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Superstar Firms: Capital Structure and Effects on The Distribution of Corporate Leverage Ratios

By

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In loving memory of my father, Ismael Ramírez Bauzó

(1943 – 2022)

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Abstract

This doctoral dissertation consists of two essays on the capital structure of superstar firms. The term superstars have been coined to designate the top performing firms for an economy, an industry or both. While recent economic research has focused on them as prime suspects for several problematic trends in key economic indicators, a proper investigation on their capital structure appears missing. It is this research gap which we want to contribute cover. Our approach can be characterized as unconventional as it is aimed at describing stars' financing behavior rather than at assessing any new factor significance or improvements in model fitness.

Essay 1 is titled "Capital Structure Evolution of Superstars: Leadership, Competitive Advantages and Fairness of Competition". In this article we investigate the evolution of the capital structure of superstar firms and compare it to that of industry peers. Our two main analyses trace back the evolution of end-of-period industry leaders to gain some perspective on their path to success. The first analysis pays particular attention to the changing characteristics of the competitive environment while the second is intended to describe the evolution of financial leverage series. We sort our fixed composition portfolios on profit margin (markups) which allows series to cross. Besides been able to corroborate previous research findings, our analyses reveal important details about within-industry (product market) competition. Competition has waned over the last two decades (Grullon, Larkin & Michaely,2019) while firms at the lowest level of market power have become important competitors for industry leadership thanks to their innovative nature. Regarding leverage evolution, macroeconomic factors seem to have driven high market power firms to increase their financial leverage position. (ElFayoumi, 2020 ; Kroen et al. (2021) In fact, these factors seem to have split firms into two power blocks with statistically different financing behavior which suggest the existence of a threshold value of profit margin.

Essay 2 is titled "Superstar Effects on The Distribution of Corporate Leverage Ratios". In this article we investigate an alternative explanation for the financing behavior of the power-quintile series observed in Essay 1, specifically that of the power blocks. We propose and test the possibility of an economic interaction between financial leverage and market power to be partially responsible for the financial behavior of firms within an industry. Adding the market power distribution (quintile categories) to the regression models commonly used to represent the capital structure theory propositions greatly improve their descriptive capabilities. Our empirical results confirm that the low-power block tends to create value mostly through innovation and tax shields (complementation effects) while the high-power block tends to substitute profit margin for financial leverage (substitution effects). More precisely, aggregating the data along the between-industries and within-industries channels of leverage variation reveals that industry concentration reduces aggregate levels of corporate debt while market power reduces the financial leverage of firms within an industry. Also, along these two channels of leverage variation leverage always increases with profitability. Analyses performed to test the adequacy of the capital structure theory to describe superstar effects on the distribution of leverage ratios show that, while within the high-power block the effects of concentration (between-industries) perfectly align to the theory predictions, the opportunistic behavior of industry leaders (within-industries) does not.

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Introduction

In this doctoral dissertation we investigate the capital structure of superstar firms and how the same forces driving their creation affects the financing behavior of industry peers. In doing so we hope to contribute cover what we consider a research gap as we could not find much literature connecting these two important fields of investigation: superstar firms and capital structure. In fact, we think the connection already exists and needs only to be highlighted and underscored. The capital structure of superstars has implicitly been studied, arguably confounded, as part of the broader financial research.

Superstar firms are generally defined as the top performers within a particular industry, economy wide or both. Performance can be measured in several ways; be it profitability, profit margin, market share or else. The issue is that superstar firms can develop substantial competitive advantages over peers and have been considered main suspects for several problematic trends of key economic indicators including a fall in the shares of labor and capital, the widening of income inequality, a weakening in product market competition and a reduction in labor market dynamism. (Krusell et al., 2000; Traina, 2018; Nolan et al., 2019; De Loecker et al., 2020; Autor et al., 2020) Autor et al. (2020) defines superstars as those firms with above-average markups and below-average labor share and blame them for the fall in labor share. In this and many other articles rising product market concentration is seen as indicative of both the presence of superstars and a weakening in competition. Grullon, Larkin and Michaely (2019) finds that since 1990 in the US not only has industry concentration increased but so have profit margins, while at the same time market power has become an important source of firm value. While using firm-level data to measure markups De Loecker et al. (2020) documents the evolution of market power and discusses its macroeconomic implications. Once again, a weakening of competition is the root cause.

In financial economics the concept of capital structure refers to the choice of financing (debt versus equity) firms employ to fund their operating and investing activities. Since Modigliani and Miller (1958, 1963) demonstrated that under the US tax code debt financing should increase the value of an otherwise unlevered firm, a huge wealth of research has followed. A great deal of this economic research has focused on identifying hidden costs that cause firms to carry apparently suboptimal levels of debt. From distress costs to the strategic use of debt while managing its relationships to several interest groups (stakeholders), the evidence shows that leverage ratios represent a state of dynamic equilibrium for a great variety of economic activity. Even within an industry no two firms are the same nor do they react to exogenous or endogenous events in the same way. Therefore, in a healthy economic environment the distribution of corporate capital structures should exhibit wide variation. (MacKay & Phillips, 2005)

We think that investigating the connection between these two research fields is very important as healthy economies start with healthy industries characterized by strong competition between firms which prevent them from extracting excessive rents from customers. In a competitive environment, firms must grow by undertaking positive net present value (NPV) projects while using the appropriate mix of financing. However, we do not think that this connection should be studied over the industry competition or investment channels but rather over the firm value one. Our economic rationale is simple, if two goods offer the same utility, they can interact in two possible ways: complementing each other or substituting for each other. While the value-optimization principle (utility) provides a common framework for the analysis we still need to distinguish superstars' influence on the financing decision. To accomplish this, for every sampling period year we sort firms into quintile groups according to own industry markup (operating profit margin) distribution. This sorting allows us to trace the evolution of average leverage ratio for each quintile and to expand previous research model specifications to include the power-quintile distribution. Based on the literature cited above and other articles we discuss in the literature review section we refer to the industry distributions of markups and profit margins as proxies for the market power one. In fact, throughout the rest of this dissertation we refer to them interchangeably.

Our methodology is unconventional, it is aimed at describing superstars' financing behavior rather than at assessing any new factor significance or improvements in model specification fitness. In fact, taking the capital structure as good and sufficient allows us to differentiate our results from previous research findings which for the most part we take as validation of our methodology. In the context of our leverage evolution analyses, it provides us a framework (benchmark) for evaluating both individual and relative behavior of the series. In the context of our interaction and compliance analyses it allows us to use model specifications as a measuring tool because we don't need to worry about methodological issues like the joint hypothesis problem in market efficiency tests.

The first chapter to this dissertation investigates the evolution of the capital structure of superstar firms and compare it to that of industry peers. In it we perform two main analyses that trace back the evolution of end-of-period industry leaders to gain some perspective on their path to success. In the first analysis we pay particular attention to the changing characteristics of the competitive environment while the second is intended to describe the evolution of financial leverage series. Because we sort fixed-composition portfolios on profit margin (markups) the series are allowed to cross. Besides been able to corroborate previous research findings, our analyses reveal important details about within-industry (product market) competition. Competition has waned over the last two decades (Grullon, Larkin & Michaely,2019) while firms at the lowest level of market power have become strong competitors for industry leadership thanks to their innovative nature. Regarding leverage evolution, macroeconomic factors seem to have driven high market power firms to rise their financial leverage position. (ElFayoumi, 2020 ; Kroen et al. (2021) In fact, these factors seem to have separated firms into two power blocks with statistically different financing behavior which suggest the existence of a threshold value of market power (profit margin).

The second chapter to this dissertation investigates an alternative explanation for the financing behavior of the leverage series observed in Essay 1, specifically that of the two power blocks. We propose and test the possibility of an economic interaction between financial leverage and market power to be partially responsible for the financial behavior of firms within an industry. Our empirical results confirm that the low-power block tends to create value mostly through innovation and tax shields (complementation effects) while the high-power block tends to substitute profit margin for financial leverage (substitution effects). However, complementation effects are only observed for the quasi-market leverage measure which suggests them to be strategic in nature. Using our quintile distribution to aggregate data along the between-industries channel of leverage variation reveals that industry concentration reduces aggregate levels of corporate debt. Furthermore, along the within-industries and between-industries channels financial leverage always increases with profitability which explains why superstars have raised their leverage position despite the effects of this economic interaction and why concentration effects might be difficult to detect at the macroeconomic level. Finally, analyses of the adequacy of the capital structure theory to describe superstar effects on the distribution of leverage ratios show that, while within the high-power block concentration effects perfectly align to the theory predictions, the opportunistic behavior of industry leaders does not.

Literature Review

In this section we review the most relevant literature pertaining to the two phenomena under investigation: superstars and capital structure. We begin with the oldest more extensively scrutinized topic of capital structure and then follow it with a discussion of the most salient topics within the superstar firms' research. We finish the review highlighting two articles that connect both topics and will help us find the right where to locate our research work within the existing literature.

Capital Structure Theory

The capital structure literature studies how firms finance both their operating activities and their growth. Because growth mostly depends on the successful execution of income generating projects which require the investment of initial amounts of capital funds, it can be said that capital structure research studies the mix of funds used by the firm to finance its projects. In fact, the firm itself can be considered a project and valued as such. However, the firm has traditionally been defined as a legal fiction, a nexus of contracts (securities) that grant different types of fund providers specific claims over the earnings generated during operating activities. (Jensen & Meckling, 1976) The relevance of this mix of financing resides in the premise that it has the potential to affect the value of the firm. (Modigliani & Miller, 1958) In fact, since Modigliani and Miller (1963) demonstrated that the use of debt, because of the tax code treatment of interests in the U.S., would increase the value of the firm. Consequently, a great debate has determined the development of several capital structure theories predicated on the fact that the levels of debt exhibited by corporations appears oblivious to this value augmenting rationale, which gave rise to the immensely generous concept of market frictions. There must be frictions preventing managers from choosing higher levels of debt. However, because of differences in market structure these frictions do not affect all firms the same, which helps explain the wide variation observed along the cross-section (between industries, within industries) as well as the time series (within firms) of leverage ratios.

In trade-off theories of capital structure (Kraus & Litzenberger, 1973), the friction originally identified was deadweight costs of bankruptcy, but the framework shortly adapted to include other distress costs like the agency costs that arise from conflicts of interest between agents and principals as well as between shareholders and creditors (Jensen & Meckling, 1976). The leverage ratio of the firm represents a trade-off equilibrium between the value enhancing benefits from using debt against the distress costs attached to it. But while within the trade-off framework distress costs derive from a wide variety of market frictions, a particular market friction give rise to an entire family of capital structure theories: pecking order (Myers & Majluf, 1984), market timing (Baker & Wurgler, 2002) and signaling (Ross, 1977; Leland & Pyle, 1977). For all these theories asymmetric information is the dominant market friction behind the financing decision. After hundreds of published studies over several decades of capital structure research these two major frameworks have facilitated the identification of several factors as reliable determinants of corporate leverage (Titman & Wessels, 1988; Harris & Raviv, 1991; Frank & Goyal, 2009), as well as corroboration of the effects of important market frictions on the financing decision (Graham & Leary, 2011). All this progress notwithstanding, not until recent research breakthroughs, corporate leverage levels continued been labeled irrationally low (the capital structure puzzle).

Just as the conciliatory approach proposed by Myers (1984) of incorporating empirically supported elements of all proposed theories of capital structure as a way forward seems to have guided subsequent research, so has done Zingales (2000) for more recent one. Zingales (2000) discusses the changing characteristics of the modern firm and the need for new or existing theories to incorporate and adapt to a new conceptualization of the firm. Important elements that a new theory of the firm should account for are flexible boundaries, a focus on intangible assets, and human capital investments. Although the human capital mentioned here as well as in other articles (Myers, 2003) refers to that of firm management, it does relate to an important development within the capital structure research, the inclusion of nonfinancial stakeholders into the financing decision process. It can be argued that the inclusion of nonfinancial stakeholders into the empirical analysis of corporate capital structures demonstrated that the observed levels of debt chosen by firms' management are not as irrational as previously thought. Like is many times the case with economic research, the evidence was always out there but it took a while for it to capture the research community attention. Several studies had suggested that the financing decision could affect firm's relation with important stakeholder groups like its customers, workers, and suppliers (Titman, 1984; Maksimovic & Titman, 1991). Debt, for example, has a bargaining role not only in the context of employee relations (Bronars & Deere, 1991; Matsa, 2018) but for suppliers and customers too (Kale & Shahrur, 2007). Most importantly, as predicted by Titman (1984) the distress costs associated to these stakeholder relationships, particularly labor, can be substantial enough to offset any additional tax benefits obtained from increasing the level of corporate debt. (Berk, Stanton & Zechner, 2010; Chemmanur, Cheng & Zhang, 2013) Add to all this the fact that measuring firms' marginal tax rates is notoriously difficult and most research results are based on best estimates (Graham, 1996a, 1996b; Graham & Mills, 2008) which some research has demonstrated to be inflated (Blouin, Core & Guay, 2010) and all the sudden corporate debt levels do not appear that puzzling.

The inclusion of nonfinancial stakeholders into the empirical analysis of corporate capital structures can also help explain another empirical anomaly, the negative relation between firm profitability and leverage. Independently of the actual magnitude of the marginal tax rate, its shielding effects should grow with increasing levels of profit. Firm's cost of capital (cost of debt) as well as distress costs should also decrease as its overall creditworthiness improves. However, the risk of firms' stocks rises with increasing levels of operating leverage (Lev, 1974), there are trade-offs between a firm's asset structure and their capital structure[1] (Mandelker & Rhee, 1984), and labor market frictions increase their operating leverage and reduce their optimal leverage ratio (Schoefer, 2016; Matsa, 2018). Chen, Harford and Kamara (2019) explain and demonstrate how "operating leverage increases profitability and reduces optimal financial leverage". Because of its sticky nature, operating leverage (fixed costs) works to increase profitability during good states of nature but amplifies loses and can accelerate bankruptcy during bad states. The threat of bankruptcy forces firms to substitute one type of leverage for the other and explains why high operating leverage firms behave as financially constrained, even if financial indicators say otherwise. (Kahl, Lunn & Nilsson, 2019)

Superstar Firms

The following review of the superstar firms' phenomena intends to establish a coherent narrative of how the concept originated and why it has attracted so much attention within the field of economics. Although general rather than comprehensive, we hope it will allow us to highlight the connections of the phenomena to the capital structure literature. However, we caution the

[1] Mandelker & Rhee (1984) find a negative and significant correlation between firms' degree of operating leverage (DOL) and their degree of financial leverage (DFL). Particularly firms with high stock beta.

reader that because the literature on superstar firms is relatively recent, we find ourselves on moving ground as many of the highlighted topics represent open-ended questions.

The term "superstars" was first introduced into the field of economics in Rosen (1981) while discussing the reasons for the skewness of the income distribution. Interestingly, the two major determinants of the shape of the income distribution are identified as (1) the imperfect substitution of quality levels and (2) advances in consumption technology. Furthermore, Rosen explains that these two features of the preferences-based income distribution allow "talented persons to command both very large markets and very large incomes" which we consider analogous to the concepts of industry concentration and profitability/ markups. Therefore, in Rosen (1981) we find all the main economic concepts over which the discussion and eventual development of the superstar firms' model centers around. The superstar firms' model was proposed by Autor et al. (2020) as an alternative explanation for the well-documented and decades long global decline in the labor's share of GDP. Superstar firms, the most productive members of an industry, are characterized as having above-average markups and below-average labor share. According to this "winner takes most" approach, changes in the economic environment that favor sector-leading firms will cause a reallocation of economic activity that will increase product market concentration and lower the labor share of economic value added. Therefore, the superstar firms' model is carefully formulated such that it can accommodate past, present, and future major economic environment events. Two such changes that have been proposed as main drivers of the ongoing global decline in the labor's share of GDP are globalization and technological changes. By building on preexisting conditions like superior capabilities of industry-leading firms, the model preserves the essence of the superstar phenomena described in Rosen (1981); the event simply confirms the existence of stars from the supply side and the form of the utility function from the demand side.

While testing the superstar model Schiersch and Stiel (2020) accurately asserts that the superstar firms' model was developed to explain "two simultaneously occurring phenomena: the rise of concentration in industries and the fall of labor shares". Understanding the driving forces behind these economic trends is extremely important because of their implications for the general health of the global economy. But the incredible appeal of superstars' approach is that, just as it originates from careful consideration of the characteristics of star individuals within the fields of arts and sports, it can easily be extended to include other units of analysis or adapted for application in other areas of research. Manyika et al. (2018) investigates how "superstar effects" can also be observed in sectors and cities around the world. Firms are identified as stars on terms of economic profit; sectors based on gross value added and gross operating surplus; and cities according to GDP and income per capita. Not surprisingly, they find that superstar effects observed for firms mostly analogously translate into sectors and cities. Interestingly, the level of aggregation introduced by sectors and cities produces some puzzling results. For example, firms show higher churn rate than cities and some superstar sectors have no superstar firms while some declining sectors do. In what could be considered a return to the behavioral roots of the superstars' phenomenon[2], Choi et al. (2021) finds a relation between the presence of superstar firms in an industry and college students' choice of major. The article presents yet another interesting connection between human psychology concepts and economics. It shows how salience, proxied by the skewness in the return distribution for an industry and/or excessive media coverage, can influence the choice of major (a human capital investment decision) of college students. The study finds that this situation creates

[2] We consider utility a behavioral economics concept.

a shift in labor supply not met by a corresponding shift in labor demand which carries long-term negative consequences for students when entering the job market.

In the superstar firms' model of Autor et al. (2020) all that is required for concentration to rise and labor share to fall, is an event that changes the economic environment in a way that advantages the most productive firms in an industry. Before the model was proposed the debate seemed endless, after its proposal all the events we discuss next seem feasible. Elsby et al. (2013) documents that since the latter half of the 1980s, the US labor's share of income has consistently declined from a postwar average of 64% to around 58%. Increased import competition resulting from globalization is presumed as the major driving force behind this trend. According to Karabarbounis and Neiman (2014), during the last 35 years the labor share of income declined 5% globally. This decline was mostly the result of a shift from labor to capital in response to a reduction in relative input prices caused by recent advances in communications and technology. During this period, the relative price of investment goods (capital) with respect to labor declined 25%. The authors develop a model where labor share only changes in response to shocks to the price of capital, markups, or technology. The magnitude of the response is a function of the elasticity of substitution of inputs, the level of labor share, and the level of markups. Elasticity is estimated "from cross-country variation in trends in rental rates and labor shares" rather than from within country time series variation in factor shares and factor prices, as is typically the case. For changes in technology, the estimated elasticity of substitution is 1.25[3] and, for the documented 25% decline in relative prices, the model can account for half of the reported labor share decline. Rising markups did contribute to the decline in labor share but do not change the estimated elasticity which implies that declining relative prices still account for 50 percent of the labor share

[3] This result is contested in Autor et al. (2020) as contrarian to consensus.

decline. These results are robust to changes in skill composition which rules out confounding effects of differential substitutability of capital as suggested in Krusell et al. (2000)[4]. Importantly, in the model a labor share decline caused by reductions in the relative price of investment results in welfare gains while one due to increases in markups yields welfare losses.

De Loecker et al. (2018) identifies technological innovation and changing market structure as main drivers of an observed rise in market power. Dao et al. (2019) analyzes advanced and emerging economies separately and finds that while technological progress is a main driver for the decline of labor shares in the former group, that for the latter group it is better explained in the context of trade globalization and capital deepening. Although the decline in labor share of income for emerging economies is lower, it still contradicts classical trade theory. These results suggest that the level of economic development affects the response to economic environment changes. However, the authors suggest caution when inferring causality as the period under consideration (1991-2014) is characterized by "deep structural changes to the global economy". Autor et al. (2020) briefly discuss the relation of the decline of labor share to other observed macroeconomic trends like the growth of industry import exposure and the perceived decline of worker power. Focusing on Chinese imports within manufacturing industries, the authors are able to generally corroborate prior findings[5] except that because the negative effects on industry payroll are smaller (in absolute terms) than for other output components (e.g., sales or value added), industry labor share rises in response to an increase in imports.[6] Regarding worker power, while still focusing on

[4] Develops an economic framework for interpreting skill-biased technological change introducing the feature of *capital-skill complementarity* which accounts for differing elasticities of substitution. It implies that the growth in the stock of equipment increases the marginal product of skilled labor but decreases the marginal product of unskilled labor.

[5] Falls in sales, payroll and value added.

[6] While this finding appears to contradict Elsby et al. (2013), different from Autor et al. (2020) their sample aggregates manufacturing and nonmanufacturing firms.

manufacturing industries the authors discuss some descriptive evidence in support of *the monopsony power hypothesis* where firms can unilaterally reduce both wages and employment through the outsourcing of "activities previously done in-house".

Grullon, Larkin and Michaely (2019) explains that governments' push for trade globalization witnessed during the end of the las century was intended to encourage competition as it promotes a healthy global economy through the efficient allocation of scarce resources. The article documents that starting around the end of the last century (1997) most US industries have experienced an increase in concentration level, which coupled to a simultaneous increase in profitability suggests that a rise in market power has contributed to a weakening of competition. The authors decompose their measure of profitability, represented by return-on-assets (ROA), into two components: (1) assets utilization (SALE/AT) which represents a measure of efficiency, and (2) operating profit margin (markups) computed as the ratio of operating income after depreciation (OIADP) to total sales (SALE), also known as the Lerner Index, which represents a measure of market power. They find that the rise in profitability is mostly driven by its market power component. After performing several tests, including robustness checks, the authors consider their results to be indicative of market power becoming an important source of value. Similarly, Barkai (2020) finds that, for US nonfinancial corporations, reductions in labor share are not offset by gains in capital share; rather increases in the share of pure profits (markups) account for their combined decline. Interestingly, their data shows the fall in the share of both capital and labor to be associated to a weakening of competition caused by rising industry concentration. Benmelech et al. (2020) documents the effects of weakening competition at the local labor market level. They find a negative relation between increased local-level employer concentration and wages, which is consistent with a rise in employer monopsony power.

Gutiérrez and Philippon (2017) also discusses possible driving forces behind these concentration and profitability trends in the US but additionally considers the weak response in business investment accompanying them. The evidence suggest that it is a decline in domestic competition (DDC) rather than an increase in efficient scale (ESC) from reallocation which is responsible for the observed trends. Because similar trends have not been observed in Europe, which has been exposed to similar changes in technology and market structure, laxed anti-trust enforcement is suspected. Furthermore, no positive relation is found between industry concentration and productivity or investment for US firms. However, using the entrance of China to the World Trade Organization (WTO) as an exogenous shock, they corroborate that investment increases with competition. Similarly, Grullon and Ikenberry (2020) investigate the paradox of falling corporate investment and rising Q-ratio using a model based on the decomposition of Tobin’s Q into three components: valuation, profitability, and asset utilization (efficiency). The authors find that corporate investment is better explained by the asset utilization component of Tobin’s Q-ratio which also has fallen dramatically since the 1980s. Their model results are incredibly robust over multiple scenarios, levels of aggregation even after controlling for several important factors including industry concentration.

Traina (2018) argues that rising market power could help explain not only rising industry concentration and declining labor shares but also potential declines in the share of capital, output growth, as well as in business and labor market dynamism. However, this author contests the accuracy of popular measures of market power as well as the documented upward trends. Using financial statement data and accounting for marketing and management expenses (OPEX), the author shows that for US non-financial and non-utility public corporations the growth of aggregate markups since 1980s was modest, within the limits of historical variation and similar in absolute terms to the previous 30-year period decline. Furthermore, the data shows that for the sampling period 1950-2016 markups has stayed consistently above 1, which implies that for this sample of US firms, market power rather than perfect competition has dominated the market. Gutiérrez and Philippon (2019), while agreeing with the profitability and concentration trends for US firms, challenge the common perception that star firms have become either larger or more productive, both at the economy-wide and industry level. In a brief but comprehensive analysis covering 60 years of data, this article shows that star firms have been a constant for the US economy, they have always been large and productive but their contribution to aggregate productivity growth have fallen dramatically since 2000. While becoming more profitable, their contribution "has fallen over time, from about 72 basis points per year before 2000 down to 43 afterwards". Interestingly, in support of a key feature of the superstar firms' model, this reduction in contribution has occurred while their productivity growth has simultaneously shifted from within-firm driven to reallocation driven. In Gutiérrez and Philippon (2019), economy-wide trends are investigated using a sample consisting of the top 20 firms by market value of equity in any given year (Top 20) while for industry trends the top 4 within each BEA[7] industry (Top 4) are selected. Therefore, with very few exceptions, the Top 20 group is fully represented within the Top 4 sample.

