Essays on Corporate Finance and Governance

Giulio Maria Giannetti

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To Luigi…

For providing stability during storms.

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For making me the man I am today.

To Bruno…

For inspiring my veers.

Declaration

I confirm the work submitted is entirely my own and that I have fully referenced my sources as appropriate.

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General Introduction

Within a field where research pieces abound – the financial realm, which, without committing hubris, I can define as a *mare magnum* – I navigate topics that, albeit explored before by other scholars, I tackle under innovative perspectives by putting on the hat of the empirical researcher. A common thread throughout is the empirical examination of firms' capital structure under varying market conditions and governance apparatuses. I analyze firms' fundamentals evolution as well as their representatives' behavior in imperfect markets subject to, among other things, policy shocks and changes in governance structures.

In the first paper, I creatively refute one of those paradigms that govern social behavior, with full awareness that paradigms are human artifacts and, as such, they are not indisputable. In finance, one of such paradigms is represented by the inverse relationship between nominal interest rates and stock prices. Intuition and evidence generally lead to confirming this relationship. However, if I am aiming for evolution, I need to be aware that paradigms can represent a constraint. In Chapter 1, I investigate an anomaly by providing evidence that the tautological inverse relationship between stock prices and interest rates does not always hold true. Using a 20--year, 5,000-firm panel and a panel vector autoregression (PVAR) framework, I uncover that for low-leverage firms, stock prices can rise when rates rise. This finding directly contests the Market Efficiency Hypothesis's (MEH's) prediction of uniformly efficient price adjustment and shows how capital structure heterogeneity fractures aggregate patterns.

I move myself at the interplay between corporate finance and macroeconomics by empirically testing the persistence and effect – in terms of sign and magnitude – of unit shocks to interest rates on a series of stock prices under varying degrees of capital structure and asset tangibility. With this paper, my aim is to lay the foundation for a new strand of literature that investigates phenomena under varying degrees of capital structure and asset tangibility by exploiting the power of a heterogeneity analysis.

I complement the first paper with an extensive literature review at the end of the first chapter. I discuss a phenomenon that has historically generated heated discussions – the leverage effect – providing an explanation for the controversial and mixed results obtained by scholars. A Markov-switching Generalized AutoRegressive Conditional Heteroskedasticity (GARCH) extension further reveals that the classic leverage effect strengthens only during high-volatility regimes, again contradicting one-size-fits-all efficiency claims.

In the second paper I shift my interest onto the upper floors, thereby disturbing – albeit only metaphorically – bank directors and members of boards at a set of private and public companies. I construct a new variable – the affiliated creditor on the board – by leveraging three distinct data sources and immersing myself in an articulated merging process.

The presence of an affiliated bank director proves stabilizing for distressed firms, but at the cost of higher-interest expenses. This duality highlights that informational advantages flow through personal ties, not through perfect markets, and that those ties carry explicit economic prices. Methodologically, fixed-effects (FE), matching, and threshold regressions corroborate these relationship-driven effects, underlining MEH's blind spot for governance networks.

The overriding message is that the figure of the banker should not have a negative nuance because, like a helmsman, they can help managers navigate distressed firms into safe waters, thereby helping them emerge from the abyss. Like every businessperson, they will not work for free but in exchange for, among other things, higher cost of debt for the borrowing firm at which they sit on the supervisory board.

The final chapter asks whether personal networks between managers and lenders mitigate information asymmetry – or merely reshuffle it. Difference-in-differences (DiD) estimates show that connections indeed influence capital structure choices, yet they also introduce a *cost of trust*: agency frictions and strategic behavior surface once relational capital replaces arm's-length discipline. The results confirm that social interactions can either lubricate or clog financial decision-making, outcomes the MEH cannot anticipate. I complement the analysis by eliciting the (heterogenous) behavioral mechanisms of both parties – borrowers and lenders – following the establishment of a borrowing relationship and depending on, inter alia, the socioeconomic status of debt requestors.

All papers are followed by research proposals that clearly direct the reader toward avenues for future research, state the limitations of the paper, and discuss ways to overcome them. In all chapters, I make use of established econometric techniques to carry out the analysis and draw my conclusions by relying on datasets in panel structure. The first paper rests on a PVAR model which enables me to derive impulse response functions to determine how stock prices respond to policy shocks under varying firms' degree of financial leverage and asset tangibility. In the penultimate section of the first chapter – the leverage effect during crises – I draw on a Markov-switching GARCH model to test whether the correlation between the first two moments of returns is more pronounced during higher volatility periods. The second and third chapters lean on FE and Pooled Ordinary Least Square (Pooled OLS) estimations – which are widespread practice in corporate finance – yet complement the methodology by using respectively a Nearest Neighbor Matching (NNM) technique, a threshold regression model, and a DiD model within the treatment–control group setting that characterizes both chapters' frameworks.

By marrying macro-finance shocks with micro-level governance data, the thesis exposes situations where markets fall short of informational efficiency and where human relationships actively rewrite financial "rules." Across chapters, econometric rigor (PVAR, Markov-switching

GARCH, matching, DiD) supports causal inference, but the larger message is conceptual: Market prices and corporate policies are coproduced by balance sheet mechanics and the social fabric binding directors, managers, and creditors.

Each paper concludes with proposals that extend this dual agenda – probing new anomalies that strain the MEH and mapping fresh terrains where social capital intersects with financial capital.

In summary, spanning corporate finance governance and macroeconomics, I navigate the boundary between endogenous factors and shocks to make statistical inference under the assumption that only what I can observe may be analyzed. The overriding intent is to render my inference as causal as possible, which becomes progressively more evident throughout my thesis. Welcome aboard!

1 Dynamics of the Volatility-leverage Connection under Varying Market Conditions

1.1 Conceptual Framework

Chapter 1 advances the view that equity market behavior reflects an interaction among three elements: unexpected changes in monetary policy, the structure of corporate balance sheets, and the prevailing market regime. When policymakers adjust interest rates, the resulting shock works through two familiar routes: First, it alters discount rates, and second, it reshapes expected cash flows. The combined impact of these routes, however, depends critically on leverage. For firms with low leverage, the limited reliance on external debt means that a monetary tightening does not significantly increase their financing burden. Consequently, the adverse valuation effect of a higher discount rate is largely offset by the absence of debt-related cash flow pressures. As a result, their share prices often rise, and their return volatility remains relatively low. Firms with high leverage, in contrast, experience the same policy change very differently: The rate shock enlarges their debt-to-assets ratio, increases the risk borne by residual equity holders, and tends to push market valuations downward. Market regimes further condition this leverage-specific response. During crisis periods – identified empirically by sharp increases in aggregate volatility – the amplifying role of leverage becomes particularly pronounced. Thinner equity cushions and more vigilant creditors make highly levered firms especially sensitive to adverse shocks. Asset tangibility can temper this spiral because collateralized assets reassure lenders, yet this mitigating influence is only partial and does not nullify the leverage effect. In summary, a monetary policy shock passes through the discount-rate and cash-flow channels, is filtered by a firm's leverage and asset mix, and is magnified under crisis conditions before it manifests in returns and volatility. The central claim of the chapter is therefore that the direction and persistence of the relationship between returns and volatility are conditional rather than universal, challenging the notion – implicit in standard market-efficiency arguments – that all firms should react in the same way to publicly available information.

1.2 The Heterogeneity of Stock Prices Responses to Policy Shocks: Evidence from International Data

1.2.1 Introduction

The financial decision-making process subsumes two separate types of decisions: investment decisions and financing decisions (Tobin, 1958). Although such a process is endogenous to firms, managers cannot overlook exogenous factors that have consequences for shareholders' wealth. Changes to policy – resulting in movements in the level of interest rates, for instance – might have long-lasting effects on stock prices (Chen, 1986). In fact, interest rates affect the cost of capital and the net present value (NPV) of investments, thereby having implications for both the liability side and asset side of the balance sheet. The persistence of stock prices' responses to shocks to interest rates – and whether they go up or down – might be heterogeneous across firms with different degrees of financial leverage and might depend on the expanse of financing frictions encountered by firms.

The debate about a prospective connection between stock returns and financial leverage has divided scholars into two groups. This debate has counterposed those who support the view that returns increase with leverage (Hamada, 1972 and Bhandari, 1988) to those who advocate a negative relationship between stock returns and financial leverage (Hall and Weiss, 1967; Dimitrov and Jain, 2008; Korteweg, 2010; Muradoğlu and Sivaprasad, 2012). The sign of stock returns depends on the role of financial leverage. Theoretically, provided that investors are risk-averse, during negative market conditions financial leverage acts as a negative multiplier – whereas, during positive conditions, financial leverage can spur positive returns.

Although the connection between stock prices and financial leverage has been extensively studied, less is known about the connection between financial leverage and macroeconomic variables. The topic of this paper is multidisciplinary, traversing the boundary between macroeconomics and corporate finance. The intent of the paper is singular – notably, to help people in decision-making. I narrate how I reached my conclusion, starting by explaining the initial reasoning that guided me to the results. My goal was originally to empirically disentangle the interrelation between leverage and interest rates by analyzing the persistence of stock prices' responses to interest rate shocks under varying degrees of capital structure and asset tangibility.

The bottom line is that interest rate shocks might be amplified by corporate leverage for companies with significant financial distress risk, thereby becoming more durable. Likewise, stock prices of constrained firms, which face frictions when trying to obtain funding, might be more persistently affected by interest rate shocks. I tested the persistence and the effect – in terms of sign and magnitude – of unit interest rate shocks on series of stock prices.

The methodology includes a PVAR, which enables me to derive impulse response functions. Using impulse response functions, I could check whether stock prices reach the steady state after a timeframe that depends on the degree of financial leverage and on the degree of financing frictions – represented by asset tangibility – characterizing the firms under scrutiny. To this end, I compute the median value of leverage for the full sample. I then split the sample into two subsamples: firms featuring above-median financial leverage and firms featuring below-median financial leverage. Finally, I derive impulse response functions for the two subsamples.

The paper then distinguishes between high- and low-leverage firms based on the median value of financial leverage. While wishing to provide evidence on whether the sensitivity to shocks could be measured in terms of the persistence of the shock itself, I serendipitously found that the main variables used in the literature (Chen et al., 1986) were statistically significant for low-leverage firms but not for high-leverage ones and, interestingly, that a unit shock to nominal interest rates decreases stock prices of firms with high debt-to-asset ratios – whereas it increases stock prices of firms with low debt-to-asset ratios.

Firstly, I surmise that stock prices' responses to interest rate shocks last longer in the case of high-leverage firms. A greater persistence of shocks, illustrated by longer responses of stock prices in the aftermath of a shock, might be due to the lack of financial slack and concomitant presence of financial constraints that characterizes firms with high corporate leverage. Similarly, longer responses of stock prices before reaching the steady state after an impulse to interest rates might be due to the degree of firms' asset tangibility, because of such firms' difficulty in adjusting their capital structure toward the optimal level. Hence, I hypothesize that stock prices' responses to interest rate shocks are more durable in the case of more constrained firms. Then, I carry out a multitude of robustness checks. I investigate the consequences of shocks for different subsamples, and I add a new explanatory variable: the market index.

The difference in terms of shocks' persistence is sizable between high- and low-leverage firms. Interestingly, I find that they are affected in opposite ways: a unit shock to interest rates determines an increase in the stock price of low-leverage firms, whereas it brings about a decrease in the stock price of high-leverage firms. Hence, the consequences of shocks are heterogeneous for the two typologies of firms, as I hypothesized. This heterogeneity manifests itself in terms of the sign of the responses of stock prices to shocks, as well as in terms of the responses' persistence and magnitude.

These puzzling findings led me to delve further into the topic. Indeed, the inverse relationship between interest rates and stock prices represents a paradigm which my results seem to confute. Therefore, I decided to investigate the temporal dimension to understand if this anomaly could be due to the peculiar behavior of market actors during periods of financial distress. The existence of an intertemporal relationship between stock prices and the discount factor should be out of discussion, by tautology. The relevance of macroeconomic factors in determining movements in the stock market is well established in the literature (Blanchard, 1981; Fama, 1981; Fama, 1990; Geske and Roll, 1983; Kaul, 1987; Barro, 1990; McQueen and Roley, 1993; Campbell and Ammer, 1993; Boyd et al., 2005; Jensen and Johnson, 1995).

Again, I split the sample into two additional subsamples, covering respectively the period from 2001 to 2006 and the period from 2011 to 2019. In this way, I exclude from my sample three periods that are commonly qualified as crises, notably the Dot-Com Bubble (2000), the global financial crisis (GFC) (2007–2010), and the COVID-19 pandemic (2020). For robustness, I decompose the panel of stock prices into their underlying components – the cyclical one and trend one – using the Christiano–Fitzgerald Filter (CF Filter) (Christiano and Fitzgerald, 2003).

I find that the anomaly in the form of a positive relationship between stock prices and interest rates disappears. I conclude that periods of financial distress are the main drivers of the anomaly.

The key implications of this paper are therefore twofold. Firstly, the different sign with which shocks affect stock prices for the subsample of high-leverage firms compared with low-leverage ones might pave the way for an investment strategy opportunity. Rational investors could try to anticipate the resulting market adjustments of a decrease in interest rates, thus reaping some profits by moving their equity investments from high-leverage to low-leverage firms during periods of financial distress.

Secondly, when investigating the market behavior of the first two decades of the second millennium, particular attention should be paid to crises because prices can depart from their fundamental values, as already suggested by many scholars (Shiller, 1989; Staumbaugh, 2012; Jiang et al., 2019), and this is more likely to happen in times of hardship when sentiment is high (Garcia, 2013).

Nations vary in their industrial composition, with industries that are inherently more or less volatile or characterized by different average degrees of financial leverage (Roll, 1992). Therefore, I rely on a dataset composed of firms spanning seven countries to avoid generalizing about country-specific phenomena.

The implementation of a VAR approach dates back to Lee (1992), Thorbecke (1997), and Patelis (1997). However, this approach is still commonly used within the field of macroeconomics (Lakdawala, 2019; Jarocinski and Karadi, 2020). Jensen and Johnson find that after including a broad measure of monetary stringency, business conditions explain future stock returns only in expansive monetary policy periods, and only the dividend yield and the default premium are significant (Jensen and Johnson, 1995).

The main contribution is then represented by the originality through which I tackle the matter of the heterogeneity of stock prices’ responses under varying degrees of financial leverage and asset tangibility. To date, this has been a quasi-unexplored topic lacking in empirical evidence. The results are interesting because the only variable that does not seem to be a key determinant of stock prices is industrial production, while inflation, unemployment, and – more interestingly – interest rates exhibit positive and significant coefficients.

The paper is organized as follows: Section 1.2.2 describes the data and methodology while providing insight into the underlying reasoning framing the analysis; Section 1.2.3 reports the empirical results; Section 1.2.4 provides robustness checks by considering different quartiles of the distribution of the leverage’s values; Section 1.2.5 presents empirical results by considering two subperiods (2002–2006 and 2011–2018) with the aim of overriding the effects of the crises (i.e., the Dot-Com Bubble, the GFC); and Section 1.2.6 concludes.

1.2.2 Data and Methodology

To empirically document the relationship between interest rates and stock prices under varying degrees of capital structure and asset tangibility, I focus on a multitude of firms in G7 countries over the period from 2000 to 2020. The data comes from Thomson Reuters Database, from which I collect accounting and financial information, including stock prices, financial leverage, and the amount of tangible assets. The dataset consists of 4,849 firms.

The model takes the following form:

$$Y_{i,t} = Y_{i,t-1} A_p + X_{j,t} B + u_i + e_{it} \tag{1}$$

where $Y_{i,t}$ is a (K x 1) vector of endogenous variables for each ith cross-sectional unit (firm) at time t, $Y_{i,t-1}$ is a (K x K) matrix of lagged endogenous variables. X_t is a (M x 1) vector of predetermined and exogenous variables for each of the jth country. A is a (K x K) matrix and B is a (M x K) matrix of parameters to be estimated.

The idiosyncratic error vector (K x 1) e_{it} is assumed to be independent from both the regressors and the individual error component u_{it} and identically distributed for all i and t with E $[e_{it}]$ = 0 and var $[e_{it}]$ = $\Sigma\boldsymbol{\Lambda}\Sigma$, positive and semidefinite. A critical assumption to ensure covariance stationarity is that the eigenvalues of the PVAR polynomial are less than 1.

The estimation technique is based upon the generalized method of moments (GMM) (Hansen, 1982) which accommodates the expected serial correlation and heteroscedasticity of the errors that may be induced by leverage (Doshi et al., 2019). Moreover, in a dynamic model, estimation by GMM does not necessarily entail a decrease in the efficiency of the estimated parameters under individual aggregation (Veredas and Petkovic, 2010).

The technique uses additional moment conditions based upon differenced values. Such conditions can be summarized as follows:

$$E\left[\Delta^* e_{i,t}\, x_{i,t-j}\right] = 0 \quad j = 1, \dots, T-1,\ t \in \mathcal{T}_{\Delta^*} \tag{2}$$

$$E\left[\Delta^* e_{i,t}\, x_{i,t-j}\right] = 0 \quad j = 1, \dots, T-1,\ t \in \mathcal{T}_{\Delta^*} \tag{3}$$

$$E\left[\Delta^* e_{i,t}\, \Delta^* u_{i,t}\right] = 0 \quad t \in \mathcal{T}_{\Delta^*} \tag{4}$$

The dimension of these matrices is as follows: $\Delta* \ \varepsilon_{i,t}$ is $m \times 1$, $y_{i,j}$ is $m \times 1$, $x_{i,j}$ is $k \times 1$ and

$\Delta{*}s_{i,t}$ is $n \times 1$.

The estimation technique aims to define the true value θ_0 of an unknown parameter vector θ ⊆ R^p. Let f[x_iθ] be a set of q population moments and f_n the corresponding sample counterparts. The GMM estimator of θ_0 is defined as that value that minimizes the criterion function Q_n(θ) = $f_n\ \theta^T W_n f_n$θ, whereby W_n, the weighting matrix, converges to a positive definite matrix W, as the number of observations grows large. In plain English, GMM of θ_0 finds the minimum of the quadratic form: $f_n\ \theta^T W_n f_n$θ, notably the quadratic form of moment conditions.

Following Holtz-Eakin, Newey and Rosen (1988), I assume that the cross-sectional units share the same underlying data-generating process, with the reduced form parameters A_1, A_2, … , A_{p-1}, A_p, and B to be common among them. Systematic cross-sectional heterogeneity is modeled as panel-specific FE. Instead of using deviations from past realizations, I remove the FE by subtracting the average of all available future observations (forward orthogonal transformation) (Abrigo and Love, 2016).

Since the panel is unbalanced and missing values are widespread, I preferred to avoid including numerous lags of the dependent variables, aware of the efficiency gains that their inclusion would have brought about, notwithstanding. Assuming that the instruments are uncorrelated with the errors, in the spirit of Holtz-Eakin, Newey and Rosen (1988), the formers are created using available data and missing values are substituted by zero, while observations with no valid instruments are excluded.

Overfitting might remain an issue and, hence, as a mitigating element, the number of lags is reduced to a minimum (only one). A limitation is that seasonality might be overlooked in my case of quarterly data.

The model presents itself as follows:

$$\text{Price}_{i,t} = \beta_1\ \text{price}_{i,t-1} + \beta_2 \text{Rate}_{j,t-1} + \beta_3 \text{lnCPI}_{j,t} + \beta_4\ \text{IndProd}_{j,t} + \beta_5 \text{Unemp}_{j,t} + e_{it} \quad (5)$$

$$\text{Rate}_{j,t} = \alpha_1 \text{Rate}_{j,t-1} + \alpha_2 \text{Price}_{i,t-1} + \alpha_3 \text{lnCPI}_{j,t} + \alpha_4 \text{IndProd}_{j,t} + \alpha_5\ \text{Unemp}_{i,t} + v_{j,t} \quad (6)$$

The PVAR model can capture both dynamic and static interdependencies. The choice is driven by the wish to conduct impulse response analyses while harnessing the informative potential of a panel dataset, incorporating both the time and the cross-sectional dimension. Financial integration determines an increased synchronization in business cycles across the G7 economies (Hardouvelis, 2006), from which the need to capture these interdependencies arises. Classical OLS-based regression methods cannot be applied because of the Nickell bias (Nickell, 1981) that does not disappear asymptotically if N → ∞ and T is fixed. The main drawbacks of such procedure are well known and described in detail in previous works. (See, for example, Cooley and Le Roy, 1985; Cooley and Dwyer, 1998; Chari et al., 2008.) In brief, when disposing of a restricted set of observations, degrees of freedom may not be sufficient, implying poor model efficiency and resulting in wide confidence intervals for model coefficients.

$Y_{i,t}$ are stock prices and the level of interest rates of randomly picked companies, whereas the control variables $X_{j,t}$ are the rate of unemployment, the inflation rate, and the level of industrial production. The choice of the control variables roots in Chen et al. (1986) who state that stock prices are influenced by those forces that impact expected cash flows or the discount factor appearing in the denominator to take into consideration the time value of money under uncertainty. Firstly, variation on the expected level of real industrial production should impact stock prices by virtue of their influence on cash flows. The rate of unemployment is a general indicator of economic conditions. Nominal interest rates are assumed to capture the state of the investment opportunity set and, in turn, are influenced by changes in the inflation rate. I run two VARs by filtering observations on the median value of financial book leverage. After filtering, I obtain two separate datasets. One comprises above-median leverage firms, whereas the other is made up of below-median financial leverage firms. I limit my attention to the largest economies where the data is sufficient to make insightful comparisons; thus I focus on G7 economies. In my analysis, I compute book leverage as the ratio of total debt over total assets, while I express tangibility as the amount of property plant and equipment divided by total assets.

The datasets consist of the quarterly stock prices of firms and quarterly values of macroeconomic variables. The datasets exclude potential errors, which are identified as firms with asset value equal to zero. Stock prices are Winsorized at the 1st and 99th percentiles and leverage is truncated to exclude values above 1. A VAR [p] process is considered stable if its reverse characteristic polynomial has no roots in or on the complex unit circle. Formally, a stochastic process X is weakly stationary if its first and second moments (mean and covariance) do not change with time. Equivalently, the process X at time t is stable if all eigenvalues of companion matrix **A** have modulus less than 1 (Lütkepohl, 2006). The impulse responses are based on decomposing the original VAR innovations ($e_{i,t}$) into a set of uncorrelated components ($v_{i,t}$) and on calculating the consequences for $y_{\text{t+s}}$ of a unit impulse in $v_{i,t}$.

Since the paradigm whereby nominal policy rates should be negatively related to stock prices seems to be confuted by my results, I split the sample into two additional subsamples to shed light on this anomaly. The first one covers the period from 2002 to 2006, whereas the second one covers 2011 to 2019. This way, I can determine if the heterogeneity in terms of stock prices' response to shocks is due to what are commonly defined as crises (i.e., Dot-Com Bubble and GFC).

On one hand, when the economy slows down, central banks tend to decrease interest rates to reinvigorate the economy. On the other, during such periods, market operators and analysts become more active (Loh and Stulz, 2018), thus increasing the number of transactions. The increment in the number of transactions determines room for disagreement among agents, thereby originating volatility (Cujean and Hasler, 2017). As volatility and attention increase, people tend to overreact to innovations, but prices become less informative (Peng and Xiong, 2006), and the general tendency is to shift from risky stocks to less risky ones such as stocks of firms with low book leverage. Hence, during periods of financial distress, the demand for risky stocks decreases and stocks prices fall, determining negative stock returns. This phenomenon is commonly known among investors as flight to quality.

With the aim of identifying recessions, I draw on the CF Filter to decompose the time series of stock prices into its main components. I can use this filter as a robustness check to verify whether those periods that I qualified as crises (i.e., 2000, 2001, from 2007 to 2010, and 2020) show a negative growth component and higher volatility.

The CF Filter provides a handy procedure through which I can decompose stock prices into a growth component and a cyclical component. Provided that my time series does not feature a seasonal component, this procedure is suited for immediate application, regardless of the order of integration characterizing the series. I can safely assume that stock prices investigated at the aggregate level are already deprived of the seasonal component because different countries are characterized by different seasonal components that I assume offset each other on average. To visualize the trend component graphically, I draw on Local Weighted Regression or Lowess Smoothing, where the weights are the "tricube" as specified by Cleveland (1979).

1.2.3 Empirical Results

Table 1 presents descriptive statistics for a sample of G7 firms over the period (second quarter 2000, second quarter 2020) drawn from Thomson Reuters Eikon (formerly Datastream). Panel A describes the mean, first quartile, median, third quartile for the full sample.

Considerable insight can be obtained just by observing descriptive statistics (see Table 1). The mean value of the panel of stock prices is equal to 28.655, whereas the median value is considerably lower (3.12). The mean book leverage of my full sample is equal to 0.211, while the median value is slightly lower (0.172). Tangibility is computed as the ratio of property plant and equipment to total assets; its mean value is equal to 0.269, while the median value is equal to 0.219. Also relevant to my analysis are the first quartile of book leverage – equal to 0.026 – and the third quartile (0.343). Finally, the first quartile of asset tangibility is equal to 0.074 whereas the third quartile is equal to 0.407. I need to make sure that the choice not to use log returns does not undermine my analysis. To this effect, a sufficient and indispensable condition is that all eigenvalues of the reduced form parameter A fall within the unit circle (Binder et al., 2005). When considering both datasets (below-leverage and above-leverage firms), I find that this condition is fulfilled, thus implying that the PVAR is stable. That is, the VAR is covariance stationary, and shocks to v_t eventually fade out. Therefore, the impulse response functions converge. However, for robustness, I carry out Fisher-type tests devised by Choi (2001).

These tests consist of implementing an Augmented Dickey–Fuller Test (Dickey and Fuller, 1979) on each time series composing the panel and then combining the p-values. I find strong evidence against the null hypothesis that all series contain a unit root for each of the variables considered in my model, except for the case of the Consumer Price Index (CPI), which I needed to make stationary by taking the natural logarithms.

Figure 1 and Figure 2 display impulse response functions respectively for below-median-leverage firms and above-median-leverage firms. Table 2 reports the regression output.

Because the innovations e_{it} and v_t are correlated, a shock on one variable is likely to be accompanied by shocks to other variables. Moving to the persistence analysis, I can note, according to the figures above, that a unit shock is more persistent for low-leverage than high-leverage firms.

In fact, the shock disappears after slightly more than 50 steps, in the case of below-median-leverage firms, and after 25 steps for high-leverage firms. Operating leverage – which should be negatively associated with financial leverage (Van Horne, 2005) – seems to play a major role in rendering price responses more persistent for below-median-leverage observations than for above-median ones.

Imagine now a shock hits the economy (e.g., one unit increase in interest rate or an earthquake). This innovation may reduce demand for goods. Firm A is strongly constrained, whereas firm B has low operating leverage. After the shock arises, Firm A risks ending up with negative NPV projects that need to be dismissed – and this operation is likely to take time, thus determining durable responses in stock prices. Firm B’s variable production can instead adjust according to the lower demand.

Interestingly, a shock to the base rate has a positive effect on stock price for below-median-leverage firms, whereas the opposite arises for high-leverage firms. Moreover, low-leverage firms are less strongly affected by shocks to the base rate than high-leverage firms. I explain this phenomenon as follows.

I start with the assumption that a firm’s stock price is determined as the sum of all its future dividend payments discounted back to their present value according to the weighted average cost of capital (WACC). For the sake of simplicity, I will assume that the company is funded only by debt and equity. A one standard deviation positive innovation to the interest rates, in case it is associated with an increase in the interest rate, determines both a higher cost of debt and a higher cost of equity capital.

The direct consequence would be a higher WACC, an increased discount factor, and a lower stock price value. Having said that, low-leverage firms' value would benefit from a positive shock, translating to an increase in the base rate. In fact, assuming that the cost of equity is equally affected by the shock to interest rates across all firms, low-leverage firms have a lower increase in the cost of debt and demand moves from high-leverage to low-leverage firms. This fact determines a higher stock value. In other words, investors reshape their portfolios according to changes in interest rates and, in the aftermath of an increase in the base rate, move their money from firms with high leverage to firms with low leverage.

The next question I would like to address concerns the validity of the MEH (Fama, 1970) within this framework. The underlying theory is that prices follow a random walk (Fama, 1970) and, according to the semi-strong version of this theory, they embed all public information, whether historical or forecasted. Nevertheless, when testing the series of stock prices for the presence of a unit root, I could reject the null hypothesis of all panels containing a unit root. This fact leads me to question the validity of the MEH, although an organic treatise of the matter is beyond the scope of this paper.

Determining whether shocks are more enduring for highly levered firms can be instrumental to the definition of optimal leverage. In light of the findings, firms may decide to deleverage to render their business more resilient to shocks, especially in the case of negative market conditions when leverage is acting as a negative multiplier. Moreover, the contribution of the paper goes beyond that, helping to explain the existence of zero-leverage firms. Those firms, which do not adjust their leverage over time, assume that shocks can arise suddenly and, hence, accept a super-precautionary policy, which is suboptimal in normal periods. The effect of macroeconomic conditions on the leverage and tangibility decisions has been studied recently by Chang (2019).

These results might also be more interesting from the perspective of investors than from the perspective of managers. In fact, if my reasoning is valid and an innovation (unit increase) in the error term of my interest rate equation is accompanied by an increase in interest rates, then once an increase of interest rates is announced, rational investors might decide to reshuffle their portfolios with the aim of anticipating the market. They might move their equity investments from high-leverage firms to low-leverage ones to forestall the market. This process, if properly and rapidly implemented, might lead investors to obtain profits – so long as the new information is not reflected in prices yet. That is, investors can beat the market in the aftermath of an increase of interest rates by adopting an active strategy. To understand if those firms that face more frictions bear an additional opportunity cost after a policy change to the interest rate level, I split the sample into two groups: constrained and unconstrained firms. In the spirit of Braun and Larrain (2005), I define constrained firms as those characterized by a lower degree of tangibility. Tangibility is expressed as net property plant and equipment over total assets. Tangible assets can serve as collateral, thus enabling firms to easily access credit when they need to. More constrained firms, which are characterized by low tangibility, can be subject to more enduring shocks**.**

I then carry out the VAR with the model specified previously, but this time I filter observations by the median value of the tangibility ratio. This median is equal to 0.211, as Table 1 shows. I produce the impulse response function to check whether shock durability depends on the degree of a firm's tangibility, thereby obtaining the results. Figure 3 and Figure 4 display the outcome of an impulse to the base rate in the form of a stock price response. Table 3 reports the regression output.

The results are not counterintuitive. The persistence of a shock to interest rates in terms of price response is a function of the degree of tangibility of a firm's assets. If their assets are tangible, firms largely face fewer difficulties when trying to adjust their capital structure. Hence, they take less time to recover after a shock hits the level of interest rates. As a result, firms that are more constrained should pay more attention to macroeconomic policy changes to the level of interest rates. In addition, the magnitude of the shock is higher for more constrained firms, suggesting that the market is aware of the difficulties in adjusting their capital structure. An implication of such results is that managers might need stronger incentives to invest in intangible assets.

For the sake of completeness, I run an FE estimator with robust standard error clustered at the firm level of the variable price on a binary variable which distinguishes between below-median and above-median leverage (see Table 7).

My regression produces a significant dummy with a negative coefficient when controlling for other macro-determinants of stock prices and main market indices. The implications of such prospective findings would digress the boundaries of the asset pricing literature because the degree of financial leverage would enter the equation of pricing models as a driver that pushes prices downwards. A negative dummy can be interpreted as the average additional discount on stock prices.

My results are puzzling in many dimensions. Firstly, I would have expected a negative relationship between stock prices and interest rates because the latter appears in the denominator of discounted cash-flow models. Secondly, the VAR regressions produce significant relationships almost exclusively when investigating firms with low leverage. Let me try then to shed light on the first anomaly. The positive coefficient on interest rate for below-median-leverage firms might be the result of the presence of financial crises (e.g., the GFC) in my sample. Therefore, after conducting robustness checks on subsamples of the full sample, I identify and exclude periods of financial distress.

