of the SGM and of FINOVA
10. Adesão ao Mutualismo	**10. Adhesion to Mutualism**
"As empresas beneficiárias (…) deverão adquirir, até à data de prestação da mesma, ações da SGM, aderindo deste modo ao mutualismo, no montante de 2% sobre o valor da garantia a prestar. Estas ações poderão vir a ser revendidas à SGM (…) ao valor nominal, uma vez terminada a garantia."	Beneficiary companies must acquire, by the date it is provided, SGM shares, thus adhering to mutualism, in the amount of 2% of the guarantee value to be provided. These shares may subsequently be resold to the SGM at nominal value, once the guarantee has ended.
11. Comissões Encargos e Custos	**11. Commissions, Charges, and Costs**
"As operações ao abrigo da presente Linha ficarão isentas de comissões e taxas habitualmente praticadas pelo Banco, bem como de outras similares praticadas pelo Sistema de Garantia Mútua"	Operations under this Line will be exempt from customary commissions and fees charged by the Bank, as well as similar ones charged by the Mutual Guarantee System
13. Alteração das Condições dos Financiamentos	**13. Alteration of Financing Conditions**
"...é, no entanto, permitido o re-embolso antecipado (total ou parcial) do capital mutuado, não sendo cobrada qualquer comissão de amortização antecipada (...). Em caso de re-estruturação de operações, se a empresa não registar situações prévias de incumprimento, embora a alteração implique a	...early repayment (total or partial) of the borrowed capital is, however, permitted, without any early amortization commission being charged. In the event of loan restructuring, if the company has no prior record of default, although the

perda da bonificação da comissão de garantia, com efeito no trimestre em que ocorre a re-estruturação, manter-se-ão, contudo, inalteradas as taxas e comissões que estavam a ser praticadas Se a empresa registar situações prévias de incumprimento os spreads e comissões serão agravados para os valores máximos constantes da Tabela anexa."	alteration implies the loss of the guarantee commission subsidy, effective in the quarter in which the restructuring occurs, the rates and commissions being applied will, however, remain unchanged. If the company has a prior record of default, the spreads and commissions will be aggravated to the maximum values in the attached Table.
14. Informações Prestadas pelas Empresas	**14. Information Provided by the Companies**
"As empresas deverão fornecer aos bancos toda a informação necessária (…). Devem, ainda, respeitar todas as obrigações legais de prestação de informação, designadamente prestação de contas e demais obrigações declarativas. (…) A prestação de falsas declarações implicará a perda da bonificação e demais benefícios atribuídos... com efeitos retroativos à data da contratação, aplicando-se, nesses casos a taxa prevista para os casos de incumprimento."	Companies must provide banks with all necessary information. They must also comply with all legal obligations to provide information, namely financial reporting and other declarative obligations. The provision of false declarations will imply the loss of the subsidy and other benefits granted with retroactive effects on the date of contracting, applying, in these cases, the rate foreseen for cases of default.

IV - EFEITOS DO INCUMPRIMENTO CONTRATUAL/EFFECTS OF CONTRACTUAL DEFAULT

"Em caso de incumprimento de qualquer das condições do financiamento, nomeadamente, a prestação de informações falsas, a ocorrência de incidente não justificado junto do sistema financeiro, da Administração Fiscal ou da Segurança Social, ou de qualquer das partes, a não prestação atempada da informação prevista, bem como o	In case of non-compliance with any of the financing conditions, namely, the provision of false information, the occurrence of an unjustified incident with the financial system, the Tax Authority or Social Security, or by any of the parties, the failure to timely provide the foreseen information, as well as

incumprimento do compromisso de manutenção de postos de trabalho (…) será declarada a caducidade dos benefícios já obtidos e supervenientes que implicará:"	the breach of the commitment to maintain jobs the forfeiture of the benefits already obtained and supervening will be declared which will imply:
(a) "No caso da caducidade ter sido determinada pela prestação de informações falsas ou pelo incumprimento do compromisso de manutenção de postos de trabalho, (…) a devolução dos benefícios já obtidos com a aplicação de juros de mora correspondentes à Euribor a 3 meses, acrescida do valor máximo de spread (…) acrescido de 0,25%;"	(a) If the forfeiture was determined by the provision of false information or by the breach of the commitment to maintain jobs, the return of the benefits already obtained with the application of default interest corresponding to the 3-month Euribor, plus the maximum spread value plus 0.25%;
(b) "A aplicação, a partir da respetiva data, de uma taxa de juro correspondente à Euribor a 3 meses, acrescida do valor máximo de spread do Banco (…) acrescido de 0,25%, a suportar pela empresa;"	(b) The application, from the respective date, of an interest rate corresponding to the 3-month Euribor, plus the maximum spread value of the Bank plus 0.25%, to be borne by the company;
(c) "A impossibilidade da empresa voltar a beneficiar de bonificação, ainda que resolvida a situação que tenha dado origem ao incumprimento"	(c) The impossibility of the company benefiting from a subsidy again, even if the situation that gave rise to the default is resolved
(d) "A cessação da bonificação da comissão de garantia, pelo que a empresa passará a liquidar, à SGM, a título de comissão, uma importância correspondente ao valor máximo de comissão da SGM (…) acrescido de 0,25%, ao ano, sobre o valor do capital vivo garantido."	(d) The cessation of the guarantee commission subsidy, whereby the company shall begin to pay the SGM, as a commission, an amount corresponding to the SGM's maximum commission value plus 0.25% per year, on the value of the outstanding guaranteed capital.

V - OUTRAS OBRIGAÇÕES/OTHER OBLIGATIONS

2. Condições de Regulação	**2. Regulatory Conditions**
"O Banco e as SGM assegurarão que os respetivos contratos a celebrar não incluem condições de regulação, nomeadamente covenants, que não se enquadrem nas condições de acesso ao protocolo"	The Bank and the SGMs shall ensure that the respective contracts to be signed do not include regulatory conditions, namely covenants, that do not fit within the protocol's conditions of access

VI - CARACTERÍSTICAS DA LINHA ESPECÍFICA "MICRO E PEQUENAS EMPRESAS"/CHARACTERISTICS OF THE SPECIFIC LINE "MICRO AND SMALL ENTERPRISES"

B.1. Montante de Financiamento por Empresa	**B.1. Financing Amount per Company**
"O montante máximo de financiamento, por cada empresa é de 25.000 euros (micro empresas) ou de 50.000 euros (pequenas empresas)."	The maximum financing amount per company is €25,000 (micro enterprises) or €50,000 (small enterprises).
B.3. Período de Carência	**B.3. Grace Period**
"Até 6 meses de carência de capital"	Up to 6 months of capital grace.

VIII - SPREAD E COMISSÃO DE GARANTIA MÚTUA (limites máximos) / SPREAD AND MUTUAL GUARANTEE COMMISSION (maximum limits)

Linha Específica **(Specific Line)**	***Spread do Banco: Parte sem garantia*** **(Bank Spread: Portion without guarantee)**	***Spread do Banco: Parte com garantia*** **(Bank Spread: Portion with guarantee)**	***Spread global da operação*** **(Global spread of the operation)**	***Comissão de garantia mútua*** **(Guarantee commission)**
Micro e Pequenas Empresas	6.125%	4.625%	5.000%	1.875%

Additionally, in the 6th version of the disclosure document (related to the period of analysis used in this dissertation) it's stated that "(a)s of August 2013, it became possible to reduce the spread on operations contracted under the PME Crescimento Credit Line, subject to a case-by-case analysis and decision by the Credit Institutions."

FACULDADE DE **ECONOMIA**