De Loecker et al. (2020) provides the most comprehensive study on the evolution of average market power and its macroeconomic implications to date. The article discusses the importance of healthy competition for a well-functioning economy as it prevents firms from gaining market power. In a nutshell, market power not only allows firms to rise prices which affects consumer well-being, but also lowers the demand for labor, discourages investment and innovation, and could even adversely influence policymaking. However, measuring market power

[7] Bureau of Economic Analysis of the U.S. Department of Commerce

(profitability or markups) is difficult and that is probably why "little is known about its systematic patterns for the aggregate economy and over time" and it is this void which their study intends to cover. The authors measure markups at the firm level using a production approach rather than the more commonly used demand approach. This production approach has the advantage of relying on financial statements data rather than on consumer demand data and therefore does not require the specification of a behavioral model. However, it does require the econometric estimation of a production function. Their article documents the evolution of market power for US firms since 1950 and finds that both markups and profit rates embarked in an upward spiral starting around year 1980. This upward trend meant that by year 2016 markups had risen from 21% to 61% above marginal cost while average profit rate went from 1% to 8%. Also documented is a rise of market value as a share of sales[8] from less than 50% in 1980 to over 150% in 2016. The study finds that the mechanism behind the upward trend is the reallocation of markups from lower-tail firms to upper-tail ones. Surprisingly, the reallocation process has left the median unchanged skewing the distribution right. These results are robust to increasing overhead costs with high-markup firms also showing higher cost increases, which altogether represents convincing evidence that market power resulting from a weakening of competition is the driving force behind rising markups. Regarding macroeconomic implications, De Loecker et al. (2020) confirm that rising market power has negative effects over labor share, both at the firm and aggregate level, and discuss how it relates to other secular trends documented by recent economic research. Confirming Traina's (2018) intuition, these secular trends include declines in capital share, in low-skill wages, in labor force participation, as well labor market dynamism and migration rates.

[8] Grullon, Larkin and Michaely (2019) finds that returns to shareholders increase on industry concentration.

Despite a clear relation between both fields of research through the firm value dimension, we could only find a couple of articles making this connection. However, they do so rather casually while focusing on the effects of specific events on firms' financing behavior. In connection to the global phenomena of falling share of labor, ElFayoumi (2020) analyzes how shocks to the credit market, like the great recession of 2008 and the COVID crisis of 2020, affect firms financing behavior. For a large sample of small and medium (SMEs) [9] european firms, the article finds that a rise in financing costs caused firms to substitute capital for labor as inputs of production. Contrary to theoretical expectations but in line with a collateral channel hypothesis, firms leverage still rose while their debt structure moved toward the longer term and their assets composition toward the fixed type. This evidence suggests that "maintaining a well-functioning credit market supports a higher labor share of economic growth". In the context of U.S. firms, Kroen et al. (2021) finds that falling interest rates (10-year U.S. Treasury rate) favors the rise of superstar firms by disproportionally increasing the valuation of industry leaders (Top 5% in terms of value) relative to that of industry followers (Bottom 95%), particularly when rates are already low (close to zero). Leading firms take advantage of lower financing costs to further improve their financial position by issuing new debt, increasing leverage, repurchasing shares, boosting their capital investment and cash acquisitions activity. Credit crises drive firms to change their balance sheet toward a less risky position while expansionary monetary policies move them to act more aggressively and to exploit their competitive advantages.

[9] Major contributors of both employment and growth in Europe.

Chapter 1

1 Capital Structure Evolution of Superstars: Leadership, Competitive Advantages and Fairness of Competition

In this chapter we investigate the evolution of the capital structure of superstar firms, the top performing firms for an industry, also referred to as leaders. For a sample of 198,717 firm-year observations covering the 1973-2020 period, using common financial leverage measures and markup-based categories, we analyze important aspects of both the financing behavior of public nonfinancial US firms and the nature of the competitive environment. A major contribution of this article is a simple methodology that builds on that implemented in Lemmon, Roberts and Zender (2008) and can be used to identify changes in behavior which can then be evaluated as either cause or consequence of macroeconomic events. The key difference from the original study methodology is that our portfolios are sorted on levels of markup rather than financial leverage. This allows the time series to intersect, something that the original methodology seems to prevent. We therefore consider our methodology to allow for a deeper description of financing behavior.

1.1 Introduction

In this chapter we investigate the capital structure of industry leading firms, but rather than assessing model fitness or the reliability of any set of explanatory variables, the evolution of their leverage ratio is analyzed and compared to that of industry peers. As discussed in the literature review section above, the major shortcomings attributed to the capital structure theory have been addressed by generating better estimates of firms' marginal tax and properly accounting for distress costs imposed by several stakeholder relationships. Importantly, the scope of the analysis has expanded to include other corporate finance dynamics like firms' strategic use of debt. (Parsons & Titman,2008; 2009) While the capital structure of US public corporations has been vastly investigated that of superstar firms has not, at least not directly. Establishing a connection between the capital structure literature and that for the superstars' phenomena is not difficult when we consider two important details. First, the capital structure of superstars has necessarily been investigated as part of the broad financial research on US public corporations and needs only to be highlighted and underscored. Second, the two subjects are connected through the value channel: the capital structure relevance argument and superstars' definition as firms with above average markups. However, we could not find many research work that directly investigates the capital structure of superstar firms by making these connections. Nevertheless, we did find a couple that discuss the subject of firm financing (capital structure) in connection to the superstar firms' phenomena or to economic trends associated to it. ElFayoumi (2020) analyzes how shocks to the credit market affect firms financing behavior in general terms. Kroen et al. (2021) investigates how industry leaders in the U.S. exploit their competitive advantages when interest rates substantially fall which has generally been the case since year 2010. In contrast to these two articles, we more directly investigate the capital structure of superstars, its evolution over time and how does it compare to that of industry peers.

Our methodology builds on that implemented in Lemmon, Roberts and Zender (2008) and can be used to describe important aspects of product market competition as well as to describe the evolution of superstars' financing behavior. The key difference from the original study methodology is that our portfolios are sorted on levels of markup rather than financial leverage. This allows series to cross, something that the original methodology seems to prevent and could be the cause of the stable pattern drawn by the series.[10] We therefore consider our adaptation of the methodology to represent an improvement that allows for a more accurate description of the leverage evolutionary paths representing trends in financing behavior. Furthermore, by evaluating the evolution of leverage ratios for different categories of market power we are effectively studying changes in financing behavior for the cross-section of sample firms over time.

Both the capital structure and the superstar firms' phenomena are closely related to within industry dynamics. Lemmon, Roberts and Zender (2008) investigate the evolution of financial leverage for nonfinancial firms in the Compustat database for the 1965-2003 sampling period. Every year firms are sorted into four different portfolios according to their level of leverage and hold together for the next 20 years. They find that after initially converging toward the middle of the leverage distribution, portfolios' average leverage remains stable for long periods of time and recommend future research efforts to focus on identifying determinants of cross-sectional variation as well as the forces responsible for the time-invariant component of leverage ratio. Similarly, MacKay and Phillips (2005) and Graham and Leary (2011) demonstrate that most cross-sectional

[10] Sorting on leverage level while drawing leverage evolutionary paths could create an asymptotic effect.

leverage variation occurs over the within-industries channel. Importantly, Grullon, Larkin and Michaely (2019) finds that due to increased product market concentration, market power (profit margin) has become "an important source of value", that there is no evidence of increased operational efficiency and that competition across industries appears to have weaken over time. Healthy competition is a necessary component of a well-functioning economy as it prevents firms from extracting excessive rents from customers. Furthermore, MacKay and Phillips (2005) finds that under competitive conditions a firm's financing decision is influenced[11] by its within industry position but not when concentration is high. Within concentrated industries the decision is instead strongly influenced by those of peer firms but for strategic reasons. Nevertheless, both Lemmon, Roberts and Zender (2008) and Graham and Leary (2011) demonstrate the time series component to still be substantial.

Our decade-by-decade competitive environment analysis confirms previous research findings that suggest that competition has declined. (Grullon, Larkin & Michaely, 2019; Autor et al., 2020; De Loecker et al., 2020) During the last two decades the number of end-of-decade industry star firms has decreased and their staying power has strengthen. Once within the sample, end-of-decade leaders mostly migrate from the immediate levels of market power (Q5-Q4) followed, surprisingly by the bottom one (Q1). Furthermore, during the last two decades firms from the bottom power quintile (Q1) challenge firms in Q4 status as second largest source of superstars. These firms competitive advantage seems related to their growth options characteristic which is similar in magnitude to that of firms in the top power quintile (Q5). A decade-by-decade leverage evolution analysis reveals no sustained trend in book leverage series, but the quasi-market leverage measure series tendency to remain flat whenever book leverage goes up suggests

[11] Decided together with technology and risk choices; all influenced by firm's position within its industry.

countering effects by gains in market capitalization. These results are consistent with a value-optimizing strategy and suggest that stars are able to avoid typical costs of distress that prevent other firms from rising their levels of corporate debt.

Our fixed-composition portfolio analysis shows power-quintile leverage series to have shifted relative position from opposite to capital structure theory in 1973 to almost full compliance by 2020. We say so, because book leverage ratio is expected to grow with profit margin as more profitable firms should be able to carry more debt and benefit from it. Results for the quasi-market leverage series show that market capitalization counter effects have always acted selectively upon each power-quintile. The analysis also reveals that the book series has separated into two distinct power blocks with the two lowest power-quintiles (Q1-Q2) dropping far below the top three series (Q3-Q5). This split is real as an econometric analysis confirms a structural break in their financing behavior. A robustness check performed on rolling windows of survivor firms confirms most of the patterns described above, except that firms in the lowest power quintile (Q1) are now shown to have outpaced every other group during the last decade race to the top of the book leverage distribution. Even more interesting, their behavior appears to have been rewarded by the market. This race to the top has been associated to macroeconomic conditions, particularly the monetary policy enacted by the Federal Reserve which during this past decade included lowering the federal funds rate to an almost zero-level. (Kroen et al., 2021)

The article is organized as follows. Section 1.2 describes the data and variables used in the study, section 1.3 explains the methodology to be implemented, section 1.4 describes the sample while results from the empirical analyses are reported and discussed in section 1.5. We offer our concluding remarks in section 1.6.

1.2 Data and Study Variables

Our main sample is taken from the Compustat Fundamentals Annual Database starting at year 1973, to include firms listed in the Nasdaq exchange, and runs through year 2020. Because our focus is strictly on domestic firms, we require the foreign incorporation code (FIC) item to equal USA. Additionally, we require sample firms to have a total assets (AT) value of at least $5 million in 1996 dollars and exclude financial (SIC numbers between 6000-6999) and utility (SIC numbers between 4000-4999) firms. The main sample consists of 198,717 firm-year observations and includes a total of 374 different 4-digit SIC code industries. The annual average of such industries is larger than 349 with the highest representation of 364 occurring at year 1996 and the lowest of 313 at year 2020. Our choice of dependent variables consists of the traditional measures of book leverage (FD/AT) and quasi-market leverage (FD/MAT). Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Our measure of performance used to rank firms within an industry is the Lerner Index (markup, profit margin) as in Grullon, Larkin and Michaely (2019), it represents a proxy for market power (industry concentration) and is defined as the ratio of operating income after depreciation (OIADP) to net sales (SALE). We introduce market power into the analysis by sorting firms into five categories according to their level of profit margin; these power-quintiles are assigned each year to all firms within an industry. By creating quintiles this way, we stratify the sample into homogenous groups, but do not add new information. The choice of quintiles follows from two important considerations; the need to retain as many observations as possible and the presence of a middle category. Firms inhabiting the fifth quintile (Q5) present the highest levels of markup every year, independently of the definition of superstars implemented the strongest effects of market power will be observed there. Not every firm in Q5 is a superstar, but every superstar is in Q5.

Other study variables we will be using as determinant factors for a basic capital structure model specification include size, defined as the natural log of total assets (AT) in1996 dollars; asset tangibility, computed as the ratio of property, plant and equipment to (PPENT) to total assets (AT); profitability, estimated as operating income before depreciation (OIBDP) scaled by total assets (AT); modified Altman's Z-score, defined as [3.3*operating income (OIBDP) + sales (SALE) + 1.4*retained earnings (RE) + 1.2*working capital (WCAP)]/AT); the ratio of research and development expenses (XRD) to company sales (SALE)[12]; and the market-to-book ratio of firm assets (MAT/AT). Market value of total assets (MAT) is calculated by simultaneously subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). Market capitalization (MCAP) is the product of end of fiscal year values for firm's common stock price (PRCCF) and number of common shares outstanding (CSHO). All study variables computed as a ratio are winsorized at the industry level using the (0.5%, 99.5%) endpoints interval to smooth out the effects of outlier values before creating any within-industry ranking. Our set of covariates is similar to that in Graham and Leary (2011), but our leverage measures are not; our results, although more general, are not directly comparable.

Finally, we compute operating leverage as selling, general and administrative expenses (XSGA) scaled by total book assets (AT), which follows the definition in Chen, Harford, and Kamara (2019) except that we do not lag the value of total assets. In this instance as well as in future ones, for both factor variables and model specification, our justification for not lagging variables would be the descriptive nature our investigation. Lagged values should be used if causation were to be assessed. We are not using operating leverage for any analysis in this article but are still interested in its relationship with both financial leverage and profitability. Chen,

[12] Because research-and-development factor is scarcely reported, missing values are interpreted as zeroes.

Harford, and Kamara (2019) provide evidence that profitability increases with operating leverage and that firms substitute between operating and financial leverage. Regarding the superstars' phenomena, we think operating leverage might be related to the fall of labor share. (Nolan et al., 2019; Autor et al., 2020; Choi et al.,2021)

1.3 Methodology

The capital structure of US corporations has been exhaustively scrutinized and empirical research results do apply to the superstars' phenomenon as these firms has not been excluded from the analysis. In this article we simply consider superstars as a performance-based category of firms and distinguish them from peers accordingly. This simplification allows us to focus on the evolution of financing behavior, as reflected in firms' leverage ratio, rather than on a particular set of determinant factors. A great deal of empirical financial research has found firms' leverage ratios to reflect several corporate finance dynamics (valuation, financing, governance) beyond just the funding of new projects and operating activities. It has been shown that firms' capital structure can be thought of as a dynamic equilibrium weighting various intricate business characteristics ranging from managerial style to corporate strategy (e.g., Bertrand & Schoar, 2003; Parsons & Titman, 2008; Graham, Harvey & Puri, 2013; Kaplan, Klebanov & Sorensen, 2012). Therefore, using a leverage ratio evolution approach allows us to generalize the analysis without considering any industry or firm specifics. In other words, we can talk about the general economic environment as reflected by the behavior of the group of industries of which it is composed.

Our methodology builds on that implemented by Lemmon, Roberts and Zender (2008) which finds that, after a short initial period of convergence, an unobserved time-invariant effect causes cross-sectional leverage variation to remain relatively unchanged for over a twenty-year period. Therefore, most leverage variation is cross-sectional in nature and remains unaccounted for by existing empirical specifications. Their methodology consists of initially creating leverage-ranked portfolios and holding them together for 20-year periods (windows); and this sorting procedure is repeated every year for as long as the sampling period allows. Every year a leverage average in computed for each ranked portfolio before an average of leverage averages is calculated on a per rank basis. Different from this original methodology our procedure forms portfolios on a markup level basis and holds them together for 10-year periods while rolling windows backward starting at the end of the sampling period, year 2020. Proceeding this way, we hope to identify distinctive patterns in the data which is now interpreted as originating from a procedure characterized in market power terms.

Interestingly, the same basic procedure for investigating the evolution of leverage portfolios can be modified to investigate the origin and migration path of end-of-decade industry leaders. Holding this group of leading firms fixed throughout the period under scrutiny, we can trace year-by-year which quintiles they occupied as well as how many of them enter the sample from the outside. Ease of entry is an important characteristic of a healthy competitive environment in a well-functioning economy (De Loecker et al., 2020). In other words, we can trace superstars' path to the top as well as the nature of the competition they face. It should be noted that the basic analysis described above consists of two simple procedures: splitting the sampling period into decades (subperiods) and splitting the full sample of firm-year observations into market-power groups. Depending on which characteristics occupy our attention a mix of both procedures can be implemented. For example, when analyzing the nature of the competitive environment and when running the rolling windows process both procedures are used, with the difference been that for the latter, windows overlap.

Equations (1.1) – (1.3) present our basic model specifications which follow from Frank and Goyal (2009) and Graham and Leary (2011). These are used to test the capital structure theory predictions but from a strictly descriptive perspective (causation not assessed):

$$L_{i,t} = \alpha + \beta F_{i,t} + \varepsilon_{i,t} \qquad (within - decade) \qquad (1.1)$$

$$\bar{L}_{.jt} = \alpha + \sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k} + \beta \bar{F}_{.jt} + \gamma_t + \epsilon_{jt} \qquad (between - industries) \qquad (1.2)$$

$$L_{ij} = \alpha + \sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k} + \beta F_{ij} + \eta_j + \epsilon_{ij} \qquad (within - industry) \qquad (1.3)$$

Where for Equation (1.1), $L_{i,t}$ is leverage for firm i at time (year) t, $F_{i,t}$ is a six-column matrix for the set of six factors described in the previous section, the constant α and the vector β are the parameters to be estimated by the regression. However, as mentioned before, in this chapter we are focused on describing financing behavior rather than assessing factors' significance. Therefore, when running regression analyses most of the time we will be interested in assessing model fitness (R^2); specifically changes in magnitude due to imposed restrictions. In other words, we focus on identifying how the group of origin (data generating procedure) and the period under investigation (competitive environment) affect firms financing behavior as suggested by the capital structure theory. Equations (1.2) and (1.3) are used to draw evolutionary paths for factors' explanatory power and are ran on a year-by-year basis. The term $\sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k}$ represents the categorical variables (power-quintiles) added to the original study model specifications; the first category (quintile) becomes part of the constant term α. We run the model in Equation (1.2) to estimate between-industries R^2 after removing year fixed effects (γ_t) from average industry data, while within-industry R^2 is estimated by running the cross-sectional regression model in Equation (1.3) which instead removes industry fixed effects (η_j) from annual data. Finally, the within-industry series for the standard deviation of leverage ratios is draw according to equation (1.4):

$$\sqrt{\frac{\sum_i \sum_j \left(L_{ij} - \bar{L}_{.j}\right)^2}{N-1}} \qquad (within - industry) \qquad (1.4)$$

which follows from the empirical capital structure review in Graham and Leary (2011) and where $\bar{L}_{.j}$ is the annual mean for industry j and $L_{ij.}$ is a firm-year observation. Similarly, the between-industry standard deviation series is draw as the annual standard deviation of industry averages.

1.4 Summary and Descriptive Statistics

Table 1.1 and Table 1.2 present the main sample statistics for all the variables used in this study in a leaders-versus-followers format while implementing two different definitions for industry superstars respectively. Similarly, Figure 1.1 and Figure 1.2 show bar graphs for the main leverage measures whose evolution we analyze. The sample splits according to the definition of industry leaders implemented, either top quintile (Q5) or top 5% of the markup distribution. Immediately evident is the fact that leaders are generally less levered as compared to followers and that this tendency is amplified the more stringent the definition of leadership becomes. Figure 1.3 shows this relation between the book and market leverage measures to persist throughout every power-quintile. However, the figure also shows that while the relation of the financial measures of leverage to level of power is not linear that for the operating leverage measure is. Regarding the other study variables Figure 1.4 shows, except for tangibility (PPENT/AT)[13], their relation to level of market power not to be linear. Nevertheless, we do not intend to use market power as dependent variable but rather its levels as categorical variables.

[13] Same could be said about the profitability and size factors if the first and last quintile results are respectively ignored.

Table 1.3 presents correlation and model fitness results for a partition of the full sample into five exclusive subperiods we refer to as decades. The correlation analysis includes only the leverage measures and a couple of factors whose evolution we pay special attention to, like profitability and profit margin (markup). In line with Chen, Harford, and Kamara (2019), the financial leverage measures are always positively and strongly correlated to each other while the operating leverage measure is negatively correlated to both. Also expected is the positive correlation between markups and profitability as well as their relationship to operating leverage; reducing costs increases profit. However, the two factor variables are shown to have a somewhat more fluid relationship with the financial leverage measures along the different decades or sub-periods. Consistent with the observations in Graham and Leary (2011), model fitness measures (R^2) suggest that explanatory power has weakened over time, although the last decade shows signs of recovery. Also consistent with previous research, determinant factors do a better job explaining market leverage variation than accounting variation which appears to corroborate the value relevance of the financing decision.

1.5 Empirical Analyses and Discussion of Results

In this section we perform our empirical analyses and discuss the results in light of the literature for the superstars and capital structure phenomena discussed in both the introductory chapter (Literature Review) and the introduction to this chapter. For every topic being investigated we try to proceed from the simple more common analysis to the more elaborated one. Robustness tests are performed for the main empirical analyses whenever there is one available; some will be included as part of the main text while others will be included in the appendix to this article for the sake of clarity and story flow.

1.5.1 Product Market Competition

1.5.1.1 Mobility Analysis – Stars Path to The Top

Table 1.4 presents a mobility (migration) analysis for fixed-composition portfolios of industry leading firms (stars) formed at the end of each of five subperiods we refer to as decades although the first one (1973-1980) is only eight-year long. Moving backward toward the start of each period allows us to identify intergroup migration as well as to assess ease of entry on a year-to-year basis. We define industry stars as those firms above the 95th percentile of industry's markup distribution each year, in other words, the top 5% (Top5). Because these firms are already included in the fifth quintile (Q5) and to keep the original power-quintile ranking mostly intact, we just split this top quintile into two groups. Group Q7 now holds Top5 firms originally within Q5 that still holds the remaining firms. We separately identify end-of-decade leading firms with missing ranking at some point along the period as members of group Q0. Leading firms that never listed before the end of the decade (new firms) occupy group Q6. A group that deserves special attention is that for Outside the sample firms, while at the start of the period this number just represents star firms not yet present, at any other point the number could also include firms with reporting gaps. Different from firms missing ranking (Q0), a reporting gap means that the firm has previously listed in the exchanges included in Compustat, but not that year. Firms in Q6 are not accounted for in the Outside total because they do not associate to any power-quintile group.

The first thing that should be noted about the results in Table 1.4 is that the number of industry-leading firms seems too low when we consider that the annual average of industries represented in the sample is around 349. Therefore, our definition of superstar firms as the top 5% of the industry distribution of markups appears too stringent. Yet, implementing such a harsh definition for superstar firms allows us to identify interesting patterns about the changing nature of the competitive environment. Consistent with a weakening in product market competition entry of outside-the-sample firms (Outside) has substantially diminished during the last two decades after reaching a peak at the beginning of the third one. Inter-quintile migration to the top flows mostly through the two highest market power groups (Q5-Q4) followed, surprisingly, by the lowest one (Q1). While the ability of Q1 to compete for industry leadership appears puzzling, Figure 1.4 provides some facts that could explain why this migration flow disruption happens; despite being smaller, younger, riskier, and less profitable, firms in the first quintile (Q1) spend more in in research and development (XRD) and have similar growth opportunities (MA/BA) as those in the top. Apparently, their focus on innovation and their level of growth options invests them with a competitive advantage that exceeds that provided by the second (Q2) or third (Q3) level of market-power (profit margin). Furthermore, the strategic importance of innovation and level of growth options seems to have survived the weakening effects of increased product market concentration experienced during the last two decades. First quintile (Q1) firms' ability to compete now rivals that of Q4. According to Figure 1.4 the most competitive decade was the third one (1991-2000), but we suspect these results to be skewed by the market forces behind the Dotcom bubble events.

Robustness analysis for survivor firms is presented in Table 1.7. It necessarily excludes the ease of entry perspective, but we can still evaluate the status of competition from the inter-quintile migration patterns. Survivor results confirm most of the inter-quintile migration patterns described above and corroborates our intuition about the results for the third decade. Despite the evidence showing distinctive trends in star firms' path to the top, survivor results suggest that there is still a healthy dose of product market competition left.