1.2.4 Robustness Checks

This section aims to solve some issues characterizing the sample. Firstly, by splitting the sample into two parts according to median values of financial leverage, the heterogeneous consequences of shocks to interest rates cannot be well decrypted at a granular level. That is, a handful of firms feature leverage levels that gravitate around the boundary of the median level of financial leverage of the full sample. These firms have some observations that enter the sample of below-median-leverage firms during certain years, while, during other years, they are included in the sample of above-median-leverage firms. Therefore, an easy approach to solve this issue would be to consider two subsamples, focusing only on those firms that exhibit below-first-quartile and above-third-quartile leverage values. When I take into consideration the two abovementioned different subsamples, represented by below-first-quartile leverage firms (see Figure 5) and by above-third-quartile leverage firms (see Figure 6), I obtain consistent results (see Table 4). Indeed, a fortiori, I note that below-first-quartile leverage firms are positively affected by shocks in terms of their stock price response, whereas above-third-quartile leverage firms are negatively affected. Again, unemployment and inflation are positively related to stock prices, whereas industrial production is negatively related to stock prices in the case of firms with zero or a very low degree of financial leverage. For firms with very high leverage, there is no evidence of a relationship between stock prices and the prospective macro-determinants.

The magnitude of the response to shocks is considerably different between the two subsamples. Those firms that are characterized by very high financial leverage and, therefore, potentially by low operating leverage, are softly affected by shocks in terms of both magnitude and persistence. In contrast, a shock determines a large increase in stock prices for firms with very low financial leverage.

When comparing firms with a very low amount of tangible assets to total assets (below-first-quartile tangibility) to the previous subsample constituted by firms with a low ratio of tangible assets to total assets (below-median tangibility), it is a different story, as shown by paralleling Figure 8 and Figure 4. Yet, the explanation is straightforward, and the findings further corroborate my results.

Figure 8 features an opposite sign compared with that in the previous section (see Figure 4). Yet, if you are willing to accept that leverage is positively associated with tangibility – as shown by Hall (2012) – then these results should not come as a surprise. In fact, the above-third-quartile tangibility firms' subsample would comprise high-leverage firms. Table 4 exhibits the regression's results.

To control for the state of the market, I add the main indices as additional explanatory variables to my system of equations. The model becomes:

$$\text{Price}_{i,t} = \beta_1 \text{ Price}_{i,t-1} + \beta_2 \text{Rate}_{j,t-1} + \beta_3 \text{lnCPI}_{j,t} + \beta_4 \text{IndProd}_{j,t} + \beta_5 \text{Unemp}_{j,t} + \beta_6 \text{Index}_{j,t} + e_{it} \quad (7)$$

$$\text{Rate}_{j,t} = \alpha_1 \text{R}ate_{j,t-1} + \alpha_2 \text{ Price}_{i,t-1} + \alpha_3 \text{lnCPI}_{j,t} + \alpha_4 \text{IndProd}_{j,t} + \alpha_5 \text{ Unemp}_{j,t} + \alpha_6 \text{Index}_{j,t} + v_{j,t} \quad (8)$$

The results are robust to the addition of the stock market index variable. With the aim of checking whether the periods we tend to call recessions are, in fact, characterized by higher volatility and decreasing stock prices on average, I apply the CF Filter. The business cycles and trends can be identified by applying the CF Filter to the panel of stock prices.

1.2.5 Identifying and Excluding the Crises from the Sample

Firstly, I investigate the business cycle component at an aggregate level for the G7 countries after filtering the stock prices data through the CF Filter. At an aggregate level (see Figure 11), the GFC manifests itself clearly, as highlighted by the higher volatility and below-average values.

Other hypothesized crises are not so evident. I then investigate the business cycle component and the trend component at country level (see Figures 11 and 12).

The countries that were most strongly affected by the GFC are Canada, the United States (US), and Japan, followed by European countries. China does not show evidence that the GFC had a strong impact, perhaps because the channels for crisis transmission were more obstructed.

The graphs (see Figure 11) purposely use equal scales, thus enabling me to make valid comparisons across countries: for example, Canada, Japan, and the US present higher volatility levels than the other countries under scrutiny.

I can now move on to investigate the second output of the Filter (i.e., the Trend). The trend-line that I obtain by decomposing the panel of time series through the CF Filter has undergone a smoothing procedure (i.e., Lowess Smoothing). This technique can be used to detect a trend in the presence of noisy data when the underlying distribution is unknown. The main advantage resides in the fact that it makes no assumption on the underlying data patterns. I run linear least squares smoothing where the bandwidth is set at 0.8, meaning that 80% of the data is used in smoothing each point. That is, given a focal point, which corresponds to the central point, I run a set of weighted regression where the focal point slides. The focal point is the one receiving more weight, while the other points receive less weight the further they are situated from the focal point.

In general, a negative trend can be seen throughout the first decade of the sample period, with a recovery during the second decade of the sample period. This means that the equity market of G7 countries went through a tough period during the middle phase (2009–2010) of the interval period under consideration, when prices stabilized themselves on lower levels. China and Canada (see Figure 12) represent exceptions where the trend is imperceptible.

I conclude that these firms have undergone two major crises – the Dot-Com Bubble and the GFC, with the GFC being the most prominent. In fact, the first decade of the second millennium turns out to be more turbulent than the second decade. Price volatility stabilized itself on higher levels, while prices exhibited a negative trend component during the first decade, followed by a positive trend during the second decade.

Given these results, I can proceed by considering subperiods characterized by relative calm within the market where the mechanism leading to the anomaly of a positive relationship between stock prices and interest rates possibly does not actualize. To this effect, I divide the sample in such a way as to consider the period from 2002 to 2006 and the period from 2011 to 2019. In this way, I omit prospective anomalies caused by the effects of crises on stock prices.

I observe in the graphs below that the anomaly disappears in the case of the two subperiods that I consider at this stage of the analysis. The relationship between stock prices and nominal interest policy rates turns negative for both subperiods, and it is robust across different subsamples, varying by degree of financial leverage. All responses to shocks to interest rates in the first subperiod (i.e., 2002–2006) are negative and feature similar magnitudes (see Figures 13–16); likewise, all responses to shocks to interest rates in the second subperiod (i.e., 2011–2018) manifest themselves as decreases in stock prices (see Figures 17–20), although the magnitude varies across subsamples.

1.2.6 Conclusion

The paper is structured in two parts which gravitate around the concepts of financial leverage and asset tangibility and share the same estimation technique, the GMM, along with the same model, a PVAR. By investigating a sample consisting of approximately 5,000 firms, I started by testing if unit shocks to interest rates are more enduring for those firms that I define as high leverage. In fact, the whole sample is divided into two parts, firstly by subsampling based on the median value of financial leverage, then based on the median value of asset tangibility, as defined above.

I demonstrate through impulse response functions that above-median and below-median financial leverage firms are heterogeneously affected by shocks, in terms of both shocks' duration and sign, as well as magnitude when considering the full sample period. That is, on one hand, the stock price responses of above-median-leverage firms are negative before reaching the steady state when unchaining an impulse; on the other hand, below-median-leverage firms, undergoing the same shock, are characterized by positive stock price responses.

Evidence shows that both low- and zero-leverage firms benefit from a unit shock to interest rates – possibly thanks to the fact that if the cost of equity is equally affected by the shock to interest rates across both firms' classes, low-leverage firms have a lower increase in the cost of debt, and demand moves from high-leverage to low-leverage firms. This phenomenon determines a higher stock value. Aware that a positive relationship between interest rates and stock prices goes against common sense, I investigate the matter more deeply, thereby identifying the crises (the Dot-Com Bubble and GFC) as the major driver of this anomaly.

With the aim of empirically isolating periods of financial distress, I rely on the CF Filter. This Filter enables me to decompose the panel of stock prices into its main components – cyclical and trend. The Filter leads me to conclude that there is evidence of turbulence across the G7 countries during the periods of 2000–2001 and 2007–2009, as well as in 2020. Hence, I exclude these periods in my second-stage analysis, and I remove the anomaly that I had spotted: the relationship between stock prices and interest rates no longer appears as positive but as negative for all subsamples.

Shifting my focus to the degree of constraints that firms face, I empirically prove that more constrained firms – which are represented by the subsample of firms with low asset tangibility – tend to take longer to see their stock prices return to stable. The reason for this phenomenon might be because they encounter more frictions in obtaining funding for positive NPV projects. Therefore, the market spends more time on ascribing prices to such firms in the aftermath of a shock to interest rates.

A suggestion for future research could be to approach such results by extending this work theoretically and building a new asset pricing model that accounts for the dynamics of the connection between stock prices, volatility (i.e., shocks), and leverage. Alternatively, different macro-variables can be investigated as prospective determinants of stock prices under varying degrees of financial leverage. The presence of periods of financial distress can help explain other phenomena such as the leverage effect.

1.2.7 Appendix

Figure 1. Impulse Response Function for Firms with Below-Median Leverage

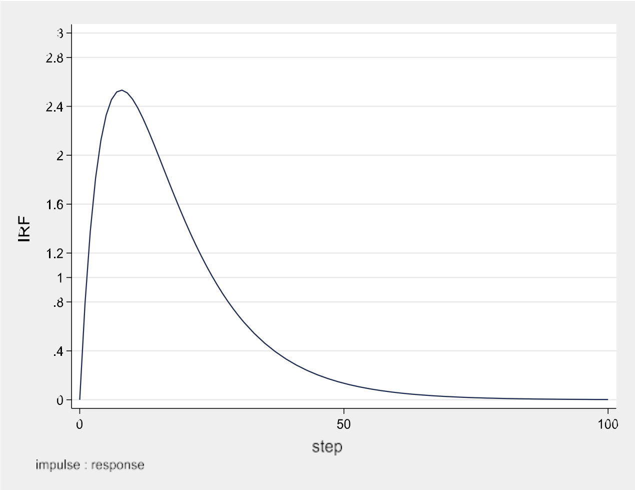


Figure 2. Impulse Response Function for Firms with Above-Median Leverage

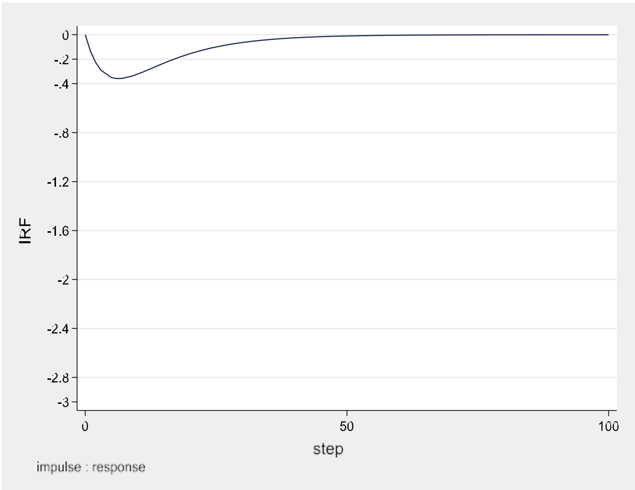


Figure 3. Impulse Response Function for Firms with Below-Median Tangibility

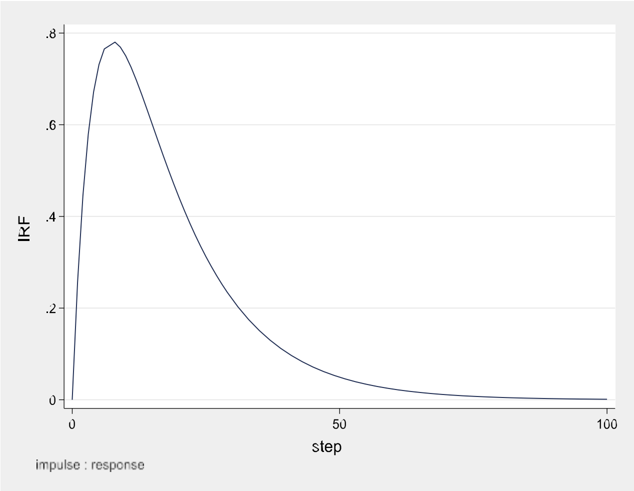


Figure 4. Impulse Response Function for Firms with Above-Median Tangibility

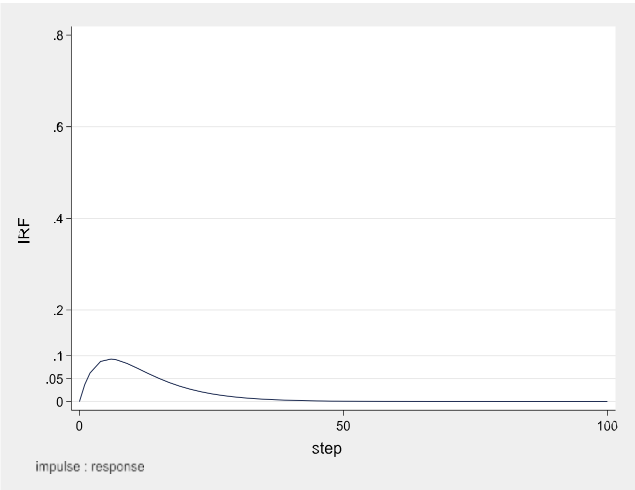


Figure 5. Impulse Response Function for Firms with Below-First-Quartile Leverage

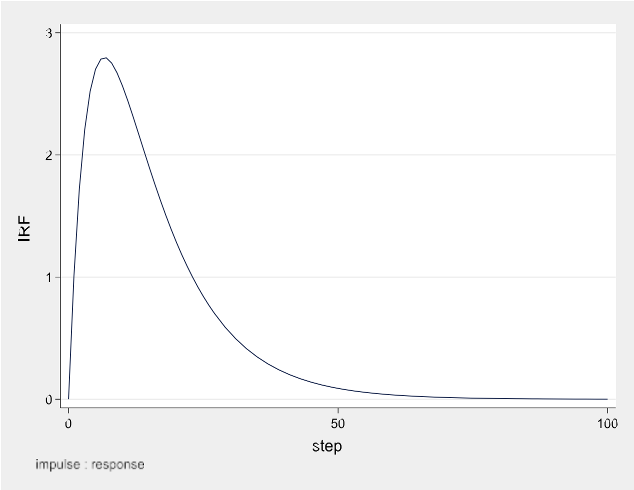


Figure 6. Impulse Response Function for Firms with Above-Third-Quartile Leverage

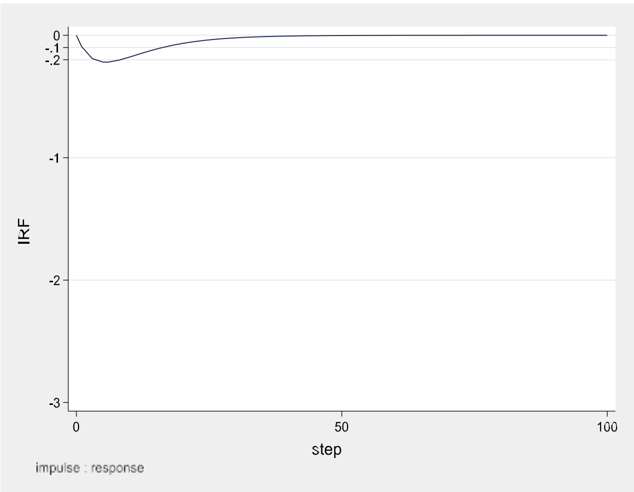


Figure 7. Impulse Response Function for Firms with Below-First-Quartile Tangibility

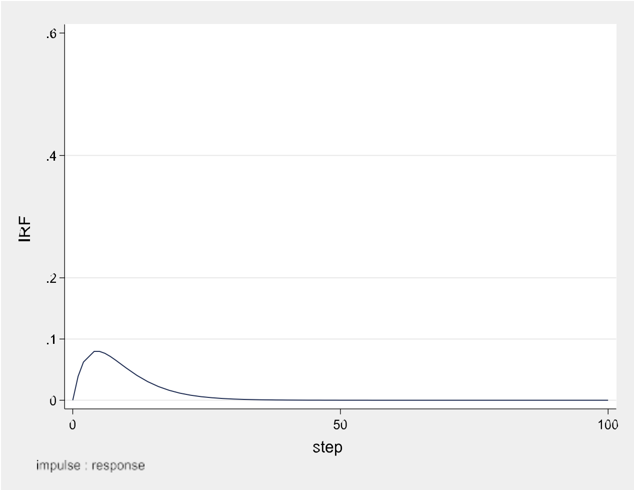


Figure 8. Impulse Response Function for Firms with Above-Third-Quartile Tangibility

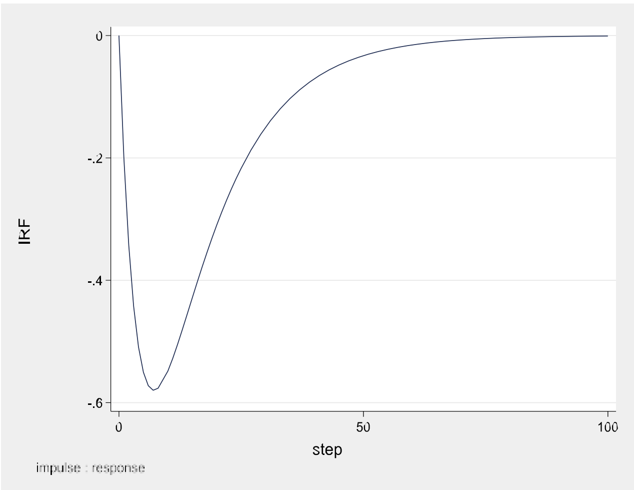


Figure 9. Impulse Response Function for Firms with Below-Median Leverage with Control for Market Index

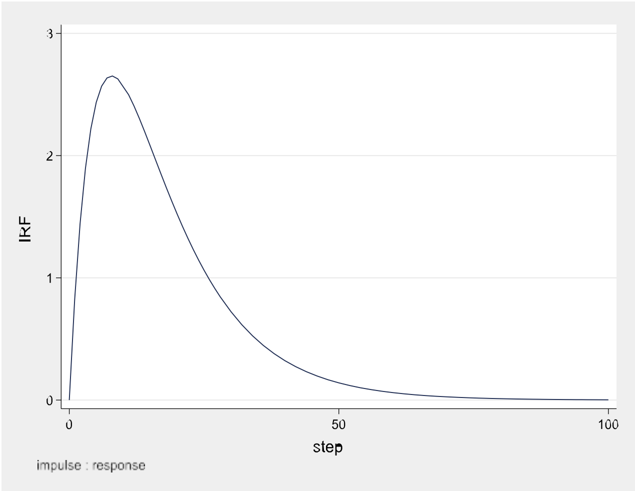


Figure 10. Impulse Response Function for Firms with Above-Median Leverage with Control for Market Index

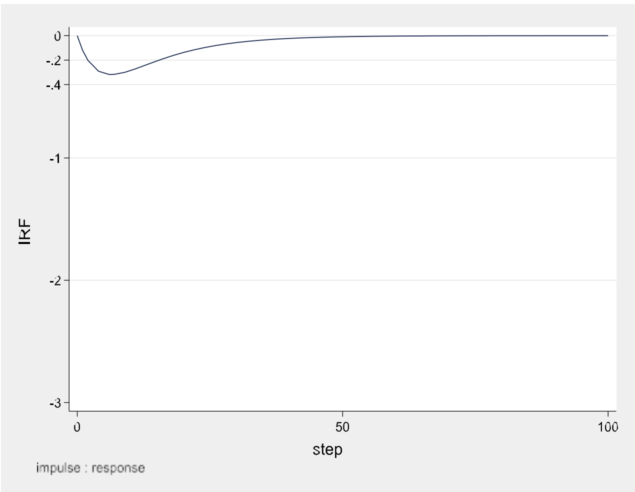
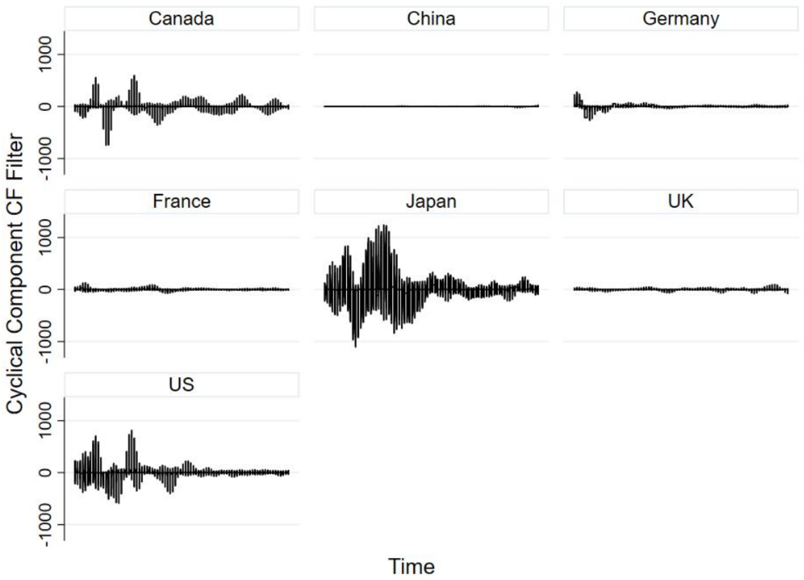
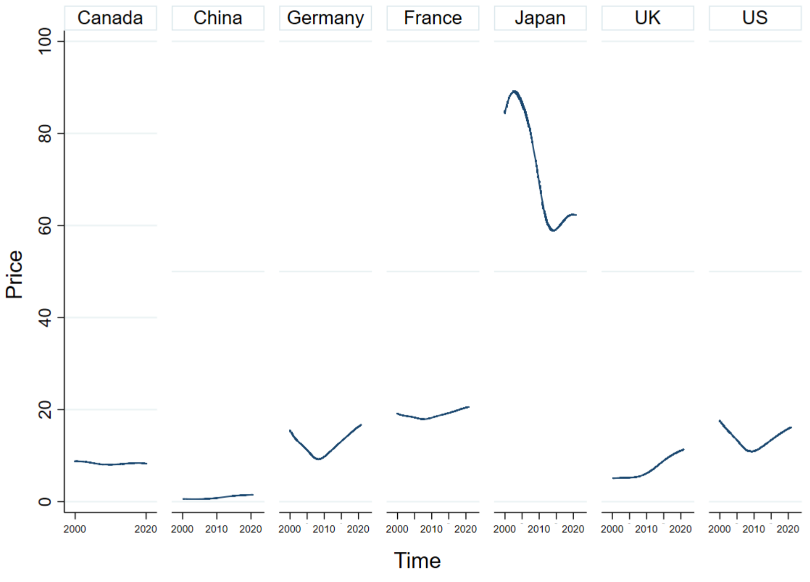


Figure 11. Cyclical Component of CF Filter



The figure above shows the cyclical component derived from the CF Filter for seven countries: Canada, China, Germany, France, Japan, the United Kingdom (UK), and the US.

Figure 12. Trend Component of CF Filter



The figure above shows the trend component derived from the CF Filter for seven countries: Canada, China, Germany, France, Japan, the UK, and the US. The procedure involves a smoothing technique (i.e., Lowess Smoothing) to facilitate a graphical analysis.

Figure 13. Impulse Response Function for Firms with Below-Median Leverage (2002–2006)

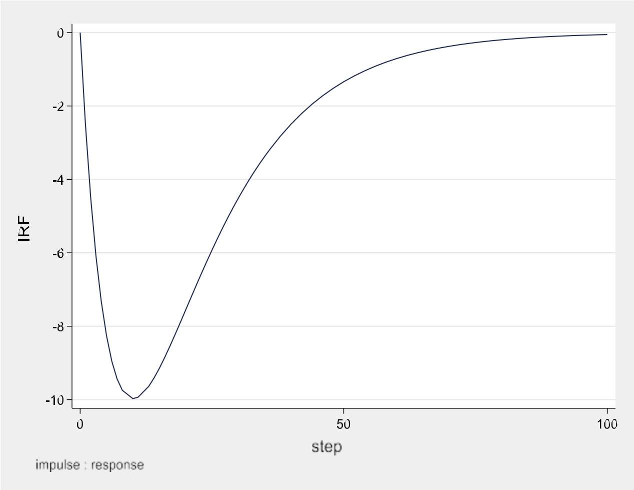


Figure 14. Impulse Response Function for Firms with Above-Median Leverage (2002–2006)

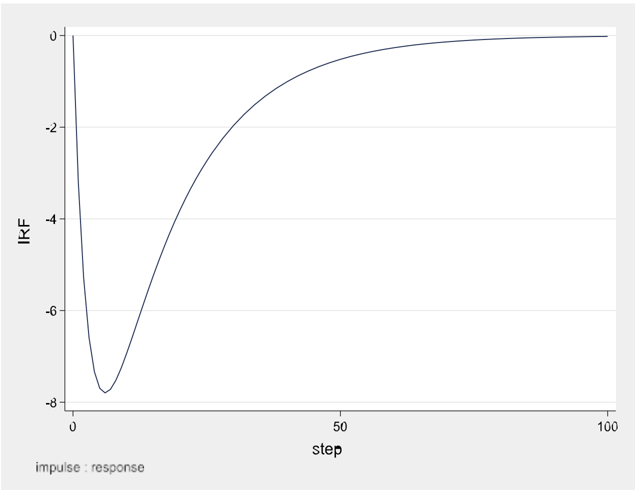


Figure 15. Impulse Response Function for Firms with Below-First-Quartile Leverage (2002–2006)

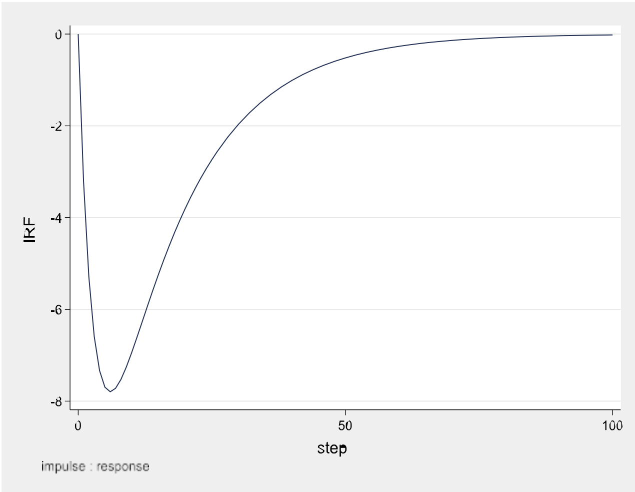


Figure 16. Impulse Response Function for Firms with Above-Third-Quartile Leverage (2002–2006)

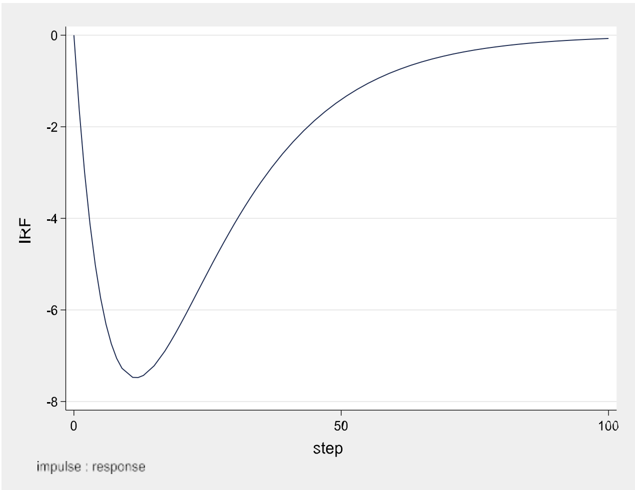


Figure 17. Impulse Response Function for Firms with Below-Median Leverage (2011–2018)

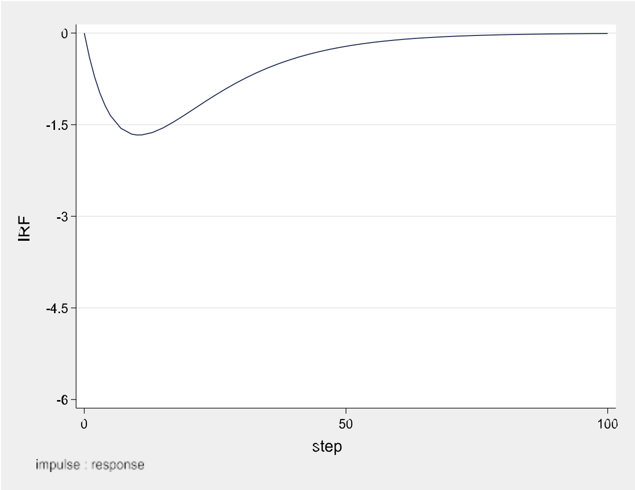


Figure 18. Impulse Response Function for Firms with Above-Median Leverage (2011–2018)

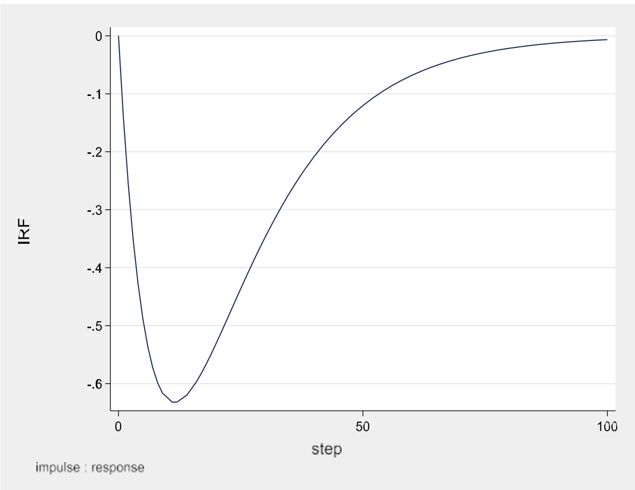


Figure 19. Impulse Response Function for Firms with Below-First-Quartile Leverage (2011–2018)

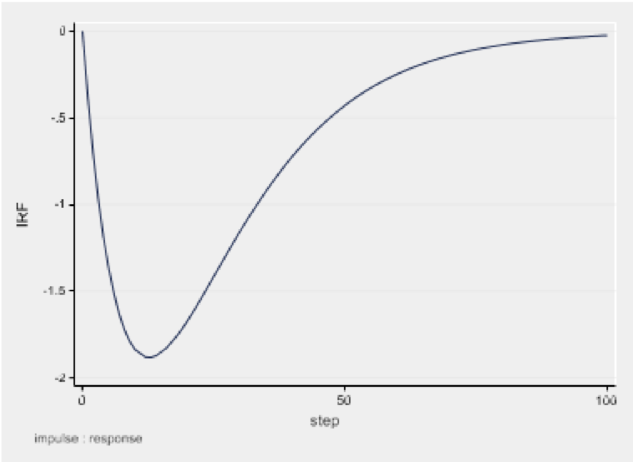


Figure 20. Impulse Response Function for Firms with Above-Third-Quartile Leverage (2011–2018)

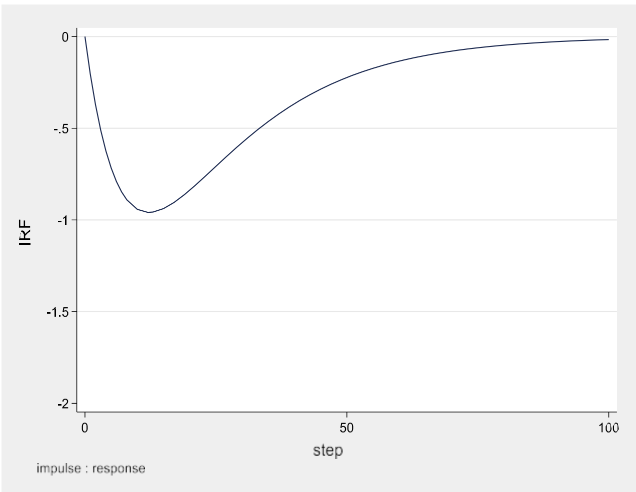


Table 1. Summary Statistics

Panel A: Full Sample

	Obs.	Mean	1st Quartile	Median	3rd Quartile
Price	383568	28.655	0.74	3.12	9.96
Total Debt	256541	788603	1922	21838	98732
Total Assets	257930	3408760	58396	160008	487626
Tangible Assets	251096	413406.8	6971.5	33473.5	114255
Leverage	254058	0.211	0.026	0.172	0.343
Tangibility	251024	0.269	0.074	0.219	0.407

Table 1 presents descriptive statistics for a sample of G7 firms over the period (second quarter 2000, second quarter 2020) drawn from Thomson Reuters Eikon (formerly Datastream). Panel A describes the mean, first quartile, median, third quartile for the full sample.

Table 2. Stock Price Response for Varying Degrees of Financial Leverage: Below and Above Median

Dependent Variable: Price		
	Below-Median Leverage	Above-Median Leverage
Lag1 Price	0.921*** (0.016)	0.910*** (0.125)
Lag1 Base Rate	0.787*** (0.280)	- 0.134 (0.087)
CPI	17.240*** (5.616)	- 2.371 (1.503)
Industrial Production	- 0.063** (0.033)	0.017 (0.018)
Unemployment	0.694*** (0.227)	0.091*** (0.060)
Dependent Variable: Base Rate		
Lag1 Price	- 0.000*** (0.000)	- 0.0003*** (0.0000)
Lag1 Base Rate	0.830*** (0.005)	0.782*** (0.002)
CPI	- 1.592*** (0.090)	- 2.211*** (0.030)
Industrial Production	0.021*** (0.000)	0.028*** (0.000)
Unemployment	0.032*** (0.004)	-0.023*** (0.0018)
No. of Observations	117,163	239,879
Average No. of T	35.397	51.631

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*Table 2 presents results using two subsamples obtained by filtering observations according to the median leverage of the full sample. Data frequency is quarterly. The dependent variable is price. See appendix for variable definitions and sources. Standard errors are reported in parentheses below coefficient estimates. Statistical significance at the 0.01***, 0.05**, and 0.1* level is designated by asterisks.*

Table 3. Stock Price Response for Varying Degrees of Asset Tangibility: Below and Above Median

Dependent Variable: Price		
	Below-Median Tangibility	Above-Median Tangibility
Lag1 Price	0.928*** (0.011)	0.883*** (0.021)
Lag1 Base Rate	0.257* (0.262)	0.037 (0.084)
CPI	6.836* (5.184)	1.539 (1.550)
Industrial Production	0.003 (0.037)	- 0.020* (0.015)
Unemployment	0.705* (0.212)	0.047 (0.062)
Dependent Variable: Base Rate		
Lag1 Price	- 0.000*** (0.000)	- 0.001*** (0.000)
Lag1 Base Rate	0.805*** (0.005)	0.792*** (0.002)
CPI	- 1.947*** (0.086)	- 2.125*** (0.032)
Industrial Production	0.024*** (0.000)	0.027*** (0.000)
Unemployment	0.024*** (0.004)	- 0.021*** (0.002)
No. of Observations	115,475	241,567
Average No. of T	37.59	52.20

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*Table 3 presents results using two subsamples obtained by splitting observations based on the median tangibility ratio of the full sample. Data frequency is quarterly. The dependent variable is price. See appendix for variable definitions and sources. Standard errors are reported in parentheses below coefficient estimates. Statistical significance at the 0.01***, 0.05**, and 0.1* level is designated by asterisks.*

Table 4. Stock Price Response for Varying Degrees of Final Leverage: Below First Quartile and Above Third Quartile

Dependent Variable: Price		
	Below-First-Quartile Leverage	Above-Third-Quartile Leverage
Lag1 Price	0.915*** (-0.02)	0.886*** (0.014)
Lag1 Base Rate	1.008*** (-0.343)	-0.093 (0.088)
CPI	19.385*** (-6.298)	-1.686 (1.431)
Industrial Production	- 0.068* (-0.045)	0.011 (0.02)
Unemployment	0.750*** (-0.252)	0.091* (0.063)

Dependent Variable: Base Rate		
Lag1 Price	- 0.000*** (0)	- 0.000*** (0)
Lag1 Base Rate	0.792*** (-0.006)	0.767*** (-0.002)
CPI	- 2.179*** (-0.1)	- 2.272*** (-0.03)
Industrial Production	0.025*** (-0.001)	0.030*** (0)
Unemployment	0.017*** (-0.005)	- 0.028*** (-0.002)
No. of Observations	59530	183786
Average No. of T	27.421	39.971

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*Table 4 presents results using two subsamples obtained by filtering observations to consider only those values below the first quartile of the sample's leverage and those above the third quartile of the ratio. Standard errors are reported in parentheses below coefficient estimates. Statistical significance at the 0.01***, 0.05**, and 0.1* level is designated by asterisks.*

Table 5. Stock Price Response for Varying Degrees of Asset Tangibility: Below First Quartile and Above Third Quartile

Dependent Variable: Price		
	Below-First-Quartile Tangibility	Above-Third-Quartile Tangibility
Lag1 Price	0.926 *** (0.013)	0.822 *** (0.032)
Lag1 Base Rate	- 0.199 (0.432)	0.039 (0.078)
CPI	- 4.840 (5.616)	1.956 (1.427)
Industrial Production	0.099 (0.061)	- 0.025 (0.016)
Unemployment	0.443 (0.334)	0.015 (0.057)
Dependent Variable: Base Rate		
Lag1 Price	- 0.000 *** (0.000)	- 0.001 *** (0.000)
Lag1 Base Rate	0.793 *** (0.006)	0.777 *** (0.002)
CPI	- 2.310 *** (0.114)	- 2.227 *** (0.030)
Industrial Production	0.026 *** (0.001)	0.030 *** (0.000)
Unemployment	0.003 (0.006)	- 0.025 *** (0.002)
No. of Observations	58,245	185,965
Average No. of T	30.336	40.684

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 presents results using two subsamples obtained by filtering observations as to consider only those values below the first quartile of the sample's ratio given by property, plant, and equipment to total assets and those above the third quartile of the ratio. Data frequency is quarterly.

Table 6. Controlling for the Market Index

Dependent Variable: Price		
	Below-Median Leverage	Above-Median Leverage
Lag1 Price	0.921*** (0.016)	0.911 (0.013)
Lag1 Base Rate	0.823*** (0.281)	- 0.119 (0.087)
CPI	16.352*** (5.597)	- 3.104** (1.499)
Industrial Production	- 0.048 (0.032)	0.023 (0.018)
Unemployment	0.607*** (0.227)	0.025 (0.061)
Index Returns	9.150*** (0.828)	4.733*** (0.504)
Dependent Variable: Base Rate		
Lag1 Price	- 0.000*** (0.000)	- 0.000*** (0.000)
Lag1 Base Rate	0.831*** (0.005)	0.784*** (0.002)
CPI	- 1.602*** (0.090)	- 2.256*** (0.030)
Industrial Production	0.021*** (0.000)	0.029*** (0.000)
Unemployment	0.031*** (0.004)	- 0.027*** (0.002)
Index Returns	0.096*** (0.009)	0.282*** (0.282)
No. of Observations	117,163	239,879
Average No. of T	35.397	51.631

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 presents results using two subsamples by filtering data at the median leverage level as two produce two subsamples. I add another variable – index returns – represented by log returns of the main stock market indices of G7 countries under investigation.

Table 7. The Leverage Dummy

Dependent Variable: Price	
Leverage Dummy	- 9.080*** (1.862)
Base Rate	1.514*** (0.16)
CPI	12.929 *** (3.871)
Index Log Returns	10.933 *** (1.201)
Constant	- 28.940 (18.185)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 reports the regression output of the FE estimation of stock prices on the dummy variable which identifies above-median-leverage firms while controlling for the state of the economy and for the market index. The full sample is considered.

1.2.8 Extensions

Given the relevance of my findings, I propose to extend the analysis to a different sample. This time I plan to follow a more rigorous procedure in the sample selection. Indeed, a strong limitation of the previous section is the fact that companies are picked randomly from the universe of firms spread around the G7 countries. With the aim of making my analysis more replicable, thereby benefiting from greater external validity, I can rely on the full set of firms contained in a specific database. Following the recent literature (e.g., Lakdawala and Moreland, 2021), I have identified the Center for Research in Security Prices (CRSP)/Compustat Merged Fundamentals Quarterly dataset as a prospective data source. By drawing on the full set of firms contained in the database, I can determine if the heterogenous behavior of stock prices is a European-led phenomenon. The focus on G7 countries in my first analysis prompts me to think that this might be the case, because a large proportion of firms are located across Germany, France, and the UK. By virtue of its centrality in the studies on the connection between policy shocks transmission and firm heterogeneity, I might focus on the US.

The key paper on such a connection is by Ehrmann and Fratzscher (2004), who investigate how policy shocks affect various companies' metrics (i.e., debt to capital and Tobin's Q) and how firm characteristics modulate the transmission of monetary policy shocks. They identify the latter through market expectations obtained from surveys of market participants. This paper is inspirational both from a theoretical and a more pragmatic perspective.

The two central bankers emphasize the pivotal role of the credit channel in determining the impact of shocks: a tightening of monetary policy particularly impacts firms that are highly bank-dependent borrowers because their lenders, banks, reduce their overall supply of credit (Ehrmann and Frazscher, 2004). Information asymmetries are also a crucial driver of the response to policy shocks by firms. For instance, "small firms for which less information is publicly available may find it more difficult to access bank loans when credit conditions become tighter as banks tend to reduce credit lines first to those customers about whom they have the least information" (Ehrmann and Frazscher, 2004). Along with the credit channel, whereby stock prices of firms that are subject to relatively larger informational asymmetries tend to react more strongly, the interest rate channel might also have an impact. Firms that produce goods for which demand is highly cyclical or interest-sensitive should see their future earnings affected relatively more following a move in monetary policy.

After the US Federal Reserve (the Fed) rates hit the zero-level bound in late 2008, there was not a significant fluctuation in the level of such interest rates until 2023, and identifying shocks within the time series is not a trivial task. Moreover, I would like to avoid defining as a shock simply the change in interest rates that results from the Federal Open Market Committee (FOMC) meeting. I would prefer to rely on a more composite time series than the real policy rates one. Following previous researchers (e.g., Kim and Singleton, 2012, Bauer and Rudebusch, 2013, Bullard, 2012 and Krippner, 2013), I can use shadow interest rates. More specifically, I can employ estimates of Wu and Xia's (2016) model of the shadow rate. Nominal interest rates cannot fall materially below zero. This is because cash provides a risk-free investment at a zero nominal rate, and holding cash will therefore be more attractive than accepting a negative nominal rate on a security (Bullard, 2012). As a result, the conventional tool used by the Fed to provide further stimulus when interest rates hit the zero-level bound is no longer effective. Consequently, the Fed has relied on unconventional policy tools such as large-scale asset purchases (commonly known as quantitative easing) and forward guidance[1] to try to affect long-term interest rates and influence the economy (Wu and Xia, 2016). For the sake of completeness, a brief explanation of how the shadow rate model works will follow. The short-term interest rate is assumed to be the maximum between the shadow rate and the lower bound interest rate. Whenever the Wu–Xia shadow rate is above 0.25%, it is exactly equal to the model implied one-month interest rate by construction. The shadow rate is assumed to be a linear function of three latent variables called factors, which follow a VAR(1) process. The latent factors and the shadow rate are estimated with the extended Kalman Filter by linearizing the nonlinear function (Wu and Xia, 2016).

An intuitive introduction to the underlying logic and functioning of the Kalman Filter is provided below. As an optimal state estimator algorithm, the Kalman Filter draws on a series of measurements (including noisy measurements) and produces estimates of unknown variables by estimating a joint probability distribution over the variables for each timeframe. It essentially puts together independent pieces of information, as inaccurate as they might be, to determine an estimate of the variable of interest. Such pieces of information are represented by other variables, either latent or directly measured, which are used to indirectly determine the estimate of the state variable.

The algorithm is structured as a two-phase process: a prediction phase and an updating phase. The latter adjusts the prediction based on the new information (i.e., innovation). As a result of the prediction phase, the Kalman Filter produces both estimates of the current state variable and the associated uncertainties derived from the covariance matrix of the distribution of the measurement's variables. The mathematical intricacies of this estimation process are not reported here. The estimates are then adjusted according to the innovation observed that results from the

[1] One prominent example is forward guidance, or central bank communications with the public about the future federal funds rate. In particular, forward guidance aims to lower the market's expectation regarding the future short rate. Market expectations about future short rates feed back through the financial market to affect the current yield curve, especially at the longer end. Lower long-term interest rates, in turn, stimulate aggregate demand.

new measurement. With the aim of updating the estimates of the variables, the previous history has no role because the process is recursive, whereas the weighted average has a pivotal role. The weights are given based on the degree of uncertainty associated with each measurement: the more uncertain the measurement, the lower the weight. Hence, the algorithm relies just on the current prediction and the previous estimate, qualifying itself as a Markov process.

A main limitation of the previous section is that the choice of variables used to control for the state of the economy, albeit still relevant to my type of analysis, are influenced by the erstwhile paper by Chen et al. (1986). The macroeconomics literature has vastly widened since then, and I believe that – in addition to the rate of unemployment, the industrial production, and inflation – capacity utilization and housing starts are also relevant to this analysis as control variables, as suggested by Wu and Xia (2016).

A central shortcoming of the next section is that the methodology is, however, subject to an endogeneity bias – notably, monetary policy shocks extracted from structural VAR models or from changes in interest rates using quarterly frequencies are unlikely to be purely exogenous. There may well be a feedback effect whereby policymakers are themselves influenced by what is happening to the stock market. This fact explains the choice of a VAR(1) with one period lags that are aimed at resolving the endogeneity issue.

I calculate returns as the log-difference of the quarterly closing quotes. Higher frequency data might capture overreaching effects that quickly disappear, thus not representing in my view a good proxy for the equity market response to policy shocks.

In the previous section, I qualify periods of financial distress as major drivers of the phenomenon to such an extent that, when considering subperiods that are less affected by both the negative trend and cyclical components of stock prices – as filtered out by means of the CF Filter – the anomaly disappears. Therefore, I would opt for temporarily widening the scope of my analysis to consider a greater number of business cycles. Finally, the use of stock prices rather than stock returns, thus not conforming to previous frameworks (Ehrmann and Fratzscher, 2004), is hard to justify even though evidence points to stationarity of level values of stock prices. However, I plan not to revolutionize the frameworks for this kind of analysis again and therefore investigate responses in stock returns.

1.3 The Leverage Effect under Varying Market Conditions: An Extensive Literature Review

1.3.1 Introduction

The leverage effect is defined as the negative correlation between the first two moments of a series of stock returns because of corporate leverage alterations. Many scholars have tried to point out the causal mechanism behind this phenomenon. The existence of a volatility asymmetry – citing Engle and Ng (1993) – becomes concrete in the form of this correlation, whereby negative (positive) returns are generally associated with upward (downward) revisions of volatility. Although it now appears as a well-documented empirical phenomenon, its determinants are still debated. Two main competing explanations coexist, but they are not mutually exclusive.

With financial leverage defined as debt over total equity, the first explanation backs up the idea that a drop in stock value mechanically increases financial leverage and the associated probability of bankruptcy, thereby making stock riskier and increasing its volatility. This theory is known as the leverage effect. The hypothesis that financial leverage can explain the leverage effect was discussed by Black (1976) and later by Christie (1982).

The second explanation refers to the existence of time-varying risk premia (Pindyck, 1984; French, Schwert and Stambaugh, 1987). If volatility is priced, an anticipated increase in volatility raises the required return on equity, leading to an immediate stock price decline. Two prevailing tenets frame this explanation, namely the unarguable persistence of volatility innovations and a positive intertemporal relation between expected return and unconditional variance. The increased volatility raises expected returns and lowers current stock prices. The appeal of this theory – known as time-varying risk premia theory – is that it can help explain the tendency of stock returns to be negatively skewed. Nevertheless, the hypothesis of correlation between returns and volatility has not been exempt from criticisms (Poterba and Summers, 1988), although nowadays it appears as a documented empirical fact.

The negative correlation between returns and volatility could be stronger during crisis periods, when volatility stabilizes itself on higher level, whereas stock returns exhibit persistent negative strings. To challenge this idea, I investigate the period of 2000–2020, which is characterized by various crises (e.g., the Dot-Com Bubble, GFC, Greek sovereign debt crisis). A stronger negative correlation between the two moments during crises may be interpreted as indirect evidence that such a correlation is driven by the concomitant effect of both operating and financial leverage, as well as irreversibility constraint. This is because a higher leverage implies higher distress risk, regardless of the market conditions – but its perception is stronger during bad times, thus inducing investors to dispose of stocks and generate volatility. In other words, investors are aware that during crises, leverage is likely to operate as a negative multiplier. The difference in the results (e.g., Engle and Siriwadane, 2018) from previous findings (e.g., Duffee, 1995) would then root in the period selection rather than in the estimation technique used.

On the one hand, corporate finance literature gravitates toward the concept that financial leverage and operating leverage magnify systematic risk (Lev, 1974). On the other hand, volatility has been in the limelight for its implication in the field of risk management, the relevance of which has increased exponentially over years. Market conditions, in turn, can influence leverage and volatility. Theory suggests (Ericsonn et al., 2016) that expected returns, asset volatilities, and leverage dynamics are jointly determined. Business cycle factors (e.g., industrial production growth) (Corradi et al., 2013) largely explain volatility levels and fluctuations. Real macroeconomic variables are more volatile during recessions (Schwert, 1989; French and Sichel, 1993), to the point that Hamilton and Lin (1996) asserted that economic downturns are the primary factor driving fluctuations in the volatility of stock returns.

My contribution is empirical. I try to shed further light on a topic that many scholars have investigated – the leverage effect – while striving to innovate by focusing on crises. Crises have rarely been identified as major determinants of the leverage effect. I rely on a model drawn from financial econometrics literature – a Markov-switching GARCH model – while devolving my attention to a specific parameter of the model and its behavior under varying market conditions.

I find that the leverage effect is indeed stronger during periods of financial distress. Provided that financial leverage is countercyclical – which seems to be the most accepted stance among scholars – I obtain indirect supporting evidence that financial leverage is the driver of the leverage effect.

Before shifting my focus to interpreting and commenting on the empirical results, I present an overarching review of the literature, which is the core point of strength of this paper. My review highlights that the matter is controversial to the extent that the significance of the correlation between the first two moments of a series of stock returns seems to be dataset dependent. Also, the causal mechanism leading to this correlation is not well established, because two competing hypotheses coexist. After exploring the dynamics linking volatility and leverage, I proceed with an analysis of two European indices. The novelty is in my application of a relatively recent model (Markov-switching GARCH model) to cast light on a long-standing topic, notably the leverage effect.

The paper is organized as follows: Section 1.3.2 contains an extensive literature review focusing on the major hypotheses explaining the leverage effect, on the prominence of both operating and financial leverage in determining returns and returns volatility, and on the effects of the business cycles on these variables (i.e., returns, returns volatility, and corporate leverage); Section 1.3.3 formulates the hypothesis. Section 1.3.4 describes the data and the methodology while bringing insight into the underlying reasoning framing the analysis; Section 1.3.5 reports the empirical results; and Section 1.3.6 concludes.

1.3.2 Literature Review

1.3.2.1 Framing the Competing Mechanisms

The scholarly debate surrounding the leverage effect pivots on two broad mechanisms. The financial leverage channel asserts that negative price shocks mechanically raise a firm's debt-to-equity ratio, thereby magnifying equity volatility. By contrast, the time-varying risk premia channel – popularized through "volatility-feedback" models – argues that investors demand higher expected returns when perceived risk intensifies; the consequent increase in discount rates simultaneously depresses prices and elevates volatility. A growing body of evidence hints at a hybrid interaction in which leverage and risk premia reinforce (or partially offset) each other, particularly during crisis regimes. My hypothesis – that the leverage effect strengthens during periods of financial distress – therefore hinges on identifying which of these forces dominates when leverage is demonstrably countercyclical.

1.3.2.2 Financial Leverage Dominance

Black (1976) and Christie (1982) laid the conceptual cornerstone by demonstrating an inverse relation between equity returns and conditional variance which intensifies as leverage rises. Their pioneering insights frame volatility as an asymmetric "mirror" of changing capital structure: a falling equity base inflates the debt-to-equity denominator, mechanically widening the variance of residual equity claims. Subsequent work, notably Booth et al. (1997), verified that this asymmetry is more pronounced for negative price moves, consistent with the leverage amplification hypothesis. Yet, even within this tradition, evidence of incomplete explanatory power emerges. Schwert (1989) acknowledged that leverage explains a significant, but not exhaustive, fraction of market-wide volatility – hinting at additional latent drivers. Recent advances such as the Structural GARCH model of Engle and Siridawane (2018) quantify the mechanical share of volatility more precisely, finding it material but far from dominant. Choi and Richardson (2016) further reveal that declining asset volatility can offset rising leverage, dampening the aggregate leverage effect and rendering it conditional on firms' asset risk profiles. In sum, the leverage channel commands empirical support, but its potency appears contingent on both firm-specific capital structures and the prevailing macro-state.

1.3.2.3 Time-Varying Risk Premia (Volatility Feedback)

Contrasting this mechanistic view, Pindyck (1984) posited that volatility shocks elevate the economy-wide price of risk, pulling valuations down even for modestly levered firms. French, Schwert, and Stambaugh (1987) provided compelling evidence: unexpected increases in conditional volatility were met by contemporaneous negative return innovations, signaling hikes in required risk premia. The econometric vehicle underpinning these findings – the GARCH-in-Mean specification of Engle, Lilien, and Robins (1987) – hardwires conditional variance into the mean return, capturing precisely the dynamic my hypothesis must disentangle from leverage. Later, regime-switching models deepened the story. Whitelaw (1994, 2000) demonstrated that the sign of the return–volatility correlation flips across business cycle regimes: negative in high-volatility (recessionary) states and positive in tranquil expansions. Macro-finance extensions by Mele (2007) and Engle (2008) attribute this cyclicality to discount-rate movements that respond asymmetrically to good and bad economic news. Thus, the volatility feedback channel predicts a crisis period surge in the leverage effect statistic, even absent leverage spikes – an empirical nuance my tests are designed to capture.

1.3.2.4 Interaction and Conditional Offsetting

Empirical work that integrates both channels shows the relationship is neither additive nor linear. Duffee et al. (1995) reported strong positive contemporaneous return–volatility links at the individual firm level that wash out – or invert – at the aggregate index level, suggesting hidden interaction terms. Carr and Wu (2017) refined the picture by distinguishing between passive and active capital structure managers: the former exhibit leverage-dominated asymmetry, whereas the latter's frequent rebalancing mutes mechanical effects and leaves volatility feedback as the primary driver. Whitelaw (2000) offered yet another wrinkle: once equity prices collapse sufficiently, percentage volatility gains can attenuate because the nominal equity base is too small to amplify further – an intrinsic cap on the leverage channel. Collectively, these studies imply that crisis state tests must allow for nonlinearities, potential attenuation at extreme leverage, and heterogeneity in rebalancing behavior.

1.3.2.5 Macroeconomic Context: Leverage Cyclicality and Crisis Regimes

The empirical prerequisite for my identification strategy is that leverage tends to rise in downturns – a stylized fact documented from Hickman (1953) through Halling et al. (2016). Korajczyk and Levy (2003) showed that financially unconstrained firms drive this countercyclicality, exploiting depressed equity prices to substitute toward cheaper debt. Begenau and Salomão (2018) provided nuance to this by firm size: smaller, growth-oriented firms behave pro-cyclically, whereas large incumbents increase leverage as recessions bite. Overlaying these patterns is the equally robust finding that aggregate volatility is itself countercyclical (Officer, 1973; Moreira and Muir, 2017). Engle's (2008) trend-GARCH model captures the long-run component of this volatility, and Mele (2007) attributes its amplification to asymmetric risk-premium dynamics. These macro facts justify the Markov-switching GARCH framework I adopt: crises are formalized as high-volatility regimes in which leverage mechanically rises, allowing me to test – within-regime and cross-sectionally – whether leverage or risk premia govern the strengthened correlation.

1.3.3 Hypothesis Formulation

I wish to end the debate about whether the leverage effect is induced by leverage, time-varying risk premia, or both. To this end, I test whether the leverage effect is more pronounced during times of financial distress. In this case, provided that leverage is countercyclical as suggested above, if the leverage effect becomes more pronounced in the cross section of firms, then I can qualify that as indirect evidence corroborating the hypothesis that financial leverage alone determines the so-called leverage effect.

Hypothesis 1: *The leverage effect is more pronounced during times of financial distress.*

I expect that this more pronounced leverage effect holds during crises regardless of whether markets are efficient or not, if leverage is driving the relationship.

Yet, there is one caveat: despite the well-known magnifying effect of leverage, I expect higher leverage to attenuate the downwards price adjustments arising when market operators decide to sell the stock in the aftermath of a negative demand shock. Under these specific circumstances, investors may, in fact, still perceive leverage as a positive factor. In fact, in the case of a negative demand shock, stocks aggregate demand decreases, prices fall, and for a given level of leverage, if high, the reduction in the denominator affects the ratio of levered firms in a more contained way. Therefore, although firms' riskiness increases and volatility follows, an increase in volatility is lessened by the high starting level of leverage; the latter then acts as a mitigating element.

An alternative prospective reason for the concomitant persistence of negative stock returns and higher volatility for levered companies – documented by, among others, Kent and Moskowitz (2016) – stems from the "panic states" that the crisis causes, leading to crashes of momentum strategies. During such periods, market operators and analysts become more active (Loh and Stulz, 2018), thus increasing the number of transactions. The increased number of transactions creates room for disagreement among agents, thereby leading to volatility (Cujean and Hasler, 2017). As volatility and attention increase, people tend to overreact to innovations, but prices become less informative (Peng and Xiong, 2006), and the general tendency is to get rid of stocks to obtain liquidity. Hence, the supply increases while the demand decreases and stocks prices fall, resulting in persistent negative stock returns.

I cannot run a standard OLS regression involving returns volatility and leverage because it would certainly suffer from omitted variable bias and endogeneity problems, making the matter difficult to tackle. Instead, I must rely on the indirect evidence provided by a proxy for the volatility–leverage connection – namely the correlation between returns means and volatility – in a context where I exploit the property of leverage of being countercyclical to infer whether financial leverage causes the leverage effect.

I employ a GARCH-type model for the time series of two stock market indices with a regime switch for periods with higher volatility. A stronger correlation during crisis periods would corroborate that leverage is a driver of stock prices volatility, assuming markets are efficient – with the caveat above regarding the negative demand shock. If markets are not efficient, the correlation would suggest that irrational behaviors govern the markets, with sentiment leading to co-movements and co-jumps of stock returns.

1.3.4 Methodology

My main interest is in the relationship between leverage effect and periods of downturn, which, by tautology, are characterized by negative returns. I therefore employ a GARCH-type model with regime switching to test whether the correlation between the first two moments of returns is stronger during higher volatility periods. Crucially, I do not investigate the unobservable inherent causes determining the regime switches, but instead model the higher level of volatility arising during the crisis periods.

A Markov process governs movements of the state variable across regimes:

$$\text{P}[\text{a} < y_t \leq \text{b} | y_1, y_2 \ldots y_{t-1}] = \text{P}\ [\text{a} < y_t \leq \text{b} | y_{t-1}] \tag{9}$$

According to Hamilton's filter (1989), the series of observed returns can be shown to evolve as follows:

$$y_t = \mu_1 + \mu_2 z_1 + (\sigma_t^2 + \phi z_1)^{1/2} u_t, \tag{10}$$

Where $u_t \sim \text{N}(0,1)$ and z_t evolves as an AR (1) process:

$$z_t = (1 - p_{11}) + \rho z_{t-1} + \eta_t \tag{11}$$

Where p_{11} is the probability of being in regime 1 given that the system was in regime 1 during the previous period, whereas p_{22} denotes the probability of being in regime 2 given that the system was in regime 2 during the previous period.

I test whether the series of subsequent changes in volatility undergoes the same switch during the GFC as the series of observed returns.

Denote by $\Im_{t-1}$ the information set observed up to time t−1.

$$y_t \,|(S_t = \text{k}, \Im_{t-1}) \sim D_k(0, h_k, \xi_k) \tag{12}$$

Where y_t represents the series of returns and ξ_k a vector of additional shape parameters.

The integer-valued stochastic variable s_t, defined on the discrete space {1, 2}, characterizes the Markov-switching GARCH model.

The conditional variances h_{kt} are assumed to follow K separate GARCH-type processes. The underlying assumption is that K = 2.

The most suitable GARCH model specification, given the asymmetric feature of stock returns volatility, is the one provided by Glosten, Jagannhatan, and Runkle (1993):

$$h_{k,t} \; \equiv \; a_{o,k} \; + \; (a_{1,k}, + a_{2,k}, I\{y_{t-1} < 0\})y_{t-1}^2 \; + \; \beta_k h_{k,t-1} \tag{13}$$

For k = 1, 2, where I{·} is the indicator function taking value one if the condition holds, and zero otherwise.

Finally, the underlying distribution assumed for the data is the t-distribution, given the fat tail properties observed in raw data.

I focus on a relatively long period (2000–2020), including the main two crises – the Dot-Com Bubble and the GFC – and various sub-crises, such as the Greek sovereign debt crisis and the post-Brexit announcement crisis, which are specific to the sample I use. I check whether the correlation between the first two moments of returns is stronger during such crises. The rationale is that a stronger correlation entails awareness of the counterproductive effect of both operating and financial leverage under negative market conditions, inducing investors to dispose of the stock and generating price adjustments which, in turn, give birth to higher volatility throughout the crisis period. Alternatively, the sentiment might drive the co-movements in returns and co-jumps in volatility (Staumbagh and Yu, 2015).

1.3.5 Empirical Results

1.3.5.1 The Leverage Effect during Crises

The empirical analysis is carried out with the help of a vast tool kit. Both R programming language 3.6 and Stata SE 16 are used. Data is downloaded from Thomson Reuters Eikon (formerly Datastream). The dataset includes the STOXX 600 index and the MSCI Index over the period from October 2000 to October 2020. The images above are produced by relying on the package Markov-switching GARCH embedded in R programming language and adjusted using Adobe Illustrator 2018.

Figure 21 shows the conditional volatility evolution estimated by the Markov-switching GARCH model, as specified in Section 1.3.4. The data frequency is daily. Some spikes can be seen. The first ones arise in the period known as the Dot-Com Bubble (2002–2003), then in the aftermath of the Lehman Brothers crisis (2008–2009). The period from 2010 to 2013 is also turbulent, probably because of the Greek sovereign debt crisis. The spikes during 2016 might be due, instead, to the announcement of Brexit. Having said that, the highest spike is in 2020, when COVID-19 unleashed its devastating effects on the economy.

Figure 21 captures the switches between the two regimes. I find supporting evidence that volatility clusters are an empirical fact. Volatility tends to show persistence, whereby periods of calm are followed by periods of prolonged turbulence. From the above figures, I can infer that calm periods manifest in the aftermath of the Dot-Com Bubble (2005–2006), before the announcement of the Brexit (2014) and thereafter, and prior to the COVID-19 outbreak (2016–2019).

Following Moreira and Muir (2017) and Paye (2012), I qualify periods of financial distress as those with higher volatility.

The unconditional volatility of state 1 of the STOXX Europe 600 index (0.117) is lower than the unconditional volatility of state 2 (0.21). *Alpha 2,1* and *Alpha 2,2* – which represent the leverage effect – are statistically significant, and the higher t-value of regime 2 compared with regime 1 provides a confidence boost regarding the significance of the leverage effect in regime 2, the lower coefficient notwithstanding (0,17 vs 0.273). The results are intriguing, albeit highly likely to be interpreted subjectively, calling for further research.