1.5.1.2 Within-Decade Leverage Evolution

The same procedure used to generate results in Table 1.4 can be modified to analyze within-decade leverage evolution, cells now will include annual average leverage for a group rather than a count of firms. In Table 1.5 and Table 1.6 we present within-decade results for the procedure when applied to book and market leverage respectively. The last column displays the annual average of group leverage averages which due to equal weighting of groups is not the same as the annual average leverage for star firms already within the sample. However, we consider these results to account for the effects of competition while the actual stars annual average would smooth them out.[14] Figure 1.5 graphically represents each decade's book leverage evolution for the annual average of group leverage averages listed under the Book Leverage column of Table 1.5. The results show no evidence of any sustained pattern beyond any one decade, which suggests that short-to-medium-term corporate tactics dominate any long-term strategies. However, Figure 1.6 shows that for the last three decades debt increments were more than compensated by firms' gains in market capitalization, suggesting a market value optimization strategy driving firms' financing behavior. We base this argument in the fact that our measures of financial leverage differ only in that the denominator in our quasi-market definition accounts for the effects of the financing decision on firm's market capitalization. The figures show that for decades D3 and D5 the market response to relatively large debt increments brought market leverage levels to around 10%. In fact, this 10% market leverage level seems important for star firms as the last four decades show a tendency to converge towards it.

One problem we can clearly observe in the results discussed above is that a significant number of end-of-decade industry leaders (stars) remain outside-the-sample (Outside) during a

[14] Annual average evolution results for industry stars are presented in Figure 1.28 of the appendix to this chapter.

great portion of the decade. This is problematic even for our competitive environment perspective as the results could be driven by entrant firms rather than by those considered more representative of product market. Therefore, as robustness check we repeat the analyses on a sample of survivor firms and present the results in Table 1.8, Table 1.9, Figure 1.7 and Figure 1.8. Survivor results appear generally very similar, except for the huge jump in book leverage towards the end of the third decade (D3) disappearing. In fact, third decade results for survivors might be considered more representative as they filter out most of the effects of the events of the Nasdaq index referred to as the Dotcom Bubble. Similarly, the fact that the fifth decade's significant increase in book leverage is still present suggest it to be real and corroborates findings in Kroen et al. (2021) consistent with superstar firms exploiting their competitive advantages during a period of very low financing costs.

1.5.2 Leverage Evolution – *All Quintiles*

In this section we perform our second major analysis which now includes all power-quintiles and not just star firms. Like the first analysis, the methodology builds on that presented in Lemmon, Roberts and Zender (2008), but we also add elements from the reviews of empirical capital structure presented in Frank and Goyal (2009) and Graham and Leary (2011). However, before proceeding with the analysis we perform two important preliminary analyses: a sensitivity analysis and a validation procedure. The sensitivity analysis is presented in the appendix because it does not form part of the main analysis but rather constitutes a general assessment of how the methodology design for an evolutionary analysis affects the results. The validation procedure, which is also a sensitivity analysis, is shown here to demonstrate that our methodology is capable of replicating previous research results and how is it expected to influence the leverage series evolution results in this study.

1.5.2.1 Validation

We next proceed to validate our rolling windows procedure by trying to replicate the results in Lemmon, Roberts and Zender (2008). Starting at year 1973 and ending in year 2001, we form portfolios on leverage level (quintile) and hold them together for 20 years at a time. We them compute the annual average leverage for each portfolio before computing the average leverage of leverage-level-portfolio (quintile-portfolio) averages on a per year basis. Figure 1.9 shows that for the sampling period overlapping that for the original study (1965-2003) our procedure successfully reproduces both the initial convergence of the series toward a central leverage value and the time-invariant effect that keep series separated and relatively flat over long periods of time (persistence). However, our extended sampling period shows that the time-invariant pattern eventually breaks down around year 2010 when the series no longer remain flat, nor do they approach any particular value. In fact, during the last decade (2011-2020) leverage generally goes up and Q5 pulls away from other quintile series which themselves seem to pull closer together, especially the bottom two (Q1, Q2).

Finally, Figure 1.10 shows results for the procedure when windows are rolled backward from 2020 to 1992. Interestingly, the patterns are now reversed indicating that the procedure itself influences the results. We can still appreciate an initial convergence pattern followed by a seemingly time-invariant effect but can no longer argue that these results are solely or mostly due to changes in firms' characteristics or in their competitive environment. We now argue instead that sorting portfolios on leverage level prevents time series from crossing each other while creating some kind of asymptotic effect that can be wrongly interpreted as stability or persistence. This apparent flaw in the methodology design limits the analysis and biases the results. Market capitalization does counter the effects of rising debt levels, but because the series are mechanically kept separated, we cannot make judgements about relative effectiveness of financing behavior. However, because our portfolios are sorted on market power (markup) level, we think our methodology avoids this issue can be used to identify patterns and relationships less procedure dependent.

1.5.2.2 Implementation

In this section we present and discuss the results from our evolutionary analysis which rolls fixed composition 10-year windows backward. When results in Figure 1.11 and Figure 1.12 are compared to those for the leverage-sorted portfolio analyses in the previous section no time-invariant or convergent trends appears present. However, when compared to results in Figure 1.22 and Figure 1.23 of the appendix some patterns emerge. These figures account for the most basic case of evolutionary analysis which simply tracks markup distribution every sampling year. Our methodology does seem to induce series to get closer to each other in the direction of the rolling process, but not toward a particular (fixed) leverage value. Both analyses show the relative positioning of the book series to have shifted from opposite to the capital structure predictions to almost full compliance; thee more profitable a firm is the more levered it should become. All book leverage series have sharply trended up since 2010 and, to a lesser degree, market series has followed. Interestingly, our results show the top three power-quintiles (Q3-Q5) to have generally trended up while the bottom two (Q1-Q2) seem to have trended down. In fact, a case could be made that the series appear to have split into two distinct blocks: the high-power block (Q3-Q5) and the low-power block (Q1-Q2). Furthermore, this separation process can be traced to the 1990s and have persisted ever since. Compared to findings in Grullon, Larkin and Michaely (2019) our results not only corroborate them but suggest that industry concentration and other macroeconomic conditions started affecting first power-quintile firms much earlier.

However, is it the radical position switch of the book series and the differential treatment the market seems to give to power-quintile financing decisions which we find very telling. According to MacKay and Phillips (2005) within competitive industries firms' financial structure is influenced by their relative position albeit with respect to median capital-labor ratio. Within concentrated industries however, financial structure is very sensitive to peer firms financing decisions. Despite many differences between our investigation and their article[15], the similarities of the results are encouraging, specially considering how simple and economical our methodology is. At the beginning of the sampling period when healthy competition was generally the norm, leverage would increase with distance from the top power-level (Q5). When industry concentration began to increase, firms far from the top tier might have felt exposed while those close to it considered themselves still under the protection of the natural hedge of Maksimovic and Zechner (1991) which the above article discusses. Therefore, firms in the low-power block lowered their financial leverage to account for rising distress costs. During the last decade, as we discussed earlier, star firms raised their financial leverage opportunistically in response to changes in monetary policy. However, because firms within concentrated industries tend to be more reactive to peers' actions chances to observe herd behavior increase which would explain the differential treatment exhibited by the market. The most obvious candidate for having acted somewhat irrationally appears to be the third power-quintile (Q3), while it rose its book leverage to a level like that of Q4 and Q5, it benefited the least.

Once again, results are tested for robustness using a sample of survivor firms which help us verify that they are not driven by non-representative firms parachuting in. Figure 1.26 and

[15] First and foremost, MacKay and Phillips are looking to improve model fitness while we take it as good and sufficient.

Figure 1.27 present survivors' results that appear almost identical to those in Figure 1.11 and Figure 1.12. The big exception been, yet again, survivor firms from the first power-quintile (Q1) which are shown to have risen their book leverage level more than any other group during the last decade while gaining a magnitude of market capitalization only firms in the top power-quintile (Q5) can match. For example, while during the last decade book leverage series Q1, Q2 and Q5 respectively show the largest growth rates (increases in financial debt), market capitalization gains for Q5 and Q1 appear respectively larger than those for Q2. Therefore, survivors' results for leverage evolution procedures usually confirm that firms from the first power quintile (Q1) are well equipped to compete against more powerful industry rivals. Innovation appears to be an important source of value, especially for firms that demonstrate to do so on a consistent basis.

1.5.2.3 Compliance - What the Power Blocks Could Mean

The separation of power-quintiles into two distinct blocks seems to indicate a difference in financing behavior determined by a market power (markup) threshold value. However, because the procedure has been shown to influence series path, we cannot say if the difference is real or not. If real, we would be interested in finding out if it has always existed or if a structural break has occurred due to changes in the competitive environment. In this section we perform cross-sectional regression analyses on the power-quintiles to investigate what the power blocks could mean.

Graham and Leary (2011) find that through the 1974-2009 sampling period determinant factors of financial leverage kept losing explanatory power, which seems contrarian to our argument of power-quintiles improved compliance. However, both things can be true at the same time as we are referring to relative leverage position from a profit margin (market-power) perspective. One way we can dissipate some doubts about our interpretation of results is to perform regression analysis. It has also been shown that most of the financial leverage variation occurs along the cross-section and that the within-industries component is more significant than the between-industries one. (MacKay and Phillips, 2005; Lemmon, Roberts & Zender, 2008; Graham & Leary, 2011) Figure 1.13 reproduces and extends leverage variation results found in Graham and Leary (2011); while our sample selection criteria differs from the original study, for the overlapping sampling period general results seem to hold. Within-industries leverage variation has consistently been about 2.5 times that of the between-industries component. We therefore focus our regression analysis on the within-industries component of cross-sectional leverage variation.

In Figure 1.14 we implement the model specification in Equation 1.3 on a year-by-year basis and confirm that the fitness of the book leverage model specification has generally weakened. In Figure 1.15 and Figure 1.16 we repeat the analysis on the individual quintiles[16] and observe that the combined effects of the power-quintiles seem to be larger than the sum of their individual effects. Compared to the patterns shown in Figure 1.14, individual series have been relatively steady throughout the sampling period. Most of the weakening has occurred within the low-power block, the structural break seems to have occurred around mid-1980s, and the financing behavior of the high-power block is now better explained. A few hikes during the 1980s, although significant in magnitude didn't seem to have lasting effects. For the market model Figure 1.17 shows a clear downward trend on fitness that seems to have started to recover around year 2010. Results for the market specification are presented in Figure 1.18 and Figure 1.19; they show the high-power block to have historically been more in compliance with the capital structure theory than the low-power one. However, the market model results for individual series behavior appear

[16] This implies either that the quintiles term drops from the model or that the original study specification is applied.

both less stable and more sensitive to competitive environment changes than those for the book model. Compliance for both power blocks seem to have halved by early 2000s and show some recovery during the last decade.[17] In summary, product market concentration seems more critical for value enhancing strategies and for less powerful firms.

1.6 Chapter Conclusions

In this chapter we set to investigate the capital structure of superstar firms in a very unconventional way; rather than investigating any factor significance or model fitness we take the theoretical model as good and sufficient and investigate financial leverage series evolution as representing changes in financing behavior. This approach allows us to investigate the changing nature of the competitive environment and its relationship to market power and within industry leverage distribution. Our justification (rationale) is very simple; the very same forces behind the creation of superstar firms must also affect peer industry firms differentially according to their level of market power.

Our competitive environment analysis corroborates that as industries have become generally more concentrated product market competition has waned. (Grullon, Larkin & Michaely, 2019) The number of end-of-decade industry leading firms (stars) for the last two decades has decreased while their staying power has increased. Ease of entry has also diminished as the number of outside-the-sample firms able to enter the scene has declined. Once within the sample, end-of-decade leaders (Q7) mostly migrate from the next two levels of market power (Q4-Q5) and surprisingly from the last one (Q1). The ability of these firms to compete for industry hegemony seems to be related to their innovative nature as they invest more than any other group in research

[17] Although sensitive, the first power quintile (Q1) again seems to be the exception by holding relatively steady around a 15% average R^2.

and development. In fact, their market-to-book ratio is similar in magnitude to that of firms in the top power quintile (Q5). A decade-by-decade leverage evolution analysis for star firms reveals a value optimization strategy as rising levels of financial debt are counter by substantial gains in market capitalization while they also appear to avoid typical costs of distress.

Our fixed-composition portfolio analysis, which rolls 10-year windows backward, reveals that power-quintiles leverage series has switched relative position (order) from opposite to capital structure theory to almost full compliance to it. However, what seems to have driven this repositioning is precisely the rise in industry concentration. As explained in MacKay and Phillips (2005), under competitive conditions within-industry position is a significant factor determining firm's financing decision while within concentrated industries peers' actions (strategy) instead are (is). Therefore, under healthy competition leverage rises when power falls but within concentrated industries the opposite is true. Under concentrated industry conditions distress costs for low market power level firms increase causing them to reduce risk by reducing financial leverage. In other words, industry concentration reduces low market power firms' optimal financial leverage.

Finally, our main leverage evolution analysis results suggest that the series has separated into two distinct power blocks, consistent with a markup (market power) threshold value. We therefore perform econometric analyses to verify if the two blocks behavior have changed and to identify any structural break. Within-industry cross-sectional model results confirm that a structural break occurred around mid-1980s, the high-power block shows higher compliance and product market concentration to be more critical for value enhancing strategies and for less powerful firms.

Tables & Figures – Main Analyses

Tables

Table 1.1 Statistics for Leaders & Followers (Top 5%)

Statistics for Leaders & Followers (Top 5%)

Group	*Stat*	*Book Lev.*	*Market Lev.*	*Oper. Lev.*	*Markup*	*Size*	*Tangibility*	*Profitability*	*Mkt/Bkt*	*Zscore*	*R&D*
~Top5	***Mean***	**0.2692**	**0.1962**	**0.3392**	**-1.7929**	**4.9033**	**0.2819**	**0.0682**	**1.8630**	**1.4357**	**1.0978**
	Median	0.2231	0.1462	0.2706	0.0544	4.7285	0.2255	0.1109	1.3323	2.0623	0.0000
	SD	0.2711	0.1911	0.2840	35.6567	1.9429	0.2228	0.2158	1.8140	3.2769	22.5730
	Obs.	193,787	165,689	180,458	194,487	194,487	194,198	194,047	166,225	185,773	194,487
Top5	***Mean***	**0.1855**	**0.0996**	**0.2334**	**0.3253**	**5.2673**	**0.2487**	**0.2599**	**3.4617**	**2.4603**	**0.0554**
	Median	0.0716	0.0212	0.1936	0.3046	5.0864	0.1497	0.2484	2.6752	2.6359	0.0112
	SD	0.2763	0.1685	0.1873	0.1458	1.9920	0.2565	0.1453	2.7212	2.3202	0.0836
	Obs.	4,208	3,642	3,691	4,230	4,230	4,195	4,182	3,661	3,762	4,230
Full	***Mean***	**0.2674**	**0.1941**	**0.3371**	**-1.7479**	**4.9110**	**0.2812**	**0.0722**	**1.8975**	**1.4560**	**1.0756**
	Median	0.2206	0.1430	0.2689	0.0565	4.7372	0.2241	0.1129	1.3445	2.0755	0.0000
	SD	0.2715	0.1911	0.2828	35.2765	1.9447	0.2236	0.2163	1.8529	3.2638	22.3319
	Obs.	197,995	169,331	184,149	198,717	198,717	198,393	198,229	169,886	189,535	198,717

Descriptive statistics for nonfinancial US firms in Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 period. Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). We also use asset tangibility, computed as the ratio of property, plant and equipment to (PPENT) to total assets (AT); profitability, estimated as operating income before depreciation (OIBDP) scaled by total assets (AT); modified Altman's Z-score, defined as [3.3*operating income (OIBDP) + sales (SALE) + 1.4*retained earnings (RE) + 1.2*working capital (WCAP)]/AT); the ratio of research and development expenses (XRD) to company sales (SALE); and the market-to-book ratio of firm assets (MAT/AT). Superstars defined as top 5% of industry's distribution of markups.

Table 1.2 Statistics for Leaders & Followers (Q5)

Statistics for Leaders & Followers (Q5)

Group	***Stat***	***Book Lev.***	***Market Lev.***	***Oper. Lev.***	***Markup***	***Size***	***Tangibility***	***Profitability***	***Mkt/Bkt***	***Zscore***	***R&D***
Q1-Q4	***Mean***	**0.2725**	**0.2069**	**0.3624**	**-2.2400**	**4.7537**	**0.2713**	**0.0351**	**1.7499**	**1.2532**	**1.3358**
	Median	0.2292	0.1626	0.2910	0.0366	4.5583	0.2206	0.0919	1.2461	1.9848	0.0000
	SD	0.2709	0.1929	0.2946	39.4277	1.9009	0.2120	0.2206	1.8113	3.5262	24.9629
	Obs.	158,430	135,134	147,643	158,951	158,951	158,743	158,620	135,522	153,071	158,951
Q5	***Mean***	**0.2470**	**0.1435**	**0.2344**	**0.2191**	**5.5400**	**0.3208**	**0.2212**	**2.4795**	**2.3076**	**0.0355**
	Median	0.1808	0.0810	0.1923	0.1841	5.4526	0.2404	0.2067	1.9325	2.3712	0.0000
	SD	0.2728	0.1748	0.1985	0.1929	1.9900	0.2612	0.1076	1.9000	1.5084	0.0673
	Obs.	39,565	34,197	36,506	39,766	39,766	39,650	39,609	34,364	36,464	39,766
Full	***Mean***	**0.2674**	**0.1941**	**0.3371**	**-1.7479**	**4.9110**	**0.2812**	**0.0722**	**1.8975**	**1.4560**	**1.0756**
	Median	0.2206	0.1430	0.2689	0.0565	4.7372	0.2241	0.1129	1.3445	2.0755	0.0000
	SD	0.2715	0.1911	0.2828	35.2765	1.9447	0.2236	0.2163	1.8529	3.2638	22.3319
	Obs.	197,995	169,331	184,149	198,717	198,717	198,393	198,229	169,886	189,535	198,717

Descriptive statistics for nonfinancial US firms in Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 period. Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). We also use asset tangibility, computed as the ratio of property, plant and equipment to (PPENT) to total assets (AT); profitability, estimated as operating income before depreciation (OIBDP) scaled by total assets (AT); modified Altman's Z-score, defined as [3.3*operating income (OIBDP) + sales (SALE) + 1.4*retained earnings (RE) + 1.2*working capital (WCAP)]/AT); the ratio of research and development expenses (XRD) to company sales (SALE); and the market-to-book ratio of firm assets (MAT/AT). Superstars defined as top quintile (Q5) of industry's distribution of markups.

Table 1.3 Correlations & Model Fitness by Decade

Correlations & Model Fitness by Decade

		Book	***Market***	***Operating***	***Markup***	**R^2 *(Book)***	**R^2 *(Market)***
Decade 1 (1973-1980)	***Market***	**0.8608***	**1**			**0.2452**	**0.2948**
	Operating	**-0.0984***	**-0.1440***	**1**			
	Markup	**-0.0371***	**-0.0105**	**-0.0111***	**1**		
	Profitable	**-0.3216***	**-0.3741***	**-0.0662***	**0.2011***		
Decade 2 (1981-1990)	***Market***	**0.7903***	**1**			**0.2080**	**0.2253**
	Operating	**-0.0800***	**-0.1564***	**1**			
	Markup	**0.0189***	**0.0351***	**0**	**1**		
	Profitable	**-0.1439***	**-0.1140***	**-0.1381***	**0.1873***		
Decade 3 (1991-2000)	***Market***	**0.8266***	**1**			**0.1629**	**0.2127**
	Operating	**-0.1165***	**-0.2142***	**1**			
	Markup	**0.0195***	**0.0400***	**-0.0683***	**1**		
	Profitable	**0.0203***	**0.0575***	**-0.3821***	**0.1613***		
Decade 4 (2001-2010)	***Market***	**0.8051***	**1**			**0.1073**	**0.1841**
	Operating	**-0.0929***	**-0.1880***	**1**			
	Markup	**0.0105***	**0.0282***	**-0.0435***	**1**		
	Profitable	**0.0413***	**0.0765***	**-0.4200***	**0.1774***		
Decade 5 (2011-2020)	***Market***	**0.7876***	**1**			**0.1313**	**0.2251**
	Operating	**-0.1162***	**-0.2595***	**1**			
	Markup	**0.0270***	**0.0485***	**-0.0318***	**1**		
	Profitable	**0.0471***	**0.1115***	**-0.4996***	**0.2160***		
Full	***Market***	**0.7966***	**1**			**0.1076**	**0.1932**
	Operating	**-0.1032***	**-0.1954***	**1**			
	Markup	**0.0164***	**0.0354***	**-0.0267***	**1**		
	Profitable	**-0.0081***	**0.0514***	**-0.3461***	**0.1678***		

Correlation and model fitness analysis for nonfinancial US firms in Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 period. Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Operating leverage computed as selling, general and administrative expenses (XSGA) scaled by total book assets (AT), markup as the ratio of operating income after depreciation (OIADP) to net sales (SALE) and profitability as operating income before depreciation (OIBDP) scaled by total assets (AT). Correlation's significance level is .05 and the model specification follows equation (1).

Table 1.4 Mobility Analysis by Decade

Mobility Analysis by Decade										
Panel A	**First Decade Migration Analysis**									
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
1973				1	5	15		7	28	33
1974		8	1	1	5	13		14	42	19
1975		6	1	3	2	16		17	45	16
1976	1	10		1	3	14		16	45	16
1977	1	4	1		2	17		20	45	16
1978		3			2	16		27	48	13
1979		4		1	1	13		34	53	8
1980							5	61	66	
Panel B	**Second Decade Migration Analysis**									
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
1981		4	3		4	10		6	27	44
1982		3	2	2	3	15		5	30	41
1983		4		6	4	11		7	32	39
1984	1	9	1		3	10		11	35	36
1985		9		1	2	15		16	43	28
1986		6	2	1	1	15		21	46	25
1987		4	3		3	18		22	50	21
1988	3	4	1	1	1	17		33	60	11
1989		2	1	1	2	20		39	65	6
1990							7	71	78	
Panel C	**Third Decade Migration Analysis**									
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
1991	1	7	3	4	12	15		14	56	72
1992		9	3	6	7	22		13	60	68
1993		10	3	6	9	23		15	66	62
1994	1	11	6	2	12	27		15	74	54
1995	1	13	9	4	10	31		21	89	39
1996	1	14	6	6	13	26		34	100	28
1997	2	10	6	2	16	36		37	109	19
1998	2	10	4	2	9	42		52	121	7
1999	1	2	5	1	7	36		74	126	2
2000							2	128	130	
Panel D	**Fourth Decade Migration Analysis**									
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
2001		13	6	2	1	8		9	39	25

2002		9	6	2	3	11		10	41	23
2003	1	8	5	2	2	13		12	43	21
2004	2	6	4	1	2	14		16	45	19
2005	3	7	3	3	1	12		18	47	17
2006	2	7	1	2	2	13		22	49	15
2007	1	4	4	1	3	15		23	51	13
2008		5	2	1	4	14		27	53	11
2009		5	1	2	1	20		28	57	7
2010							1	64	65	
Panel E	**Fifth Decade Migration Analysis**									
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
2011		8		1	8	15		10	42	12
2012		6	1	2	5	17		12	43	11
2013		8		1	4	19		13	45	9
2014	2	6	3		4	17		15	47	7
2015	1	6	2	2	2	18		17	48	6
2016	1	5	5		4	15		19	49	5
2017	1	4	2		4	14		25	50	4
2018		5	3		3	16		24	51	3
2019		3	3		3	15		30	54	0
2020								54	54	

Within decades mobility analysis for end-of-period industry leaders. Q0 includes firms without ranking; quintiles Q1-Q4 remain unaltered but the original Q5 quintile now splits into three. Q7 includes the top 5% of the industry distribution of markups and the new Q5 holds the remaining 15% of the original 20%. Q6 represents new firms (age=1) that enter the end-of-decade sample as superstars. The Outside category tracks end-of-decade leaders not found in that year sample while the Within category tracks leaders already accounted for by any of the Q0-Q7 groups.