Finally, I can measure the STOXX Europe 600 index volatility persistence, which is equal to $alpha_{1,1} + \frac{1}{2} alpha_{2,1} + beta_1$ = 0.9 in the case of the first regime, and to $alpha_{1,2} + \frac{1}{2} alpha_{2,2} + beta_2$ = 0.975 in the case of the second regime.

In summary, the first regime of the STOXX Europe 600 is characterized by: (i) lower unconditional volatility, (ii) less significant leverage effect, and (iii) lower persistence of the volatility process compared with the second regime.

The results related to the MSCI do not seem to deviate much, featuring, in fact, a lower unconditional volatility in state 1 (0.12) compared with state 2 (0.23). The leverage effect is significant in both states, and it manifests itself with a lower coefficient in state 2 (0.152) than in state 1 (0.214), associated with a lower standard Error (0.018 vs 0.045). Overall, it appears more significant in state 2.

The volatility persistence during the first regime (0.88) is lower than that over the second regime (0.98), thus leading me to conclude that the first regime is characterized – like the STOXX

Europe 600 – by: (i) lower unconditional volatility, (ii) less significant leverage effect, and (iii) lower persistence of the volatility process compared with the second regime.

In summary, I can state that (i) the leverage effect is significant when considering the last two decades, (ii) both conditional and unconditional volatility are higher during periods labeled as crises, and (iii) evidence of a stronger leverage effect during crises is not overwhelmingly convincing, even though a tendency in this direction can be noted. The third point might be due to a lower autocorrelation of returns compared with volatility autocorrelation, whereby, although volatility clusters protract over the long run, strings of negative returns are not so persistent. That is, the stochastic component is more prevailing for returns' first moment than for returns' second moment. In addition to the caveat about the demand shock mentioned above, this last fact can disguise the stronger relationship between the first two moments of stock returns in the cross section during periods of financial distress.

1.3.6 Conclusion

I provide an extensive review of the literature which for several years was characterized by controversies around the leverage effect, before reaching a consensus that there is a significant negative correlation between the first two moments of stocks' returns. This correlation is due to the dual effect of financial leverage, which plays a positive role during positive market conditions and a negative one during periods of downturn.

I decompose the market conditions into two categories according to the level of volatility characterizing stock returns. During negative market conditions, represented by a high level of volatility, the leverage effect appears slightly more pronounced than during positive market conditions – in line with what intuition would suggest. Yet, the effect is not much stronger by virtue of a mitigating mechanism. That is, volatility persistence is higher than returns persistence.

Overall, my evidence confirms that there is a leverage effect and that both conditional and unconditional volatility are higher during those periods labeled as crises. The main limitation is that the paper does not directly investigate the causal mechanism whereby the leverage effect is driven by the degree of corporate leverage with a tailored model. The reluctance to develop a model must be seen as a fear of running into endogeneity problems. The main contribution instead, in my opinion, is represented by the literature review, which is the most exhaustive since the paper by Bakaert and Wu (2000).

1.3.7 Appendix

Figure 21. Conditional Volatility and Regimes' Identification

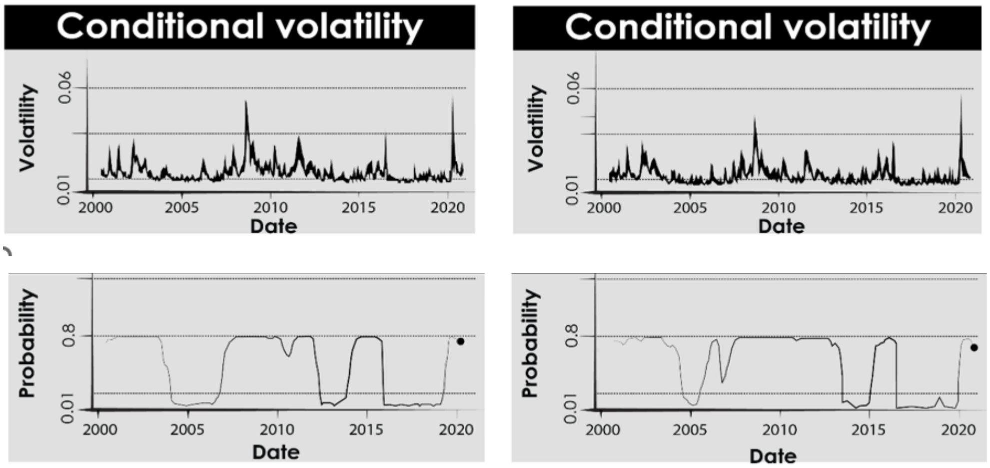


Figure 21 displays the filtered (conditional) volatility of the overall process (top graphs) for the STOXX Europe 600 index (top-left graph) and the MSCI Index (top-right graph) as well as the smoothed probabilities of being in regime two (high unconditional volatility regime), superimposed on the STOXX Europe 600 index log returns (bottom-left graph) and on the MSCI Index (bottom-right graph).

Table 8. Markov-Switching GARCH: The STOXX 600

	STOXX 600		Obs. 5220	
	Coefficient	Std. Error	t	p
Alpha 0,1	<0.001	<0.001	5.21	<0.001
Alpha 1,1	<0.001	<0.001	0.035	0.486
Alpha 2,1	0.273	0.0437	6.25	<0.001
Beta 1	0.77	0.032	23.97	<0.001
Nu 1	9.65	1.18	8.16	<0.001
Alpha 0,2	<0.001	<0.001	4.14	<0.001
Alpha 1,2	<0.001	<0.001	8.65	<0.001
Alpha 2,2	0.17	0.02	8.65	<0.001
Beta 2	0.89	0.0113	78.8	<0.001
P 1,1	0.99	<0.001	>1000	<0.001
P 2,1	0.0012	<0.001	1.60	0.054

Table 8 features the output of the Markov-switching GARCH model on the time-series data represented by the STOXX 600 market index. The data frequency is daily. The data period covers 20 years from 2000 to 2020. The leverage effect in the lower volatility regime is subsumed by the parameter Alpha 2,1 whereas, in the higher volatility regime, it is subsumed by the parameter Alpha 2,2.

Table 9. Markov-Switching GARCH: The MSCI Europe

	MSCI Europe		Obs. 5219	
	Coefficient	Std. Error	t	p
Alpha 0,1	<0.001	<0.001	3.96	<0.001
Alpha 1,1	<0.001	<0.001	>1000	<0.001
Alpha 2,1	0.214	0.045	4.77	<0.001
Beta 1	0.775	0.046	16.73	<0.001
Nu 1	9.27	1.09	8.46	<0.001
Alpha 0,2	<0.001	<0.001	3.65	<0.001
Alpha 1,2	<0.001	<0.001	0.038	0.484
Alpha 2,2	0.152	0.018	8.16	<0.001
Beta 2	0.907	0.010	83	<0.001
P 1,1	0.99	0.001	703	<0.001
P 2,1	0.001	<0.001	1.57	0.058

Table 9 features the output of the Markov-switching GARCH model on the time-series data represented by the MSCI Europe Index. The data frequency is daily. The data period covers 20 years from 2000 to 2020. The leverage effect in the lower volatility regime is subsumed by the parameter Alpha 2,1 whereas, in the higher volatility regime, it is subsumed by the parameter Alpha 2,2.

2 Credit, Governance, and the Power of Affiliation

2.1 Conceptual Framework

Chapter 2 explores how a firm's governance structure determines its capacity to cope with financial distress. The key feature of that structure is the presence of an affiliated creditor on the board (ACB) – that is, a director whose professional allegiance is primarily to the firm's main lender rather than to its shareholders. The analysis begins with the onset of distress, identified empirically by a low interest coverage ratio. In that situation, lenders face a higher expected loss should default occur. They typically react in two complementary ways: first, they charge a higher risk premium, which appears as an increase in the loan's interest expenses; second, they seek greater control by nominating an ACB, thereby reinforcing monitoring at the board level. These two responses move the firm along distinct but connected margins. The higher interest expense raises the cost of debt, making new borrowing less attractive just when the firm is most vulnerable. At the same time, the ACB's presence allows creditors to block financing decisions that would further enlarge leverage. Consequently, leverage growth slows or, in some cases, reverses. Although this heightened oversight is costly in the short term – both in the literal sense of a higher cost of debt and in the strategic sense of tighter managerial discretion – it serves an insurance function for creditors and helps stabilize the firm's capital structure. The cost–benefit profile changes once the firm restores its solvency above a critical threshold. At that point, the certification value of having a creditor-representative on the board exceeds the direct cost of reduced managerial autonomy. Lenders now regard the ACB as evidence that credible monitoring mechanisms are in place and, as a result, begin to lower the risk premium previously embedded in the interest expense. Meanwhile, the board's continued oversight facilitates a measured reduction in leverage, guiding the firm toward a more sustainable capital structure target. In effect, the ACB evolves from a defensive safeguard during the distress phase into a positive signal of governance quality during recovery. This chapter therefore argues that the economic value of creditor representation is inherently state dependent. In distress, the arrangement primarily protects lenders and disciplines managers, albeit at a higher financing cost. After recovery, it serves as a seal of creditworthiness, unlocking cheaper funding. Certification and control should thus be viewed not as intrinsically beneficial or harmful, but as contingent tools whose net impact shifts with the firm's passage from distress to solvency.

2.2 Emerging from the Abyss under the Guidance of the Creditor on Board

2.2.1 Introduction

Since the publication of the pioneering paper by Jensen and Meckling (1976), the behavior of firms has been described as the outcome of a complex equilibrium process, whereby individuals try to maximize their own utility functions. This categorization enables me to pinpoint that those individuals can incur conflicts of interest. For instance, managers are interested in the decisions regarding how their firm needs to be funded and the appointment of top management, whereas creditors strive to make sure that their loans will be repaid.

I empirically demonstrate that the apparent dichotomy between the interests of managers and their creditors tends to end with a well-identified solution, namely the appointment of one or more creditors to the board of directors of the borrowing company. Nevertheless, this practice is not a panacea – it tends to be employed under specific circumstances, namely when firms need help because they are approaching or already in financial distress.

In the case of such a contingency, a competent external adviser is vital to guaranteeing business continuity. With the aim of conducting their advising function in the best possible way, the external adviser can become more deeply involved in the firm dynamics by being appointed as a board member. In this way, they can gain insight into the specific problems that the parties (i.e., managers and creditors) need to address to avoid the firm defaulting on its debt.

Two questions arise: does the presence of a creditor on the supervisory board reduce leverage levels so that firms can restore their soundness, and does it reduce the cost of debt? These empirical questions are important to understand whether creditors can help firms to recover when they are facing difficulties.

I aim to shed light on the underlying mechanisms that appointing creditors determines within the sphere of the lending relationship, with particular emphasis on the cost of debt and on the degree of financial leverage of the borrowing firm resulting from such an appointment.

The appointment of the creditor on the board is not exogenously determined – instead, it strongly rests on the firm's internal dynamics, thereby posing serious endogeneity concerns when estimating my model with the aim of deriving the causality mechanisms that the appointment of a creditor on the board can trigger on outcomes (i.e., leverage and cost of debt). In my context, this is because I may not be able to interpret the causal effects of the presence or the appointment of a creditor to the board on my outcomes. Since high-leverage firms are more likely to adjust their leverage to a lower value, it is hard to establish if the treatment induced the adjustment or if the firms relying on the appointment of the creditor had higher leverage pre-treatment to determine the adjustment. I introduce a discontinuity design to tackle the endogeneity problem. If firms are approaching financial distress – as indicated by levels of interest coverage ratios below a threshold – it is possible to elicit the local treatment effect of appointing a creditor to the board by comparing firms around that threshold. Provided that high-leverage firms with low interest coverage ratios draw on this intervention, then if these firms heterogeneously adjust their leverage pre- and post-threshold, I can infer that it is indeed the treatment that causes such a heterogeneity.

The practice of appointing a creditor on the board appears to be consolidated in the industry. However, the related corporate governance literature (Hasan et al. 2021, Zhao et al. 2021, Ferreira et al. 2018, Erkens et al., 2014, Hilscher and Sisli-Ciamarra, 2013, Sisli-Ciamarra, 2012, Byrd and Mizruchi, 2005, Kroszner and Strahan, 2000, Booth and Deli, 1999) does not investigate this phenomenon thoroughly in terms of the implications that nominating a creditor on the board of the borrowing company has on the cost of debt and more generally on the progress of the lending relationship between the parties.

The board of directors plays an intermediary role between the firms' shareholders and the management team. According to the American Bar Association's Corporate Laws Committee (1994), boards must review and approve fundamental operating and financial decisions, as well as other corporate plans and strategies (Adams and Ferreira, 2007). The composition of the board of directors might influence key decisions, including the financial leverage determination, of which the presence of a creditor among board members appears to be a factor (Byrd and Mizruchi, 2005). In Germany, for instance, the corporate governance system is influenced considerably by the proactive role of banks in shaping governance apparatuses (Thomsen and Conyon, 2012). Banks play the same role as that of large shareholders in the Anglo-Saxon model by monitoring the firm. As a result, banks in Germany typically have representatives on a firm's supervisory board.

The presence of a creditor in the supervisory board can help confine information asymmetries by mitigating ex post: (i) the moral hazard risk, and ex ante (ii) the adverse selection problem. A creditor presiding over the supervisory board contributes to reducing information asymmetries between creditors and firms' top management, whereby: (i) managers are impeded from taking excessively risky decisions such as keeping leverage above an optimal level, and (ii) the choice of providing further credit is subject to the case wherein the creditor is reassured of future solvency of the firm.

Even though creditors' representatives and the interests of firms' managers are not always aligned, they share the objective of ensuring the long-term survival and stability of the firm. A creditor within the board (for consistency with the literature, I refer to creditors on the board as affiliated creditors or affiliated bankers henceforth) has access to privileged internal information; they might threaten to deny future funds, thereby exercising strong influence on incumbent managers. Alternatively, creditors' representatives might ask ex ante for strong guarantees by subordinating the funds' concession to stipulation of covenants.

The initial intent of my paper is to determine whether the presence of an affiliated banker contributes to lower book and/or market leverage, as in Byrd and Mizruchi (2005). Although my analysis commences by addressing the same research question, not only do I rely on different data sources – widening the analysis to approximately 15,000 firms in the US – but I also rely on different approaches to mitigate the risk of endogeneity (NNM in addition to the instrumental variable approach). I deviate in terms of control variables used, too – although, following the same logic as Byrd and Mizruchi, I add a control for the risk of financial distress. However, regarding the second research question, to my knowledge, my paper is a frontrunner in investigating if appointing an affiliated banker to the board of directors contributes to lower cost of debt by using a quasi-experimental design.

I then investigate the temporal dynamics of the borrowing relationship by identifying the point in time at which the creditor is appointed on the board of the borrowing company and when the borrowing agreement is stipulated. The study of those events is instrumental to the explanation of the causal mechanism that leads to the financial leverage decreasing, which I witness as result of my initial examination. I wish to understand if the appointment of the creditor is the main driver of this result, even when considered as a stand-alone factor.

Finally, I extend my analysis to consider different dependent variables, as recommended by Byrd and Mizruchi (2005). On the wave of my results, I determine if the certification role that affiliated bankers seem to deploy subsumes improved governance, with Tobin's Q as my proxy for governance quality. I measure the impact of the presence of a creditor on the board on the dividend policy and on research and development (R&D) expenditures to establish what interests – whether those of the creditors or the shareholders – such creditors appear to serve more unswervingly.

With the aim of solving the self-selection bias that would characterize the analysis, Sisli-Ciamarra (2012) draws on the Heckman selection model while Hasan et al. (2021) and Erkens et al. (2014) rely on propensity score matching. Other common techniques consist of using instrumental variables (Erkens, 2014, Byrd and Mizruchi, 2005). Although I acknowledge the merits of such estimation techniques, I start my investigation by NNM (also known as greedy matching), thereby obtaining preliminary results. I complete the analysis by modeling the nonlinearities in the relationships between the variable of interest (i.e., affiliated banker) and the outcomes (i.e., cost of debt, dividend payout) through a threshold regression.

I find that the presence of an affiliated banker on the board imposes a downwards pressure on market leverage. This result is less clear in the case of book leverage. Overall, this finding is neither counterintuitive nor easily predictable. While it is true that affiliated bankers on boards might restrain managers from risking jeopardizing the solvency of the firm by increasing leverage to achieve short-term objectives, it cannot be refuted that the presence of an affiliated banker could favor the establishment of a borrowing relationship, thus potentially reversing the direction of the pressure.

I logically infer that banks do not propose to appoint their representatives randomly but rather when firms are prone to bankruptcy. Bankers stipulate more onerous loan conditions with firms that are forced to have a bank representative within their staff if they want to avoid a worsening financial situation (i.e., default).

Even though I follow a relatively consolidated approach to preprocess the data (i.e., one-to-one NNM) and well-established estimation technique (i.e., firms FE, threshold regression), the hypothesis whereby *the presence of a creditor on the board contributes to cost-of-debt reductions in favor of the borrower* is novel, to my knowledge, and the relationship between the cost of debt and affiliated bankers is a quasi-unexplored topic. I further explore the topic to extricate the causal dynamics that tie this study's outcomes and the variable of interest. For future research, one could draw on an instrumental variable approach to isolate the average treatment effect of the presence of a creditor on the board on book leverage, market leverage, and the cost of debt.

The paper consists of five sections. Section 2.2.1 introduces the topic and the main research questions that I strive to address. Section 2.2.2 reviews the extant literature. Section 2.2.3 offers a deep dive into the methodology implemented and the data used. Section 2.2.4 discusses the empirical findings. Section 2.2.5 extends the empirical analysis to address additional research questions related to the impact of affiliated creditors on the firm's market valuation, dividend policy, and R&D expenditure. Section 2.2.5.5 describes the role of nominating committees in appointing board members. Finally, Section 2.2.6 concludes by reiterating the main results and their implications.

2.2.2 Literature Review

2.2.2.1 Affiliated Bankers

Booth and Deli (1999) emphasize the prominence of financial expertise within the board of a firm. Commercial bankers (i.e., top executives of commercial banks) on a board appear to facilitate identifying short-term, long-term, and aggregate bank debt. Booth and Deli (1999) distinguish between affiliated commercial bankers – who maintain a contractual relationship with the firm as creditors – and unaffiliated ones.

Kroszner and Strahan (2000) shed light on the interdependence between firms' characteristics and the presence of a banker on the board. Firms with bankers on their board tend to be large and stable, with a higher level of tangible assets and a lower level of short-term financing in their capital structure. Kroszner and Strahan also delve into the benefits–costs trade-off of a banker on the board. According to them, on one hand, the willingness of an affiliated banker to become a board member might signal to the market that the firm is sound, thus playing a certification role. On the other hand, the different payoff structures associated with debt and equity lead to divergent interests in how each would prefer the firm to be run: a banker would strive to minimize the risk of default, while shareholders would tend to maximize expected returns. Finally, Kroszner and Strahan emphasize how the capital structure of the firm can provide information about the value of a close bank relationship, because managing a higher proportion of debt might require a higher degree of financial expertise, thus rendering the certification role more prominent.

The paper by Byrd and Mizruchi (2005) investigates the relationship between financial leverage and bankers on the board. Byrd and Mizruchi find that affiliated bankers on boards with a lending relationship with the firms influence the leverage determination, while the impact of other bankers depends on the probability of financial distress. They also identify that bankers on boards accomplish a downwards pressure on leverage. Byrd and Mizruchi also argue, consistently with Kroszner and Strahan (2000), that bankers avoid firms wherein conflicts of interest might prospectively be a more concrete issue.

Firstly, I wish to test whether the appointment of a creditor on the board is associated with downwards pressure on leverage, as pointed out by Byrd and Mizruchi (2005). Hence, I formulate the following hypothesis:

Hypothesis 1: *The appointment of a creditor on the board of the borrowing company contributes to a decrease of book and market leverage*.

I add on this previous strand of literature – pioneered by Byrd and Mizruchi (2005) – by moving toward a type of causal inference that purports to tackle ex ante the endogeneity problem from which my analysis could suffer. Hence, not only do I use lagged values of my explanatory variables, but I also make sure that the firms are comparable in terms of size, tangibility, and operating Return on Assets (ROA), which are three major determinants of variations in the probability of finding an affiliated banker on the board of directors of a company (Kroszner and Strahan, 2000) and of variations of financial leverage (Asker et al., 2015). I prune out observations which do not fulfill these requirements in terms of similarity. This way, I end up excluding the effects of other variables that would bias my causal inference.

Sisli-Ciamarra (2012) focuses on the monitoring function that creditors on board perform. Their paper posits that if a bank holds a seat on the board of directors of a company, the amount of proprietary information that the bank has about the company would increase, monitoring will become more effective, and the cost of information collection by the bank would decrease. As a result of more effective monitoring, the company may be able to raise more debt financing and the lender may be willing to share the cost benefits with the borrower and extend credit.

Sisli-Ciamarra (2012) also demonstrates that affiliated banker-directors are associated with an increase in the amount of debt in a company's capital structure via an increase in private debt financing. Furthermore, they find that the presence of an affiliated banker on a board reduces the sensitivity of the debt ratio of a company to the amount of tangible assets that can be pledged as collateral.

In fact, the prominence of board members in exerting advising and monitoring functions is long established – as is the importance of shaping a board structure, which is tailored to the specific complexity of the firm reality (Coles, 2008).

Ferreira et al. (2018) explore the causal direction contributing to the disentanglement of the endogeneity problem that characterizes board structure and financial leverage. Their findings indicate that high-leverage firms are more likely to violate covenants. This violation would lead to the appointment of new independent directors, because contracts are renegotiated to protect creditors' control rights. The presence of affiliated bankers on boards strictly depends on the strength of creditors' rights, which materialize in the imposition of covenants. Covenant violations convey the same contractual rights to creditors as payment defaults do, including immediate repayment of principal and termination of further lending commitments (Nini et al., 2012). Covenants provide creditors with the right to initiate a renegotiation of the credit agreement, resulting in an increase of monitoring power or changes in the terms of the loan. Recent evidence (Berlin et al., 2020) shows that this is becoming an increasingly common tool to shield creditors, because almost all loans are issued with an embedded financial covenant, despite the limited incentive and ability to monitor their borrowers in the presence of a covenant-lite term loan. Overall, I can conclude from the literature that the stronger the creditors' rights, the lower the need for creditors to be represented by a member on the board.

Debt covenants are ultimately conceived to avoid transferring wealth from creditors to shareholders. The strength of creditor rights depends positively on the degree of information asymmetry between the two negotiating parties, on the cost for the lender to become informed, and negatively on the cost to renegotiate (Garleanu and Zwiebel, 2009). A borrower that violates a financial covenant is in "technical default" of the agreement, which gives the lender the right to accelerate the outstanding loan. The restrictions are efficient when the savings from lowered interest payments are more pronounced – for instance, when expected returns are low and the potential for asset substitution is high – so that the cost of abiding by the contract is lower than such savings (Nini et al., 2009).

2.2.2.2 Debt Covenants

Chava et al. (2019) investigate the growing empirical literature on debt covenants with a critical perspective. Although debt covenants always impose compliance with financial performance and capital structure requirements, they are highly moldable. According to Chava et al., extant literature includes two major fronts, whereby covenants can be grouped into two main macro-categories: financial and restrictive. Financial covenants are based on the borrower's accounting information and are generally expressed in terms of requirements of financial accounting–related disclosure and/or specification of acceptable ranges of accounting ratios. Restrictive covenants, meanwhile, more invasively shape the investment opportunity set of the borrower, posing restrictions on financial and investment activities. A restrictive covenant violation subsumes a deliberate action of the borrower, whereas violation of a financial covenant is often due to unforeseeable shocks. The difference between the two – restrictive and financial covenants – becomes more pronounced when investigating the inherent causes of the violation. Discretion is traceable only in the case of restrictive covenants, thus making this latter category a more irksome type to be renegotiated. The imposition of a debt covenant is not a panacea for lenders because even those contracts that are efficient ex ante may harm lenders' interests in some states of the world. In fact, these contracts might impair financial and operational flexibility, thus preventing the borrower from achieving the desired outcomes and paradoxically increasing the default risk (Chava et al. 2019).

The opportunity to redesign the covenant *in itinere* enables the parties to tailor the contract to the stochastic contingencies that arise. The violation of contractual clauses can determine transfer of control from shareholder to debtholders. Severe clauses are then unlikely to be accepted by borrowers and, even from the borrower perspective, the contracting decision must be guided by the trade-off between ex-ante incentive efficiency, which may require tight covenants and nonnegotiable ownership transfer, and ex-post exigibility, which may require relatively loose covenants that are reset following violations (Chava et al., 2019). Moreover, the risk that managers undertake earnings management to avoid violating the imposed restrictions should not be overlooked. Therefore, information-based covenants might trigger moral hazard instead of confining it.

2.2.2.3 Cost of Debt

The cost of debt is another matter for consideration within the context of the relationship between affiliated bankers on boards of directors and the remaining top management. The cost of debt depends primarily on general economic conditions (e.g., prevailing nominal interest rates), but it also decreases with the number of transactions between the parties (i.e., creditors and firms). Since relationship lending typically involves repeated interaction between a lender and a borrower over time, such interactions may generate "inside information" for the lender and reduce its cost of providing further loans and other services (Bharath et al., 2007). Boot (2000) defines relationship banking as: "the provision of financial services by a financial intermediary that invests in obtaining customer specific information, often proprietary in nature, and evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products." There is a trade-off between benefits and costs for both the parties involved, and ample literature exists regarding relationship lending (see Degryse et al., 2009; Kysucky and Norden, 2016; Bolton et al., 2016 for a theoretical model comparing relationship lending and transaction lending over the business cycle). Degryse et al. (2009) highlight the main literature takeaways related to the asymmetric information in the lender–borrower relationships analyzed in the literature. When a bank renews a loan contract, the renewal acts as an accreditation of the firm's ability to meet the bank obligation, thus reassuring both other funds' providers and the public. In crisis times, firms may prefer to solve their expected financial problems privately in a credit relationship, rather than damaging their reputation on the financial markets (Degryse et al, 2015). For a firm experiencing difficulties in meeting contracted loan payments, a bank can smooth interest rates and reschedule capital payments through, for example, overdraft facilities and renegotiation (Chemmanur and Fulghieri 1994).

As a result, one would expect that a banker on the board would reduce information asymmetries by producing inside information, thus potentially contributing to reducing the cost of debt. Hence, I formulate the following hypothesis:

Hypothesis 2: *The presence of a creditor on the board contributes to cost-of-debt reductions in favor of the borrower.*

2.2.3 Methodology

2.2.3.1 Data and Sample

I source data from a multitude of databases: specifically, I collect information about managers' positions within firms from the BoardEx database. BoardEx contains employment, relationship, and compensation data on boards' directors and senior managers of both publicly listed companies and private companies. The whole universe of firms within the database numbers approximately 20,000 units around the world. BoardEx covers the following four regions: North America, Europe, the UK, and the Rest of the World. I focus on the North America region, thereby collecting information for 10,390 companies.

I also collect market and accounting information about firms from CRSP and S&P Compustat database. The CRSP US Stock Databases contain daily and monthly market and corporate action data for over 32,000 active and inactive securities with primary listings on the New York Stock Exchange (NYSE), NYSE American, NASDAQ, NYSE Arca, and Bats and include CRSP broad market indexes. Compustat Fundamentals North America provides standardized financial statements and market data for over 28,000 active and inactive publicly traded companies.

I extract information regarding borrowing agreements and covenants from the DealScan database, which contains historical information on the terms and conditions of deals in the global commercial loan market.

My strategy is to collect all available data from these databases, because I know that some observations will be removed after I implement the NNM technique, thus reducing my sample size.

After implementing my merging process across the three databases, the initial dataset turns out to be composed of 247,563 firm-year observations and focuses on firms operating in the US. The period considered goes from 1995 to 2020 and involves approximately 15,000 firms. The panel data structure is unbalanced. My merging procedure smooths out distortions that can arise from relying on a unique database.

I can obtain insight into the effect of the presence of an affiliated banker on various standard corporate finance variables by investigating the descriptive statistics (Table 1, Table 2, and Table 3). Table 1 displays a breakdown of my sample by sector. I drop observations for firms belonging to the finance and insurance, utilities, and management of companies and enterprises sectors because of the peculiarities characterizing these sectors, in line with standard corporate finance practices.

2.2.3.2 Treatment and Control Group

To avoid selection bias and investigate the causality direction, I need to make sure that firms feature intergroup homogeneity. To this effect, I rely on a combination of NNM on some standard corporate finance variables (i.e., size, profitability, and tangibility) and exact matching on the industry identifier and year. Two groups of firms can be observed: those firms that received the treatment, namely the appointment of an affiliated banker or similar category, and the remaining firms that serve as a control group.

I apply NNM (Rubin, 1973) that guarantees a reduction of imbalance when used to preprocess data (Imbens, 2004). This method can complement and enhance standard regressions by increasing their efficiency. I use a matching technique for several reasons. First, previous studies have confirmed that matching methods can allow for more accurate inferences in a treatment–control group setting such as mine (Michaely and Roberts, 2012). Second, the control group is larger than the treatment group (i.e., firms featuring an affiliated banker), thus increasing the likelihood of overlap in terms of firms’ characteristics across groups. That is, close matches are more likely to be found by the matching algorithm, thereby increasing its efficiency. Additionally, both firms with affiliated bankers and firms without them share the same environment, because all firms are based in the US and subject to the same accounting requirements. The key feature of NNM is that it prunes out the unmatched controls. I employ one-to-one NNM because it is the most frequently used form of matching (Asker et al., 2015). This way, I can limit the need to make functional-form assumptions on the data to a minimum.

Following Asker et al. (2015), I match firms through the NNM technique on observed size, operating ROA, and tangibility. In addition, I exactly match on industry and year. The underlying rationale is to match across firms that are comparable in terms of amount of collateral that can be provided, size, and profitability. With the aim of tackling ex-ante endogeneity problems and establishing a clear direction of causality, I use lagged values of my explanatory variables. Otherwise, I would not be able to establish whether it is the appointment of an affiliated banker that causes the reduction of market leverage that I witness or, instead, whether the fact that the leverage has been reduced induces an affiliated banker to join the borrowing company. Similarly, I wish to be able to state clearly if the appointment of an affiliated banker causes a renegotiation of the cost of debt or if shareholders only accept a creditor within the firm after such renegotiation has been made.

I tend to employ FE at the firm level, albeit not in all models. FE control for firm-specific unobserved heterogeneity, which explains a substantial portion of the cross-sectional variation in leverage ratios (Flannery and Rangan (2006), Lemmon et al. (2008)). Year FE control for time-varying macroeconomic conditions over the sample period (Flannery et al. 2022).

Since the establishment or strengthening of a borrowing relationship and the appointment of a creditor on the borrowing company might create conflicting effects on my dependent variables, I clearly identify the point in time when these events occur. This way, I can extricate the effects of such events on book and market leverage, as well as on cost of debt, to ascertain the sign of each individual effect. Establishing or strengthening a borrowing relationship by construction produces an increase in book leverage, whereas I presume that appointing a creditor produces – albeit not immediately – a book leverage decrease. It is a different story for market leverage: the first event has a more contained – albeit still positive – effect, whereas the latter event might determine a more pronounced decrease of the financial variable.

I explicitly investigate three scenarios: in the first one, a firm takes on a loan and then a manager is appointed. In the second one, I swap the events: a manager is appointed first, and then the firm stipulates the borrowing agreement. In the third scenario, one of the two events does not occur at all. This way, I can exploit the heterogeneity in the timing of the appointment among those firms that appoint.

I rely on existing literature when choosing the set of control variables. Specifically, I follow Flannery and Rangan (2006) and control for the ratio of earnings before interest and taxes over total assets, market-to-book ratio, property plan and equipment over total assets, the natural logarithm of total assets, cash-flow volatility, and net debt issuance as defined below. Finally, I include the interest coverage ratio as proxy for the risk of default.