Table 1.5 Within-Decade Book Leverage Evolution

Within-Decade Book Leverage Evolution									
Panel A	**First Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	B. Lev
1973				0.2751	0.2789	0.2302		0.2903	0.2686
1974		0.3848	0.4452	0.2574	0.2600	0.2678		0.2435	0.3098
1975		0.4709	0.8269	0.2507	0.2541	0.2341		0.2123	0.3748
1976	0.0000	0.3918		0.8796	0.1663	0.2197		0.2028	0.3100
1977	0.4484	0.4181	0.1164		0.4478	0.2757		0.2119	0.3197
1978		0.4453			0.2919	0.2662		0.2268	0.3075
1979		0.2699		0.4741	0.1110	0.2063		0.2294	0.2581
1980							0.1174	0.1992	0.1583
Panel B	**Second Decade Leverage Evolution**								

fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	B. Lev
1981		0.1990	0.2116		0.2063	0.2020		0.2213	0.2080
1982		0.1644	0.2656	0.3251	0.1385	0.1862		0.2769	0.2261
1983		0.1843		0.1554	0.1558	0.1942		0.2014	0.1782
1984	0.2027	0.0978	0.0000		0.1927	0.2336		0.2021	0.1548
1985		0.1498		0.1454	0.1236	0.1958		0.1917	0.1612
1986		0.2408	0.1749	0.2868	0.4034	0.1389		0.2596	0.2507
1987		0.1229	0.2329		0.1487	0.2288		0.2498	0.1966
1988	0.6725	0.2217	0.5606	0.2254	0.2539	0.1272		0.2814	0.3347
1989		0.8063	0.1576	0.0404	0.4988	0.1876		0.2483	0.3232
1990							0.2275	0.2080	0.2178
Panel C				**Third Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	B. Lev
1991	0.0000	0.3452	0.0885	0.1714	0.2014	0.1718		0.1658	0.1634
1992		0.1468	0.1450	0.1235	0.1494	0.1128		0.1125	0.1317
1993		0.1123	0.1026	0.2055	0.1235	0.1063		0.1260	0.1294
1994	0.0810	0.1478	0.1477	0.2505	0.2213	0.1032		0.1519	0.1576
1995	0.0000	0.2221	0.2768	0.2169	0.1277	0.1041		0.1604	0.1583
1996	0.0256	0.1964	0.1198	0.2683	0.1201	0.1234		0.1130	0.1381
1997	0.0358	0.0970	0.2968	0.2752	0.1232	0.1130		0.1114	0.1504
1998	0.0706	0.2816	0.1042	0.2548	0.1097	0.1428		0.1311	0.1564
1999	0.0000	0.5629	0.0778	0.4495	0.0723	0.1603		0.1488	0.2102
2000							0.7045	0.1433	0.4239
Panel D				**Fourth Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	B. Lev
2001		0.1805	0.0621	0.0246	0.0329	0.1074		0.0687	0.0794
2002		0.2035	0.0682	0.1334	0.0442	0.1650		0.0772	0.1152
2003	0.2081	0.2921	0.1186	0.1619	0.0334	0.0493		0.0945	0.1368
2004	0.0855	0.2038	0.3706	0.2224	0.1196	0.0457		0.0755	0.1604
2005	0.0469	0.1871	0.2147	0.0745	0.0000	0.1047		0.1046	0.1046
2006	0.0350	0.2113	0.1795	0.2024	0.0341	0.1067		0.0964	0.1236
2007	0.0000	0.1066	0.2697	0.3145	0.0210	0.1417		0.1874	0.1487
2008		0.0927	0.1341	0.2534	0.0746	0.1316		0.2673	0.1590
2009		0.0591	0.1671	0.1076	0.0000	0.0979		0.2161	0.1080
2010							0.0038	0.1226	0.0632
Panel E				**Fifth Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	B. Lev
2011		0.2031		0.2527	0.1126	0.1806		0.1918	0.1881
2012		0.2039	0.0292	0.1499	0.1358	0.2094		0.2083	0.1561
2013		0.2726		0.0205	0.1882	0.2058		0.1848	0.1744

2014	0.0906	0.4975	0.1626		0.1705	0.2325		0.1823	0.2227
2015	0.0000	0.2840	0.1802	0.2244	0.1716	0.2666		0.3509	0.2111
2016	0.0000	0.5535	0.2807		0.2688	0.3932		0.3686	0.3108
2017	0.0000	0.3839	0.1082		0.2985	0.4396		0.3255	0.2593
2018		0.3772	0.0772		0.2382	0.2885		0.4407	0.2844
2019		0.1200	0.4906		0.2909	0.3376		0.4196	0.3317
2020								0.3728	0.3728

Within decades leverage evolution analysis for end-of-period industry leaders. Q0 includes firms without ranking; quintiles Q1-Q4 remain unaltered but the original Q5 quintile now splits into three. Q7 includes the top 5% of the industry distribution of markups and the new Q5 holds the remaining 15% of the original top quintile 20%. Q6 represents new firms (age=1) that directly enter the end-of-decade sample as superstars. The Book Leverage category traces end-of-decade leaders' portfolio average leverage for that year's sample composition.

Table 1.6 Within-Decade Market Leverage Evolution

Within-Decade Market Leverage Evolution									
Panel A	**First Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
1973				0.2653	0.1820	0.1892		0.3013	0.2345
1974		0.6760	0.5822		0.2741	0.2336		0.2553	0.4042
1975		0.6960				0.2195		0.2488	0.3881
1976		0.4122			0.0010	0.2756		0.1968	0.2214
1977		0.7237			0.8065	0.1771		0.2119	0.4798
1978		0.0912				0.2106		0.1981	0.1666
1979		0.1800		0.6019		0.1268		0.2038	0.2781
1980							0.2160	0.1472	0.1816
Panel B	**Second Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
1981		0.0637	0.1633		0.2079	0.0905		0.1692	0.1389
1982		0.0678	0.2130	0.2212	0.1316	0.1082		0.2666	0.1681
1983		0.0800		0.0460	0.1435	0.0924		0.1454	0.1015
1984	0.1677	0.0571	0.0000		0.1642	0.1196		0.1382	0.1078
1985		0.0817		0.0732	0.1212	0.1240		0.0870	0.0974
1986		0.0726	0.1520	0.2848	0.3228	0.0866		0.1350	0.1756
1987		0.1168	0.1946		0.1228	0.1336		0.1522	0.1440
1988	0.8229	0.1786	0.6364		0.2070	0.0747		0.1548	0.3457
1989		0.1156	0.1593	0.0230	0.3822	0.0862		0.1722	0.1564
1990								0.1368	0.1368
Panel C	**Third Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
1991		0.1132	0.0097	0.1550	0.1286	0.0945		0.1790	0.1133

1992		0.1400	0.1834	0.1039	0.0778	0.0673		0.0768	0.1082
1993		0.0808	0.0325	0.2106	0.0415	0.0628		0.0849	0.0855
1994	0.0239	0.1027	0.1549	0.1731	0.1458	0.0569		0.1232	0.1115
1995	0.0000	0.1004	0.2256	0.2423	0.0517	0.0411		0.0902	0.1073
1996	0.0052	0.0700	0.1083	0.2149	0.0859	0.0581		0.0473	0.0842
1997	0.0085	0.0236	0.1255	0.2879	0.0518	0.0529		0.0700	0.0886
1998	0.0132	0.2592	0.0876	0.1417	0.0988	0.0562		0.0753	0.1045
1999	0.0000	0.3735	0.1625	0.1193	0.0328	0.0635		0.0735	0.1179
2000								0.0711	0.0711
Panel D	**Fourth Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
2001		0.0841	0.0504	0.0098	0.0067	0.0618		0.0273	0.0400
2002		0.1525	0.0637	0.0833	0.0409	0.0894		0.0407	0.0784
2003	0.2403	0.1539	0.0732	0.0903	0.0169	0.0298		0.0281	0.0904
2004	0.2156	0.0865	0.2985	0.1621	0.0641	0.0260		0.0325	0.1265
2005	0.0209	0.0602	0.2383	0.3306	0.0000	0.0499		0.0230	0.1033
2006	0.0178	0.0696	0.0942	0.1308	0.0122	0.0478		0.0223	0.0564
2007	0.0000	0.0727	0.1381	0.1163	0.0082	0.0565		0.0393	0.0616
2008		0.0791	0.1517	0.2599	0.0720	0.0807		0.0717	0.1192
2009		0.0193	0.0659	0.0651	0.0000	0.0476		0.0870	0.0475
2010							0.0015	0.0542	0.0279
Panel E	**Fifth Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
2011		0.0793		0.1777	0.0480	0.0917		0.0873	0.0968
2012		0.0657	0.0044	0.0931	0.0575	0.0855		0.0799	0.0644
2013		0.0503		0.0051	0.0966	0.0845		0.0510	0.0575
2014	0.0000	0.0862	0.2256		0.0842	0.0932		0.0587	0.0913
2015	0.0000	0.0734	0.0288	0.1791	0.1065	0.1001		0.1075	0.0851
2016	0.0000	0.1666	0.1333		0.1322	0.1142		0.1243	0.1118
2017	0.0000	0.1119	0.1947		0.1417	0.1034		0.0979	0.1083
2018		0.0789	0.0645		0.1158	0.1220		0.1100	0.0982
2019		0.0763	0.1373		0.1232	0.1068		0.1359	0.1159
2020								0.1202	0.1202

Within decades leverage evolution analysis for end-of-period industry leaders. Q0 includes firms without ranking; quintiles Q1-Q4 remain unaltered but the original Q5 quintile now splits into three. Q7 includes the top 5% of the industry distribution of markups and the new Q5 holds the remaining 15% of the original top quintile 20%. Q6 represents new firms (age=1) that directly enter the end-of-decade sample as superstars. The Market Leverage category traces end-of-decade leaders' portfolio average leverage for that year's sample composition.

Table 1.7 Within-Decade Market Leverage Evolution

Mobility Analysis Through Decades (Survivorsl)										
Panel A				**First Decade Leverage Evolution**						
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
1973				1	4	15		7	27	0
1974		1	1		4	8		13	27	0
1975		2				10		15	27	0
1976		3			1	9		14	27	0
1977		1				10		16	27	0
1978						9		18	27	0
1979				1		6		20	27	0
1980								27	27	
Panel B				**Second Decade Leverage Evolution**						
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
1981		3	3		3	10		6	25	0
1982		3	1	1	3	14		3	25	0
1983		3		3	3	10		6	25	0
1984	1	4			3	10		7	25	0
1985		6			1	12		6	25	0
1986		4	1	1	1	9		9	25	0
1987		2	1		1	9		12	25	0
1988		2			1	9		13	25	0
1989		1	1		1	10		12	25	0
1990								25	25	
Panel C				**Third Decade Leverage Evolution**						
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
1991		7	3	4	12	15		14	55	0
1992		6	3	6	6	22		12	55	0
1993		5	1	6	8	20		15	55	0
1994		4	5	2	8	22		14	55	0
1995		4	5	3	7	17		19	55	0
1996		3	4	3	7	14		24	55	0
1997		2	2	2	9	21		19	55	0
1998		2	2	1	6	20		24	55	0
1999		1	1		3	14		36	55	0
2000								55	55	
Panel D				**Fourth Decade Leverage Evolution**						
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside

2001		12	5	2	1	8		9	37	0
2002		8	5	1	3	11		9	37	0
2003	1	6	4	2	2	10		12	37	0
2004	1	3	3	1	1	13		15	37	0
2005	1	7	1	1	1	11		15	37	0
2006	1	5	1	2	1	12		15	37	0
2007		3	4	1	1	10		18	37	0
2008		4	1	1	1	10		20	37	0
2009		2	1	1	1	14		18	37	0
2010								37	37	
Panel E				**Fifth Decade Leverage Evolution**						
fyear	`	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Within	Outside
2011		8		1	8	15		10	42	0
2012		6	1	2	5	16		12	42	0
2013		8		1	4	16		13	42	0
2014		6	3		4	15		14	42	0
2015		4	2	2	2	16		16	42	0
2016		3	5		3	14		17	42	0
2017		2	2		4	12		22	42	0
2018		3	2		3	11		23	42	0
2019			3		3	12		24	42	0
2020								42	42	

Within decades mobility analysis for end-of-period industry leaders present during the entire decade (survivors). Q0 includes firms without ranking; quintiles Q1-Q4 remain unaltered but the original Q5 quintile now splits into three. Q7 includes the top 5% of the industry distribution of markups and the new Q5 holds the remaining 15% of the original 20%. Q6 represents new firms (age=1) that enter the end-of-decade sample as superstars. The Outside category is necessarily empty while the Within category now simply verifies survivors total count for the distribution of firms over the Q0-Q7 groups.

Table 1.8 Within-Decade Book Leverage Evolution (Survivors)

Within-Decade Book Leverage Evolution (Survivors)									
Panel A				**First Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Bk. Lev
1973				0.2751	0.2265	0.2302		0.2903	0.2555
1974		0.6813	0.4452		0.2182	0.2652		0.2261	0.3672
1975		0.6317				0.2258		0.2406	0.3660
1976		0.5293			0.0008	0.2830		0.2070	0.2550
1977		0.5315				0.2218		0.2476	0.3336
1978						0.1977		0.2618	0.2298
1979				0.4741		0.2346		0.2368	0.3152

1980								0.2377	0.2377
Panel B				**Second Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Bk. Lev
1981		0.2600	0.2116		0.1695	0.2020		0.2213	0.2129
1982		0.1644	0.2581	0.2166	0.1385	0.1995		0.3406	0.2196
1983		0.2431		0.2847	0.1207	0.1582		0.1961	0.2006
1984	0.2027	0.1071			0.1927	0.2336		0.1638	0.1800
1985		0.1524			0.2473	0.2059		0.2064	0.2030
1986		0.3001	0.0000	0.2868	0.4034	0.1884		0.2432	0.2370
1987		0.1496	0.2821		0.2463	0.2629		0.2218	0.2325
1988		0.1830			0.2539	0.1681		0.2548	0.2150
1989		0.1290	0.1576		0.1959	0.1531		0.2255	0.1722
1990								0.1541	0.1541
Panel C				**Third Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Bk. Lev
1991		0.3452	0.0885	0.1714	0.2014	0.1718		0.1658	0.1907
1992		0.2129	0.1450	0.1235	0.1543	0.1128		0.1228	0.1452
1993		0.1846	0.0138	0.2055	0.1372	0.1027		0.1260	0.1283
1994		0.2107	0.1586	0.2505	0.1782	0.0923		0.1636	0.1756
1995		0.1601	0.2197	0.2892	0.1784	0.0735		0.1556	0.1794
1996		0.1845	0.1091	0.3154	0.2026	0.1143		0.1095	0.1726
1997		0.0448	0.1944	0.2752	0.1195	0.1173		0.1238	0.1458
1998		0.3395	0.1883	0.0000	0.1298	0.1242		0.0922	0.1457
1999		0.0026	0.0000		0.1153	0.1444		0.1188	0.0762
2000								0.1244	0.1244
Panel D				**Fourth Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Bk. Lev
2001		0.1903	0.0745	0.0246	0.0329	0.1074		0.0687	0.0831
2002		0.2123	0.0819	0.2278	0.0442	0.1650		0.0815	0.1354
2003	0.2081	0.3673	0.1412	0.1619	0.0334	0.0571		0.0945	0.1519
2004	0.1709	0.3141	0.4896	0.2224	0.2321	0.0492		0.0794	0.2225
2005	0.1406	0.1871	0.4043	0.2146	0.0000	0.1141		0.0713	0.1617
2006	0.0700	0.2428	0.1795	0.2024	0.0614	0.1156		0.0901	0.1374
2007		0.1422	0.2697	0.3145	0.0569	0.1579		0.1466	0.1813
2008		0.1159	0.2281	0.2534	0.2936	0.1652		0.2623	0.2198
2009		0.1479	0.1671	0.2152	0.0000	0.1318		0.2453	0.1512
2010								0.1498	0.1498
Panel E				**Fifth Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Bk. Lev
2011		0.2031		0.2527	0.1126	0.1806		0.1918	0.1881

2012		0.2039	0.0292	0.1499	0.1358	0.2035		0.2083	0.1551
2013		0.2726		0.0205	0.1882	0.2096		0.1848	0.1751
2014		0.4975	0.1626		0.1705	0.2432		0.1804	0.2508
2015		0.4002	0.1802	0.2244	0.1716	0.2755		0.3543	0.2677
2016		0.9177	0.2807		0.2651	0.3846		0.3894	0.4475
2017		0.5759	0.1082		0.2985	0.4296		0.3557	0.3536
2018		0.6287	0.1158		0.2382	0.2470		0.4599	0.3379
2019			0.4906		0.2909	0.3693		0.4179	0.3922
2020								0.3982	0.3982

Within decades leverage analysis for end-of-period industry leaders present during the entire decade (survivors). Q0 includes firms without ranking; quintiles Q1-Q4 remain unaltered but the original Q5 quintile now splits into three. Q7 includes the top 5% of the industry distribution of markups and the new Q5 holds the remaining 15% of the original top quintile 20%. Q6 represents new firms (age=1) that directly enter the end-of-decade sample as superstars. The Book Leverage category traces end-of-decade leaders' portfolio average leverage for that year's sample composition.

Table 1.9 Within-Decade Market Leverage Evolution (Survivors)

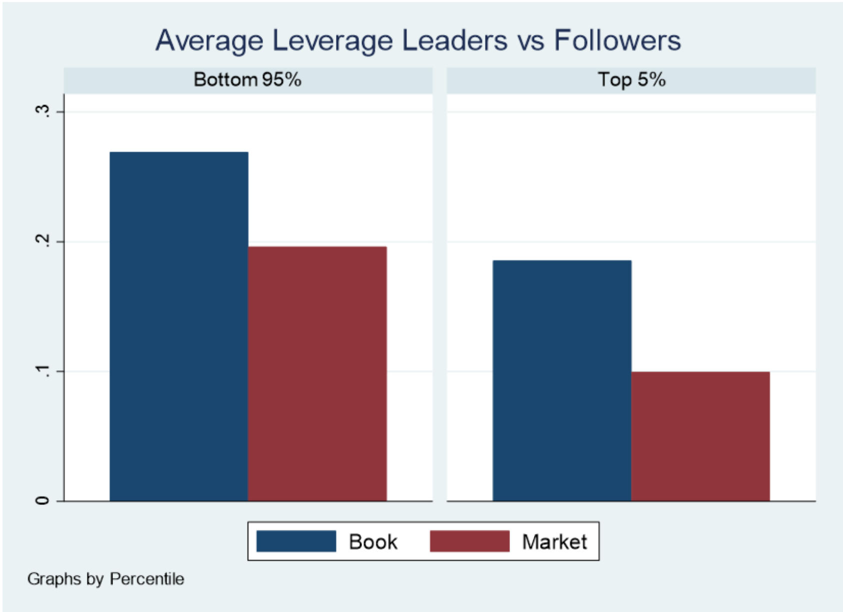
Within-Decade Market Leverage Evolution (Survivors)									
Panel A				**First Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
1973				0.2653	0.1820	0.1892		0.3013	0.2345
1974		0.7237	0.5822		0.2741	0.2336		0.2553	0.4138
1975		0.6960				0.2195		0.2488	0.3881
1976		0.5178			0.0010	0.2756		0.1968	0.2478
1977		0.7237				0.1878		0.2270	0.3795
1978						0.1901		0.2268	0.2084
1979				0.6019		0.1781		0.1884	0.3228
1980								0.1826	0.1826
Panel B				**Second Decade Leverage Evolution**					
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
1981		0.0843	0.1633		0.1439	0.0905		0.1692	0.1303
1982		0.0678	0.1205	0.2212	0.1316	0.1082		0.2666	0.1527
1983		0.1063		0.0784	0.0928	0.0924		0.1528	0.1045
1984	0.1677	0.0000			0.1642	0.1196		0.1295	0.1162
1985		0.0510			0.2424	0.1240		0.1469	0.1411
1986		0.0969	0.0000	0.2848	0.3228	0.1061		0.1592	0.1616
1987		0.1727	0.0822		0.2161	0.1517		0.1190	0.1483
1988		0.1519			0.2070	0.1116		0.1316	0.1505
1989		0.0335	0.1593		0.1914	0.1017		0.1208	0.1213
1990								0.0875	0.0875

Panel C	Third Decade Leverage Evolution								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
1991		0.1132	0.0097	0.1550	0.1286	0.0945		0.1790	0.1133
1992		0.1633	0.1834	0.1039	0.0791	0.0673		0.0845	0.1136
1993		0.0937	0.0068	0.2106	0.0471	0.0545		0.0849	0.0830
1994		0.1266	0.1721	0.1731	0.1275	0.0506		0.1327	0.1304
1995		0.0591	0.2686	0.2423	0.0724	0.0396		0.0946	0.1294
1996		0.1332	0.1449	0.2444	0.1335	0.0559		0.0582	0.1284
1997		0.0079	0.1662	0.2879	0.0569	0.0507		0.0840	0.1089
1998		0.3228	0.1620	0.0000	0.1365	0.0559		0.0611	0.1230
1999		0.0010	0.0000		0.0630	0.0742		0.0736	0.0424
2000								0.0642	0.0642
Panel D	**Fourth Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
2001		0.0908	0.0604	0.0098	0.0067	0.0618		0.0273	0.0428
2002		0.1645	0.0764	0.1547	0.0409	0.0894		0.0407	0.0944
2003	0.2403	0.2018	0.0732	0.0903	0.0169	0.0327		0.0281	0.0976
2004	0.2156	0.0646	0.2985	0.1621	0.1271	0.0279		0.0325	0.1326
2005	0.0627	0.0602	0.2732	0.3306	0.0000	0.0544		0.0263	0.1153
2006	0.0356	0.0723	0.0942	0.1308	0.0222	0.0478		0.0289	0.0617
2007		0.0969	0.1381	0.1163	0.0238	0.0612		0.0455	0.0803
2008		0.0989	0.2802	0.2599	0.2860	0.0925		0.0737	0.1819
2009		0.0483	0.0659	0.1301	0.0000	0.0650		0.0674	0.0628
2010								0.0484	0.0484
Panel E	**Fifth Decade Leverage Evolution**								
fyear	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	M. Lev
2011		0.0793		0.1777	0.0480	0.0917		0.0873	0.0968
2012		0.0657	0.0044	0.0931	0.0575	0.0855		0.0799	0.0644
2013		0.0503		0.0051	0.0966	0.0845		0.0510	0.0575
2014		0.0862	0.2256		0.0842	0.0932		0.0538	0.1086
2015		0.1020	0.0288	0.1791	0.1065	0.1005		0.1008	0.1030
2016		0.2208	0.1333		0.1498	0.1139		0.1144	0.1465
2017		0.1119	0.1947		0.1417	0.0971		0.0965	0.1284
2018		0.1314	0.0968		0.1158	0.0754		0.1100	0.1059
2019			0.1373		0.1232	0.1154		0.1028	0.1197
2020								0.1047	0.1047

Within decades leverage analysis for end-of-period industry leaders present during the entire decade (survivors). Q0 includes firms without ranking; quintiles Q1-Q4 remain unaltered but the original Q5 quintile now splits into three. Q7 includes the top 5% of the industry distribution of markups and the new Q5 holds the remaining 15% of the original top quintile 20%. Q6 represents new firms (age=1) that directly enter the end-of-decade sample as superstars. The Market Leverage category traces end-of-decade leaders' portfolio average leverage for that year's sample composition.

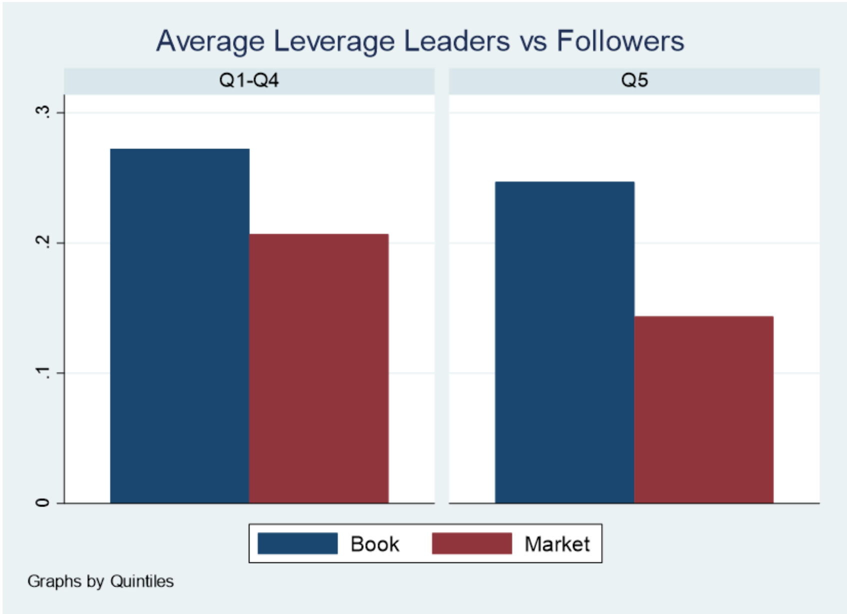
Figures

Figure 1.1 Average Leverage Leaders vs Followers (Top 5%)



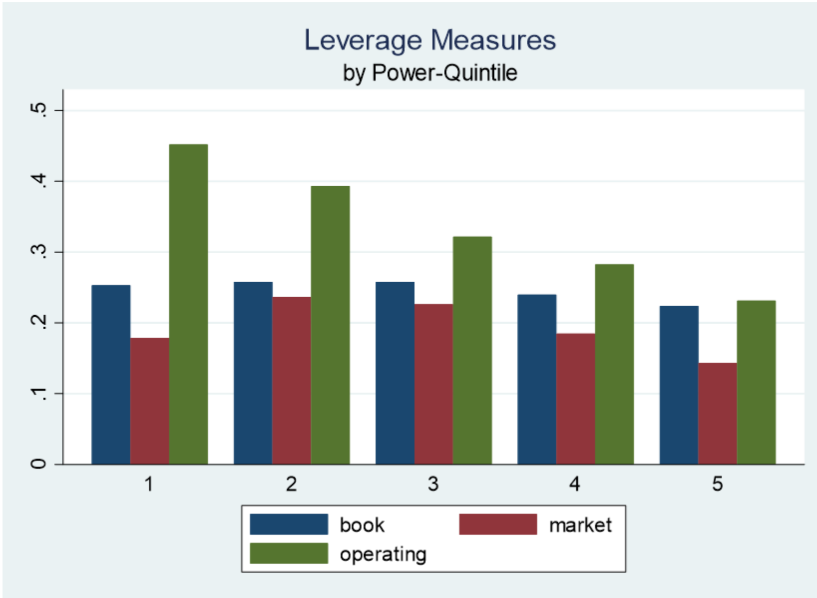
Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). Superstars defined as top 5% of industry's distribution of markups.

Figure 1.2 Average Leverage Leaders vs Followers (Q5)



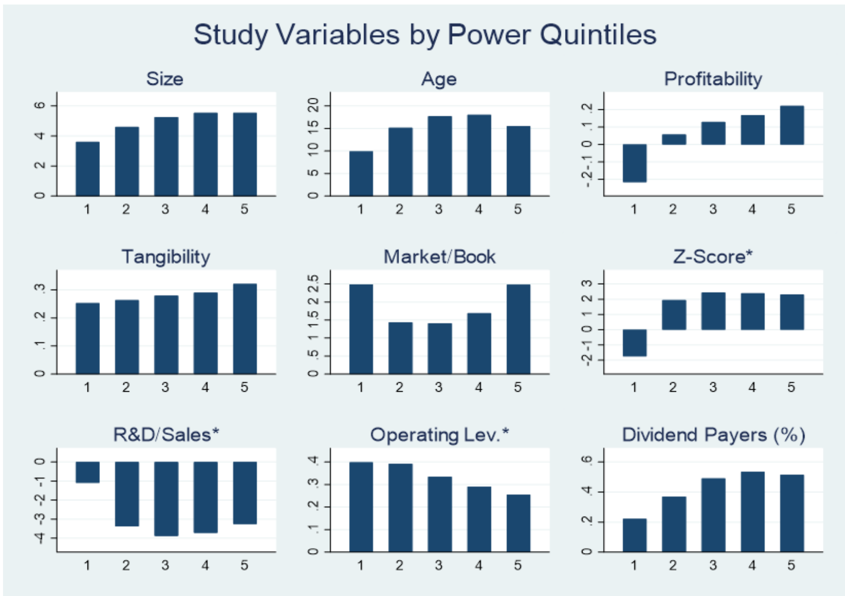
Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). Superstars defined as top quintile (Q5) of industry distribution of markups.

Figure 1.3 Leverage Measures Statistics (Bars)



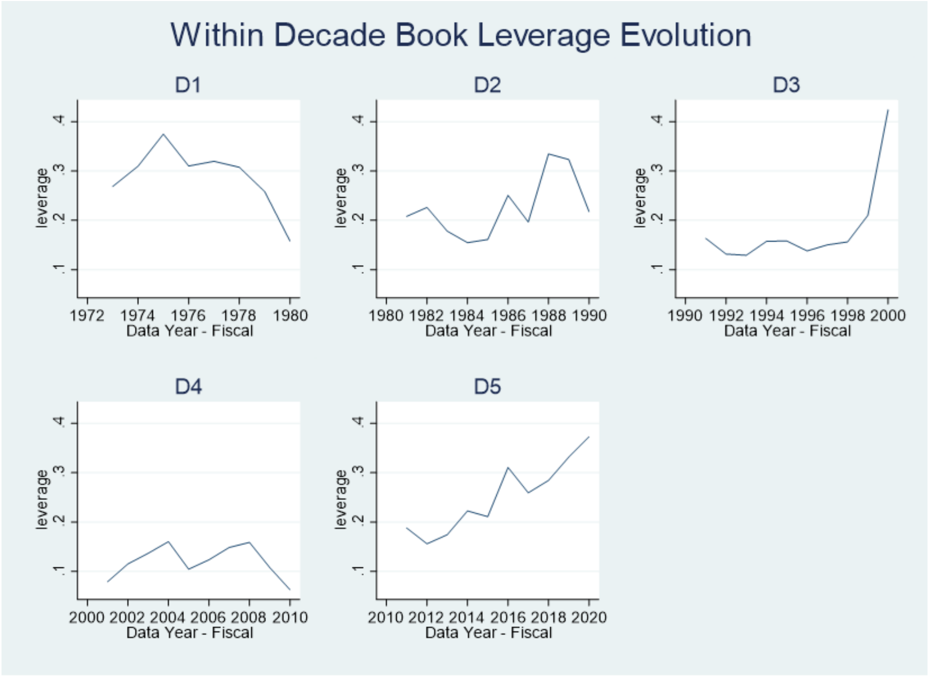
Mean leverage ratios for nonfinancial US firms in Compustat Fundamentals Annual database on a markup-quintile basis. Firms are required to have total book assets of at least $5 million in 1996 terms during the 1973-2020 period. Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Operating leverage computed as selling, general and administrative expenses (XSGA) scaled by total book assets (AT), markup as the ratio of operating income after depreciation (OIADP) to net sales (SALE) and profitability as operating income before depreciation (OIBDP) scaled by total assets (AT).

Figure 1.4 Factor Measures Statistics (Bars)



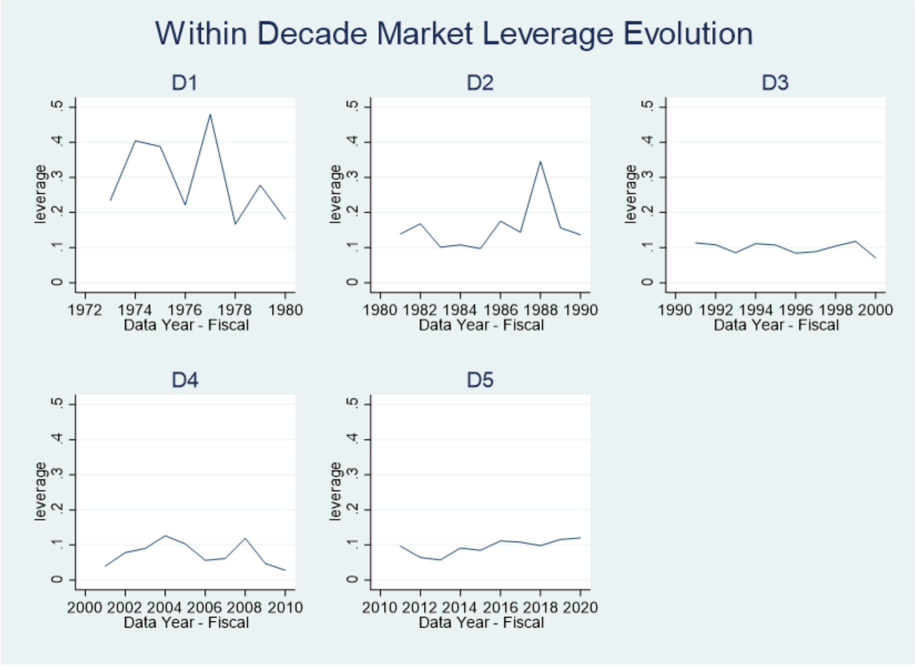
Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). We also use asset tangibility, computed as the ratio of property, plant and equipment to (PPENT) to total assets (AT); profitability, estimated as operating income before depreciation (OIBDP) scaled by total assets (AT); modified Altman's Z-score, defined as [3.3*operating income (OIBDP) + sales (SALE) + 1.4*retained earnings (RE) + 1.2*working capital (WCAP)]/AT); the ratio of research and development expenses (XRD) to company sales (SALE); and the market-to-book ratio of firm assets (MAT/AT). Quintiles of industry's distribution of markups defined as the ratio of operating income to sales (OIADP/SALE).

Figure 1.5 Within Decade Book Leverage Evolution



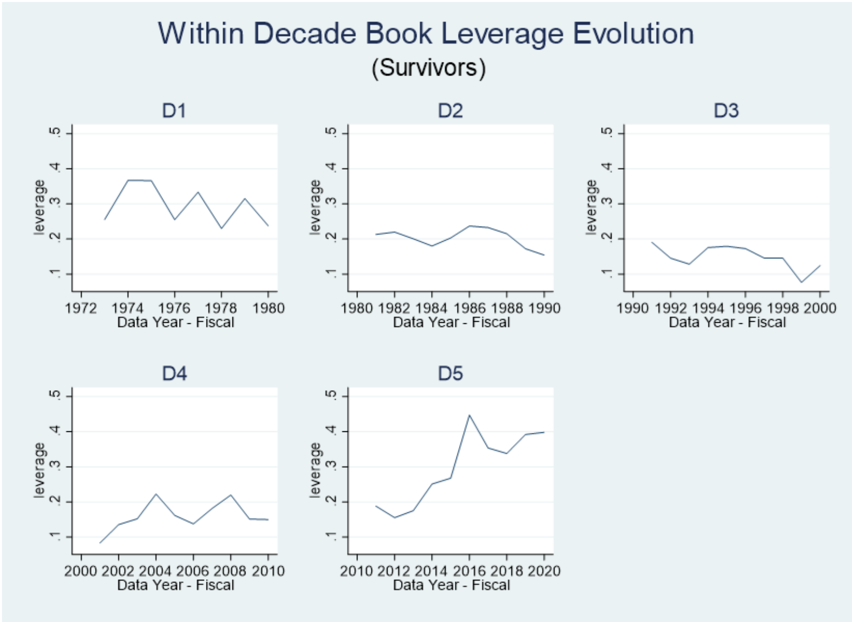
Within decades leverage evolution for end-of-period industry leaders. Leaders are defined as the top 5% of the industry distribution of markups. The time series shown plots the Book Leverage column in Table 5 which tracks end-of-decade leaders' portfolio average leverage for that year's sample composition.

Figure 1.6 Within Decade Market Leverage Evolution



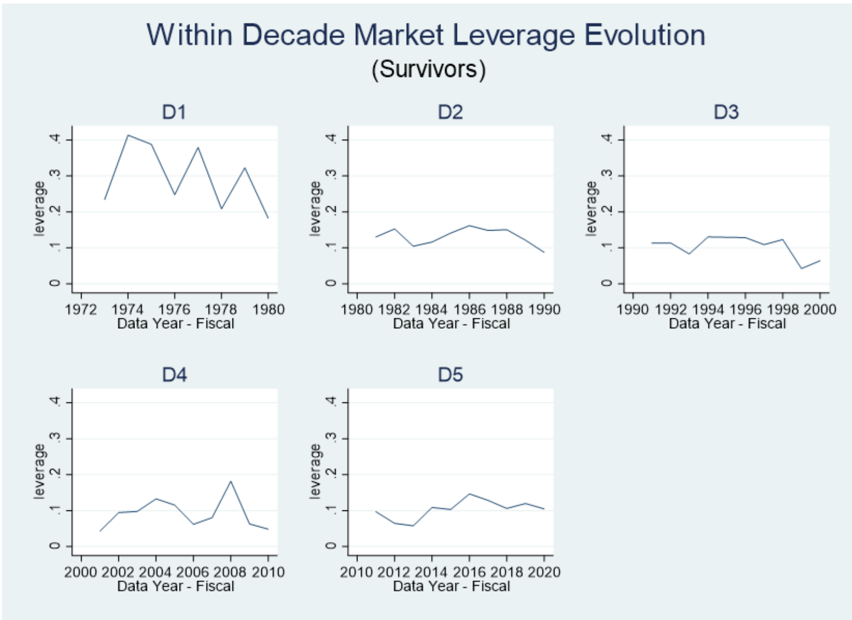
Within decades leverage evolution for end-of-period industry leaders. Leaders are defined as the top 5% of the industry distribution of markups. The time series shown plots the Market Leverage column in Table 6 which tracks end-of-decade leaders' portfolio average leverage for that year's sample composition.

Figure 1.7 Within Decade Book Leverage Evolution (Survivors)



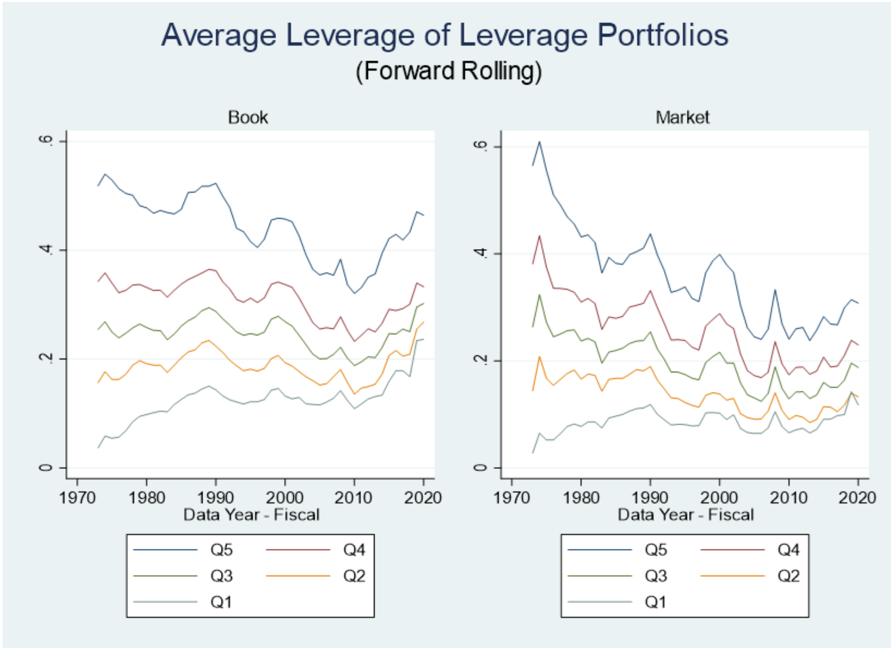
Within decades leverage evolution for end-of-period industry leaders present during the entire decade (survivors). Leaders are defined as the top 5% of the industry distribution of markups. The time series shown plots the Book Leverage column in Table 8 which tracks end-of-decade leaders' portfolio average leverage for that year's sample composition.

Figure 1.8 Within Decade Market Leverage Evolution (Survivors)



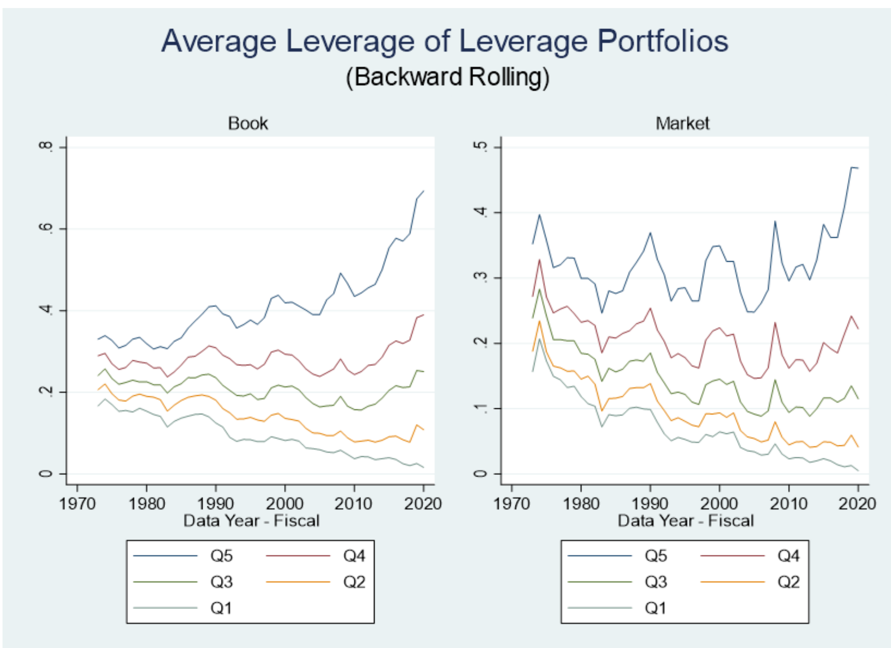
Within decades leverage evolution for end-of-period industry leaders present during the entire decade (survivors). Leaders are defined as the top 5% of the industry distribution of markups. The time series shown plots the Market Leverage column in Table 9 which tracks end-of-decade leaders' portfolio average leverage for that year's sample composition.

Figure 1.9 Average Leverage of Leverage Portfolios (Forward)



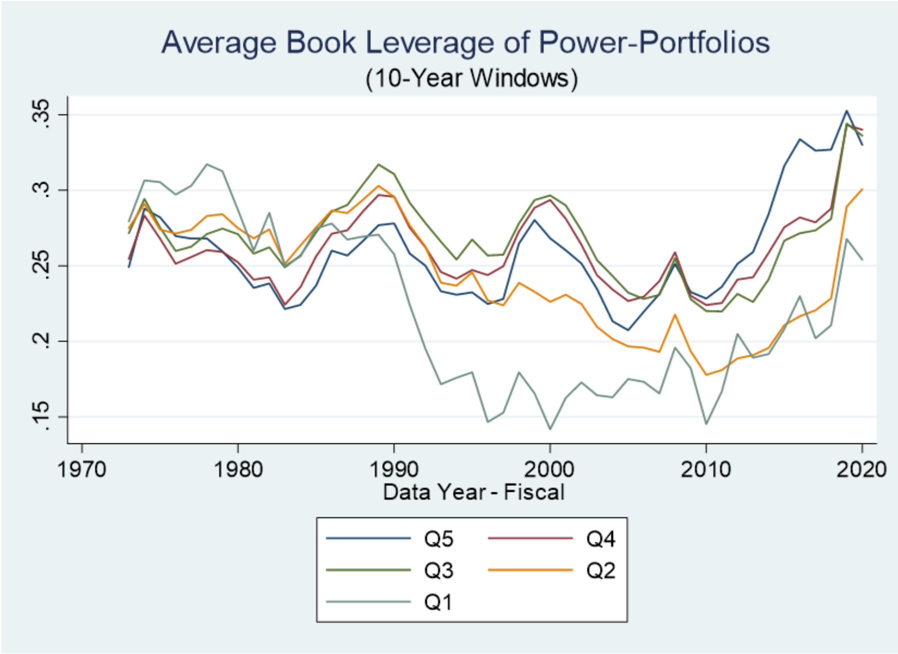
Evolution of annual average leverage of leverage-level-portfolio (quintile-portfolio) averages for fixed composition portfolios hold together over 20-year windows. The procedure rolls forward from 1973 to 2001.

Figure 1.10 Average Leverage of Leverage Portfolios (Backward)



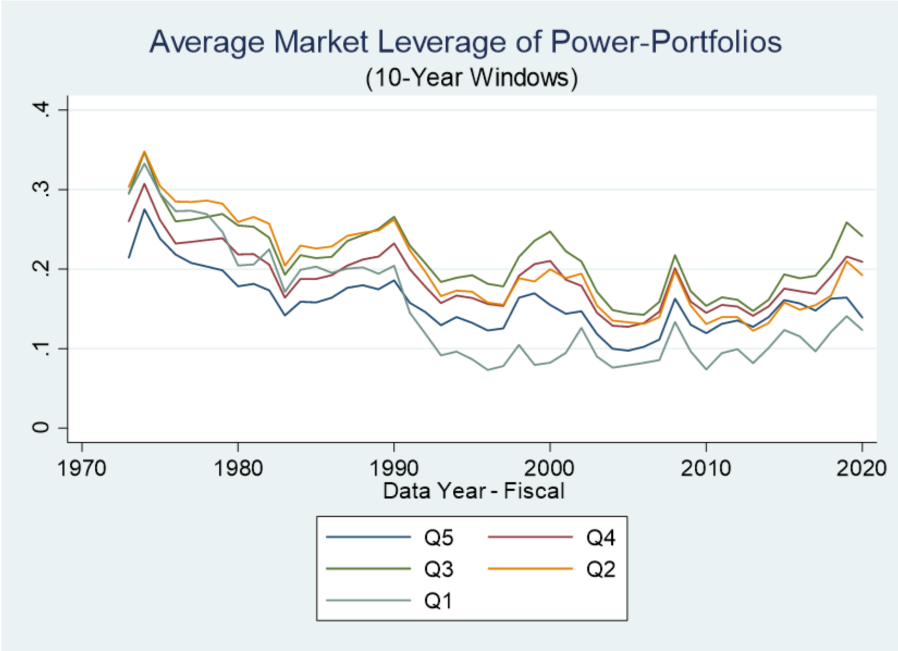
Evolution of annual average leverage of leverage-level-portfolio (quintile-portfolio) averages for fixed composition portfolios hold together over 20-year windows. The procedure rolls backward from 2020 to 1992.

Figure 1.11 Average Book Leverage of Power-Portfolios (10-yr Back)



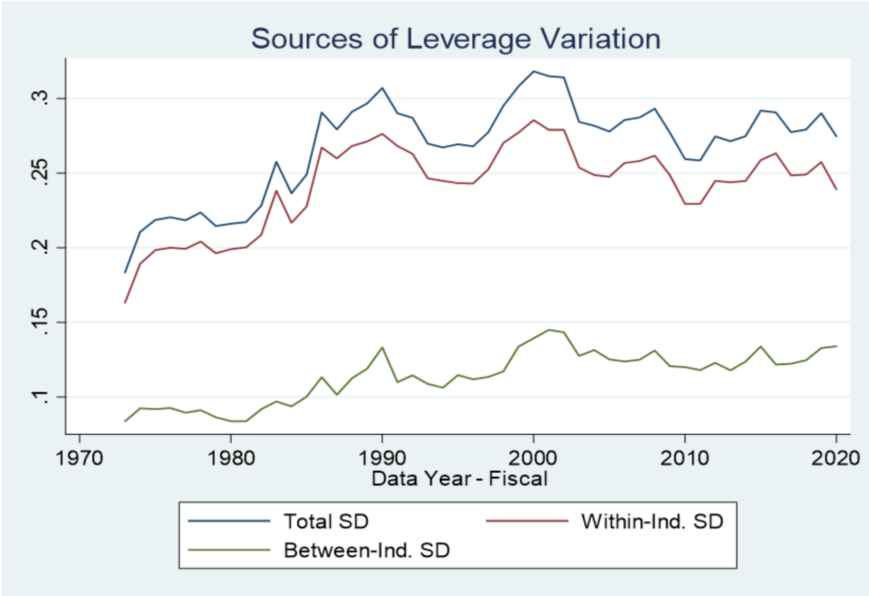
Results for a fixed composition quintile- portfolio analysis that rolls 10-year windows backward, for the 1973-2020 sampling period. New portfolios add each year from 2020 to 1982 and the series represent the evolutionary path of the average of portfolio averages for the book leverage measure.

Figure 1.12 Average Market Leverage of Power-Portfolios (10-yr Back)



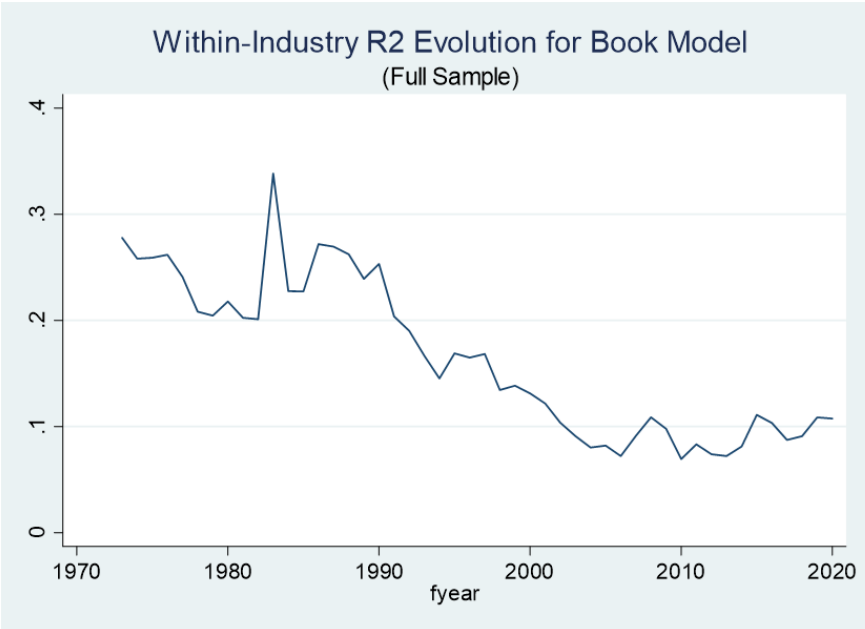
Results for a fixed composition quintile- portfolio analysis that rolls 10-year windows backward, for the 1973-2020 sampling period. New portfolios add each year from 2020 to 1982 and the series represent the evolutionary path of the average of portfolio averages for the market leverage measure.