2.2.3.3 Model Specification

I specify the models as follows:

$$Leverage_{it} = \beta_0 + \beta_1 loan_{it} + \beta_2 ManagerinbothBoards_{it} + \beta_3 loan_{it} \bullet ManagerinbothBoards_{it} + \alpha X_{it} + \gamma_i + \mu_t + \varepsilon_{it} \quad (14)$$

$$CoD_{it} = \beta_0 + \beta_1 loan_{it} + \beta_2 ManagerinbothBoards_{it} + \beta_3 loan_{it} \bullet ManagerinbothBoards_{it} + \alpha X_{it} + \gamma_i + \mu_t + \varepsilon_{it} \quad (15)$$

I run the above model for two distinct scenarios: firstly, in the scenario where the first event is the stipulation of a borrowing agreement and the second event is the appointment of a creditor to the board; secondly, in the scenario where the first event is the appointment of a creditor to the board and the second event is the stipulation of the borrowing agreement.

I then implement a threshold regression model. The model introduces discontinuities within the regression explaining the level of the dependent variable (Dagenais, 1969). I make use of the fixed-effect panel threshold model devised by Hansen (1999). I believe that the treatment might be applied to firms that are approaching or are already in financial distress, whereby after firms undergo specific conditions (i.e., financial distress) the relationship between my dependent variables (i.e., leverage and cost of debt) and the presence of a creditor on the board may change. That is, I hypothesize that there are two regimes, separated by a threshold crossing which the relationship between my outcome and the variable of interest varies. I further hypothesize that this threshold is determined by the level of credit risk.

I rely on the interest coverage ratio to account for the credit risk of borrowing firms. To start, consider the following single-threshold model:

$$Leverage_{it} = \mu + X_{it} \, (IntCov_{it} < \gamma) \, \beta_1 + X_{it} \, (IntCov_{it} \geq \gamma) \, \beta_2 + u_i + \varepsilon_{it} \quad (16)$$

$$CoD_{it} = \mu + X_{it} \, (IntCov_{it} < \gamma) \, \beta_1 + X_{it} \, (IntCov_{it} \geq \gamma) \, \beta_2 + u_i + \varepsilon_{it} \quad (17)$$

Where $IntCov_{it}$ is the threshold variable and γ is the threshold parameter that divides the equation into two regimes with coefficients β_1 and β_2. The parameter u_i is the individual effect, whereas ε_{it} is the disturbance.

To explicitly control for the confounding effect that the prevailing level of interest rates may have on my threshold variable – the interest coverage ratio – I exploit the static nature of the level of the base rate in the US during the subperiod from 2008 to 2015, thereby narrowing the sample period to this subperiod and obtaining a balanced panel whose structure is a prerequisite to be fulfilled to fit the threshold model.

Finally, I implement the estimator proposed by Seo and Shin (2016) because I believe the true data-generating process is dynamic, as one could deduce from the relationship lending literature (e.g., Degryse et al., 2009; Degryse et al., 2015; Kysucky and Norden, 2016; Bolton et al., 2016).

$$Leverage_{it} = x'_{it}\beta + (1, x'_{it})\,\delta 1\,\{q_{it} > \gamma\} + \mu_i + \varepsilon_{it} \quad (18)$$
$$i = 1, \ldots, n;\ t = 1, \ldots, T$$

$$CoD_{it} = x'_{it}\beta + (1, x'_{it})\,\delta 1\,\{q_{it} > \gamma\} + \mu_i + \varepsilon_{it} \quad (19)$$
$$i = 1, \ldots, n;\ t = 1, \ldots, T$$

Where $\mathbf{x}_{it}$ includes a lagged dependent variable and q_{it} is the threshold variable. I assume T is fixed while the sample size n grows to infinity. Thus, I remove the incidental parameter μ_i with the first-difference transformation and estimate the unknown parameters $\theta = (\beta', \delta', \gamma)'$ through the GMM (Seo et al., 2019).

2.2.3.4 Key Variables

One of the main objectives of the paper is to determine whether the presence of affiliated bankers has statistically significant effects on the cost of debt and on the financial leverage decision-making process. An affiliated banker equals unity if such a banker serves on the boards of two companies that are tied to each other by an outstanding borrowing agreement and zero otherwise.

Affiliated bankers can prevent managers from pursuing risky investments for personal benefits or preferences (e.g., empire building), thereby aligning shareholders' and creditors' interests. This solution is characterized by the interference of creditors on the investment opportunity set of shareholders. Such interference may still contribute to maximizing both shareholders' and creditors' utility functions if shareholders greet it as an interaction from which all participants can profit (i.e., a win–win game). Cooperating may help confine the information asymmetries which, by definition, represent market imperfections. This is a classic example in which two parties – whose interests are potentially in conflict – can agree on a solution that mitigates market imperfections. The theoretical insight is that the state of the world in which the parties cooperate dominates the others. However, a potential hold-up problem may arise when two parties, despite being aware of the dominance of cooperation, refrain from cooperating because they fear that the other party's bargaining power will increase, eventually reducing their future profits. When party A has made a prior commitment to a relationship with party B, the latter can "hold up" the former for the value of that commitment.

2.2.3.5 Control Variables

The ratio of earnings before interest and taxes over total assets can serve as a proxy for profitability. The pecking order theory (Donaldson, 1961; Myers and Majluf, 1984) suggests that firms prefer raising capital, firstly from retained earnings, secondly from debt, and finally from issuing new equity. In such a circumstance, the amount of earnings available to be retained should be an important determinant of current capital structure. More precisely, firms experiencing an increase in profitability, ceteris paribus, are mechanically characterized by an increase in their assets and value. This fact leads to lower book and market leverage if the firm chooses not to either buy back shares or issue debt. With relatively high adjustment costs and/or slow adjustments, book and market leverage should appear to be negatively correlated with profitability because firm value increases before firms adjust their levels of debt. Provided that companies adjust their leverage level at refinancing point, thereby deviating from the optimal leverage, I expect to find a negative correlation between profitability and financial leverage.

High-leverage companies are more likely to pass up profitable investment opportunities (Myers, 1977). Therefore, firms expecting high future growth should use a greater amount of equity finance (Rajan and Zingales 1995), thereby rendering the market-to-book ratio inversely correlated with capital structure. This interpretation is endorsed by Smith and Watts (1992) who underpin the relevance of contracting theories in shaping the investment opportunity set (i.e., explaining cross-sectional variation in observed financial, dividend, and compensation policies).

Fischer et al. (1989) and Leland (1994) conclude that the inverse relationship between market-to-book ratios and both the observed debt ratios and the probability of debt versus equity issue choice is consistent with the trade-off and the pecking order theories. Similarly, Hovakimian (2004) states that high market-to-book firms have low target debt ratios and, therefore, are more likely to issue equity and less likely to issue debt. Issuing secured debt reduces the agency costs. Jensen and Meckling (1976) define such costs as the sum of the monitoring expenditures by the principal, the bonding expenditures by the agent, and the residual loss. From the perspective of a creditor in the presence of frictions, such as contract incompleteness and limited enforceability, tangible assets are more desirable because they are easier to repossess in bankruptcy states. Hall (2012) investigates the link between asset tangibility and leverage. Their empirical analysis indicates that the connection between asset tangibility (fixed assets as a portion of total assets) and leverage (measured as long-term debt over total assets) varies, such that in countries with fewer restrictions on collateral (i.e., land transferability), the relationship between these variables is much tighter. I then expect a positive relationship between tangibility and leverage.

Size is defined as the natural logarithm of total assets. Big firms are less prone to bankruptcy (Titman and Wessels, 1988) because they tend to diversify more, thus facing lower default risk (Frank and Goyal, 2004). Therefore, large firms can afford higher debt levels in principle. Then, I expect a positive relationship with both book and market leverage.

I measure cash-flow volatility as the rolling standard deviation on a three-year window of operating cash flows (operating income before depreciation, minus interest-related expenses, minus income taxes, minus preferred dividends) divided by total assets and truncated at zero to drop meaningless negative numbers. Since high-leverage firms are riskier, I expect cash-flow volatility to be negatively associated with financial leverage. Risk adverse managers might be tempted to reduce debt issuance or perform buybacks to adjust their capital structure toward a lower target level, given a high degree of cash-flow volatility.

Net debt issuance is computed as the change in total debt from year t-1 to year t divided by the total assets at the end of the year. The propensity to issue net debt is monotonically negatively related to firms' leverage ratios (Lemmon et al., 2014).

I account for the borrower's default risk by computing the interest coverage ratio as in Petersen and Rajan (1994) and Zou and Adams (2009). The interest coverage ratio is defined as the ratio of earnings before interest, tax, and extraordinary items to annual total interest incurred. I would expect an inverse relationship between this variable and the cost of debt, because the cost of debt should decrease when the firm increases its ability to repay interest expenses on debt. Moreover, I would expect it to be inversely associated with leverage as well as consistently with the pecking order theory. Finally, I control by the industry median leverage, as suggested by Flannery and Rangan (2006). This way, I consider the unobserved heterogeneity across sectors that may not be captured by the other relevant control variables.

2.2.4 Empirical Results

2.2.4.1 Descriptive Statistics

In Table 10, most observations are represented by the manufacturing sector, which constitutes 43.53% of my initial dataset. The information sector represents the second sector by observations' frequency (11.22%), while mining, quarrying, and oil and gas extraction is third (9.53%).

Market and book leverage median values are higher when an affiliated banker is presiding the board (0.253 vs 0.217). This might be due to selection bias, whereby the treatment is applied to companies facing financial distress which tend to feature higher levels of debt. Affiliated bankers tend to be within those firms characterized by higher tangibility levels on average (0.350 vs 0.288), potentially because of a more substantial collateral request by creditors as a form of guarantee after the establishment of a borrowing relationship.

Interestingly, cash flows tend to be more stable in firms where the treatment is applied. In fact, cash-flow volatility is lower for these firms (0.024 vs 0.535). The presence of an affiliated banker or affine category might help to stabilize income, potentially thanks to the financial expertise they bring. Alternatively, banks may push for appointing creditors to the board only in firms where the cash flow is expected to be stable. Profitability also is higher on average for those firms featuring an affiliated banker (0.065 vs 0.272). Yet, from this initial analysis I am unable to infer whether the presence of an affiliated banker determines higher profitability or, instead, whether the higher risk profile characterizing firms with affiliated bankers drives up the profitability ratio.

Moving deeper into my descriptive analysis, I look at the distribution of observations over time to investigate the number of years a banker stays on the board. In most cases, affiliated bankers remain on the board for up to five years, with three years representing the mode. I also note that this phenomenon tended to be more common from 2000 to 2019, especially after crises (i.e., the Dot-Com Bubble and GFC). Finally, just one affiliated banker is deemed to be sufficient for most companies, with three being the maximum number.

I then implement the NNM technique (see Tables 13 and 14) and obtain that the average treatment effect on the treated firms of the appointment of an affiliated banker is statistically significant and is represented by a reduction of market leverage (Table 14). Affiliated bankers do not seem to induce a significant reduction in the cost of debt, as one could have hypothesized – on the contrary, the effect is positive (see Table 13). The representative of the creditor (i.e., affiliated banker), perhaps in exchange for their financial expertise, on average manages to persuade firms to accept more onerous conditions on debt.

2.2.4.2 Regression Results

In the first set of regression results that I present (see Table 13), the dependent variable is the cost of debt, whereas the key explanatory variable is the affiliated banker’s constructed variable. The presence of an affiliated banker is associated with a higher cost of debt. All regressors feature a degree of statistical significance, with the sole exception of net debt issuance.

Table 13 provides results after one-to-one NNM has been applied on the full sample – whereby I match only on size and tangibility – with exact matching on the sector aggregation and year.

Higher cost of debt would seem a counterintuitive average outcome after the appointment of a creditor on the board, because one would expect that borrowers reluctantly accept interference in the business from externals, as well as more onerous conditions on debt financing. In fact, the appointment of an external adviser on the board of directors would require the consent of all three parties involved: the borrower, the lender, and the individual. All parties need to benefit for this outcome to occur, and benefits can take the form of lower costs, less risk, or a direct profit.

On one hand, the lender can benefit from a reduction of information asymmetries, and the individual might be promoted to a senior or board position within the borrowing firm, thereby obtaining additional compensation. On the other hand, it seems odd that the borrower could accept higher borrowing costs, unless their contractual power is constrained and they need external help from financial experts. I logically infer that a prospective reason for this result would be that the borrower is in financial distress. They would therefore need a leading helmsman who would act in the best interest of the borrower. Thanks to creditors on the board's financial expertise, the parties can jointly steer the firm out the storm. However, further analysis could be carried out to back up the conjecture around whether the firm is in hardship.

In the second set of results (see Table 14), the dependent variable is market leverage, whereas the key explanatory variable is again represented by the affiliated banker's constructed variable. The presence of an affiliated banker is associated with lower market leverage. All regressors feature a degree of significance, with the sole exception of size. Table 14 provides results after one-to-one NNM has been applied on the full sample – in which I match on size, tangibility, and profitability – with exact matching on the sector aggregation and year. I explain these results by assuming that the equity value in the denominator of marker leverage increases after the appointment of a creditor to the board, because market actors would be aware of the benefits that could derive from this new working relationship and would start buying the borrower's stock.

However, I find no statistically significant relationship between my variable of interest and book leverage. I justify this lack of evidence since adjustments to book leverage take longer than adjustments to market leverage, which are driven by the market, inter alia. Although the presence of a creditor on board is immediately recognized by the market as a catalyst for conflicts of interest resolution and an aid to the distressed firm, book leverage reductions are delayed.

Said that, the analysis calls for further investigation because the relationship between the two dependent variables under consideration so far in this section (i.e., the cost of debt and the market leverage) and the variable of interest (i.e., the affiliated creditor) may not be monotonic.

In the next set of results (see Table 15), I consider the full untreated sample. The dependent variables considered are book leverage, market leverage, and borrowing costs. My explanatory variables are constructed in such a way that the prospective effects of the establishment or strengthening of the borrowing relationship, as well as the appointment of a creditor to the board, can be considered as stand-alone factors. The overriding intent is to separate the effects – which can be conflicting – of the two main events investigated.

The variable *First Credit Then Manager* is negatively associated with book leverage and market leverage. This relationship suggests that if the appointment of a creditor arises after stipulating a borrowing agreement, then such manager's nomination is related to a decrease in both book leverage and market leverage, despite not having a significant effect on borrowing costs. Yet, this variable does not presuppose that there is an ongoing borrowing relationship when the manager is appointed. The variable just suggests that there was a borrowing relationship and that, in a successive period, the manager from the lending company was appointed as a senior manager or board member in the borrowing company, without the two conditions necessarily being simultaneously fulfilled.

The variable *First Manager Then Credit* is negatively associated with market leverage and, to a weaker extent, with book leverage as well. When the manager gets appointed (N.B. not yet a creditor) prior to the establishment of the borrowing relationship, they manage to influence future borrowing decisions. Firms where managing experts are appointed tend to be in hardship and therefore, as expected, managers pledge to reduce financial leverage. The signaling function on the financial market still manifests itself with a reduction of market leverage. In addition, a reduction of book leverage is seen – albeit not as significantly from a statistical perspective.

The statistical significance of the variable *Ongoing Loan* suggests that, when I consider the stipulation of a loan as a stand-alone factor, such borrowing agreement is mechanically associated with a higher book leverage and higher cost of debt. Finally, the *Affiliated Banker* constructed variable does not bring about any effects on the untreated sample in this first regression Other standard corporate finance variables are significant and feature the expected signs.

In fact, my variable of interest is, to some extent, associated with my outcomes, but results are mixed and any conclusions I might be tempted to draw would be controversial. Therefore, I have decided to continue to investigate further.

In Table 16, I consider the set of results, including the interest coverage ratio variable in my model specification. This variable is not economically significant, which might explain why it is not often considered. However, it is significant from a statistical standpoint and, therefore, for an accurate estimation of the relationship between my outcomes and the variables of interest, it needs to be included in the model. When running a standard Pooled OLS regression – with both individual (firm) and time (year) FE – my variable of interest (i.e., the affiliated banker) is identified as having a significant negative relationship with both market leverage and book leverage. However, this relationship is not statistically significant with respect to the cost of debt.

In Table 17, I implement the threshold model (Seo and Shin, 2016) whereby I use my additional variable (i.e., interest coverage ratio) as a proxy for firms' risk of financial distress. The interest coverage ratio is my threshold variable, defining the boundary between the firm being in financial distress and outside the storm.

2.2.4.3 Discussion

I wish to add to the previous literature (Kroszner and Strahan, 2000; Byrd and Mizruchi, 2005;

Sisli-Ciamarra, 2012; Hilscher and Sisli-Ciamarra, 2013; Erkens et al., 2014; Hasan et al., 2021 and Zhao et al., 2021) by disentangling the inherent drivers of the causality effect that I witness, whereby the nomination of an affiliated banker seems to bring about – on average – higher cost of debt and lower market leverage.

The effects of a borrowing relationship and of a creditor on the board appear to strengthen each other to some extent, thus creating a virtuous circle from which all firms-financial institutions could benefit. On one hand, cash-flow volatility appears lower and profitability higher when a banker is presiding over the company. On the other hand, market leverage appears to be lower, thus entailing a reduction of riskiness for firms which would now be more likely to be able to repay their loans.

Nevertheless, there are two pending caveats which I may pose as two questions. Firstly, is it always convenient for creditors to place their own representatives on the board of a firm? One might be tempted to assume a positive answer, considering the reduction of monitoring costs highlighted in the literature (e.g., Sisli-Ciamarra, 2012). Secondly, why then firms are not flooded by creditors' representatives? To begin with, nominating a board member requires the consent of shareholders, who might refuse to be monitored by creditors in such a pervasive way. Moreover, having a representative within the board of a firm represents a constraint for the creditor as well, because that might limit the opportunity to trade securities of the debtor. This is called the insider trading problem. Finally, I demonstrate empirically that nominating a supervisor entails a cost to the firm, subsumed in higher cost of debt. Therefore, three confluent forces push toward avoiding the diffusion of affiliated bankers.

Furthermore, bankers – who generally constitute the main category of creditors – presiding over the board, such as in Germany and Japan, cannot be a panacea for all countries. Political, historical, sociological, and juridical roots as well as axiological tenets play a pivotal role in shaping corporate governance mechanisms and apparatuses, which cannot be driven solely by an underlying economical mindset.

For instance, some countries (e.g., Italy) guarantee strong creditors' rights through promoting more stringent covenants, thereby lowering the cost of debt by enforcing a system of rules aimed at safeguarding creditors. Regulating relationships so incisively might prejudice financial flexibility; in particular, it might push leverage below the optimal level and disincentive the diffusion of new firms. Finding the right balance is a challenging task. The solution cannot be common to all countries – it should be tailored according to specific countries' needs and likely even specific firms' needs. This paper can contribute to the debate.

Debt covenants can be considered as a valid alternative to appointing an affiliated banker because they overcome the insider trading problem. However, firms' managers might want to avoid the intrusiveness in the decision-making process that a debt covenant brings about de facto. The prospective imposition of a debt covenant might ex ante refrain managers from stipulating borrowing agreements, because such covenants often have a rigid structure. This might prevent managers from reaching the desired level of financial leverage. Moreover, the benefits in terms of reduction of monitoring costs may not be so evident as in the case of an affiliated banker who actively employs such a monitoring endeavor.

The last pending element to be discussed is when the creditors are appointed to the board of the borrowing firms. Figure 23 shows that this phenomenon was prevalent in the period just prior to the GFC. There are reasons to believe that financial institutions harness the hardship of the firm to expropriate the rents of those firms that can recover but are undervalued by the market. An event that could trigger this phenomenon might be, for instance, a hostile takeover whereby when the raider manifests their intention to acquire the firm, the creditor is reasonably reassured about the business continuity of the firm and thus decides to place their own representative on the board of directors of the firm.

2.2.5 Extensions

Affiliated creditors on a board appear to accomplish a clear certification role on the market, as demonstrated by market leverage significantly decreasing in the aftermath of their appointment on the supervisory board – in contrast with book leverage, whereby the effect is negligible.

A significant increase in the cost of debt can also be witnessed, which leads me to hypothesize that creditors agree to be appointed to the board of the borrowing company subject to these additional financial expenses. This higher cost would be born unwillingly by the borrowing company and it would not be accepted unless the latter is hypothetically forced to, possibly because of looming financial distress, or unless such creditors can add value through the certification role deployed and the supply of financial expertise resulting in improved governance. I could further empirically corroborate the former hypothesis by checking if creditors on boards are appointed to those firms allotted with low credit ratings and if the nomination of creditors on boards enhances credit ratings. I can also use a matching technique by conditioning on firms' credit rating to investigate the outcomes based on firms that are comparable in terms of credit ratings. With this approach, I would further mitigate the endogeneity risk potentially affecting my analysis. Since this kind of analysis requires access to a different database (e.g., S&P Capital IQ), I leave this investigation for future research.

2.2.5.1 General Metrics

I calculate a few metrics to understand how common and widespread the practice of appointing affiliated creditors to a board is, to gain some insight into the board structure of firms that adopt such practice, and to see if creditors on the board mainly deploy a supervisory function or if they are also involved in executive duties.

I start by defining borrowing firms as those firms that have been tied to one or multiple lending firms by credit agreements at any point during the timeframe considered. To simplify, I ignore the temporal dimension whereby the credit agreement between borrowing and lending firms does not need to be outstanding for the former to be qualified as borrowing firms. I then define affiliated creditors on boards as those board members of the borrowing firms that have worked or will work for the lending firms (not necessarily as board members) at any point during the time considered. That is, I start by building a dummy variable that equals unity if a creditor works on the board of the borrowing company.

Then, I calculate the percentage of borrowing firms that have affiliated creditors on their board over the total number of firms. This revisited number of borrowing firms is equal to 870, of which the number of firms with more than one creditor on their board is equal to 434, meaning that approximately half of the firms which rely on this practice tend to appoint multiple affiliated creditors on their board. Given that the total number of firms in my dataset is equal to 15,000, then the percentage turns out to be approximately 5.8%. Hence, when ignoring the temporal dimension, only 5.8% of the total number of firms feature one or multiple affiliated creditors on their board. That means this practice is relatively uncommon, and it is even more infrequent if I relax the two assumptions made. I then ask whether affiliated creditors on boards tend to deploy supervisory functions or whether they are instead involved in ordinary top-level executive activities. The former type of function can be ascribed to the macro-category of *control tasks* whereby board members monitor firm performance and activities as well as chief executive officer (CEO) behavior. *Service tasks* subsume ordinary top-level executive activities whereby board members evaluate and select strategic alternatives that have been developed by top managers, as well as providing advice to enhance the quality of strategic decisions (Zattoni and Cuomo, 2010). The total number of affiliated creditors on boards in my dataset is equal to 2,239. Most affiliated creditors on boards in my dataset were identified as non-executive directors (87.41%), as expected. If I had relaxed the above assumptions, thereby also considering the temporal dimension, this percentage would have totaled approximately 100% because it would be unlikely that managers with executive duties can work for two companies simultaneously. In my simplified setting, instead, I might have cases of executive board members of borrowing companies who take on their role only after having worked for a lending company. Similarly, there can be cases of executive directors who were on the board of the borrowing company prior to working for a lending company.

2.2.5.2 Additional Hypotheses Formulation

To explore the underlying mechanism through which the presence of a creditor on the supervisory board affects the outcomes, I investigate Tobin's Q to determine whether firms' market value increases by virtue of improved governance resulting from a reduction of objectives' misalignment. Creditors on boards might reduce agency costs by monitoring executives' behavior.

I can then formulate my first hypothesis as follows:

Hypothesis 3: *The presence of a creditor on the board is positively related to Tobin's Q.*

Although I am hesitant to generalize individuals' behavior – which hinges upon their ethics and integrity as well as their degree of risk aversion, among other things – it might be worth investigating what the predominant interests of creditors on boards are in a context where the interests of the two firms they represent may clearly be conflicting. On one hand, as a creditor, they might be tempted to push to reinvesting any profits of the borrowing firm to guarantee soundness and solidity; on the other hand, they might accommodate the interests of the borrowing firm's shareholders to pay dividends. In contrast with other directors, their approach to the dividend policy might be more conservative so as to also represent debtholders' interests.

Therefore, I formulate the following hypothesis as follows:

Hypothesis 4: *The presence of a creditor on the board of the borrowing company is associated with a decrease of dividends payout*.

Relying on their financial expertise, affiliated creditors may wish to bolster firms' innovativeness by promoting investments in R&D. They would be able to identify positive NPV projects, thus increasing shareholders' value.

Hypothesis 5: *The presence of a creditor on the board is associated with an increase in R&D expenditure*.

Having said that, again the selection bias whereby creditors are nominated to firms in hardship can prompt these creditors to reduce R&D expenses, consistently with the evidence found by Ghosh (2016). In fact, distressed firms are more likely to cut R&D expenses (Mezzanotti and Simcoe, 2023).

At the beginning of my analysis to determine the relationship between the presence of a creditor on the board and Tobin's Q, I control by size, R&D, and dividend payout, in addition to other relevant standard variables (i.e., profitability, market leverage industry median, and market to book) already thoroughly discussed in Section 2.2.3. As emphasized by Coles et al. (2008), large firms tend to be more complex and the risk of inefficiencies due to coordination problems might be amplified. This might negatively impact Tobin's Q. Hence, I control by the log of total assets. Also, in line with Lang and Stulz (1994), I control by R&D because its exclusion from the denominator of the Q ratio might bias my analysis. Firms might be unable to exhaust their positive NPV projects because of capital rationing. This would not be an issue for those firms that pay dividends, because they would draw on the capital distributed as dividends to refinance their projects if needed.

2.2.5.3 Additional Descriptive Statistics

In a similar logic to Section 2.2.4, I make a preliminary investigation by comparing firms with and without affiliated creditors on their board with respect to the three additional variables I build. I refer back to the Tobin's Q metric, which appears to be consistently lower when affiliated creditors are on the board, according to different metrics' specifications (see Table 18). Although this is seemingly counterintuitive – one would expect positive market premium for having creditors on the supervisory board – deeper reasoning suggests that these results can be explained through the composition of my proxy (Tobin's Q), as explained later. R&D expenditures over total assets are, on average, lower for firms with affiliated bankers than for firms without affiliated bankers (0.012 versus 0.069), whereas the dividend payout ratio is higher for firms with affiliated bankers (0.311) than for firms without affiliated bankers (0.185).

2.2.5.4 Model Specifications

I specify the models as follows:

$$Tobin's\ Q_{i,t} = \beta_0 + \beta_1 CredOnBoard_{i,t} + \beta_2 x_{2,it} + \cdots + \beta_n x_{n,it} + \mu_i + \nu_t + \varepsilon_{it} \qquad (20)$$

$$DivPayout_{i,t} = \beta_0 + \beta_1 CredOnBoard_{i,t} + \beta_2 x_{2,it} + \cdots + \beta_n x_{n,it} + \mu_i + \nu_t + \varepsilon_{it} \qquad (21)$$

$$R\&D_{i,t} = \beta_0 + \beta_1 CreditorOnBoard_{i,t} + \beta_2 x_{2,it} + \cdots + \beta_n x_{n,it} + \mu_i + \nu_t + \varepsilon_{it} \qquad (22)$$

Where *Tobin's Q*, *DivPayout*, and *R&D* constitute my set of dependent variables, $\sum_n^1 x_{i,t}$ represents my set of explanatory variables. Finally, μ_i represents firm-level FE and ν_t year FE.

Tobin's Q is calculated based on three different specifications:

1) The market value of assets plus total liabilities over total value of equity plus total liabilities.

2) The market value of assets plus total liabilities over common stock plus total liabilities.

3) The market value of equity plus the book value of preferred stock minus investment tax credits, as in Kahle and Stulz (2020).

The dividend payout is computed as the ratio of total dividend over net income (loss).

Finally, R&D is computed as the ratio of R&D expenditures over total assets, and as the ratio of R&D expenditures over sales, measuring the number of resources devoted to R&D as well as R&D expenditures over market value of equity, as in the specification suggested by Chan et al. (2001). I break down a constituent variable of the market leverage ratio's denominator (i.e., market value) to elaborate further on the certification role deployed by affiliated creditors. I wish to determine whether affiliated creditors permit an increase in the market value of a firm.

To this end, I calculate Tobin's Q (Brainard and Tobin, 1968 and Tobin, 1969) and use it as the dependent variable in my regression analysis. Tobin's Q – conceived by Brainard and Tobin (1968) and Tobin (1969) – is defined as the ratio between the market value of capital and its replacement cost.

I start by testing whether the presence of creditors on boards is associated with shareholders' value creation (destruction) and concurrently whether it is associated with reduced (increased) risk. The underlying idea is that creditors on a board possess financial expertise, and the extant literature suggests that the presence of financially expert, independent directors on the audit committee enhances firm value (Chan and Li., 2008) and that financial expertise is an essential component of effective monitoring (Gore et al., 2011).

Having said that, the presence of a credit agreement might lead to appointing a manager regardless of their suitability for a specific role, thus destroying the value of the company for the shareholders. On one side, affiliated bankers are deemed to be financial experts but, on the other side, appointing creditors limits the hiring opportunity set of the borrowing firm to the creditors' landscape. While reducing information asymmetries and the associated costs, shareholders' value can be ultimately negatively impacted by creditors' appointments simply because borrowing firms might potentially be able to find better candidates for these critical roles outside the sphere of connections resulting from the constitution of the lending relationship. That is, the opportunity cost – which can materialize in low managerial ability – deriving from the unexploited hiring opportunity set might be greater than the benefits arising from the reduction in information asymmetries. Additionally, network ties from friendships are found to lead to bad practices, such as earnings management, and are associated with auditors reporting internal control weaknesses (Bruynseels and Cardinaels, 2013).

2.2.5.5 How Are Creditors Appointed to a Supervisory Board in Practice? The Role of Nominating Committees

New board members are usually appointed through nominating committees, which are composed of subgroups of current members of the board. The two main US stock exchanges (NYSE and NASDAQ) enacted requirements that all listed firms' boards have compensation and nominating committees (Kolev et al., 2019). Nominating committees focus on finding suitable candidates, whom they recommend to the entire board of directors. Shivdasani and Yermack (2002) investigate empirically the role of CEOs in nominating board members, suggesting that a nominating committee can help ensure the independence of new board members and a lower risk of conflict of interest if the CEO does not sit in such a committee. Moreover, when weak governance arrangements are in place (e.g., overly sympathetic directors) firms tend to have fewer independent nominating committee members (Cohen et al., 2012). Jones et al. (2015) reiterate the importance of having nominating committees because they contribute to streamlining the process of the adoption of governance committees.

After nominating committees recommend candidates to the entire board of directors, the directors make the final decision by voting in favor or against a prospective candidate. As an alternative approach, the corporate policy can establish that any shareholder can make a recommendation, and the full board then votes on the nominees. Finally, some companies let the shareholders vote on the nominees, appointing the candidate with the most votes. In any case, board members are never exogenously imposed (e.g., by creditors) because the final decision on their nomination is the responsibility of the board in charge or of the current shareholders.

The evidence on the relationship between nominating committees' independence and firm performance is controversial. As emphasized by Kolev et al. (2019), some studies report that when these committees are independent, firms exhibit higher performance (Grove et al., 2011; Hoechle et al., 2012) and are more likely to avoid bankruptcy (Platt and Platt, 2012). Yet, other studies find a positive relationship between insiders on the nominating committee and market return, highlighting the importance of management participation in selecting directors (e.g., Callahan et al. 2003, Faleye 2007).

To elaborate on this controversy, I need to distinguish between monitoring committees and advisory committees. The former might benefit from the presence of independent directors, who can enhance monitoring quality (e.g., increased sensitivity of turnover to firm performance, less discretionary accruals, reduced excess compensation) (Faleye et al., 2011). On the contrary, the latter might benefit from the presence of executive directors because, presumably, the active commitment in managerial activities of executive directors might foster innovation and spur performance in acquisition processes. Hence, the board structure should be tailored to the specific firm's needs, which should be satisfied by keeping in mind the trade-off between advising and monitoring functions.