Figure 1.13 Sources of Leverage Variation



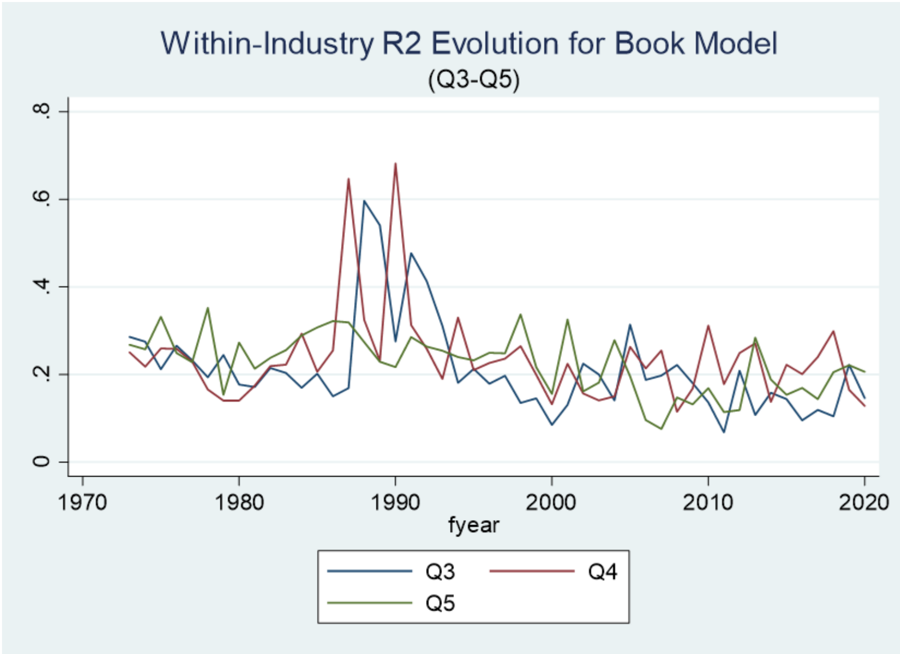
Total cross-sectional book leverage variation (standard deviation) and its components. For a sample of nonfinancial US firms in the Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 sampling period. Book leverage L_{ijt} is computed as the ratio of financial debt to total assets (FD/AT). The between-industry standard deviation series is draw as the annual standard deviation of industry averages while the within-industry series is draw according to $\sqrt{\frac{\sum_i \sum_j (L_{ij} - \bar{L}_{.j})^2}{N-1}}$

Figure 1.14 Within-Industry R2 Evolution for Book Model (Full)



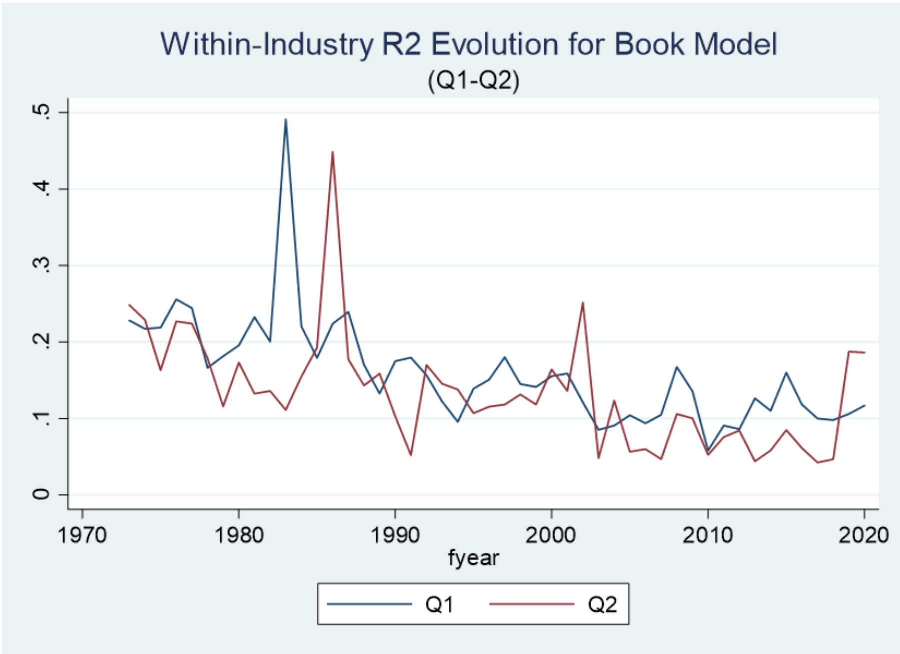
For a sample of nonfinancial US firms in the Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 sampling period. Model fitness R2 is estimated from $L_{ij} = \alpha + \sum_{k=2}^{5} \varphi_k + \beta F_{ij} + \eta_j + \epsilon_{ij}$, where book leverage is FD/AT, $F_{ij}$is a six-factor vector and η_j accounts for industry fixed effects. The regression is ran on an anual basis.

Figure 1.15 Within-Industry R2 Evolution for Book Model (High)



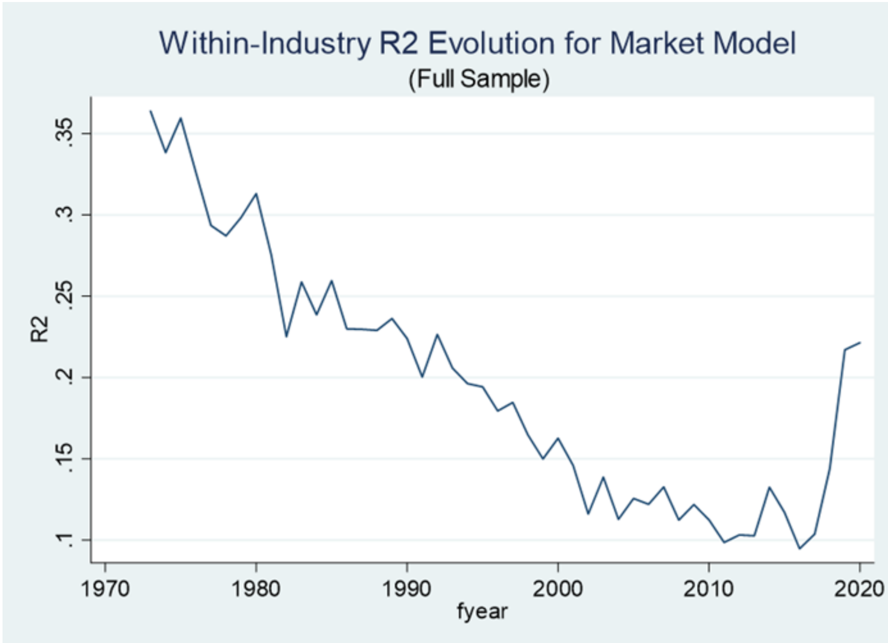
Model fitness (R2) is estimated from running the model specification on data from each power-quintile in the high-power block. The model is: $L_{ij} = \alpha + \beta F_{ij} + \eta_j + \epsilon_{ij}$, where book leverage is FD/AT, F_{ij} is a six-factor vector and η_j accounts for industry fixed effects.

Figure 1.16 Within-Industry R2 Evolution for Book Model (Low)



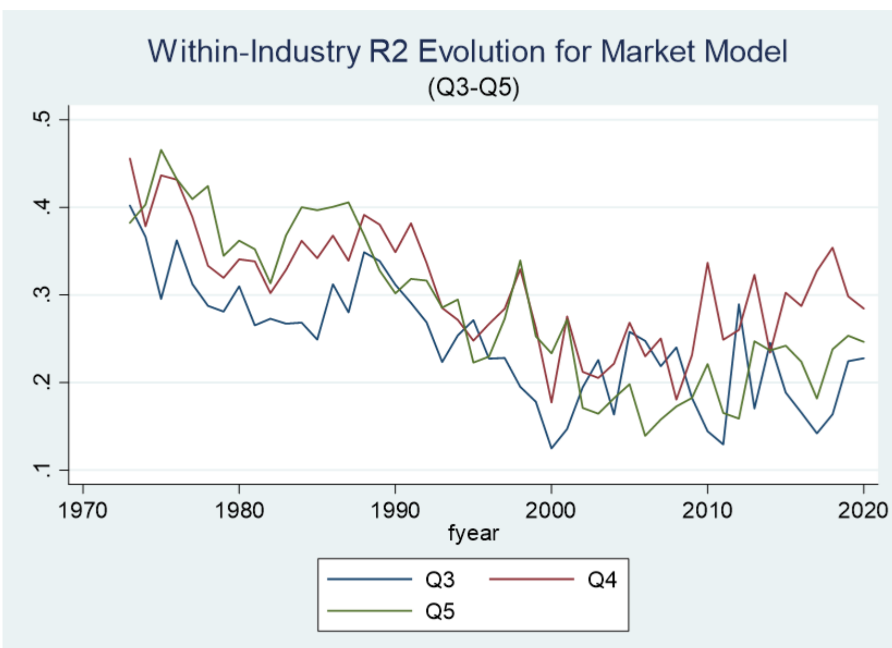
Model fitness (R2) is estimated from running the model specification on data from each power-quintile in the low-power block. The model is: $L_{ij} = \alpha + \beta F_{ij} + \eta_j + \epsilon_{ij}$, where book leverage is FD/AT, F_{ij} is a six-factor vector and η_j accounts for industry fixed effects.

Figure 1.17 Within-Industry R2 Evolution for Market Model (Full)



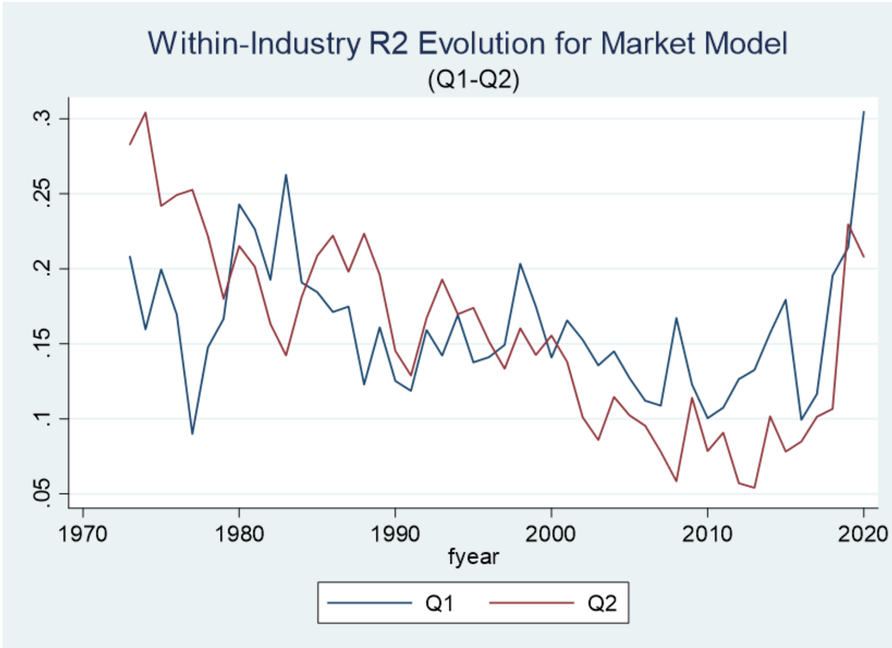
For a sample of nonfinancial US firms in the Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 sampling period. Model fitness R2 is estimated from $L_{ij} = \alpha + \sum_{k=2}^{5} \varphi_k + \beta F_{ij} + \eta_j + \epsilon_{ij}$, where market leverage is FD/MAT, $F_{ij}$is a six-factor vector and η_j accounts for industry fixed effects. Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT).

Figure 1.18 Within-Industry R2 Evolution for Market Model (High)



Model fitness R2 is estimated by running the model on data from each power-quintile in the high-power block. The model is: $L_{ij} = \alpha + \beta F_{ij} + \eta_j + \epsilon_{ij}$, where market leverage is FD/MAT, F_{ij} is a six-factor vector and η_j accounts for industry fixed effects. Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT).

Figure 1.19 Within-Industry R2 Evolution for Market Model (Low)



Model fitness R2 is estimated by running the model on data from each power-quintile in the low-power block. The model is: $L_{ij} = \alpha + \beta F_{ij} + \eta_j + \epsilon_{ij}$, where market leverage is FD/MAT, F_{ij} is a six-factor vector and η_j accounts for industry fixed effects. Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT).

Appendix to Essay 1

Sensitivity Analysis - Groupings and Partitions

In this section we investigate how the way in which firms are group and the sampling period windows are defined and rolled affects the results of the evolution analysis. That is, we show how the methodology design implemented to analyze the evolution of the leverage series influences the results. Figures

Figure 1.20 and Figure 1.21 present the evolution of average leverage for groupings of the main sample into industry leading firms and industry followers; superstars are defined as top quintile (Q5) and top 5% (Top5) respectively. They show that followers have been more levered than leaders throughout most of the sampling period, but around year 2010 leaders has rapidly caught up and have recently surpassed them. Although these patterns seem to generally survive the different definitions of leadership, the changing in composition of the groups greatly determines the time series path. For example, while in Figures

Figure 1.20 leaders surpass followers' leverage early during the last decade, Figure 1.21 shows the same event happening by the end of the period. Both figures seem to corroborate the findings of ElFayoumi (2020) and Kroen et al. (2021) that suggest that firms rise their debt levels strategically and according to the competitive advantages granted by their financial characteristics and product market position. Because in this article our focus is on superstar or market-power effects on the distribution and evolution of corporate leverage ratios, we feel comfortable with correctly identifying the general patterns and recognize the need to proceed with caution when comparing results. Therefore, we feel comfortable saying that book leverage ratios have trended up since 2010 and that the rate of change (slope) seems higher (steeper) for superstars. However, we feel less comfortable speaking about when the leaders' time series crosses (intersects) that of followers.

In Figure 1.22 and Figure 1.23 we first implement the main grouping procedure to be used throughout the rest of our leverage evolution analysis, the markup (market power) quintiles. This is the most basic and traditional evolution analysis and represents the evolution of such quintiles when annual substitution is allowed. Two things are immediately clear; book leverage time series have completely shifted relative positioning and moved closer together. This shift could be interpreted as a transition from complete disregard for the capital structure theory to full embrace. Figure 1.23 shows market reaction (capitalization) to counter the effects of accounting changes but not necessarily in a proportional way. In other words, the market reacts differentially to the financing decisions of the power-quintiles. At first look, the fact that the series have moved closer together could be interpreted as an effect of the increased product market concentration discussed in Grullon, Larkin and Michaely (2019) and could help explain the apparent newfound interest for the capital structure theory. However, a sensitivity analysis included as part of the validation procedure to our main leverage evolution analysis shows this pattern to be mechanically introduced by the methodology design.

Finally, in Figure 1.24 and Figure 1.25 we present the evolution results for a procedure design that considers only survivor firms for a partition of the sampling period into the five main subperiods we refer to as decades. When compared to the previous results, they show that while the general patterns seem to be sustained, the individual series paths have substantially change. Importantly, these figures show that the constant entry and exit of firms into the sample would have unexpected effects on the results. All in all, caution is advised, and we intend to do so by relying in previous research findings while interpreting our results.

Tables

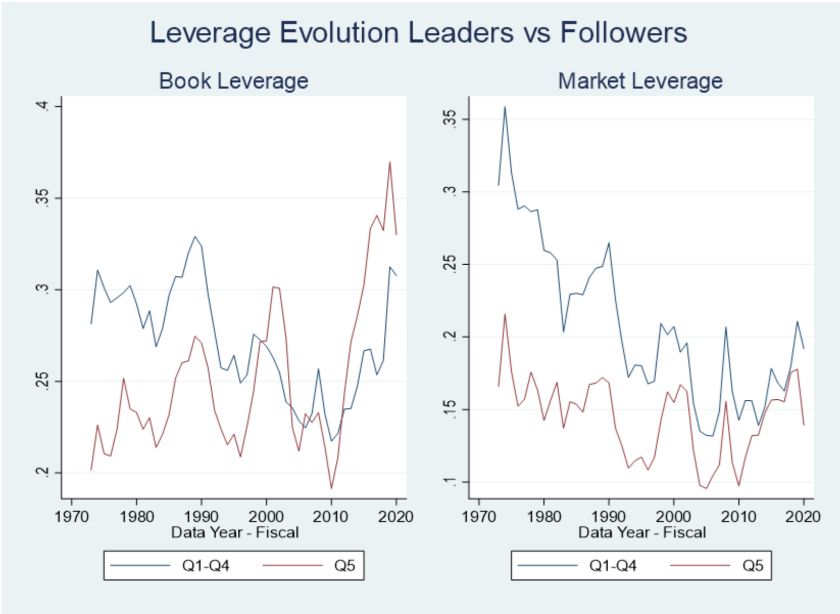
Table 1.10 Summary Statistics for All Quintiles

Group	*Stat*	*Book Lev.*	*Market Lev.*	*Oper. Lev.*	*Markup*	*Size*	*Tangibility*	*Profitability*	*Mkt/Bkt*	*Zscore*	*R&D*
Q1	*Mean*	0.2718	0.1789	0.4614	-9.1136	3.6103	0.2527	-0.2156	2.4876	-1.7478	5.2680
	Median	0.1762	0.0879	0.3694	-0.3170	3.3563	0.1657	-0.1234	1.5382	-0.5126	0.0390
	SD	0.3307	0.2097	0.3774	78.4683	1.4479	0.2423	0.3015	2.8036	5.1080	49.7272
	Obs.	39,547	32,915	32,557	39,725	39,725	39,673	39,599	33,050	38,365	39,725
Q2	*Mean*	0.2750	0.2367	0.3947	-0.0037	4.6046	0.2631	0.0577	1.4356	1.9394	0.0337
	Median	0.2428	0.2074	0.3257	0.0111	4.4436	0.2158	0.0624	1.0706	2.0985	0.0000
	SD	0.2560	0.1994	0.3006	0.0534	1.7419	0.2016	0.0804	1.4898	2.6242	0.0845
	Obs.	39,590	33,771	38,474	39,739	39,739	39,702	39,673	33,887	38,407	39,739
Q3	*Mean*	0.2800	0.2264	0.3237	0.0548	5.2586	0.2795	0.1296	1.4080	2.4434	0.0190
	Median	0.2482	0.1967	0.2712	0.0559	5.1765	0.2404	0.1236	1.1661	2.5050	0.0000
	SD	0.2481	0.1843	0.2401	0.0170	1.8649	0.1952	0.0545	1.0094	1.6052	0.0500
	Obs.	39,654	34,119	38,497	39,750	39,750	39,697	39,679	34,185	38,296	39,750
Q4	*Mean*	0.2634	0.1849	0.2846	0.0997	5.5406	0.2899	0.1680	1.6906	2.3898	0.0243
	Median	0.2279	0.1472	0.2371	0.0988	5.4745	0.2473	0.1610	1.4143	2.4414	0.0000
	SD	0.2389	0.1704	0.2191	0.0181	1.9084	0.2039	0.0672	1.1977	1.3785	0.0518
	Obs.	39,639	34,329	38,115	39,737	39,737	39,671	39,669	34,400	38,003	39,737
Q5	*Mean*	0.2470	0.1435	0.2344	0.2191	5.5400	0.3208	0.2212	2.4795	2.3076	0.0355
	Median	0.1808	0.0810	0.1923	0.1841	5.4526	0.2404	0.2067	1.9325	2.3712	0.0000
	SD	0.2728	0.1748	0.1985	0.1929	1.9900	0.2612	0.1076	1.9000	1.5084	0.0673
	Obs.	39,565	34,197	36,506	39,766	39,766	39,650	39,609	34,364	36,464	39,766

Descriptive statistics for nonfinancial US firms in Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 period. Common book leverage (FD/AT) and quasi-market leverage (FD/MAT) measures are used. Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). We also use asset tangibility, computed as the ratio of property, plant and equipment to (PPENT) to total assets (AT); profitability, estimated as operating income before depreciation (OIBDP) scaled by total assets (AT); modified Altman's Z-score, defined as [3.3*operating income (OIBDP) + sales (SALE) + 1.4*retained earnings (RE) + 1.2*working capital (WCAP)]/AT); the ratio of research and development expenses (XRD) to company sales (SALE); and the market-to-book ratio of firm assets (MAT/AT). Quintiles Q1-Q5 represent a within-industry distribution of operating profit margin which proxies for levels of market power.

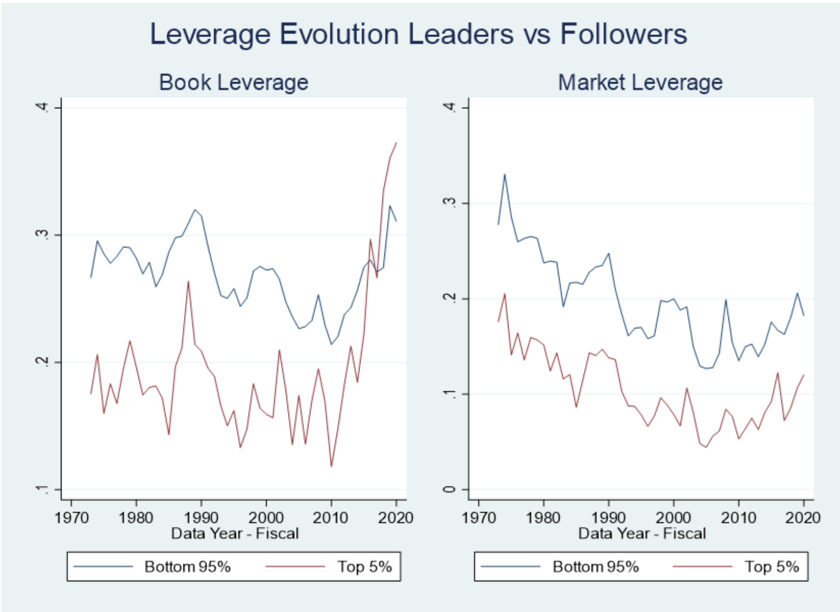
Figures

Figure 1.20 Leverage Evolution Leaders vs Followers (Q5)



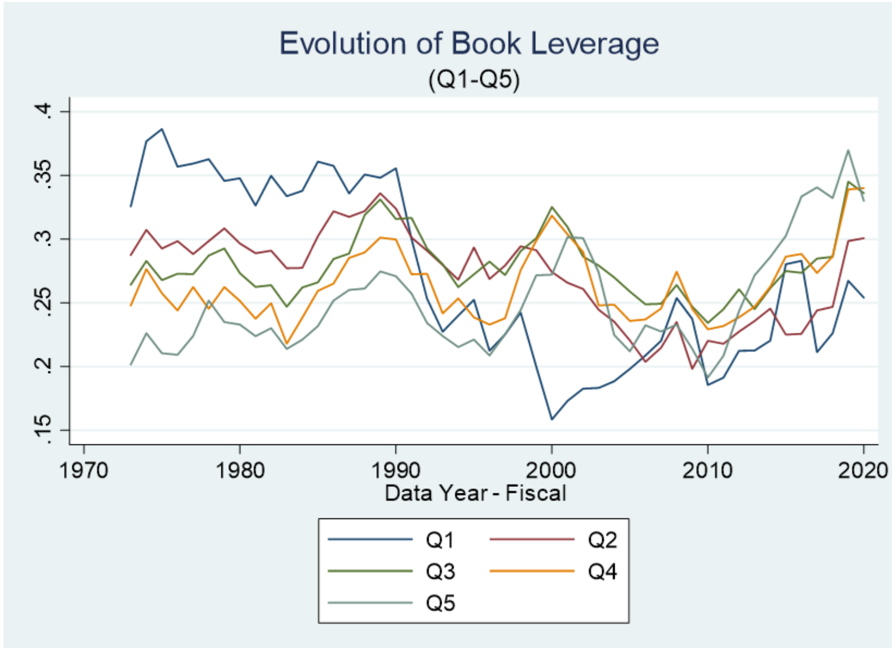
Annual average leverage evolution for sample firms split into industry leading firms (Leaders) and industry peers (Followers). Superstars (Leaders) are defined as firms occupying the top quintile (Q5) of the markup distribution for their industry. Sample consists of nonfinancial US firms in Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 period.

Figure 1.21 Leverage Evolution Leaders vs Followers (Top 5%)



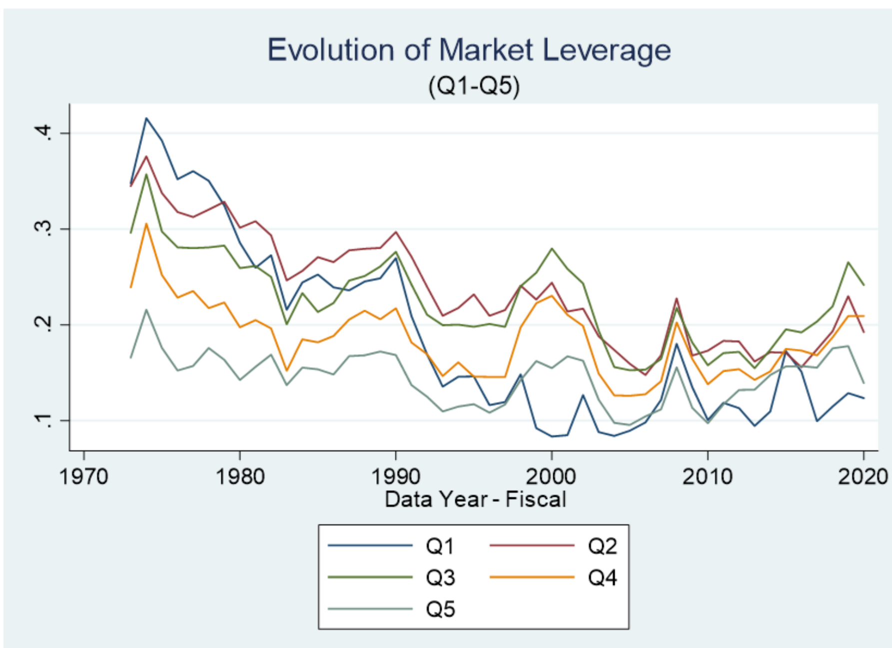
Annual average leverage evolution for sample firms split into industry leading firms (Leaders) and industry peers (Followers). Superstars (Leaders) are defined as firms occupying the top 5% of the markup distribution for their industry. Sample consists of nonfinancial US firms in Compustat Fundamentals Annual database with total book assets of at least $5 million in 1996 terms during the 1973-2020 period.

Figure 1.22 Evolution of Book Leverage Series (Basic)



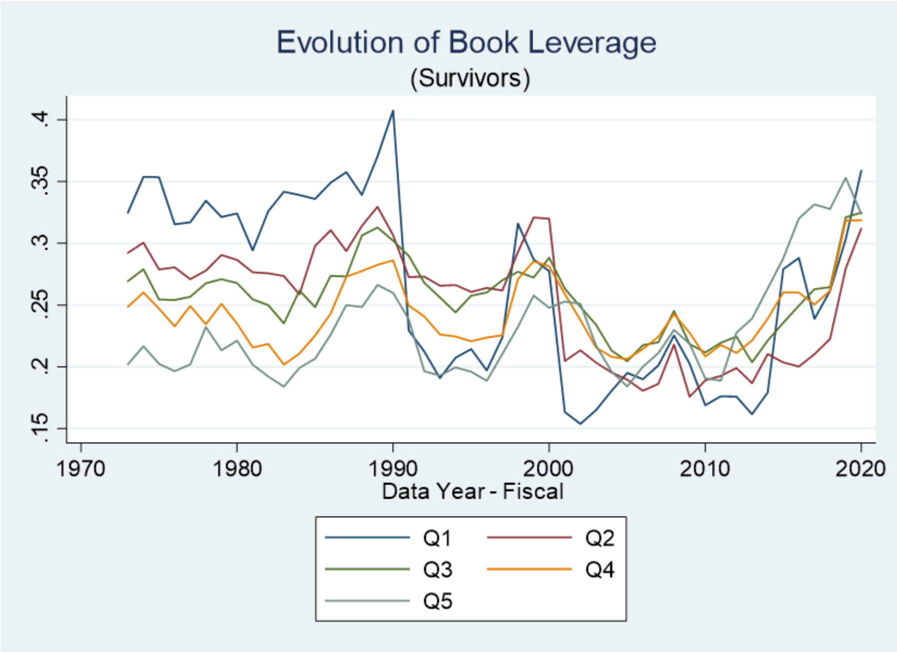
Evolution of annual average book leverage of quintile-portfolios with substitution. New portfolios are formed each year for the 1973-2001 sampling period based on industry markup distribution.

Figure 1.23 Evolution of Market Leverage Series (Basic)



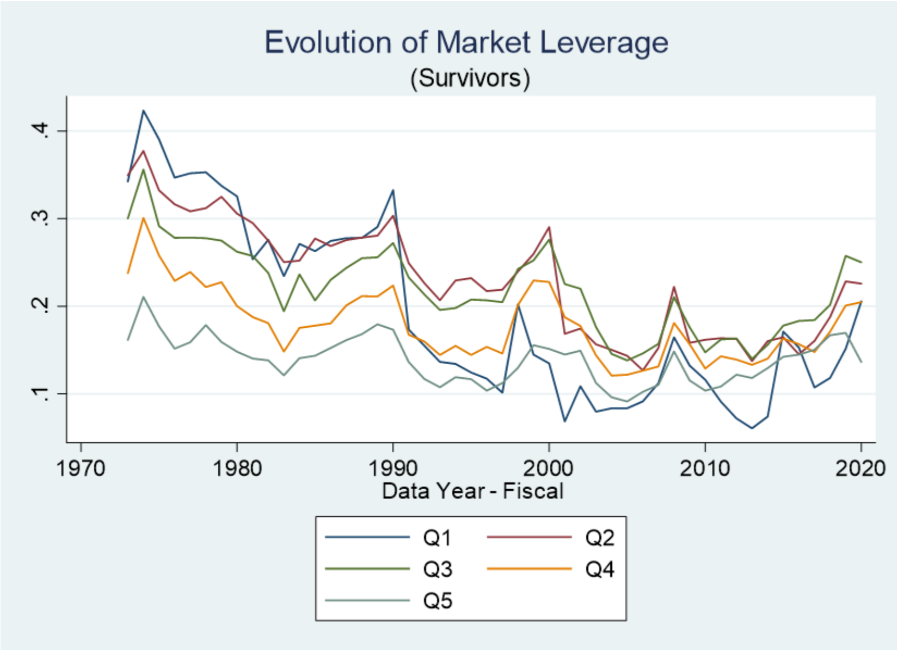
Evolution of annual average market leverage of quintile-portfolios with substitution. New portfolios are formed each year for the 1973-2001 sampling period based on industry markup distribution.

Figure 1.24 Evolution of Book Leverage Series (Decade Survivors)



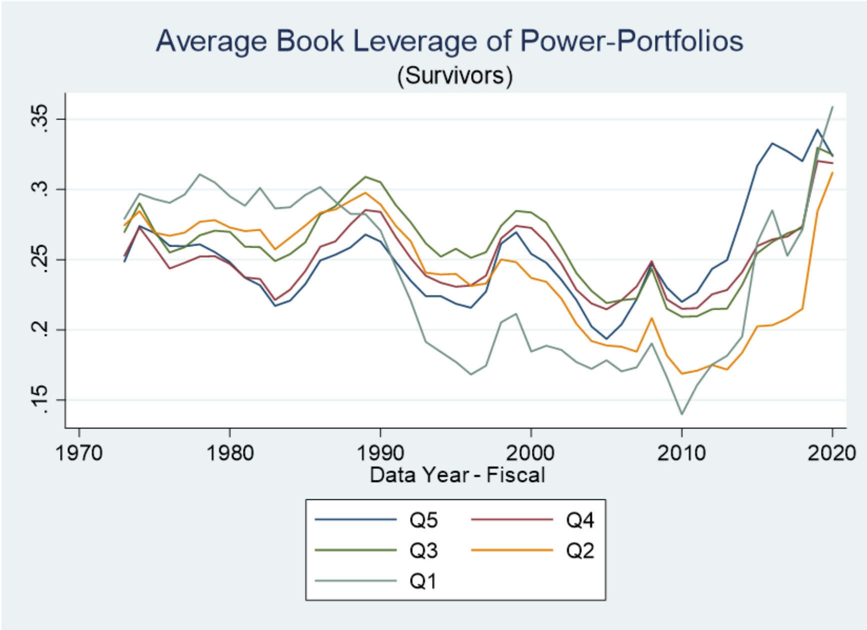
Evolution of annual average book leverage of quintile-portfolios for main decades' survivor firms. Starting at year 1973, new portfolios are formed at the beginning of each main period based on industry markup distribution.

Figure 1.25 Evolution of Market Leverage Series (Decade Survivors)



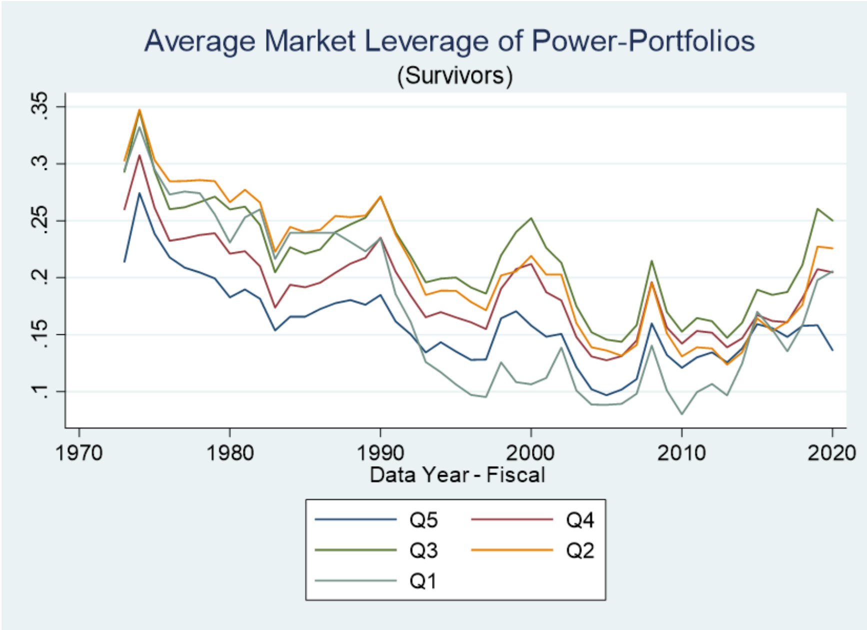
Evolution of annual average market leverage of quintile-portfolios for main decades' survivor firms. Starting at year 1973, new portfolios are formed at the beginning of each main period based on industry markup distribution.

Figure 1.26 Average Book Leverage of Power-Portfolios (10-yr Survivors)



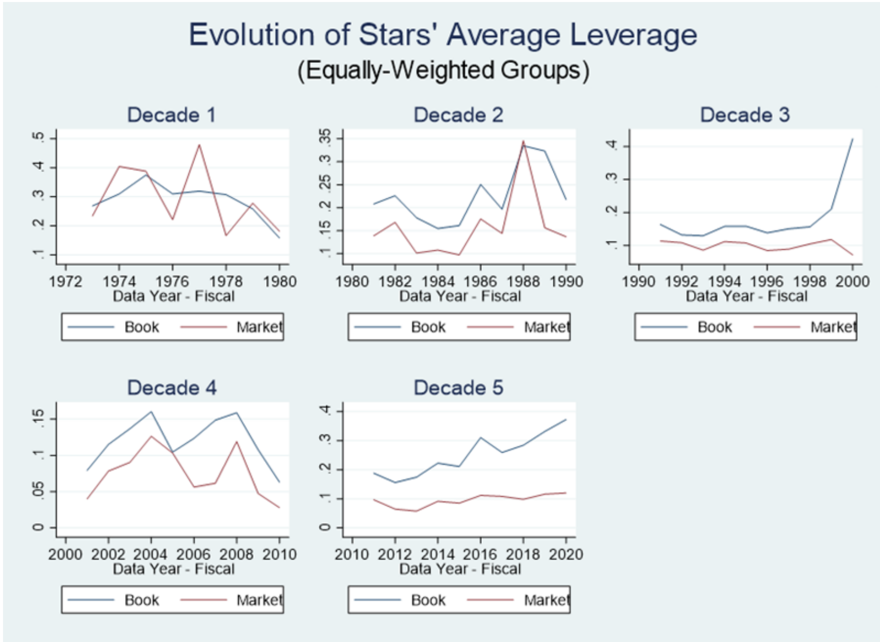
Results for a fixed composition quintile-portfolio analysis that rolls 10-year windows backward, for the 1973-2020 sampling period. New portfolios of 10-year survivor firms add each year from 2020 to 1982 and the series represent the evolutionary path of the average of portfolio averages for the book leverage measure.

Figure 1.27 Average Market Leverage of Power-Portfolios (10-yr Survivors)



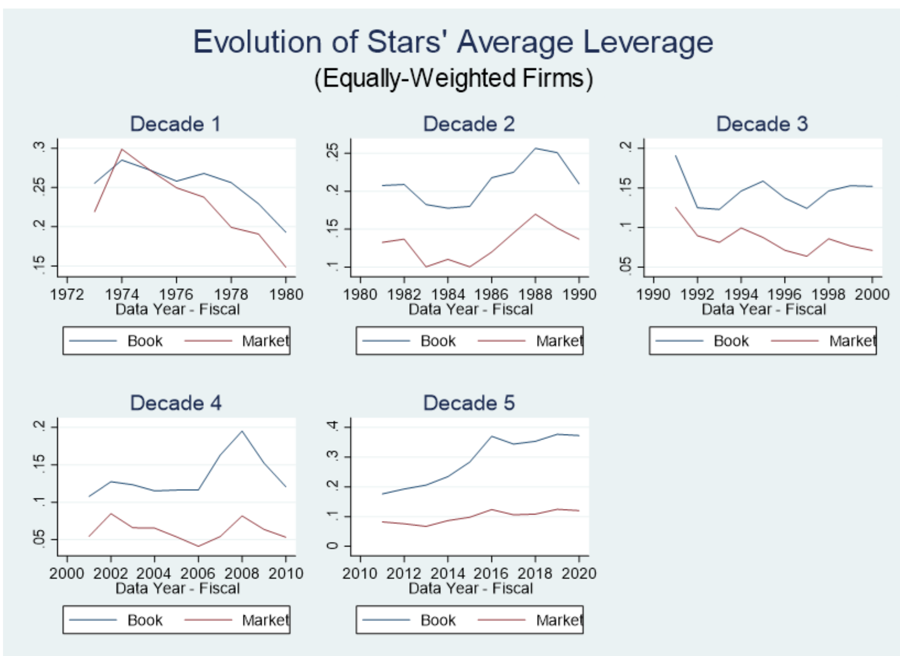
Results for a fixed composition quintile-portfolio analysis that rolls 10-year windows backward, for the 1973-2020 sampling period. New portfolios of 10-year survivor firms add each year from 2020 to 1982 and the series represent the evolutionary path of the average of portfolio averages for the market leverage measure.

Figure 1.28 Evolution of Stars' Average Leverage (Groups)



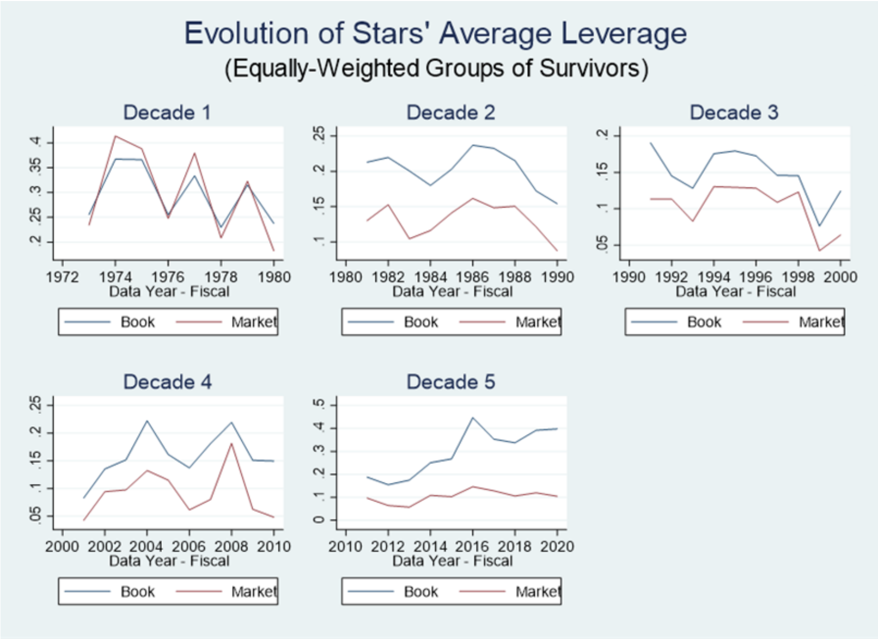
End-of-period stars' evolutionary path traces annual average group leverage for within-sample constituents. The fixed composition portfolios are sorted at the end of each decade and the average group leverage of constituent firms is computed as an average of individual group average leverages. End-of-decade stars are defined as firms at the top 5% of the market power distribution.

Figure 1.29 Evolution of Stars' Average Leverage (Firms)



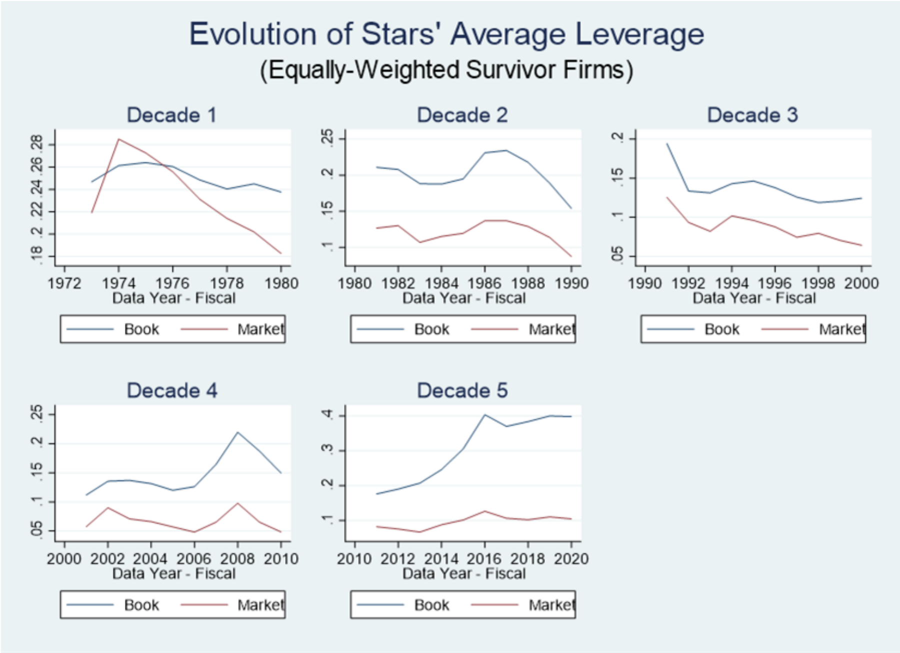
End-of-period stars' evolutionary path traces annual average leverage for within-sample constituents. The fixed composition portfolios are sorted at the end of each decade and the average leverage of constituent firms is computed in an as available basis. End-of-decade stars are defined as firms at the top 5% of the market power distribution.

Figure 1.30 Evolution of Stars' Average Leverage (Groups of Survivors)



End-of-period stars' evolutionary path traces annual average group leverage for constituent firms present during the entire period (survivors). The fixed composition portfolios are sorted at the end of each decade and the average group leverage of constituent firms is computed as an average of individual group average leverages. End-of-decade stars are defined as firms at the top 5% of the market power distribution.

Figure 1.31 Evolution of Stars' Average Leverage (Survivor Firms)



End-of-period stars' evolutionary path traces annual average leverage for within-sample constituents. The fixed composition portfolios are sorted at the end of each decade and the average leverage of constituent firms present during the entire period (survivors) is computed. End-of-decade stars are defined as firms at the top 5% of the market power distribution.

Chapter 2

2 Superstar Effects on The Distribution of Corporate Leverage Ratios

In the previous chapter we find that the leverage series seem to split into two distinct power blocks. But while for the book series it can be argued that a structural change occurred by late 1980s, the blocks have always behaved differently in market terms. This suggests the existence of a threshold market power value that determines firms' financial behavior. In this chapter we explore a possible explanation for the results obtained from our descriptive analyses on the evolutionary paths of the financial leverage series. Specifically, we explore the possibility that an economically intuitive interaction between the financial leverage of a firm and its relative market-power position might influence the financing decision.

2.1 Introduction

In this second essay we explore the possibility that firms financing behavior might be determined by an economic interaction between financial leverage and within-industry market power ranking. Because in the previous chapter we were able to identify two distinct market power blocks and verify that their financial behavior is statistically different, we think that a threshold level of market power determines financing behavior. The capital structure theory explains how the financing mix of the firm is relevant to its value. According to Grullon, Larkin and Michaely (2019), as concentration has increased market power has become an important source of value for the firm. As important sources of firm value, the economic theory would suggest that financial leverage and market power could either complement each other or substitute for each other. However, market power would not always be a factor as gross profit might not be substantial enough or simply represent a lost as is the case for firms in the low-power block. High profit margin firms, like those in the high-power block, might choose to reduce financial leverage as tax shields become a second order factor for generating value. We therefore propose and then test the existence of an economic interaction between financial leverage and market power. Low-power block firms would follow a value-optimizing strategy based on tax shields (complementation effects) while high-power firms would substitute profit margin for leverage. In economic terms, we are saying that the relative price of profit margin to tax shield changes with level of market power. We additionally corroborate our argument that superstars have already been investigated as part of the broader capital structure phenomena. In order to do this, we segregate the data according to market power level and apply basic model specifications representative of the capital structure theory to measure relative performance. If superstars were to perform poorly that would suggest that they should be considered a separate phenomenon and could help explain the low model fitness (R^2) of theoretical specifications.

Because evolution is not our focus, both cross-sectional and time series dimensions of leverage variation are now analyzed which allows to assess both relevance and breadth of our empirical results. However, our approach continues to be mostly descriptive so we cannot confidently assess causality but rather speak of financing behavior. In other words, we can say what firms do but only speculate about why they do it. Our methodology builds on that of Graham and Leary (2011) which we expand to include the distribution of market power. Key to our econometric analyses are the findings in Grullon, Larkin and Michaely (2019) that we interpret to support our assumption that operating profit margin (Lerner Index) could proxy for both market power and industry concentration. Our results show that firms in the low-power block (Q1-Q2) tend to complement leverage and market power as sources of value while those at the top-power block (Q3-Q5) tend to substitute profit margin for financial leverage. This interaction relationship seems stronger for market leverage specifications of the capital structure theory, about equal for the within-industries and between-industries channels of leverage variation and weakens over the within-firms channel. Interestingly, over the cross-sectional dimension of leverage variation where data is aggregated at the industry level the usually negative relationship between profitability and market leverage turns positive. Furthermore, even over the within-firms channel the economic interaction remains operational for the market specification and the inclusion of the quintile distribution of market power improves overall results. Once again, these results are aligned to the findings of MacKay & Phillips (2005) where firms financing decisions are determined by both industry conditions and their own characteristics. When data is aggregated at the between-industries level the effects of industry concentration on the financing decision are highlighted. When data is aggregated at the within-industries level product market competition effects are instead highlighted. But when the data is analyzed at the individual firm level (within-firms) the more general value-optimization perspective dominates.

Regarding the adequacy of the capital structure theory to describe superstars' effects on financing behavior, when regression analysis is performed on data segregated according to market power level the model fitness (R^2) is generally larger for the high-power block. For the between-industries channel the model fitness generally increases with concentration. Over the within-industries channel stars are shown to abandon the theory propositions relative to their closest contenders. The within-firms channel shows a relatively more random model fitness ranking which we associate to an expected dilution of industry effects as the market power distribution makes little sense at the individual firm level. For example, two identically ranked firms from different industries do not face the same competitive environment or similar level of industry concentration.

These results as well as the ones above are robust to alternative industry classifications like the Noth American Industry Classification System (NAICS) and the 48-Industries Classification by Fama-French.

The rest of the chapter is organized as follows. In section 2.2 we develop our main hypotheses and in section 2.3 explain the methodology used to test them. In section 2.4 we validate our use of operating profit margin quintiles as proxy for the market power distribution and verify the sample characteristics as continuation of the summary and descriptive statistics analysis for the main sample presented in Chapter 1. In section 2.5 we report and discuss our main empirical results and in section 2.6 we offer some concluding remarks.