Generally, a creditor on the board would sit on the supervisory board as a non-executive director. In fact, I find that non-executive affiliated creditors on boards equal 87.41% of the total number of creditors on boards in the US. The board is presumed to be more independent as the number of non-executive directors increases. The main role of non-executive directors is threefold, as follows.

Firstly, such directors contribute to safeguarding corporate accountability by enabling a steady flow of information to stakeholders and society. This way, they help ensure that organizations account for their actions in a context where companies seek self-interest with guile. Indeed, my framework is based on the founding concepts of agency theory, which assumes that distrust prevails over trust when organizational behavior is envisaged.

Secondly, non-executive directors provide valuable oversight of firms' financial reporting practices in cases where they possess financial expertise. To this end, some companies institute audit committees made of members of the supervisory board, whose remit includes the workings of both internal and external auditors, as well as procedures for whistleblowing, internal controls, and risk management systems.

Finally, such directors help protect shareholders' interest, especially when the board might undergo some changes (e.g., CEO substitution), during the establishment or amendment of top management's compensation and when takeovers have the potential to take place. In the latter instance, non-executive directors can help shape anti-takeover mechanisms (Zattoni and Cuomo, 2010). In the agency theory frameworks, non-executive directors are deemed to represent shareholders' interests more directly than executive directors (Kose and Lemma, 1998), who are instead prompted to maximize short-term profits to reap gains from shareholders. Hence, I would expect that when creditors are appointed to the board, the value is positively impacted for shareholders, so that Tobin's Q is positively related to the presence of creditors on boards of a specific company.

2.2.6 Conclusion

The potential advisory support of creditors on the board is clearly perceived by the market, as shown by the reduction of market leverage arising after the appointment of an affiliated banker. Creditors on boards help firms in hardship to navigate toward safe waters in exchange for higher cost of debt, thus negating my second hypothesis, when firms are approaching financial distress; however, in normal conditions, the relationship between the presence of an affiliated banker and the cost of debt turns negative, as one might expect. That is, creditors on the board induce borrowing firms to renegotiate the cost of debt, thereby making them pay a premium for the advisory and certification role that the appointed creditor plays when these firms are in financial distress. Nevertheless, I find evidence that their role reduces the cost of debt under normal circumstances.

The presence of an affiliated creditor (see Table 19) does not seem to be related to Tobin's Q in two out of three of the specifications I adopted when implementing the FE model[2]. The underlying reason may be the conflicting effects the appointment of the creditor on the board has on a firm's fundamentals, whereby both liabilities decrease and firms' market value increase. I construct the first two Tobin's Q variables to feature the sum of total liabilities and market capitalization on the numerator while figuring the sum of shareholders' equity and total liabilities on the denominator. Total liabilities tend to be higher on average for firms where creditors are on the board, and market value tends to be higher for such firms as well. I witness an increase in both the numerator and the denominator when creditors are appointed to the board. Since the overall value of the numerator is medially higher than that of the denominator, such an increase affects the denominator more significantly – hence, the lower Tobin's Q for firms with creditors on the board.

However, when running a Pooled OLS regression, I find a positive relationship between the third specification of Tobin's Q and the presence of a creditor on the board. The choice of this model can be justified since there is little variation of my key variable of interest (i.e., affiliated creditor) within firms by construction, thus accepting the efficiency gains at the expense of less biased coefficients, which a FE model would have guaranteed. This way, in fact, I exploit the variation across firms as well.

Dividend payout does not appear to be influenced by the presence of an affiliated creditor. I spot a significant relationship between affiliated creditors and R&D expenditures. In fact, my analysis shows that the appointment of a creditor on the board is associated with a decrease in this kind of expense.

Overall, even though the appointment of a creditor on the board might logically enhance information flows and monitoring, I do not believe it can be considered a one-size-fits-all solution. In case of a significant and robust positive relationship between the presence of an affiliated creditor and Tobin's Q, I might have been tempted to promote this practice, but given the lack of a robust positive association, I refute hypothesis 3 and conclude that only under specific circumstances – namely when firms are approaching financial distress – can this be considered a good practice.

The message I wish to convey is that appointing a creditor on the board should not be seen as an easy solution to be adopted in any circumstances, but rather as a possible response to the potential crisis that the borrowing firm is facing. As a result, such a solution cannot be decontextualized from the specific needs that the firm has or from the specific contingencies the firm is going through. Only after careful reflection and assessment of both internal and external

[2] For brevity, I report only one set of results.

stakeholders should such an extreme solution be considered.

Creditors tend to be appointed to firms’ boards with the aim of restoring their soundness.

2.2.6.1 Avenues for Future Research

I expand the first part of the analysis in this extension section, where I assess the relationship between the presence of an affiliated banker and Tobin’s Q. I use an instrumental variable approach to deal with endogeneity issues that arise in my framework, whereby agents can make suboptimal decisions in terms of shareholders’ value maximization, thus affecting Tobin’s Q. In fact, prospective good investment opportunities, as characterized by positive NPV, might be discarded because of what I call “managerial idleness.” That is, managers might pass up profitable investments because of the degree of active monitoring required ex post (Dybvig, and Warachka, 2012). As a result, Tobin’s Q numerator is less than proportionally affected by underinvestment – in contrast with the denominator, where the effect of underinvestment is proportional. Creditors on the board, equipped with financial expertise, can facilitate this monitoring by proactively implementing it or by scrutinizing managers’ commitment.

Likewise, I could use an instrumental variable approach for the last part of the analysis, where I assess the relationship between the presence of an affiliated banker and R&D expenditures. A potential valid instrument could be the lender’s credit rating downgrade. When lenders get downgraded by a rating agency, they might need to rethink their approach to monitoring, thus potentially pushing to appointing a creditor to the board of the borrowing firm. The lender’s downgrade would be exogenous to the borrower–lender relationship, thereby enabling me to isolate the average treatment effect of the appointment of a creditor on the board on R&D expenditure.

2.2.7 Appendix

Figure 22. Merging Procedure Diagram

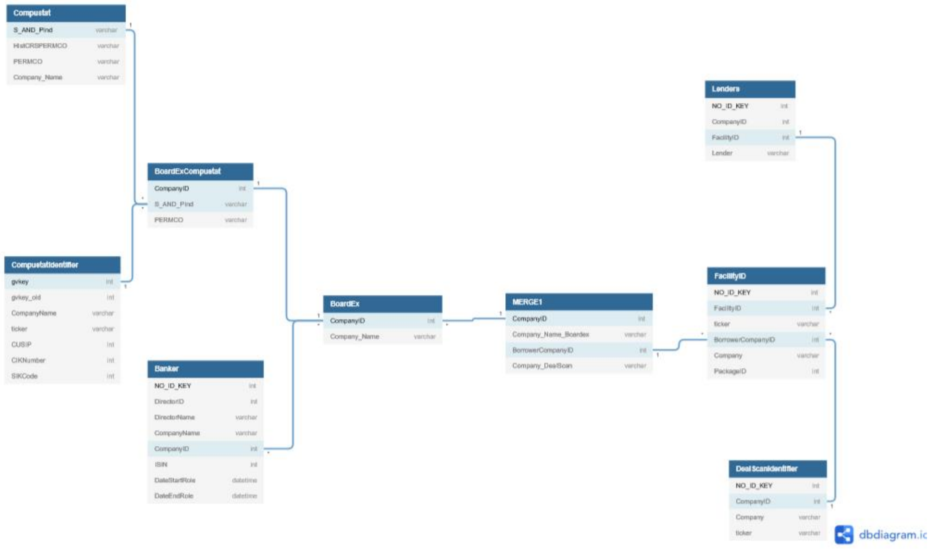
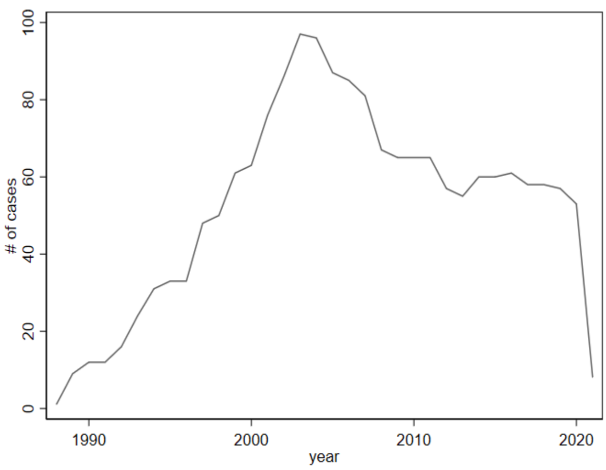
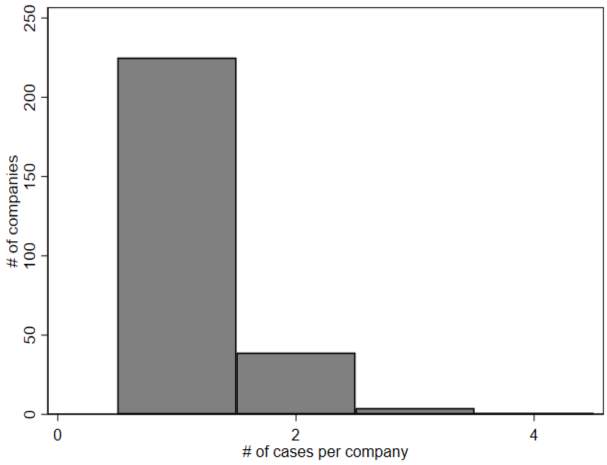


Figure 23. The Affiliated Creditor Phenomenon over Time



The figure shows the quantitative evolution of the creditors on boards' phenomenon. It shows that such practice has become increasingly prevalent since 1990, peaking around the middle of the first decade of the 21st century (2004–2006), just before the GFC (2007–2010).

Figure 24. The Matrix: Number of Companies by the Number of Affiliated Bankers per Company



The figure shows that the most widespread practice in the industry consisted of appointing only one creditor on the board per company although, in some cases, two creditors were appointed to a single company. The marginal positive effect of the appointment of a new creditor might be deemed to diminish with the number of creditors appointed on the board.

Figure 25. The Duration of the Mission of the Banker on the Board and its Distribution: A Histogram

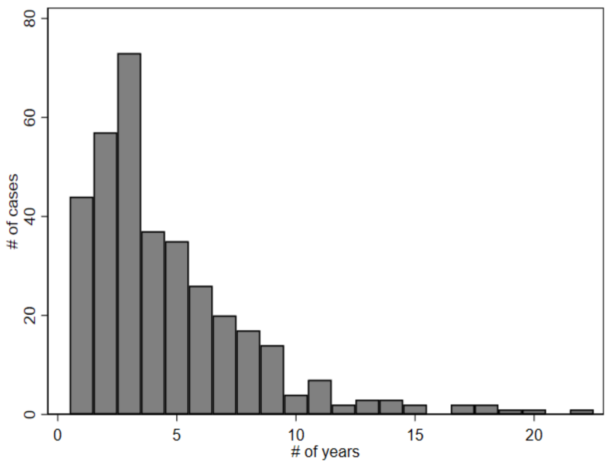


Figure 25 shows the length of time a creditor stays on the board. It shows that the highest number of creditors remain on the board for up to three years. Three years is deemed to be the most beneficial number of years by most firms.

Table 10. Industry Breakdown

Industry Breakdown	Obs.	Percentage
Accommodation and Food Services	4,086	2.024
Administrative and Support and Waste Management and Remediation Services	4,732	2.344
Agriculture, Forestry, Fishing, and Hunting	883	0.437
Arts, Entertainment, and Recreation	1,569	0.777
Construction	3,156	1.563
Educational Services	897	0.444
Health Care and Social Assistance	3,981	1.972
Information	22,654	11.221
Manufacturing	87,881	43.53
Mining, Quarrying, and Oil and Gas Extraction	19,246	9.533
Other Services (except Public Administration)	897	0.444
Professional, Scientific, and Technical Services	9,570	4.74
Real Estate and Rental and Leasing	7,785	3.856
Retail Trade	9,008	4.462
Transportation and Warehousing	17,731	8.783
Wholesale Trade	7,811	3.869
Total	201,887	100

Table 10 presents the industry breakdown for the full sample where I drop observations belonging to the finance and insurance, utilities, and management of companies and enterprises sectors. The amount of firm-year observations totals 201,887.

Table 11. Descriptive Statistics for the Whole Untreated Sample

	Obs.	Mean	Std. Dev	Min	p50	Max
Cost of Debt	159,164	0.103	0.096	0	0.075	0.6
Book Leverage	207,427	0.223	0.221	0	0.176	1
Market Leverage	207,427	0.218	0.246	0	0.128	1
Size	207,427	5.027	2.42	0.4	4.908	11.2
Profitability	206,616	-0.056	0.272	-1.2	0.038	0.2
Tangibility	205,139	0.289	0.261	0	0.202	0.9
Market to Book	207,070	2.879	3.211	-2.3	1.847	20.2
Market Leverage Industry Median	207,427	0.17	0.158	0	0.132	0.7
Cash-Flow Volatility	157,981	0.53	15.232	0	0.034	2,778.30

Table 11 features descriptive statistics, including those related to the sectors that were dropped in Table 1, whereby the number of observations refers to the full initial dataset. The table details the number of observations, the mean, standard deviation, minimum value, median, and maximum value.

Table 12. On–Off Board Comparison

	Obs.	Mean	Std. Dev	Min	p50	Max
Without Affiliated Banker						
Cost of Debt	157,422	0.103	0.096	0	0.075	0.6
Book Leverage	205,637	0.223	0.222	0	0.175	1
Market Leverage	205,637	0.217	0.247	0	0.126	1
Size	205,637	4.998	2.406	0.4	4.88	11.2
Profitability	204,826	-0.057	0.272	-1.2	0.038	0.2
Tangibility	203,349	0.288	0.261	0	0.201	0.9
Market to Book	205,280	2.878	3.215	-2.3	1.842	20.2
Market Leverage Industry Median	205,637	0.169	0.158	0	0.131	0.7
Cash-Flow Volatility	156,259	0.535	15.316	0	0.034	2,778.30
With Affiliated Banker						
Cost of Debt	1,742	0.069	0.055	0	0.061	0.6
Book Leverage	1,790	0.283	0.158	0	0.271	1
Market Leverage	1,790	0.253	0.178	0	0.221	1
Size	1,790	8.358	1.526	0.7	8.543	11.2
Profitability	1,790	0.092	0.065	-0.5	0.095	0.2
Tangibility	1,790	0.35	0.233	0	0.293	0.9
Market to Book	1,790	2.986	2.645	-2.3	2.249	20.2
Market Leverage Industry Median	1,790	0.229	0.147	0	0.211	0.7
Cash-Flow Volatility	1,722	0.024	0.037	0	0.014	1

Table 12 features a comparison of some firms' metrics with and without a creditor on the board. The table details the number of observations, the mean, standard deviation, minimum value, median, and maximum value.

Table 13. The Price of the Affiliated Banker's Appointment

	Cost of Debt 1:1 matching 0.05 (Caliper)
Explanatory Variables	
Affiliated Banker	0.00473** (0.00192)
Profitability	-0.0325** (0.0160)
Size	-0.0141*** (0.00144)
Market Leverage Industry Median	0.0253*** (0.00902)
Market-to-Book Ratio	-0.00173** (0.000796)
Net Debt Issuance	-0.00549 (0.00418)
Cash-Flow Volatility	0.0343* (0.0194)
Constant	0.186*** (0.0129)
Observations	9,103
R-squared	0.046
Company FE	YES
Year FE	YES
Adjusted R-squared	0.0453

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13 presents the first regression on the treated sample. The dependent variable is cost of debt, whereas the key explanatory variable is represented by the affiliated banker's constructed variable. The presence of an affiliated banker is associated with a higher cost of debt. All regressors feature a degree of significance, with the sole exception of net debt issuance. Table 13 provides results after one-to-one NNM has been applied on the full sample – I match only on Size and Tangibility – with exact matching on the sector aggregation. The sector classification follows the North American Industry Classification System (NAICS).

Table 14. The Certification Role of the Affiliated Banker

	Market Leverage 1:1 matching 0.05 (Caliper)
Explanatory Variables	
Affiliated Banker	-0.0390*** (0.0106)
Tangibility	0.0532* (0.0312)
Market-to-Book Ratio	-0.00508** (0.00198)
Size	0.00282 (0.00560)
Profitability	-0.627*** (0.119)
Dividend	0.0583*** (0.0195)
Market Leverage Industry Median	0.457*** (0.0484)
Cost of Debt	-0.241** (0.121)
Constant	0.289*** (0.0581)
Observations	1,874
R-squared	0.405
Company FE	YES
Year FE	YES
Adjusted R-squared	0.392

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14 presents the second regression on the treated sample. The dependent variable is market leverage, whereas the key explanatory variable is again represented by the affiliated banker's constructed variable. The presence of an affiliated banker is associated with lower market leverage. All regressors feature a degree of significance, with the sole exception of Size. Table 14 provides results after one-to-one NNM has been applied on the full sample – I match on Size, Tangibility, and Profitability – with exact matching on the sector aggregation.

Table 15. Dynamics of the Credit Agreements–Bankers on the Board Connection

Variables	Book Leverage	Market Leverage	Cost of Debt
First Credit Then Manager	-0.0627*** (0.0175)	-0.0949*** (0.0161)	0.00761 (0.00819)
First Manager Then Credit	-0.0310* (0.0178)	-0.0539** (0.0255)	0.000943 (0.00631)
Managers in Both Boards	-0.0109 (0.0179)	-0.0415** (0.0192)	-0.00529 (0.00519)
Ongoing Loan	0.0390*** (0.0147)	0.00142 (0.0136)	-0.00614*** (0.00221)
Affiliated Banker	-0.00517 (0.0320)	0.0101 (0.0290)	-0.00334 (0.00587)
Tangibility	0.0911*** (0.00538)	0.0805*** (0.00583)	-0.0201*** (0.00143)
Market to Book	0.00363*** (0.000353)	-0.0168*** (0.000334)	-0.000411*** (0.000125)
Size	0.00495*** (0.000673)	0.00513*** (0.000774)	-0.00564*** (0.000199)
Profitability	-0.0981*** (0.00542)	-0.0426*** (0.00524)	-0.0777*** (0.00247)
Cash-Flow Volatility	-0.000131*** (2.16e-05)	0.000137** (5.62e-05)	-3.77e-05** (1.75e-05)
Dividend	0.0520*** (0.00361)	0.0785*** (0.00423)	0.0111*** (0.00108)
Market Leverage Industry Median	0.414*** (0.00903)	0.573*** (0.0102)	-0.0217*** (0.00248)
Cost of Debt	-0.345*** (0.00812)	-0.280*** (0.00862)	
Constant	0.177*** (0.00743)	0.206*** (0.00848)	0.159*** (0.00242)
Observations	134,013	134,013	136,927
R-squared	0.178	0.289	0.135
Company FE	YES	YES	YES
Year FE	YES	YES	YES
Adjusted R-squared	0.177	0.289	0.135

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15 features the final regression, which considers the full untreated sample. The dependent variables considered are book leverage, market leverage, and cost of debt. My explanatory variables are constructed in such a way that the prospective effects of the establishment/strengthening of the borrowing relationship, as well as the appointment of a creditor to the board, can be considered as stand-alone factors. The overriding intent is to separate the effects – which can well be conflicting – of the two main events investigated. The variable First Credit Then Manager is negatively associated with book leverage and market leverage. When the manager gets appointed (N.B. not yet a creditor) prior to the establishment of the borrowing relationship, they manage to influence future borrowing decisions so that, again, book and market leverage are negatively associated with the variable under scrutiny. When firms are not tied by a borrowing agreement, a common manager induces exclusively a reduction in book leverage, potentially through the signaling role they have in the market. Moving ahead, the stipulation of a loan is mechanically associated with a higher book leverage and, unsurprisingly, higher cost of debt. Finally, the affiliated banker constructed variable does not bring about any effects on the untreated sample. Other standard corporate finance variables are significant and feature the expected sign.

Table 16. Back to the Basics: Pooled OLS including Control for Credit Risk

Variables	Book Leverage	Market Leverage	Cost of Debt
Affiliated Banker	-0.02025** (0.008494)	-0.06609*** (0.008759)	-0.02089 (0.044348)
Tangibility	0.089807*** (0.005536)	0.103631*** (0.006094)	-0.65144*** (0.157337)
Market to Book	-2.04E-08** (9.73E-09)	-9.3E-08*** (6.30E-09)	-2.4E-07*** (3.83E-08)
Size	0.004258*** (0.000645)	0.00517*** (0.000729)	-0.10331*** (0.023752)
Profitability	-0.00693*** (0.002608)	0.00568*** (0.002054)	-0.02768 (0.018994)
Dividend Dummy	0.057101*** (0.004072)	0.078022*** (0.004784)	0.54262 (0.372486)
Market Leverage Industry Median	0.391896*** (0.009083)	0.609706*** (0.010393)	-0.38615 (0.221204)
Interest Coverage Ratio	-9.81E-07 (6.04E-07)	-1.1E-06** (5.52E-07)	-5.9E-06 (7.37E-06)
Cost of Debt	-0.00017** (6.75E-05)	-0.00015*** (5.73E-05)	
Constant	0.1330282*** (0.0040871)	0.0756014*** (0.0045224)	1.180339*** (0.3086844)
Observations	111,977	111,977	109,432
R-squared	0.1556	0.2491	0.0009
Company FE	NO	NO	NO
Year FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 16 presents the second set of regressions on the untreated sample when using Pooled OLS estimation. The dependent variables are book, market leverage, and cost of debt, whereas the key explanatory variable is again represented by the affiliated banker's constructed variable. In these regressions, I consider the four control variables (i.e., profitability, market to book, size, and tangibility) used by Rajan and Zingales (1995) with four additional ones (i.e., market leverage industry median, interest coverage ratio, cost of debt, and the dividend dummy), whose inclusion into the model is justified by their relevance in my framework. The presence of an affiliated banker is negatively associated with book and market leverage, whereas its relationship with the cost of debt is not identified as statistically significant. Standard errors are robust to arbitrary heteroskedasticity and allow for correlation through clustering at the firm level.

Table 17. Dynamically Navigating the Boundary: The Affiliated Banker–Cost of Debt Relationship in and out Financial Distress

	Cost of Debt
Lower Regime	
Cost-of-Debt Lag	0.066661* (0.038987)
Affiliated Banker	11.57737*** (3.667918)
Tangibility	2.838717** (1.220537)
Market-to-Book Ratio	3.72E-06 (3.32E-05)
Size	1.505318*** (0.275645)
Profitability	-1.34067*** (0.414488)
Cash-Flow Volatility	-3.30974*** (1.052928)
Dividend Dummy	-0.39709 (0.424881)
Market Leverage Industry Median	-6.03962* (3.344372)
Constant	27.72666 (6.621422)
Upper Regime	
Cost-of-Debt Lag	-0.11274*** (0.039389)
Affiliated Banker	-63.45066*** (8.053094)
Tangibility	9.002992 (8.204089)
Market-to-Book Ratio	-0.00109 (0.01122)
Size	-3.96191*** (0.70999)
Profitability	-8.2061 (6.731235)
Cash-Flow Volatility	1.161906 (6.975858)
Dividend Dummy	8.384661 (5.351455)
Market Leverage Industry Median	88.59819*** (9.083864)
Threshold (Interest Coverage Ratio)	14.47267 (22.37582)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 17 presents the output of the dynamic single-threshold regression, whereby the outcome is the cost of debt. Firstly, the interest coverage ratio is defined as the ratio of earnings before interest and taxes over interest expenses. The higher the ratio, the greater the ability to repay interest expenses. In the lower regime, the firm is assumed to be in financial distress, whereas it is sound in the upper regime. When firms are in financial distress, the lagged dependent variable of my dynamic model may be less relevant, because bankers might need to rethink their strategy to avoid losing the funds lent; the firm instead wants to avoid going bankrupt. Given these circumstances, the borrower does not have much bargaining power, and it is to some extent forced to accept the interference of the creditor. This explains why I witness a positive relationship between my outcome (cost of debt) and the variable of interest (i.e., affiliated banker). Tangibility of assets is particularly relevant in this context because firms can potentially pledge more collateral if counting on a large amount of tangible assets. The size is an important control because, depending on the size of the firm, the law sanctions heterogenous legal proceedings. Profitability is particularly relevant in times of financial distress because it signals to the counterparty how much of the debt the firm can afford to repay. The same applies to cash-flow volatility from a risk perspective.

Table 18. On–Off Board Comparison

	Obs.	Mean	Std. Dev	Min	p50	Max
Without Affiliated Creditors						
Cost of Debt	157,163	0.103	0.096	0	0.075	0.6
Book Leverage	204,717	0.223	0.221	0	0.176	1
Market Leverage	204,717	0.218	0.247	0	0.128	1
TobinQ_1	136,879	2.914	5.98	-75	1.503	100
TobinQ_2	133,891	9.113	103.062	-8.5	2.447	20,754.50
TobinQ_3	198,433	2.35	5.003	-1	1.183	99.9
Profitability	203,916	-0.054	0.267	-1.2	0.038	0.2
Tangibility	202,429	0.289	0.261	0	0.201	0.9
Market to Book	204,361	2.877	3.192	-2.3	1.845	20.2
Market Leverage Industry Median	204,717	0.169	0.158	0	0.132	0.7
Depreciation and Amortization	200,596	0.043	0.033	0	0.037	0.2
Cash-Flow Volatility	155,828	0.363	8.151	0	0.034	1,392.90
Size	204,717	5.016	2.396	0.4	4.894	11.2
R&D	204,717	0.069	1.465	-0.8	0	648.1
Dividend Payment	204,717	0.185	11.184	-2,059.00	0	2,218.60
With Affiliated Creditors						
Cost of Debt	1,742	0.069	0.055	0	0.061	0.6
Book Leverage	1,790	0.283	0.158	0	0.271	1
Market Leverage	1,790	0.253	0.178	0	0.221	1
TobinQ_1	1,564	1.756	0.892	0.4	1.479	7.9
TobinQ_2	1,554	3.124	3.663	0	2.37	58.7
TobinQ_3	1,682	1.358	0.847	0	1.12	6.7
Profitability	1,790	8.358	1.526	0.7	8.543	11.2
Tangibility	1,790	0.35	0.233	0	0.293	0.9
Market to Book	1,790	2.986	2.645	-2.3	2.249	20.2
Market Leverage Industry Median	1,790	0.229	0.147	0	0.211	0.7
Depreciation and Amortization	1,790	0.044	0.022	0	0.04	0.2
Cash-Flow Volatility	1,722	0.024	0.037	0	0.014	1
Size	1,790	8.358	1.526	0.7	8.543	11.2
R&D	1,790	0.012	0.025	0	0	0.3
Dividend Payment	1,790	0.311	2.695	-54.4	0.223	77

Table 18 features a comparison of some firms' descriptives with and without a creditor on the board. The table details the number of observations, the mean, standard deviation, minimum value, median, and maximum value.

Table 19. Governance, Conservativism, and Innovativeness

FE				Pooled OLS		
Variables	Tobin's Q3	Dividend Payout	R&D	Tobin's Q3	Dividend Payout	R&D
Affiliated Creditor	0.000226	0.00325	-0.00155	30.67964**	0.017363	-0.00769*
	(0.0373)	(0.0100)	(0.00114)	(13.2213)	(0.014985)	(0.00427)
Profitability	-1.148***	0.0395***	-0.0920***	-1.08612	0.196287***	-0.385***
	(0.144)	(0.00366)	(0.00692)	(0.947356)	(0.009008)	(0.00834)
Size	-0.576***	0.00751***	0.0109***	-12.8687**	0.047929***	0.0560***
	(0.0256)	(0.00141)	(0.00137)	(5.602941)	(0.001581)	(0.001)7
Market Leverage Industry Median	-0.430***	-0.0796***	-0.0295***	71.72552	0.341542***	-0.336***
	(0.113)	(0.0133)	(0.00410)	(53.36415)	(0.012946)	(0.00734)
Market to Book	0.169***	0.00165***	0.00169***	0.008235	0.00518***	0.00907***
	(0.00792)	(0.000250)	(0.000334)	(0.112944)	(0.000585)	(0.00035)
R&D	2.289***			3.04744***	-3.1E-05**	
	(0.298)			(1.086051)	(1.12E-05)	
Dividend Payout	0.000179			0.033939**		
	(0.000220)			(0.0155946)		
Sales			-0.0265***		-0.02126***	-0.0499***
			(0.00196)		(0.001349)	(0.00167)
Constant	4.372***	0.0711***	0.0503***	46.6335***	-0.06575***	0.0618***
	(0.118)	(0.00698)	(0.00631)	(16.69723)	(0.005794)	(0.00266)
Observations	148,013	152,895	139,185	148,809	173,738	140,889
R-squared	0.074	0.025	0.059	0.0043	0.1524	0.386
Company FE	YES	YES	YES	NO	NO	NO
Year FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 19 features the final regression, which considers the full untreated sample when running both FE and Pooled OLS estimations. The dependent variables considered are Tobin's Q, Dividend Payout, and R&D expenditures. My key explanatory variable – the Affiliated Creditor – features a significant positive relationship with the Tobin's Q and a negative relationship with R&D only in the Pooled OLS specification. The risk of endogeneity in this preliminary analysis is severe, and this negative coefficient's sign might be explained by the fact that the intervention is applied to firms that are approaching or are already in financial distress. Hence, the affiliated creditors would use their expertise to identify those R&D expenditures to be cut. Standard errors are robust to arbitrary heteroskedasticity and allow for correlation through clustering at the firm level.

Table 20. The Dividend Policy in and out of Financial Distress

	Dividend Payout
Lower Regime	
Dividend Payout Lag	-0.293*** (0.107)
Affiliated Banker	0.412 (0.260)
Profitability	0.0215 (0.0695)
Size	0.0210 (0.0236)
Market Leverage Industry Median	-0.646*** (0.205)
Market to Book	-0.00393 (0.00469)
Net Debt Issuance	-0.00147 (0.00167)
Cash-Flow Volatility	0.00464 (0.00403)
Constant	-0.421 (0.297)
Upper Regime	
Dividend Payout Lag	0.826*** (0.225)
Affiliated Banker	-0.531 (0.349)
Profitability	0.222 (0.00408)
Size	0.0486 (0.0409)
Market Leverage Industry Median	1.913*** (0.490)
Market to Book	-0.00280 (0.0142)
Net Debt Issuance	-0.0384 (0.0732)
Cash-Flow Volatility	-0.845* (0.478)
Threshold (Interest Coverage Ratio)	4.520*** (0.0786)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 20 presents the output of the dynamic single-threshold regression whereby the outcome is the dividend payout. Dividend payout determinants remain a puzzle. However, the dividend payout seems to be strongly explained by its previous values in both regimes, thus suggesting the correctness of a dynamic model. Interestingly, the lagged value of my dependent variable (i.e., dividend payout) changes its sign. When firms are in financial distress, they tend to rethink their dividend policy, whereas when they are sound, they tend to practice dividend smoothing. The industry median leverage variable appears to be highly related to the dividend payout, irrespective of whether the firm is in financial distress. The approach to the dividend policy seems to be subject to the median value of the sector the firm operates in, whereby industry's market leverage increases are associated with dividend payout decreases when firms are in financial distress and dividend payout increases when firms are sound. Finally, the threshold variable is highly significant, thus leading me to infer that the relationship needs to be modeled in a threshold-dependent way.

3 The Role of Social Capital in Corporate Finance

3.1 Conceptual Framework

Chapter 3 conceptualizes social capital as a form of "shadow equity" that can either augment or erode a firm's formal balance sheet strength. Two constructs anchor the analysis. Borrower connectedness (BCON) refers to the breadth and intensity of the top management team's professional network, as measured by board interlocks, shared directorships, and industry associations. Lender connectedness (LCON) captures the analogous network reach of officers within the lending institution.

Before any loan is granted, a dense borrower network reduces information asymmetry between the firm and potential creditors. Lenders interpret extensive ties as evidence that the borrower operates in a well-monitored social environment and therefore requires less formal oversight. The immediate consequence is a decline in collateral demands and a narrowing of loan spreads. In this pre-contract phase, social capital functions as a substitute for hard information: reputation embedded in the network compensates for incomplete financial disclosure.

Once the loan proceeds are disbursed, however, the same network that facilitated contracting can generate what this chapter terms a "cost of trust." High BCON weakens hard monitoring because lenders, relying on relational assurances, devote fewer resources to ongoing oversight. Managers may exploit this slack by pursuing riskier investment strategies – a behavior that, over time, manifests as higher equity–return volatility. Thus, social capital transitions from an informational asset to a latent source of agency friction.

LCON interacts asymmetrically with this process. When the lending relationship is active, a well-connected banking officer can temper the post-loan risk escalation by re-injecting relational monitoring capacity; without an outstanding loan, those ties lack a channel through which to influence firm behavior. The effectiveness of both BCON and LCON is further conditioned by two boundary factors. First, the nature of the credit agreement matters: relationship loans, characterized by repeated interactions and soft information exchange, allow networks to substitute more extensively for formal covenants than arm's-length, transactional loans do. Second, firm size alters the marginal value of social capital: smaller firms, which possess thinner disclosure records and less analyst coverage, benefit more from network certification but are also more vulnerable to the cost-of-trust effect once monitoring slack sets in.

Overall, the chapter argues that social networks constitute a dynamic, state-dependent asset. Prior to lending, they lower financing frictions and price, effectively expanding borrowing capacity. After funds are obtained, they can either sustain disciplined behavior, if reinforced by lender networks, or enable risk taking, if left unchecked. Understanding this dual role is essential for assessing how relational capital interacts with formal control mechanisms to shape capital structure outcomes and equity risk profiles.

3.2 Enhancing Information Flows through Connections: Credit Agreements, Hesitance to Refusal, and the Cost of Trust

3.2.1 Introduction

Information asymmetries determine the social costs that most financial actors bear when they are involved in social interactions. While social interactions can create information asymmetries, their iteration over time contributes to reducing the costs that arise from such information asymmetries. This phenomenon is well documented within the financial realm, and many instances of its manifestation can be seen in the relationship lending literature (e.g., Degryse et al., 2009; Kysucky and Norden, 2016; Bolton et al., 2016).

Asymmetric information is known in theory to have important effects on credit markets, leading to inefficient credit provisions and even market unraveling (De Fusco et al., 2022). For example, think of the case of a bank representative who must make the decision of whether to grant a loan to an individual or an institution. In such a situation, prospective borrowers might be in a position where they are unable to repay the loan. If protected from the consequences of their actions, they might be tempted to save the resources needed to protect them against risk (i.e., moral hazard). In a similar logic, when two parties in a deal possess different information, a social cost arises when those who want to make the deal are indeed those who cannot afford such a deal. Given that the other parties involved might be aware of this fact (i.e., adverse selection), the parties might end up avoiding stipulating the deal ex ante, thus causing lending market unraveling.

A reasonable approach to overcome this problem is to limit information asymmetries. To this end, individuals strive to guarantee a steady information flow through multiple interactions, thus producing soft information (Houston et al., 2018) and enabling the emergence of a network. A network might bring about trust, which is crucial not only to successful interorganizational collaboration (La Porta et al., 1997; Owen and Currie, 2022) but also to intraorganizational collaboration because information asymmetries may exist even among directors on the same board (Cao et al., 2014).

I aim to navigate the boundary between sociology and finance by investigating how social connections branch out within lending relationships between intertwined firms and banks. To this end, I apply a revisited type of network analysis – a consolidated approach in the sociological field (Mizruchi and Stearns, 2001) – to disentangle the dynamics of lending relationships without disregarding the relevant insights I can get from sociology. The aim is to shed light on potential implications for finance, specifically on the behavioral and traditional finance mechanisms driving my empirical results.

Trust can promote financial decision-making because people feel that, in such a process, they can depart from a decisional framework where individuals only act opportunistically and driven by an economically rational mindset, which would restrict the investment opportunity set to what produces financial returns. As pointed out by D'Amato et al. (2022), a growing body of observational studies have provided evidence of a positive correlation between real per-capita gross domestic product and trust (Algan and Cahuc, 2013; Algan and Cahuc 2014; Dincer and Uslaner, 2010; Knack and Keefer, 1997; Zak and Knack, 2001). Individuals might expand the scope of their actions to those producing general welfare: a broader category additionally involving psychological well-being which is hardly measurable but, in my opinion, equally important.

While agreeing with the formal definition of trust whereby "trust is the willingness of an entity (i.e., the trustor) to become vulnerable to another entity (i.e., the trustee)" (Schilke et al., 2021), I add that in my setting, trust entails a propensity to deviate from a rational mindset toward a more emotional one. It is this implication that I would like to discuss. Agents temper these two kinds of mindsets with the aim of finding balance between financial returns and psychological well-being. Starting from this assumption, which subsumes the rationale for my analysis, I test empirically whether the degree of connectedness between borrowing and lending firms' representatives contributes to lower cost of debt, while also specifying its relationship with book and market leverage.

When financial institutions concede credit to firms, they willingly take on some risk which can be mitigated by what can be summarized in the trust's category. Trust can be seen as that exogenous factor akin to culture subsuming certain informal institutions such as individuals' socioeconomic background.

Even though the outcomes of interest are purely financial variables, the underlying causal mechanisms hinge upon the hesitation of lenders' representatives to not concede credit to connected borrowers' representatives. I justify such a hesitation by virtue of the managers working for lenders contemplating other endogenous and hardly measurable factors, such as the hedonic losses caused by the refusal of the requests of connected managers working for borrowers. I hypothesize that such losses – which can relate to the reputational sphere, for example – are increasing in the socioeconomic *status* of the connected interacting individuals. Therefore, the higher the socioeconomic status (e.g., directors of the board) of these individuals, the more hesitant creditors are to refuse their requests to renegotiate debt in terms of amount issued and cost. That is, the higher the status of the interacting individuals, the stronger the creditors' departure from rationality when making decisions.

A similar reasoning can apply regarding the quality of the connections between these two sets of individuals: borrowers and lenders. When individuals' connections are of good quality, interacting individuals may be a fortiori reluctant to refuse requests by counterparties even if such requests can compromise to some extent their economic interests. Although I do not directly measure connections' quality, in Section 3.2.5 I reconstruct my key variables in a way that enables me to focus on good quality connections. Therefore, through juxtaposing my results before and after rebuilding variables, I can extrapolate the effects of connections' enhancement.

The extant literature on trust within the scope of finance is full of valuable research pieces, such as Guiso et al. (2008), that assess the implications of lack of trust on the stock market where transactions occur across disconnected agents. Therefore, while Guiso et al. (2008) were interested in the lack of trust in the financial system which can be partly offset by stronger formal institutions, more recent research (Alvarez-Botas and Gonzales, 2021) investigates the role of trust on lender–borrower relationships and the relevance of informal institutions. Nevertheless, to my knowledge, I am a pioneer in investigating whether the level of informal institutions (e.g., trust and culture), measured by the degree of connectedness across agents, contributes to causing renegotiation on the amount or cost of debt. I define the degree of connectedness as the number of ties that these individuals have built during their employment or education history. My contribution is then twofold: first, I create a measure of informal institutions – the degree of connectedness, which includes a multitude of constructed variables. The degree of connectedness can theoretically affect my outcomes by promoting the fulfillment of mutual interests, immediately or intertemporally. In fact, the degree of connectedness can push a party to accept a deal, determining a transaction even against their own interests and permitting the counterparty to capture all the rents. This behavior may be based on the idea that going forward, the first party has the option to make another deal against the interests of the counterparty who, based on the same reasoning, can accept the deal. By counting the number of ties that individuals have in such an interconnected environment such as the syndicated loan and bond market of the US, I can uncover some behavioral patterns. Secondly, I elaborate on the causal mechanisms driving my results, based on reasoning stemming from behavioral principles.

To this end, I construct several key explanatory variables which discern between the specific roles that managers have within the borrowing and lending firms – whether directors on boards or other types of top to middle management – as well as whether an outstanding loan is tying the companies. These variables count the number of connections, defined as the ties that managers within the borrowing and lending firms have built by sharing education or employment history. I carry out this investigation in two directions, namely considering the number of connections that representatives of borrowers have with managers in lenders and vice versa.

Human biases, emotions, and cognitive limitations in processing and responding to information affect economic behavior (Baker et al., 2023). The institution of connections can prompt information and behavioral biases resulting from transmitting feeling and behaviors through personal observation, conversation, mass media, and social media (Akçay and Hirshleifer, 2021). Although I strongly agree with the above statement, pieces of research linking behavioral finance and sociology are scarce, particularly within the subfield of corporate behavioral finance, which has had some resonance only regarding two stylized behaviors: loss aversion (Kahneman and Tversky, 1979) and overconfidence (Daniel et al., 1998; Ben David et al., 2013).

I ask if the degree of connectedness between managers and bankers influences the degree of financial leverage of a firm and if it contributes to reductions in its cost of debt. I further ask if any prospective effect is homogenous, based on the socioeconomic status of the interacting agents and on the quality of the connections.

Interestingly, I find heterogenous behaviors of individuals undertaking financial decision-making depending on the socioeconomic status of the interconnected agents. Moreover, when juxtaposing connections of good quality and the full set of connections, I find that the effect of connections on my variables of interest varies both in terms of sign in several instances and economic significance.

I also distinguish between the case when an outstanding loan is tying the companies and when there is no ongoing loan.

When describing the effect of connectedness on my outcomes, I focus only on statistically significant relationships. When considering middle managers of borrowing firms, I empirically find that their degree of connectedness contributes to causing market leverage reductions regardless of the presence of an outstanding loan and has no effect on the cost of debt. When considering directors on the boards of borrowing firms, their degree of connectedness contributes to causing heterogenous responses in terms of market and book leverage – depending on the presence of an ongoing loan – and increases cost of debt. Specifically, the higher their degree of connectedness, the lower the market leverage when there is no ongoing loan, and the higher the book and market leverage – as well as the cost of debt – when there is an ongoing loan.

I find that even those managers who work for lenders influence – supposedly indirectly – the outcomes of interest. In fact, I find that the higher the degree of connectedness for middle managers working for lenders, the lower the cost of debt when there is no ongoing loan and the higher the market leverage when a loan is outstanding. When considering directors working in the board of lenders, a higher degree of connectedness contributes to causing a lower book leverage with no effect on other regressands.

I aim to fill the gap in the literature by systematically juxtaposing my findings across multiple specifications of my variables of interest, varying by manager's position and by how the number of connections is calculated. Specifically, I initially sum up the number of connections, aggregating them by individual, then I follow Faleye et al. (2014), relying on a logarithmic specification to calculate the number of connections, whereby the latter is equal to the natural logarithm of 1 plus the number of connections. The results vary based on the different ways I calculate the number of connections. I also compare results pre- and post-amendment of the merging procedure used.

The paper includes six sections as follows. Section 3.2.1 introduces the topic. Section 3.2.2 reviews the extant literature and formulates the hypotheses. Section 3.2.3 describes the dataset and outlines methodology. Section 3.2.4 discusses the empirical findings. Section 3.2.5 investigates if results are robust using a different approach in the merging procedure and implements a different calculation of the number of connections, enabling me to devote my attention to high-quality ones. Finally, Section 3.2.7 concludes by summarizing the main findings and their implications.

3.2.2 Literature Review

Since the development of loss aversion theory by Kahneman and Tversky (1979), the idea of *homo economicus* has been challenged based on the assumption that people may make choices that do not maximize utility because they rank other considerations above utility (Baker et al., 2023). However, the literature on behavioral corporate finance is scant. Although social interactions have long been studied, thereby highlighting their prominence in creating sentiment (Nofsinger, 2005) and herding behavior (Nofsinger and Sias, 1999), applications within the corporate finance boundaries are scarce. In fact, the extant literature focuses only on two typical situations in which managers exhibit irrationality: loss aversion (Kahneman and Tversky,1979), whereby people prefer small, guaranteed outcomes over larger but risky outcomes; and overconfidence (Daniel et al., 1998; Ben David et al., 2013), whereby an investor overestimates the precision of their private information. However, both traditional (e.g., investors' rationality) and behavioral considerations drive financing decisions (Gider and Hackbarth, 2010).

The other strand of literature I wish to contribute to – initiated by Gätcher et al. (2004) – focuses on the relevance of socioeconomic background in affecting trust attitudes as determinants of voluntary cooperation. Gächter et al. (2004) find that differences in socioeconomic states correlate with variations in subjects' attitudes toward trust, which, in turn, are reflected in different levels of voluntary contributions in a one-shot public goods game (D'Amato et al. 2022). In the context of corporate finance, the degree of cooperation is not utterly voluntary – rather, such a cooperation arises in exchange for the so-called spread which materializes itself in the cost of debt. Nevertheless, when an individual requests credit from a financial institution, the latter has free will in deciding whether to grant it, and it is hard to refute that considerations about the socioeconomic status of the individual are relevant.

Both my intuition and reality's interpretation suggest that even though managers are generally not personally liable through their holdings in the case of the default of the firm, their socioeconomic status might affect the amount of debt and its cost by virtue of their prospective superior ability to bargain. Moreover, acting as a proxy for prestige and reputation, their socioeconomic status might affect the outcomes because of the bankers' hesitance to refuse to accommodate their requests. The fact that the manager belongs to the board of directors of a firm can represent an incentive to make a deal, which is further strengthened if the representative of the financial institution knows about the requestor background, because the two are connected as per my definition of connectedness – and this is even further strengthened if the connections are of high quality.

I focus on the role of managers' connections in shaping the capital structure of the borrowing firm and its borrowing conditions. Specifically, I ask if the degree of connectedness – measured by the number of connections each manager has with the counterparty in a borrowing–lending relationship – is significantly related to the book and market leverage, as well as to the cost of debt. Depending on the position a manager has within a firm, whether sitting on the board of directors or covering another top or middle managerial position, their role and that of their connections in determining the capital structure could vary – as well as their ability to negotiate borrowing conditions. Directors sitting on the borrowing company's board might relatively easily alter the firm's capital structure and increase debt by contacting the connected directors in the lending company, who might be hesitant to refuse to grant a loan considering the prospective friendship these individuals have built. In such circumstances, the transaction might be driven by the psychological frictions that the lending company's representative might encounter, rather than by a rational mindset rooted in economic principles. In this context, then, the role of connections plays a pivotal role in enabling firms to obtain debt. I formulate my first hypothesis as follows:

Hypothesis 1: *The higher the degree of connectedness between lenders' and borrowers' directors, the higher the book and market leverage and the lower the cost of debt.*

Having said that, when top or middle managers interface with lenders' representatives, the role of connections might enforce a diametrically opposed pressure to the two financial variables (i.e., financial leverage and cost of debt). This is because managers might be guided by a more economical mindset whereby, notwithstanding that connections help obtain more favorable credit conditions, the effect of such connections materialize in facilitating debt repayments rather than debt accumulation. The reduction of information asymmetries resulting from the creation of connections might help both parties to fix an operationally efficient quota of debt, so that the debt amount needed is not overrated.

In other words, the position covered by a specific individual might matter in shaping the capital structure of a firm.

Hypothesis 2: *The higher the degree of connectedness between lenders' and borrowers' middle management, the lower the book and market leverage and the lower the cost of debt.*

Furthermore, my outcomes may be heterogeneously affected based on the quality of the connection. If, as I assume, individuals exponentially increase their number of connections, then after a specific individual dependent threshold, it is unlikely that additional connections could have a significant impact on the outcomes. In fact, a widespread opinion is that it is difficult to nurture a lot of good connections. Therefore, I formulate my third hypothesis as follows:

Hypothesis 3: *The effect of an additional connection on financial leverage and cost of debt is heterogeneous depending on the quality of such a connection.*

3.2.3 Data and Methodology

3.2.3.1 Data and Methodology Overview

I rely on Wharton Research Data Services, through which I gain access to BoardEx, DealScan, and Compustat. I use BoardEx North America and DealScan North America to build my network of intertwined firms by extracting information concerning managers' positions in the corporate hierarchy from the former and credit agreements from the latter. Inspecting BoardEx North America enables me to establish the number of connections an individual has and who the connected individuals are, as well as whether a specific manager works on the board or is part of middle management. The number of connections is equal to the number of ties an individual has built during their employment or education history. Specifically, two individuals are qualified as connected if they worked or work for the same institution or if they studied at the same school. Through investigating DealScan North America, I can determine what firms feature a borrowing relationship with a financial institution and what the terms of the credit agreement are.

Finally, I retrieve information about firms' fundamentals from Compustat. After implementing my merging process – detailed in the appendix – I obtain my final dataset, made of approximately 15,000 firms covering the period from 1995 to 2020. The panel data structure is unbalanced.

3.2.3.2 Model Specification

The model features the following structure:

$$Y_{i,t} = \alpha + \beta_1 T_{i,t} + \beta_2 c_{i,t} + \delta(T_{i,t} \cdot c_{i,t}) + \mu X_{i,t} + \tau_i + \lambda_t + \varepsilon_{i,t} \quad (23)$$

Where the coefficients given by α, β, γ, δ, μ are all unknown parameters and $\varepsilon_{i,t}$ is a random, unobserved error term.

$T_{i,t}$ represents the treatment allocated to firm i at time t, notably the presence of a credit agreement, whereas $c_{i,t}$ denotes the number of connections. Finally, $T_{i,t} \cdot c_{i,t}$ is the interaction term and δ the parameter of most interest, namely the ATT (average treatment effect on the treated). This way, I can gauge the effect of an additional connection on the group of firms that have an ongoing credit agreement based upon the following counterfactual: what is the effect of an additional connection on the financial leverage and on the cost of debt in cases where a credit agreement is not currently outstanding?

I have cases where the treatment is applied multiple times to a specific borrower because the latter received various loans from a multitude of financial institutions. Hence, I cannot implement DiD by means of the standard procedure, comparing the average change over time in the outcome variable for the treatment group with the average change over time for the control group once the treatment is first applied – I would end up introducing bias into the estimation. Instead, I take a different approach: for the set of borrowers, I compute their number of connections with their respective lenders by summing up the connections with each lenders' representative. Similarly, for the set of lenders, I compute the number of connections with their borrowers, even if the outcomes of interest (i.e., market leverage, book leverage, and cost of debt) are still referred to the borrowing firms. The interaction term then needs to be computed by multiplying the dummy variable for the credit agreement in a specific year and the number of connections with only the representatives of those lenders that are tied by a credit agreement in that specific year. In the case of multiple lenders, I sum up the number of connections with each of them.

I consider the variables on the lenders' side (i.e., *Connectedness from Lender Side*, *Connectedness from Lender Board*, *Ongoing Loan and Connectedness from Lender*, *Ongoing Loan and Connectedness from Lender Board*) to understand if their number of connections can affect the borrowing firms' financing costs and financial leverage through a prospective enhancement of information flows across the two kinds of firms. For example, through learning about borrowers, as the number of connections increases, lending firms might be willing to accept lower cost of debt. The underlying idea is that, as the number of connections increases, the informativeness of an additional connection might increase, thereby pushing lending firms to be more lenient on borrowing conditions.

3.2.3.3 Key Variables

I build several key variables (i.e., *Connectedness from Borrower Side*, *Connectedness from Lender Side*, *Connectedness from Borrower Board*, *Connectedness from Lender Board*, *Ongoing Loan*, *Ongoing Loan and Connectedness from Borrower Side*, *Ongoing Loan and Connectedness from Lender Side*, *Ongoing Loan and Connectedness from Borrower Board*, *Ongoing Loan and Connectedness from Lender Board*). These variables represent the number of connections between various classes of managers working for the borrowing companies and those working for the lending companies. Hence, I can discern two groups: firms that receive the treatment and firms that do not, where such a treatment is represented by the presence of an ongoing credit agreement, which constitutes a lending relationship.

The variable *Connectedness from Borrower Side* expresses the number of connections between managers working for the borrowing company and creditors. The variable *Connectedness from Lender Side* expresses the number of connections between representatives of the lending company and their debtors. The variable *Connectedness from Borrower Board* restricts the set of managers subsumed by *Connectedness from Borrower Side* to managers working in the board of directors of the borrowing company, whereas the variable *Connectedness from Lender Board* includes those in *Connectedness from Lender Side* only if they work on the board of the lending company. The variable *Ongoing Loan* is a dummy that indicates the presence of an ongoing loan tying borrowers and lenders at the firm level. The variable *Ongoing Loan and Connectedness from Borrower Side* represents the number of connections between managers working for borrowing companies with their creditors when there is an outstanding loan, while the variable *Ongoing Loan and Connectedness from Lender Side* subsumes the number of connections between managers working for lending companies and their debtors when there is an ongoing loan. Finally, the variable *Ongoing Loan and Connectedness from Borrower Board* restricts *Ongoing Loan and Connectedness from Borrower Side* to managers working in the board of the borrowing company, whereas the variable *Ongoing Loan and Connectedness from Lender Board* restricts *Ongoing Loan and Connectedness from Lender Side* to those managers working on the board of the lending company.

3.2.3.4 Control Variables

I control by the standard corporate finance variables (i.e., tangibility, market to book, size, profitability, cash-flow volatility, dividend, market leverage industry median), which are thoroughly described in Chapter 2. In the book and market leverage model, I control for the cost of debt, whereas in the cost-of-debt model, I control for both book and market leverage.

3.2.4 Empirical Results

3.2.4.1 Descriptive Statistics

I then begin to explore the concept of connectedness, using the new variables that are constructed as outlined in the appendix. Table 21 features descriptive statistics. There are extreme cases where the number of connections is above 5,000, but I decided not to arbitrarily truncate that number. Since most managers have no connections of this kind, the median is equal to zero. By construction, *Connectedness from Borrower Board*, *Connectedness from Lender Board*, *Ongoing Loan Connectedness from Borrower Board*, *and Ongoing Loan Connectedness from Lender Board* include those connections that exist exclusively among directors sitting on the board of the two companies tied by a lending relationship. They thus feature a significant lower maximum than the other key variables, not including the maximum value of unity for the *Ongoing Loan* dummy variable.

3.2.4.2 Regression Results

In Table 22, I review the relationship between the degree of connectedness and financial leverage as well as cost of debt. The connectedness is measured bidirectionally by the number of ties between managers in borrowing firms and those in lending firms. I focus on the significant relationships I come across. The variable *Connectedness from Lender Side* features a significant negative coefficient for the cost of debt. I can then state that an additional connection for lenders contributes to reducing borrowers' cost of debt. When lenders' number of connections increases, they acquire a deeper knowledge of borrowing firms' deeds, thus leading to a reduction in the risk perceived in having a borrowing relationship with them. Therefore, such lenders might be less hesitant to accept lower lending premium.

The variable *Connectedness from Borrower Board* features a significant negative coefficient for market leverage, meaning that an additional connection for those managers on the board of directors of the borrowing firm contributes to reducing market leverage. On one hand, if managers work on the board of directors, by increasing their degree of connectedness with lenders they can play a more convincing certification role on the market, thus leading to a reduction of market leverage. On the other hand, seemingly only from the board, managers can significantly influence financing decisions, exerting a downward pressure on market leverage when they widen their network of connections with lenders.

The variable *Ongoing Loan* includes the presence of an ongoing credit agreement. While the existence of an ongoing credit agreement mechanically increases book leverage, the signaling power of a borrowing relationship with a financial institution seems to be stronger to the market when considered as a stand-alone factor than such a mechanical effect, thus reducing market leverage. In fact, having an ongoing borrowing agreement per se can induce market players to reevaluate firms that possess such a tie. Market agents might be reassured by a financial institution having an outstanding credit agreement, based on the belief that such an institution has carried out due diligence prior to conceding credit, thus demonstrating free-riding attitudes. The presence of an ongoing borrowing agreement with a financial institution can also prompt the latter to concede further debt at lower costs, given the existence of an already established lending relationship.

The variable *Ongoing Loan and Connectedness from Borrower Side* presents a significant negative coefficient for market leverage, which can be potentially explained by the fact that the presence of a credit agreement strengthens the effect of an additional connection between borrowers' representatives and lenders' managers. In addition to the reassuring presence of an outstanding credit agreement for the market, when tied by an existing obligation contract, the parties might more willingly accommodate the counterparty's requests. This might render a network of connections more valuable.

The variable *Ongoing Loan and Connectedness from Lender Side* features a positive coefficient for market leverage, whereby an additional connection might prompt lenders to concede debt to borrowing firms if the latter can lean on an ongoing credit agreement with a financial institution. In this instance, as connections' informativeness increases, lenders become more aware of the risk of insolvency of the counterparties and thus need to spend fewer resources on due diligence processes. The presence of an ongoing credit agreement reinforces the relationship between the degree of connectedness and market leverage by boosting creditors' confidence in borrowers' ability to repay loans. The impact of increased connections' informativeness on book leverage is less significant because the ratio's denominator (i.e., total assets) endures a stronger impact of the increase in liabilities than market leverage ratio's denominator. The latter is mostly driven by stock market movements, which remain unaltered by increases in the degree of connectedness of lenders' middle management.

The variable *Ongoing Loan and Connectedness from Borrower Board* features a highly significant positive coefficient for all dependent variables, meaning that when borrowers' representatives expand their network of connections, they can more compellingly demand debt – especially if counting on high socioeconomic status (i.e., directors on boards) as well as on an already established borrowing relationship (i.e., an ongoing loan). The relationship with the cost-of-debt variable could seem puzzling at first glance. However, by ascribing the willingness of lenders to concede credit in favor of connected individuals to a hesitation to refuse or to trust, I can see that this behavior needs to be somehow offset by higher premium. In this way, a new kind of cost arises at the expense of borrowers: the cost of trust.

3.2.5 Robustness Checks

For robustness, I now rely on a different merging technique: forming all pairwise combinations within groups rather than performing matching by combining observations with equal values of the identifier, as I did in Section 3.2.4. I believe that the new approach is more accurate, even if it might exacerbate the influence of outliers. In fact, through this new approach I end up obtaining individuals with a huge number of connections. These connections might not be of high quality – it is generally understood that beyond a highly individual dependent threshold, it is difficult to nurture a large number of social connections. I show the new descriptives in Table 25 and the results originated from my regression after implementing this new approach in Table 26.

In Table 25, the number of connections per capita increases significantly because of undertaking this new approach. On average, an individual working for a firm tied to another firm by a credit agreement appears to have 202 connections with individuals working for lenders. This average number of connections is much higher than the mean value of less than five connections per capita that I had identified in the previous merging procedure, shown in Table 21. I believe that this new average number of connections (202) is unrealistic and likewise for the maximum number of 127,271 connections for the most-connected individual. Similarly, for the second variable (*Connectedness from Lender Side*) it is unlikely that an individual working for a lending firm that established a credit agreement with a borrower has on average 160 connections with individuals working for the borrowing firm, or that the most-connected individual working there can count on 166,186 connections. Hence, this clearly calls for a solution to deal with outliers. To make the results amenable for comparison with those in Section 3.2.4, I report my regression output and summarize it in Table 26.

Even though the results do not change drastically from those in Section 3.2.4 – neither in terms of sign nor economic significance – through this new approach, I identify some new relationships as statistically significant. Specifically, the variable *Connectedness from Borrower Side* features a significant positive estimated coefficient for both book and market leverage. I can then infer that an additional connection for borrowers contributes to an increase of borrowers' book and market leverage. When borrowers expand their network of connections, they might more easily refinance themselves with debt because they can rely on additional people who might hesitate to refuse to grant a loan or underwrite a bond.

The variable *Connectedness from Lender Side* features a negative relationship with book and market leverage. When lenders' number of connections increases, they acquire a more extensive knowledge of borrowing firms' actions. This enables lenders to identify those borrowers that may benefit from the help of a supervisor (the affiliated creditor, whose impact I thoroughly discuss in Chapter 2) who can help borrowers reduce their leverage. The variable *Ongoing Loan and Connectedness from Borrower Side* presents a significant negative coefficient for both book and market leverage, as well as for cost of debt. When an ongoing loan ties the parties, the relationship lending literature suggests that firms benefit from a reduction in information asymmetries, which helps borrowing firms to sign better borrowing conditions and lenders to identify those firms that potentially need a supervisor. The variable *Ongoing Loan and Connectedness from Lender Side* also features a positive coefficient for book leverage. What I said about market leverage may apply to book leverage as well: as connections' informativeness increases, lenders can spend fewer resources on due diligence processes. The presence of an ongoing credit agreement reinforces the relationship between the degree of connectedness and book leverage by boosting creditors' confidence in borrowers' ability to repay loans. Finally, the variable *Ongoing Loan and Connectedness from Lender Board* features a positive estimated coefficient for market leverage, consistent with *Ongoing Loan and Connectedness from Lender Side*.

Overall, the results are intriguing, but I need to mitigate the influence of outliers. After careful examination of the data-generating process through histograms, I identify that the process follows a log-normal distribution. Observations appear to be clearly right-skewed, and the quantities may exhibit exponential growth. Hence, I modify how I compute the number of connections. Specifically, whereas in the previous section I sum up the number of connections by individual, I now adopt the following specification: natural logarithm of 1 plus the number of connections, as in Faleye et al. (2014). This way, I minimize the impact of potential outliers and add a small constant because the logarithm of zero would be undefined.

I find that the impact of outliers is significant to the extent that the sign of the relationship between my outcome and the variables of interest changes in many instances after log-normalizing the data. I show the relative output in Table 27. This new variables' construction enables me to focus on high-quality connections – assuming that the more connections an individual has, the harder it is to nurture them and, therefore, the lower their quality. When regressing against log-normalized variables, I end up underweighting individuals with a large number of connections, thereby smoothing the contribution to the mean square error across observations. In other words, I reduce the distance between observed and predicted values more significantly for individuals with lots of connections than for those with fewer connections.

My intuition suggests that the counterparties' deviation from rationality in the agreement is more pronounced when connections are of high quality, thus rendering the interpretation of these results more complex. The variable *Connectedness from Borrower Side* changes its coefficients' sign – turning negative – for the full set of regressands. An additional (high-quality) connection might subsume the appointment of a new creditor to the borrowing company who, as previously stated, imposes a downward pressure on both book and market leverage. A new connection, however, might arise aside from the appointment of a new creditor. In the latter instance, a high-quality connection might play the role of certification on the market, which was previously (prior to implementing the normalization) confined only to the connections across board members. The effect of an additional connection on the cost of debt is negative.

In these specific circumstances, the appointment of a creditor on the board seems to reduce the cost for the borrowing firm, potentially because of an aversion to displease friends in common or the individuals working for the borrowing firm themselves. The same reasoning applies irrespective of the new connection being a creditor employed by the borrowing firm – that is, this new connection might well be represented by a different individual.

The variable *Connectedness from Borrower Board* changes its coefficient – turning positive – for both book and market leverage, suggesting that an additional connection for individuals with high socioeconomic status helps them modify their company's capital structure, consistently with what happened previously in reference to the relationship between *Ongoing Loan and Connectedness from Borrower Board* and the two outcomes in question.

Overall, I can safely assume that the very fact that connections are of good quality pushes lenders to gloss over certain requirements, thereby departing from a framework based on economic principles. When contemplating good quality connections, those considerations previously confined to interactions across board members apply also to top and middle management. Similarly, those considerations, previously elaborated because of an ongoing loan between the parties, apply to interactions across board members. Put another way, the signaling power of an additional connection is so much stronger if the quality of the connections and the socioeconomic status of the subject making decisions are higher. A further strengthening element is the presence of an ongoing loan.

3.2.6 Discussion

Every transaction involving heterogenous agents comes at a cost because it involves some degree of risk. This risk can be mitigated but never fully eradicated, leading to the need for remuneration. The mitigating factors of such a risk in my context are the trust built across interconnected agents and the enhancement of the information flow resulting from such connections. The very existence of these mitigating factors permits the transaction to arise. In a different decisional framework – the one more commonly considered – it is the existence of a direct profit for all parties to let the transaction take place. Having found a positive relationship between the degree of connectedness a board member of the borrowing firm has with the lender and the cost of borrowing, I can infer the following: when the credit agreement is stipulated between a board member highly connected with a lending company, psychological and behavioral elements might prevail in the lender's rationality, thus leading to the transaction taking place even if the lender might find it economically inconvenient. To compensate for such "inconvenience," the lender requires a premium, which materializes itself in a higher cost of debt for the borrower: what I call the cost of trust.

Does greater connectedness among managers improve interorganizational information flow, thereby reducing information asymmetries? A high degree of connectedness might facilitate transactions between counterparties by allowing firms to renegotiate conditions on credit agreements more easily and by bolstering alterations of capital structure.

Nevertheless, connectedness among board members entails risk, such as higher likelihood of corporate fraud (Khanna et al., 2015). In fact, the percentage of gray directors (i.e., outside directors having some non-board affiliation with the firm) on major committees is positively associated with fraud (Uzun et al., 2004).

Social affinities or shared experiences are potentially actual drivers of interpersonal behavior (Houston et al., 2018). A prospective creditor who graduated from the same MBA program as the prospective borrower might be more prone to accept lower premium. However, I find the opposite, thus ascribing the emergence of a new cost – the cost of trust – to the deviation from economic principles that arises when lenders interact with borrowers with whom they are connected and who can count on higher socioeconomic status.

Likewise, if the two individuals previously faced the same challenges because they worked at the same company, not only will the creditor encounter social and psychological frictions in refusing to grant the loan because of the friendship or so presumed, but they will also be in a better position to judge the moral integrity of the prospective borrower.

I can make the following recommendation:

I recommend that firms in need of restructuring their capital let highly connected managers characterized by elevated socioeconomic status negotiate on debt because they seem to have privileged access to credit, even if not at better conditions.

3.2.7 Conclusion

The degree of connectedness between managers within the borrowing firms and representatives of the lending companies only facilitates alterations of borrowing firms' capital structure if certain conditions are fulfilled. These conditions include the presence of an outstanding credit agreement and the membership of the debt requestor to the board of directors of the borrowing firm. Instead, the effect of such a degree of connectedness on the market is heterogeneous by manager position within the corporate hierarchy and is dependent on the presence of a credit agreement, as shown by the varying sign of the relationship with market leverage across the multiple constructions of the explanatory variables (i.e., *Connectedness from Borrower Board*, *Ongoing Loan and Connectedness from Borrower Side*, *Ongoing Loan and Connectedness from Borrower Board*).

The implications that I can draw are manifold. Firstly, social connections are beneficial to both borrowers and lenders, albeit for different reasons. Borrowers' social connections, especially high-quality ones, help them adjust capital structure more easily and even obtain better borrowing conditions. For lenders, social connections help reduce the costs associated with due diligence processes. However, the marginal benefits of network expansion decrease as the number of connections increases. An individual should seek to find their own balance between the quantity and quality of connections, because these two elements display an inverse relationship after a specific subjective threshold.

3.2.8 Appendix A

Table 21. Descriptive Statistics

	Descriptive Statistics					
	Obs.	Mean	Std. Dev	Min	p50	Max
Connectedness from Borrower Side	207,427	4.198	47.404	0.000	0.000	5,822.000
Connectedness from Lender Side	207,427	3.398	32.248	0.000	0.000	2,884.000
Connectedness from Borrower Board	207,427	1.438	11.388	0.000	0.000	536.000
Connectedness from Lender Board	207,427	0.602	5.411	0.000	0.000	454.000
Ongoing Loan	207,427	0.080	0.272	0.000	0.000	1.000
Ongoing Loan and Connectedness from Borrower Side	207,427	1.625	29.465	0.000	0.000	5,276.000
Ongoing Loan and Connectedness from Lender Side	207,427	1.316	17.965	0.000	0.000	2,176.000
Ongoing Loan and Connectedness from Borrower Board	207,427	0.590	6.358	0.000	0.000	426.000
Ongoing Loan and Connectedness from Lender Board	207,427	0.230	2.782	0.000	0.000	190.000
Cost of Debt	159,164	0.103	0.096	0.000	0.075	0.600
Book Leverage	207,427	0.223	0.221	0.000	0.176	1.000
Market Leverage	207,427	0.218	0.246	0.000	0.128	1.000
Size	207,427	5.027	2.420	0.400	4.908	11.200
Profitability	206,616	-0.056	0.272	-1.200	0.038	0.200
Tangibility	205,139	0.289	0.261	0.000	0.202	0.900
Market to Book	207,070	2.879	3.211	-2.300	1.847	20.200
Depreciation and Amortization	203,293	0.043	0.033	0.000	0.037	0.200
Cash-Flow Volatility	157,981	0.53	15.232	0	0.034	2,778.30

Table 21 features descriptives for my constructed variables. The table details the number of observations, the mean, standard deviation, minimum value, median, and maximum value. The extreme number of connections – as shown in the maximum value column – calls for a remedy to manage outliers.

Table 22. The Connectedness Effect on Borrowing Terms

	Book Leverage	Market Leverage	Cost of Debt
Connectedness from Borrower Side	8.92e-07 (2.02e-06)	1.43e-06 (2.47e-06)	3.19e-07 (6.15e-07)
Connectedness from Lender Side	-2.66e-06 (4.54e-06)	-2.44e-06 (5.17e-06)	-1.27e-06* (7.60e-07)
Connectedness from Borrower Board	6.91e-06 (7.58e-06)	-1.60e-05** (6.85e-06)	3.58e-06 (2.79e-06)
Connectedness from Lender Board	-1.39e-05 (1.90e-05)	-3.02e-05 (2.06e-05)	-2.33e-06 (3.36e-06)
Ongoing Loan	0.00965*** (0.00363)	-0.0227*** (0.00401)	-0.00319*** (0.000930)
Ongoing Loan and Connectedness from Borrower Side	-6.90e-06 (4.62e-06)	-9.71e-06* (5.00e-06)	-1.42e-06 (1.09e-06)
Ongoing Loan and Connectedness from Lender Side	1.36e-05 (9.79e-06)	1.96e-05* (1.06e-05)	3.58e-06 (2.26e-06)
Ongoing Loan and Connectedness from Borrower Board	3.24e-05*** (8.81e-06)	3.68e-05*** (9.58e-06)	5.78e-06*** (2.17e-06)
Ongoing Loan Connectedness from Lender Board	-5.74e-05* (3.08e-05)	-4.80e-05 (4.13e-05)	-1.21e-05 (9.73e-06)
Tangibility	0.0790*** (0.00523)	0.0696*** (0.00564)	-0.0127*** (0.00141)
Market to Book	0.00338*** (0.000347)	-0.0170*** (0.000326)	0.000113 (0.000137)
Size	0.00365*** (0.000686)	0.00619*** (0.000792)	-0.00490*** (0.000207)
Profitability	-0.131*** (0.00528)	-0.0515*** (0.00511)	-0.0864*** (0.00247)
Cash-Flow Volatility	-0.000207*** (6.87e-05)	9.35e-05*** (2.17e-05)	-5.74e-05** (2.36e-05)
Dividend Dummy	0.0530*** (0.00359)	0.0800*** (0.00418)	0.0150*** (0.00108)
Market Leverage Industry Median	0.415*** (0.00891)	0.573*** (0.0101)	0.0136*** (0.00266)
Cost of Debt	-0.447*** (0.00808)	-0.324*** (0.00889)	
Book Leverage			-0.0967*** (0.00284)
Market Leverage			0.00944*** (0.00232)
Constant	0.207*** (0.00711)	0.216*** (0.00825)	0.170*** (0.00234)
Observations	136,954	136,954	136,954
R-squared	0.182	0.293	0.170
Company FE	YES	YES	YES
Year FE	YES	YES	YES
Adjusted R-squared	0.182	0.293	0.170

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

Table 22 presents three models originating the DiD results of the leverage and cost-of-debt regressions. The dependent variables are book leverage, market leverage, and cost of debt. I consider a fixed set of explanatory variables, differing just by the fact that in the leverage models I control for the cost of debt, inter alia, whereas in the cost-of-debt model I control for book and market leverage, inter alia. The models suggest that my set of explanatory variables better predict the proportion of variation in market leverage than in the other two dependent variables, as indicated by the higher adjusted coefficient of determination. By comparing the two models where the dependent variable is financial leverage, I can infer that the degree of connectedness among managers working for companies tied by a borrowing agreement better explains the portion of variation in market leverage rather than that in book leverage. Consequently, I am led to think that while the degree of connectedness does not have a substantial impact on book leverage, it is *clearly perceived by market operators as an important factor either in fostering firms' performance (e.g., financial returns) or in mitigating their risk. In a mean-variance framework, in fact, these are the two key elements driving the buy-sell decisions of market agents. Regarding the other control variables, they feature the expected sign and are statistically significant, with the sole exception of the market-to-book ratio in the cost-of-debt models.*

Table 23. Economic Significance: Scaling by the Mean

Variables	Book Leverage	Market Leverage	Borrowing Costs
Connectedness from Borrower Side	0.00019	0.00031	0.00015
Connectedness from Lender Side	-0.00038	-0.00036	-0.00040
Connectedness from Borrower Board	0.00035	-0.00084	0.00040
Connectedness from Lender Board	-0.00034	-0.00075	-0.00012
Ongoing Loan	0.01177	-0.02832	-0.00842
Ongoing Loan and Connectedness from Borrower Side	-0.00091	-0.00131	-0.00041
Ongoing Loan and Connectedness from Lender Side	0.00110	0.00162	0.00062
Ongoing Loan and Connectedness from Borrower Board	0.00092	0.00107	0.00036
Ongoing Loan and Connectedness from Lender Board	-0.00072	-0.00061	-0.00033

Tables 23 and 24 present the economic significance of the relationship between my constructed variables and my outcomes, with the aim of quantifying the economic impact of my findings. Even though I do not expect such an impact to be large, because I am considering the marginal effect of an additional connection on my outcomes, for completeness I report the results of this exercise as recommended by Mitton (2024). I obtain the results in Table 23 by dividing the coefficient estimates resulting from my regression by the mean value of my dependent variables, then multiplying the resulting value by the standard deviation of the relative explanatory variables. To quantify the impact of an additional connection between managers working for the borrowing company and creditors (as subsumed in the variable Connectedness from Borrower Side), I should interpret the first numerical entry of the table as follows: a one standard deviation change in Connectedness from Borrower is associated with a 0.019 percentage change in book leverage relative to mean values.

Table 24. Economic Significance: Scaling by the Standard Deviation

Variables	Book Leverage	Market Leverage	Borrowing Costs
Connectedness from Borrower Side	0.00007	0.00028	0.00016
Connectedness from Lender Side	-0.00019	-0.00032	-0.00043
Connectedness from Borrower Board	0.00018	-0.00074	0.00042
Connectedness from Lender Board	-0.00006	-0.00066	-0.00013
Ongoing Loan	-0.00393	-0.02510	-0.00904
Ongoing Loan and Connectedness from Borrower	-0.00019	-0.00116	-0.00044
Ongoing Loan and Connectedness from Lender	0.00029	0.00143	0.00067
Ongoing Loan and Connectedness from Borrower Board	0.00017	0.00095	0.00038
Ongoing Loan and Connectedness from Lender Board	-0.00015	-0.00054	-0.00035

I obtain the results in Table 24 by dividing the coefficient estimates resulting from my regression by the standard deviation of my dependent variables, then multiplying the resulting value by the standard deviation of the relative explanatory variables. The interpretation goes as follows: a one standard deviation change in Connectedness from Borrower Side is associated with a 0.00007 standard deviation change in book leverage.

Table 25. Descriptive Statistics after Tweaking the Merging Procedure

	Obs.	Mean	Std Dev	Min	p50	Max
Connectedness from Borrower Side	207,427	202.052	1,973.58	0	0	127,271
Connectedness from Lender Side	207,427	191.031	1,879.41	0	0	166,186
Connectedness from Borrower Board	207,427	40.797	248.212	0	0	10,218
Connectedness From Lender Board	207,427	17.997	253.661	0	0	35,722
Ongoing Loan	207,427	0.142	0.349	0	0	1
Ongoing Loan and Connectedness from Borrower	207,427	80.577	1,000.43	0	0	69,706
Ongoing Loan and Connectedness from Lender	207,427	70.139	951.443	0	0	87,598
Ongoing Loan and Connectedness from Borrower Board	207,427	18.497	162.738	0	0	10,206
Ongoing Loan and Connectedness from Lender Board	207,427	8.358	210.706	0	0	32,595
Cost of Debt	159,164	0.103	0.096	0	0.075	0.6
Book Leverage	207,427	0.223	0.221	0	0.176	1
Market Leverage	207,427	0.218	0.246	0	0.128	1
Size	207,427	5.027	2.42	0.4	4.908	11.2
Profitability	206,616	-0.056	0.272	-1.2	0.038	0.2
Tangibility	205,139	0.289	0.261	0	0.202	0.9
Market to Book	207,070	2.879	3.211	-2.3	1.847	20.2
Market Leverage Industry Median	207,427	0.17	0.158	0	0.132	0.7
Depreciation and Amortization	203,293	0.043	0.033	0	0.037	0.2
Cash-Flow Volatility	157,981	0.53	15.232	0	0.034	2,778.30
Dividend Dummy	207,427	0.105	0.307	0	0	1

Table 25 presents the summary statistics of my key variables of interest and control variables after amending the code underlying the merging process. By comparing mean and median, I can infer that data distribution is likely to be skewed. When considering in the investigation the minimum and the maximum values, I can infer that the distribution is right-skewed.

Table 26. The Connectedness Effect on Borrowing Terms after Tweaking the Merging Procedure

	Book Leverage	Market Leverage	Cost of Debt
Connectedness from Borrower Side	4.73e-06** (1.93e-06)	6.37e-06** (2.82e-06)	7.47e-07 (4.74e-07)
Connectedness from Lender Side	-7.42e-06*** (2.34e-06)	-8.65e-06** (3.47e-06)	-1.47e-06** (6.22e-07)
Connectedness from Borrower Board	3.91e-06 (7.67e-06)	-1.61e-05** (7.42e-06)	2.03e-06 (2.04e-06)
Connectedness from Lender Board	-7.97e-06 (1.60e-05)	-2.09e-05 (1.83e-05)	-3.93e-07 (3.72e-06)
Ongoing Loan	0.00661* (0.00365)	-0.0225*** (0.00403)	-0.00322*** (0.000927)
Ongoing Loan and Connectedness from Borrower Side	-9.58e-06*** (3.14e-06)	-1.19e-05*** (4.28e-06)	-1.22e-06* (6.57e-07)
Ongoing Loan and Connectedness from Lender Side	1.09e-05** (4.73e-06)	1.43e-05** (6.00e-06)	1.09e-06 (1.03e-06)
Ongoing Loan and Connectedness from Borrower Board	2.09e-05** (9.42e-06)	2.23e-05*** (8.47e-06)	4.07e-06** (1.67e-06)
Ongoing Loan and Connectedness from Lender Board	2.37e-05 (1.63e-05)	3.62e-05* (2.08e-05)	3.51e-06 (3.28e-06)
Tangibility	0.0919*** (0.00540)	0.0788*** (0.00582)	-0.0127*** (0.00141)
MB	0.00360*** (0.000354)	-0.0166*** (0.000335)	0.000115 (0.000138)
Size	0.00448*** (0.000699)	0.00661*** (0.000803)	-0.00490*** (0.000207)
Profitability	-0.0994*** (0.00542)	-0.0408*** (0.00522)	-0.0864*** (0.00247)
Cash-Flow Volatility	-0.000131*** (2.17e-05)	0.000135** (5.56e-05)	-5.74e-05** (2.36e-05)
Dividend Dummy	0.0523*** (0.00363)	0.0789*** (0.00422)	0.0150*** (0.00108)
Market Leverage Industry Median	0.412*** (0.00905)	0.570*** (0.0103)	0.0136*** (0.00266)
Cost of Debt	-0.345*** (0.00813)	-0.281*** (0.00861)	
Book Leverage			-0.0967*** (0.00284)
Market Leverage			0.00946*** (0.00232)
Constant	0.179*** (0.00744)	0.201*** (0.00848)	0.170*** (0.00234)
Observations	134,040	134,040	136,954
R-squared	0.178	0.290	0.170
Company FE	YES	YES	YES
Year FE	YES	YES	YES
Adjusted R-squared	0.177	0.289	0.170

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 26 features the DiD results of the leverage and cost-of-debt regressions after the small amendments to the code were implemented. Although such an output does not change significantly after the amendments in terms of economic significance and the sign of the relationships under investigation, it does change – in a way that cannot be ignored – when testing for statistical significance. In fact, I can identify some additional relationships as statistically significant. Specifically, the relationship between the variables Connectedness from Borrower Side and Book and Market Leverage turned significant, akin to the relationship between the variables Connectedness from Lender and Book and Market Leverage.

Table 27. The Connectedness Effect on Borrowing Terms after Log-Normalizing the Variables of Interest

	Book Leverage	Market Leverage	Cost of Debt
Connectedness from Borrower Side	-0.0104*** (0.00287)	-0.0144*** (0.00314)	-0.00193** (0.000884)
Connectedness from Lender Side	0.00116 (0.00270)	-0.00117 (0.00290)	0.000285 (0.000786)
Connectedness from Borrower Board	0.00803*** (0.00283)	0.00914*** (0.00293)	0.00136* (0.000821)
Connectedness from Lender Board	-0.00942** (0.00380)	-0.0110*** (0.00415)	5.10e-05 (0.00109)
Ongoing Loan	-0.0154** (0.00665)	-0.00982 (0.00807)	-0.00726*** (0.00216)
Ongoing Loan and Connectedness from Borrower	-0.00462 (0.00399)	-0.00391 (0.00418)	-0.00211** (0.00107)
Ongoing Loan and Connectedness from Lender Side	0.0230*** (0.00368)	0.0204*** (0.00406)	0.00421*** (0.00102)
Ongoing Loan and Connectedness from Borrower Board	0.00852** (0.00385)	0.00347 (0.00398)	0.00168* (0.000964)
Ongoing Loan and Connectedness from Lender Board	-0.0158*** (0.00373)	-0.0106*** (0.00404)	-0.00317*** (0.00104)
Tangibility	0.0783*** (0.00521)	0.0675*** (0.00562)	-0.0126*** (0.00141)
MB	0.00346*** (0.000346)	-0.0167*** (0.000325)	-7.11e-05 (0.000124)
Size	0.00453*** (0.000710)	0.00829*** (0.000823)	-0.00485*** (0.000218)
Profitability	-0.130*** (0.00529)	-0.0511*** (0.00509)	-0.0857*** (0.00248)
Cash-Flow Volatility	-0.000209*** (6.88e-05)	9.12e-05*** (2.12e-05)	-5.51e-05** (2.29e-05)
Dividend Dummy	0.0533*** (0.00358)	0.0805*** (0.00416)	0.0154*** (0.00108)
Market Leverage Industry Median	0.409*** (0.00889)	0.564*** (0.0101)	0.0157*** (0.00261)
Cost of Debt	-0.447*** (0.00807)	-0.324*** (0.00884)	
Book Leverage			-0.0897*** (0.00211)
Market Leverage			
Constant	0.208*** (0.00713)	0.216*** (0.00823)	0.171*** (0.00234)
Observations	136,954	136,954	136,954
R-squared	0.186	0.299	0.170
Company FE	YES	YES	YES
Year FE	YES	YES	YES
Adjusted R-squared	0.186	0.299	0.170

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 27 features the DiD results of the leverage and cost-of-debt regressions after log-normalizing the key variables. This way, I can emphasize the role of high-quality connections in shaping firms' capital structure and in defining the borrowing conditions. While the goodness of fit does not change drastically, when contemplating high-quality connections, I see a few coefficients that change their sign.

3.2.9 Appendix B

3.2.9.1 Sample Construction

The merging process is structured in multiple steps. I start from the credit agreement information contained in the DealScan database at the company level (i.e., using companies' identifiers). I need such information to establish whether companies are involved in a lending relationship. I then filter out some firms contained in the DealScan database by selecting exclusively the universe of firms contained in the Compustat North America database. In fact, I am just interested in those companies for which I can retrieve information about fundamentals. Then I move onto the individual manager level (whereby I use managers' identifiers), including again only those managers who work for the companies considered in Compustat North America database.

I can then dig into the most granular level, where I incorporate data on connections (extracted from BoardEx), only for those individuals working for the companies so far under consideration. To establish connectedness across individuals, I draw on the data about connections contained in BoardEx. After applying some filtering, such information turns out to be composed of a list of managers working for the universe of firms contained in the Compustat North America database and of another list of managers representing the people with whom the former shared employment or education history. The latter information is contained in the BoardEx North America Database. The dataset is made of five association typologies: Education, Listed Organization, Not-for-Profit Organization, Unlisted Organization, and a residual category named "Other." These association types can be further divided into the following organization types: Armed Forces, Charities, Clubs, Government, Medical, Private, Quoted Sporting, and Universities.

This way, I obtain a temporary dataset which contains company, individual, and facility identifiers, as well as information about the start and end dates of the credit agreements and information about the periods when managers held specific positions. I can then transform the dataset into panel structure. I end up with a panel dataset where the key new explanatory variables are constructed as follows:

Connectedness from Borrower Side: starting with the full list of managers in my sample resulting from the merging procedure across the abovementioned three databases, I filter the list to consider only managers who worked for the borrowing companies in a given fiscal year of my time period and count their number of connections represented by the number of distinct managers who work for a lending company tied to the borrowing companies by a credit agreement.

Connectedness from Lender Side: starting with the full list of managers in my sample, I filter the list to consider only managers who worked for the lending companies in each fiscal year in my period and count their number of connections as defined for *Connectedness from Borrower*

Side.

Connectedness from Borrower Board: representing the interaction variable given by the product of *Connectedness from Borrower Side* (as above) and *Borrower Manager on the Board*; the latter is equal to unity if a manager holds a position on the board of the borrowing company, 0 otherwise.

Connectedness from Lender Board: representing the interaction variable given by the product of *Connectedness from Lender Side* (as above) and *Lender Manager on the Board*; the latter is equal to unity if a manager holds a position on the board of the lending company, 0 otherwise.

Ongoing Loan: a variable that equals unity if, for the specific fiscal years included in the dataset, there is a credit agreement, 0 otherwise.

Ongoing Loan and *Connectedness from Borrower Side*: representing the interaction variable resulting from the product of the following two variables: *Connectedness from Borrower Side* (as above) and *Ongoing Loan* (as above).

Ongoing Loan and *Connectedness from Lender Side*: representing the interaction variable resulting from the product of the following two variables: *Connectedness from Lender Side* (as above) and *Ongoing Loan* (as above).

Ongoing Loan and *Connectedness from Borrower Board*: representing the interaction variable given by the product of *Ongoing Loan* (as above) and *Connectedness from Borrower Board* (as above).

Ongoing Loan and *Connectedness from Lender Board*: representing the interaction dummy variable given by the product of *Ongoing Loan* (as above) and *Connectedness from Lender Board* (as above).

3.2.10 Extensions and Avenues for Future Research

I can expand by investigating whether the number of connections is associated with a higher probability of hiring an affiliated creditor or, more broadly, a manager – regardless of them being a creditor. I believe that the number of connections is more relevant when hiring those managers that are not intended to work in the C-suite or on the board of directors. Because directors must possess specific moral, ethical, and technical qualities, the role of connections might be or should be less crucial to their appointment. Still, my dataset also includes top managers who do not serve on the board of directors. For these individuals – who are hired by other managers operating within the firm – the hiring process is less transparent than for board members, and the role of connections might be more decisive. Since fewer resources are invested in the hiring process, in terms of time and money for candidate research and screening, managers might base their hiring decision on candidates having already worked for a well-known institution. In this instance, the role of connection is crucial to guaranteeing that candidates have already been properly screened and duly trained.

Then, I can construct a further variable proxying the quality of connections. In fact, I want to control for the latter, assuming that such a variable is negatively associated with the number of connections. To this end, I can retrieve information about the time periods during which connected individuals have worked for the same institution and the point in time to which their connection dates back – assuming that the longer the connection lasts, the higher the connection quality, and the further in the past the connection was established, the lower its quality. More precisely, the quality of connections might be calculated as the number of years that individuals worked for the same company or studied in the same institution, as well as how recent their tie is. The more recent the tie, the better the connection. Although it is safe to state that the more durable the tie, the better the connection, a recent connection is not always more valuable than an old connection. One could argue that when people are young, they have less ties and therefore the connection quality is stronger. Yet, for the sake of simplicity, I would assume that an older connection is less valuable than a recent one. This way, I could determine whether the role of connections is pivotal in spreading the practice of affiliated creditors on the board, while investigating whether connections help secure a job in general. I would shape the hypotheses as follows:

Hypothesis 1: *Creditors' likelihood of being nominated as affiliated creditors on the board increases with the number of connections that such creditors have.*

Hypothesis 2: *The number of connections an individual has with managers in an institution is positively associated with the likelihood of this individual being hired.*

Finally, I might investigate whether similar social status, as proxied by the number of connections, entails higher connectivity.

The tendency of nodes of similar degree to connect to each other is known as assortativity within the context of network analysis (Engel et al., 2021) whereas, in sociology, the phenomenon whereby people tend to connect with others of a similar status is called homophily (McPherson et al., 2001).

People with many connections do not necessarily want to make deals with people with a similar number of connections. In my opinion, this is because individuals tend to feel in competition with people who have a similar social status to them. Hence, such highly connected individuals might avoid making deals with other individuals with many connections, to preserve their competitive advantage and hinder the empowerment of others. Also, the current tendency of employers is to seek inclusiveness and diversity in the workforce, thereby promoting what sociologists call heterophily (Rogers, 2003).

An individual with few connections might be interested in widening their network of connections quickly. Therefore, these individuals might strive to connect themselves with highly connected people to speed up the process of expanding their network.

Hypothesis 3: *Managers with a high number of connections tend to be connected to other individuals with a high number of connections. Likewise, managers with a low number of connections tend to be connected to other individuals with a low number of connections.*

4 General Conclusion

After embracing the idea that different experiences can shape different realities and there is no universal approach to build your own reality, I embarked on this journey to develop awareness and, subsequently, to create my financial realm. This realm currently manifests as a multitude of agents who, through interactions, can speed up their learning and building of their own realities. As a result, market efficiency cannot exist in reality, even though as the number of interactions across financial actors increases and ultimately tends to infinity, it can be – albeit only theoretically – reached. What I observe is indeed a financial market where agents reshuffle their portfolios following their own specific guidelines, as emerges from the heterogeneity of stock prices' responses to policy shocks. However, portfolio managers – who have experienced a greater number of social interactions than other managers – tend to be empowered to reorganize portfolios and tend to agree quite uniformly on these guiding principles, which means such responses tend to converge across firms with similar capital structure.

That said, the marginal contribution of each social interaction decreases as its learning power increases, and the marginal learning effect gained increases with the time spent reflecting on such interactions. Therefore, to maximize the speed of the learning process, in my reality, one should aim to find their own balance between the time spent interacting and reflecting.

Furthermore, interactions logically provide varying degrees of learning power, meaning that interactions with experienced individuals (i.e., experts on a specific field) provide more learning power than those with non-experts, if such experts express their reality bona fide: exactly in the way they have learned it, without filters.

This idea led me to investigate a phenomenon that could – on its own – increase the number of social interactions, notably the appointment of a creditor (e.g., banker) on the board. The contribution I make at this point allows for a reevaluation of the figure of the banker, which people historically have conceived with a negative nuance. The banker, with their financial expertise, can and does help managers adjust the capital structure toward a lower level, potentially helping distressed firms recoup their soundness. Bankers do not share their experience and knowledge for free but in exchange for higher cost of debt, thus favoring the financial institution they previously worked or currently work for.

Finally, I investigate the phenomenon of social interactions per se, witnessing that as the potential for worthwhile social interaction increases – as could logically happen to individuals (i.e., managers on the board) who have many connections with experts – instances of key financial decisions are facilitated. In fact, I find that the degree of connectedness across individuals is significantly related to alterations of capital structure. Also, I find that a higher socioeconomic status, as measured by the membership of an individual to the board of directors of a company, is positively associated with lenders' propensity (or hesitancy to refuse) to concede credit even if that leads to a higher cost of debt, which I call the cost of trust. In fact, debt requestors that belong to top positions in the corporate ladder logically tend to have experienced a larger amount of valuable social interactions. Although providing an accurate representation of my full learning process is not possible, the key insights may be uncovered in a table. To this effect, Table 28 presents such insights: I summarize the contributions in terms of empirical evidence and economic magnitude that I propose, as well as the identification strategies that I implement to deliver them. However, my learning process cannot be deemed as complete, hence the need to pinpoint its limitations.

I conclude that social interactions are vital for learning purposes. Such interactions foster the convergence of behaviors toward dominant managerial practices regarding investment in both the stock and debt-loan markets, as well as shareholders' value maximization, which interacting agents aim to achieve – as per my assumption – by, inter alia, restructuring firms' capital.

Taken together, the evidence supports a unified view: financial markets are only efficient depending on the institutional and social context. Future research avenues proposed in each chapter extend this dual agenda – mapping new contexts where social capital intersects with financial capital and probing further anomalies that strain the traditional MEH.

Table 28. The Results at a Glance

Research Question (Chapter)	Identification/Estimation Strategy	Core Empirical Finding	Economic Magnitude	Main Theoretical/Policy Implication
Are stock's movements uniform across capital structures and states of the world? (Chapter 1)	Panel VAR (GMM); heterogeneity splits by median and quartile leverage/tangibility; crisis vs. calm subsamples; Markov-switching GARCH to test leverage effect regime switching.	Unit monetary policy shock *raises* low-leverage prices but *depresses* high-leverage prices; effects vanish when crisis years are removed.	βPrice (lagged Price) = +0.928 for below-median-leverage firms but negative and significant for above-median ones; impulse response function half-life ≈ 50 vs. 25 quarters respectively.	Challenges semi-strong MEH: balance sheet positioning conditions the sign and persistence of price responses; supports view that leverage is countercyclical shock-amplifier.
Does seating a creditor on the board help or hurt the borrower? (Chapter 2)	1:1 NNM (size, tangibility, industry); firm and year FE; DiD; dynamic single-threshold regression (Interest Coverage Ratio cut-off) to separate "distress" vs. "sound" regimes.	Affiliated banker raises average borrowing cost but simultaneously disciplines leverage; cost-of-debt effect flips sign once the firm exits distress.	After matching, having an affiliated creditor increases the cost of debt by 4.7 bp and reduces market leverage by 3.9 ppts. In the threshold model, the cost of debt rises by 11.6 bp in the distress regime, whereas once the Interest Coverage Ratio exceeds 14.5, it falls by 63.5 bp. However, the threshold is not significant, indicating no discrete regime change and a more gradual evolution of the covariate–outcome relationship.	Bank representation is *not* a free lunch: it is priced like an insurance premium – more costly credit during triage, but a sizable discount once solvency is restored; corroborates certification vs. conflict trade-off in board theory.
Do personal links between managers and lenders matter beyond the balance sheet? (Chapter 3)	Large DiD panel with high-dimensional FE; alternative definitions of "connectedness;" robustness to tweaked merging and log-normalization.	Borrower-side social ties lower leverage and debt costs, while lender-side ties matter primarily when a loan is active. When the borrower's ties involve board members, they generate a pricing cost: "a cost of trust".	Log-normalized estimates: a one-sd rise in BCON lowers market leverage by 1.4 ppts and Cost of Debt by 1.9 bp. However, a one-sd rise in BCON of board members entails a 1.6 bp additional cost.	Confirms that informational capital embedded in human networks substitutes for collateral but also reveals cost-of-trust channels.

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