2.2 Hypotheses Development

In this section we highlight a couple of important points taken away from the above reviews on the capital structure and the superstar firms' phenomena that help us develop a possible explanation for the results obtained in our first essay. We had argued before that while the capital structure of superstar firms has not been directly investigated, indirectly it has as part of the general economic research on the financing behavior of US public corporations. We now argue that a direct connection between the capital structure literature and that for the superstars' phenomenon exists through the value channel. The relevance of firms' capital structure rests on financial debt's potential to increase firm value not only through its tax shield benefit but also over corporate strategy and governance considerations. (e.g., Shleifer & Vishny,1997; Zingales, 2000; Parsons & Titman, 2008) Superstars are labeled as so precisely due to their ability to outperform industry peers and extract larger rents from both external and internal customers as reflected by accounting measures and economic factors like profit margin and share of labor. The rationale behind our investigation is simple, the financing behavior of superstar firms can be different in many ways from that of peers, but still be part of the phenomena described by the capital structure theory. These arguments help us develop the main hypotheses we will test in order to answer our main research questions: How different is the financing behavior of superstar firms from that of peers? How does market power affect the distribution of corporate leverage ratios?

Additional motivation for our research is what we perceive as a public overreaction to success stories like Amazon (AMZN), Google (GOOG) and Apple (AAPL). Our concerns are neither new nor extraneous to the superstars' research. Rosen (1981) explains how the presence of stars in a specific market can skew the income distribution due to the imperfect substitution of quality levels and advances in consumption technology. Gutiérrez and Philippon (2019) shows that while star firms have always been part of the US economy, their contribution to aggregate productivity growth have fallen dramatically since 2000. Autor et al. (2020) finds that sales concentration rises due to reallocation of activity toward industry-leading firms rather than to economy-wide superstars expanding their scope of operations over other industries. This study finds that while in 1982 the biggest firms in a four-digit industry operated on 13 other four-digit industries on average, that number came down to below 9 by year 2012. Similarly, firms in the top-four tier in one industry used to be within an average of 0.37 other industries of the same tier by 1982, but only in 0.24 by 2012. This is evidence that companies are generally becoming more focused in "their lines of business" and that cases like Amazon (AMZN) represent exceptions to the rule. Choi et al. (2021) shows how the presence of superstar firms in an industry influences college students' choice of major and can have long-term negative consequences for students as this shift in labor supply is not met by a corresponding shift in labor demand.

Regarding capital structure theories, the inclusion of nontraditional (nonfinancial) stakeholders into the empirical research has dissipated previous questions about their capability of describing the financing phenomena. (e.g.,Titman, 1984; Berk, Stanton & Zechner, 2010; Chemmanur, Cheng & Zhang, 2013; Matsa, 2018) This point is very important because it will allow us to use common specifications as analytical tools to test if the financing behavior of superstar firms fits the model rather than the other way around. While our discussion of the capital structure theory seems to validate the trade-off framework, we will keep referring to "dominant theories" because value relevance of the financing decision is mostly tested using the asymmetric information framework (event and long-run performance studies). Optimization of firm value is a key component of any description of the capital structure phenomena, just as utility maximization is for explaining any economic phenomena including the existence of superstars. According to Grullon, Larkin and Michaely (2019), market power, a key characteristic of superstar firms, have become an important source of value for the firm. If both leverage and market power accomplish the same goal, in a world ruled by rational expectations, we should expect them to interact in two possible ways: as complements or as substitutes.

Because the acquisition of market power can be accompanied by gains in employer monopsony power (Benmelech et al., 2020), easing labor market frictions and reducing the threat of bankruptcy, it could cause optimal leverage ratio to increase (Matsa, 2018) consistent with complementary effects. However, because in Chapter 1we identified a threshold market power level that split the series into two power blocks that behave statistically different such a general proposition does not appear feasible. We therefore propose a possible explanation based on both our first chapter findings and the economic theory propositions. At low levels of market power where profit margin is not a significant factor, firms rely on innovation and tax shields as sources of value. Once a substantial level of market power (profit margin) has been achieved the ability of industry leading firms to extract higher markups (rents) could turn the financing decision into a second order consideration and substitution effects would dominate. Our analogy of market power and financial leverage as normal goods is also aligned with the economic perspective of state and control variables; the financing decision affects control variables (debt level) and is influenced by firm's current power ranking (state variable). Control variables can change every fiscal year while market power changes happen over time. These are the arguments that lead us to state our first main hypothesis (H1):

Hypothesis 1: ***"As sources of firm value, market power and financial leverage should exhibit complementation at low levels of power and substitution at the high ones."***

While our first main hypothesis (H1) addresses the issue of how market power differentially affects the financing behavior of firms within an industry, our second main hypothesis (H2) addresses the issue of how well the capital structure theory fits the data within each power quintile, especially that originating from the top most level. The hypothesis is completely based on our argument that states that the capital structure of superstar firms has been indirectly investigated as part of the more general financial research on US public corporations. Our second main hypothesis (H2) states that:

Hypothesis 2: ***"The financing behavior of superstar firms is adequately described by the major theories of capital structure."***

2.3 Methodology

In this research work we are not interested in identifying any new factor, assessing causality, or improving model fitness; our methodology is primarily descriptive. We compare the financing decisions of superstar firms with those of peers and evaluate how different (similar) their behavior is. We do hope to be able to disentangle information already present in the data but previously overlooked. We introduce market power into the model specification by creating a categorical variable with five levels, the power-quintiles. The choice of quintiles follows from two important considerations; the need to retain as many observations as possible and the existence of an actual middle category. These categorical variables represent the distribution of market power for the industries contained within our main sample in a concise way. The power-quintiles are assigned yearly to all firms within an industry based on the distribution of operating profit margins (Lerner Index). By creating quintiles this way, we stratify the sample into homogenous groups, but do not add new information. However, because the margin and profitability measures are closely related the regression analysis requires us to first test for multicollinearity. Because the information set does not change, we do not expect the model fitness (R^2) to significatively change, independently of the sign or level of significance of the slope estimates for the power-quintiles. Nevertheless, the power quintiles could mechanically introduce additional leverage variation and marginally improve fitness (R^2).

Once again, our methodology builds on that in Graham and Leary (2011) and could be interpreted as designed to test several of the overarching questions at the end their review. In this dissertation, we have been discussing issues of time-invariant characteristics, value relevancy of the financing decision, sample composition (subsampling) and now turn our attention to investigating a possible interaction between the financing decision with other corporate policy, the acquisition and retention of market power. Equations (2.1) - (2.4) reproduce the equations used in Graham and Leary (2011) to measure leverage variation (variance) and model fitness (R^2) along two dimensions containing a total of three channels. The cross-sectional dimension comprehends two channels: between-industries and within-industries. The time series dimension is fully composed of the within-firms variation channel. Leverage variation is measured according to Equation (2.1):

$$\sum_i \sum_j \sum_t \left(L_{ijt} - \bar{\bar{\bar{L}}}\right)^2 = \sum_i \sum_j \sum_t \left[\left(L_{ijt} - \bar{L}_{ij.}\right) + \left(\bar{L}_{ij.} - \bar{\bar{L}}_{.j.}\right) + \left(\bar{\bar{L}}_{.j.} - \bar{\bar{\bar{L}}}\right)\right]^2 \quad (2.1)$$

$$= \sum_i \sum_j \sum_t \left(L_{ijt} - \bar{L}_{ij}\right)^2 \quad \text{(within} - \text{firm)}$$

$$+ \sum_i \sum_j \sum_t \left(\bar{L}_{ij.} - \bar{\bar{L}}_{.j.}\right)^2 \quad \text{(within} - \text{industry)}$$

$$+ \sum_i \sum_j \sum_t \left(\bar{\bar{L}}_{.j.} - \bar{\bar{\bar{L}}}\right)^2 \quad \text{(between} - \text{industries)}$$

L_{ijt} represents firm-year observations for either book or market leverage and, $\bar{L}_{ij.}$ is the within-firm mean for firm i, $\bar{\bar{L}}_{.j.}$ is the industry mean for industry j, and $\bar{\bar{\bar{L}}}$ the full sample mean. Equation (2.1) computes leverage variation along three channels: between-industries, within-industry, and within-firm. Careful inspection of Equation (2.1) suggests that for the between-industries channel the inclusion of power-quintiles requires modification, we would need to average data along the industry power-quintiles. For the within-firm channel the categorical variable simply attaches to the firm-year observation while for the within-industry channel it falls off the analysis.[18]

Equations (2.2) - (2.4) present the model specifications used to investigate how well the proposed theory explains the data along the three channels of leverage variation identified above:

$$L_{ijt} = \alpha + \sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k} + \beta X_{ijt} + \rho_i + \epsilon_{ijt} \quad (within - firms) \quad (2.2)$$

$$\bar{L}_{.jt} = \alpha + \sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k} + \beta \bar{X}_{.jt} + \gamma_t + \epsilon_{jt} \quad (between - industries) \quad (2.3)$$

$$L_{ij} = \alpha + \sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k} + \beta X_{ij} + \eta_j + \epsilon_{ij} \quad (within - industries) \quad (2.4)$$

where the regression model shown in Equation (2.2) is used to compute within-firm R^2 after controlling for firm fixed effects (ρ_i) and that in Equation (2.3) to compute between-industries R^2 after partialling out year fixed effects (γ_t). The R^2 for the within-industry channel is computed as

[18] It makes no sense to compute either a firm or a full sample average leverage by power-quintile.

a sampling period average after running the regression model from Equation (2.4) for each year cross-section while controlling for industry fixed effects (η_j). All R^2 results are reported in their adjusted version. The *X* term represents a six-column matrix for the set of six factors described in the Data and Study Variables section in Chapter 1. The β term still represents the original six-row vector of factor parameters to be estimated by the regression. However, the constant term estimate α now incorporates the first categorical (dummy) variable $\boldsymbol{\varphi_1}$ while the term $\sum_{\boldsymbol{k=2}}^{\boldsymbol{5}} \boldsymbol{\varphi_k}$ accounts for the estimates for the remaining market power distribution. Like was the case with Equation (2.1), the model specification in Equation (2.3) for the between-industries channel requires averaging industry data over individual quintiles.

Leverage variation is computed as part of our validation process and in this case consists in replicating previous research results to demonstrate that our main sample, although different in several ways, is still representative with respect to the capital structure phenomena being investigated. A second component of our validation process consists in corroborating that our profit margin quintiles are similar to an estimated markup measure distribution and can be used as a proxy for market power. The model specifications are used to perform regression analysis in two very distinct ways, expanded to include the market power distribution (quintiles) and in is original form (level) to evaluate quintile specific data. The inclusion of power-quintiles into the model specification allows us to evaluate both the existence and the characteristics of our proposed interaction between market power and financial leverage. Proceeding this way, we test our first hypothesis (H1) which refers to complementation and substitution effects. For there to be substitution effects categorical estimates must be strictly decreasing and the opposite is true for complementation. When the power-quintiles are used to segregate data and the basic regression models are run we can answer hypothesis (H2). In this case the quintiles are interpreted to represent data generating processes (DGPs) and the model fitness (R^2) results can be compared to assess the relative adequacy of the capital structure theory to describe their financing behavior.

2.4 Summary and Descriptive Statistics *(Continued)*

In this essay we will be using the same data sample and study variables as in the first one, so the summary and descriptive statistics remain unchanged. Because we do not need to repeat those analyses here, that give us the opportunity to verify important characteristics of our sample and categorical variables (power-quintiles) we have taken for granted up to this point. We have relied in the findings of Grullon, Larkin and Michaely (2019) to justify our use of operating profit margin (Lerner Index) as a proxy for both markups and market power. Additionally, we have never verified if our sample share the same characteristics of those used in previous research. Therefore, before proceeding with the main empirical analyses of this article, which build on the findings of the previous one, we check if our assumptions are appropriate.

2.4.1 Quintiles Validation – *Proxying for Market Power*

As we mentioned before, the key measure of performance that best proxies for market power is markups. However, measuring markups is not easy (De Loecker et al., 2020) and it can determine the empirical results obtained by the research (Traina, 2018; Grullon, Larkin & Michaely, 2019; Barkai, 2020). In the first essay to this dissertation, we used the distribution of operating profit margins (Lerner Index) to create our power-quintiles. Our justification for doing so is that Grullon, Larkin and Michaely (2019) finds return on assets (ROA) to be mostly driven by its operating margins (Lerner Index) component and for it to increase with the level of product market (industry) concentration. In arithmetic terms, the major difference between profit margin and markup is the denominator in the formula for used for their calculation. Profit margin refers to the ratio of gross profit to sales revenue while markup computes the ratio of gross profit to costs. For our assumption to be valid we only need both measures to behave similarly and for their distributions to allow for the creation of market power quintiles irrespectively. While in the first essay to this dissertation we demonstrate that sorting portfolios on levels of the same measure whose evolution is to be analyzed creates an asymptotic effect, in this section we want to demonstrate that sorting on a proxy measure produces similar results. In other words, sorting on either proxy variable prevents series for the alternative measure from crossing each other.

In Essay 1 we used the distribution operating profit margin (Lerner Index), defined as the ratio of operating profit after depreciation (OIADP) to sales revenue (SALE), to create our power quintiles. In this section we retain our quintile distribution but additionally estimate a markup measure as the ratio of OIADP to costs of goods sold (COGS). As shown in Figure 2.1, for the most part our estimated value for markups is of larger magnitude than the profit margin measure. Similarly, it seems to move in the same direction as the margins measure but appears far more sensitive. These results suggest that gross profit (OIADP) might be more responsive to cost adjudgment than to price setting. Furthermore, combined to the results presented in Figure 1.3 they suggest that market power might be related to firms' efficiency in controlling their cost structure. In Essay 1 of this dissertation, we find that firms at the bottom of the power distribution can strongly compete for stardom thanks to their innovative nature. Here we find that efficient management of cost structure characterizes firms in the higher levels of market power.

In Figure 2.2 we exclude firms in the bottom quintile because they literally fall out of range, especially within the group of profit margin series. The figure shows that the average markup series for portfolios sorted on profit margin do not cross each other as required by our proxies' interchangeability assumption. That is, our market power categories refer to firms with distinctive performance regardless of the performance measure used. Furthermore, results obtained from using either measure in our previous or future analyses are expected to hold. But the figure, not just validates our use of profit margin quintiles to proxy for the market power distribution, it also corroborates that firms at the bottom and top power quintiles behave different than peers, although not necessarily for the same reason. When we look at Figure 2.3 an additional aspect of the behavior of the bottom quintile firms is revealed, these firms appear to be more sensitive to price setting than to cost management. Innovation is costly, so it seems like these firms pricing strategy is oriented toward recuperating costs rather than to generating high profits. These results align perfectly to the story suggested by Autor et al. (2020) where superstar firms gain market power through the innovation and efficiency channels. Further corroboration for the above article story is the evolution experienced within the competitive environment we highlight in Essay 1; it seems like stars have been able to block the entry of new competitors over time. However, because here we lack the private sector perspective it could also be the case that competitors are better off staying where they are.

Finally, Figure 2.4 corroborates that something happened around year 2000 that caused nonfinancial US public firms to lower their costs and that this behavior has since persisted within the high-power block of firms. Chen, Harford and Kamara (2019) demonstrate that operating leverage and financial leverage are substitutes and Gutiérrez and Philippon (2017) that investment increases with competition. All the above offers support to our suggestion that the changes in financing behavior documented in Essay 1 appear more related to product market competition strategies. We do observe substitution of financial leverage for operating leverage, but because overall competition has decreased what these funds have been used for, we can’t easily identify. While Grullon, Larkin and Michaely (2019) finds ROA to be driven mostly by its profit margin component Grullon and Ikenberry (2020) finds investment to follow ROA's efficiency component, asset utilization. Because asset utilization has been declining over time so had investment, which lead us to believe that rising levels of debt (see Figure 2.5) within the high-power block must obey strategic purposes.

2.4.2 Sample Validation - *Characteristics of Leverage Variation*

In this section we validate the main sample characteristics and justify the inclusion of power-quintiles into the regression analysis. It is important that our sample could be characterized as similar (representative) to those used in previous research so the empirical results could be deemed comparable. Regarding the inclusion of power quintiles, the most critical situation that could arise is the issue of multicollinearity. In Table 2.1we present the results for multicollinearity tests using a Variance Inflation Factors (VIF) analysis and comparing adjusted R^2s. Because multicollinearity is a property of the factor variables any regression model will suffice, yet for this test we elected to go with Equation 1.1 from Essay 1. The decision rules for the analysis are a mean VIF below 4 and little to no improvement in model fitness (R^2). The first two columns show multicollinearity test results for the factor variables in the basic model specification, the next two add the raw margin measure to the model while in the last two we use a quintile transformation of this market power measure. Clearly the addition of the profit margin factor to the model creates multicollinearity issues and does not improve model fitness. Transforming markups into industry power-quintiles gets rid of the multicollinearity issue while marginally adding explanatory power to the model specification. The VIF for the profitability factor goes up from 2.26 to a borderline value of 3.59, which we interpret as confirmation of the latent multicollinearity issue between the profitability and markup factors. Similarly, while staying below 4 the VIF for the quintiles increases with power. The improved explanatory power shown at the bottom of the table needs contextualization. We do not actually change the information set, but by disaggregating between-industries data into power-quintiles when modifying Equation (2.3), we mechanically introduce leverage variation and gain descriptive power.

Once the inclusion of power-quintiles has been justified we can proceed to fully validate our main sample characteristics. Table 2.2 presents the characteristics of leverage variation for the book and market debt ratio measures used in this study; the first two columns show the percentages of leverage variation corresponding to each channel while the next two show how much of this variation is explained by implementing the model specifications in equations (2.2) - (2.4). Panel A shows variation characteristics before the inclusion of power-quintiles into the model specifications and Panel B shows post inclusion results. Although our sampling period, applied filters and winsorizing procedure do not exactly match those of Grahan and Leary (2011), we obtain results that replicate the main trends identified in the original study. Panel A shows that, for both book and market leverage, the highest leverage variation occurs through the within-industries channel (48%, 45%) and over the cross-sectional dimension (58%, 66%). Still, the leverage variation over the time series dimension is substantial accounting for 42% in book terms and 33% in market terms. However, different from the original study, the performance of level specifications for the cross-sectional channels appears even. In Panel B, when we include our power-quintiles, the between-industries variation increases from 10% to 13% (21% to 27%) in book (market) leverage terms. These effects mechanically spread to other channels through the common denominator of total variation and simply represent a rebalancing of weights.

2.5 Empirical Analyses and Discussion

We next turn to our main empirical analyses that will allow us to test our main hypotheses which we develop with the purpose of continue investigating the effects of market concentration (market power) on the distribution of corporate leverage ratios. As stated before, we argue that the same forces behind the rise of superstar firms must have differential effects on the behavior of peer industry firms. Specifically, in this dissertation we focus on their effects on financing behavior.

2.5.1 Economic Interaction: Complementation & Substitution Effects

In this section we investigate both the existence and the characteristics of an interaction between market power and financial leverage for the aggregate main sample. We do so by implementing the model specifications in Equations (2.2) - (2.4) whose results we present in Table 2.3 – Table 2.6. Each table shows results for our two measures of financial leverage as well as for both the basic (level) and quintile-augmented model specifications through a specific leverage variation channel. A quick look at the factors included in the basic specifications reveals that the strategy they intend to assess appears to be one of value optimization while controlling for risk. Size and tangibility proxy for collateral value; profitability, market-to-book, and R&D ratio cover for growth; and z-score proxies for distress risk level.

Table 2.3 presents regression results for the between-industries channel. The level specifications show all factor variables to be highly significant; the book specification suggests that the constant term has no meaningful interpretation while the market one shows the typical negative relation for the profitability factor. Leverage increases on collateral value and falls on growth opportunities as well as distress level. Results for quintile-augmented specifications are very encouraging, they show strong substitution effects for the high-power block (Q3-Q5) and weaker mixed results for the low-power block. Second quintile (Q2) results are not significantly different than Q1 at common levels of significance (0.05) for the book specification and suggest complementation effects over the market model. The constant term which now incorporates the first power-quintile is always positive and significant, suggesting that on average, the first quintile

(Q1) carry a substantial level of debt. However, these results should not be interpreted as describing firm financing behavior but rather how industries behave as concentration levels increase. Substitution effects would mean that aggregate levels of debt decrease on industry concentration and complementation effects would suggest that aggregate debt increases on increasing concentration. Therefore, the fact that profitability is now always positive and significant suggests that aggregate levels of debt increase on increasing aggregate profitability. The lack of complementation effects for the book specification within the low-power block indicates that within competitive industries market power does not play a role in determining levels of aggregate book debt. However, it does factor into rising the levels of aggregate market leverage. Within concentrated industries (high-power block) aggregate levels of debt always fall with increasing concentration.

Table 2.4 presents regression results for the within-industries channel. The results for the level specifications look similar to those for the within-industries channel except that the relation between market leverage and the profitability factor is not shown to be significantly negative. The quintile-augmented specifications again show weak complementation effects and strong substitution effects, but they substantially differ from those for the between-industries channel. The book model suggests that the average firm in the low-power block do not carry substantial (significant) levels of debt and that the situation increasingly worsens when high levels of market power are reached. However, from a market perspective low-power block levels of debt do appear to be significant and exhibit complementation behavior. The high-power block again shows substitution effects, and the third quintile (Q3) leverage level is statistically indistinguishable from that of the first one (Q1). These results are consistent with the financing decision been of second order importance relative to product market competition strategies. In fact, results for the quasi-market measure of leverage suggest that the market is able to distinguish between the strategic use of financial debt and its pure financing function. While firms in the high-power block increasingly depend on profit margins to generate value those in the low-power block avoid distress costs by keeping their debt levels as low as possible. This is exactly the picture presented in Figure 1.3, Figure 1.4 and Figure 2.4 whose results perfectly align with the findings in Matsa (2018) and Chen, Harford and Kamara (2019) that financial leverage increases distress costs and that its optimal value decreases with operating leverage.

Table *2.5* presents regression results for the within-firms channel but the t-statistics look clearly inflated. In Table *2.6* we correct standard errors for clustering effects at the industry level and the t-statistics now look normal. Compared to the results for the within-industry channel, the overall results appear weaker particularly for the book model specifications. It is to be expected that market power (industry) effects will dissipate at the individual firm level where for example two firms with similar ranking but from different industries would be equally weighted by the regression procedure. Similar explanations can be constructed for the market-to-book and R&D-to-Sales ratios. Figure 1.4 shows Q1 and Q5 to have similar market-to-book ratio and only Q1 firms can be characterized as R&D intensive. The inclusion of the market power distribution (quintiles) seems to strengthen the book model results but only for the profitability factor. The augmented market model results seem to support our economic interaction hypothesis but the relation between the profitability factor and financial leverage relation goes back to been significantly negative. These results suggest that while at the individual firm level the value optimization perspective of the theoretical model dominates, the influence of own industry factors is still important. Therefore, our within-firms channel results seem to corroborate MacKay and

Phillips (2005) findings that industry-related factors like "a firm's position within its industry" help explain individual firm financing behavior.

2.5.2 Capital Structure Theory Adequacy

In this section we address our second main hypothesis (H2) by investigating how well does our general capital structure specification explains the variation in leverage data from individual quintiles. Because we are taking the model as good and sufficient, it could be said that we will be testing if the data fits the model. For each quintile's data we run the regression analyses indicated by equations (2.2) – (2.4) on its level (basic) version. Quintiles are now the equivalent to a data generating process and the constant term should not be considered the same as the previous categorical (dummy) variables as those estimates represented the combined effects of the market power distribution. Any categorical effects are now implicit in the data via the subsampling procedure. Special attention is paid to the fitness results for the industry leading firms within the fifth quintile (Q5).

Panels A and B in Table *2.7* present the regression estimates for the between-industries specification in equation (2.3) when implemented for the book and market leverage measures respectively. In Panel A, book leverage regression results show data from highly concentrated industries (Q5) to be better explained than that from less concentrated ones. The same is true in panel B for the market specifications where the ranking in the low-power block is now inverted which suggests that for competitive industries market power is not that determinant. Panels A and B in Table *2.8* present the regression results for the within-industries specification in equation (2.4). It shows model fitness for data generated by industry leaders (Q5) to rank second behind that from the fourth quintile (Q4) which is consistent with our proposition of the financing decision having second order relevance for powerful firms. The low-power block ranking continues to be inverted but it now suggests that profit margin is not a factor for the financing decision of these firms. The results are similar for both measures of leverage. Panels A and B in Table *2.9* present the regression results for the within-firms specification in equation (2.2). Here model fitness for data from the most powerful firms in an industry (Q5) ranks second for book measure and third for the market one. Furthermore, the low-power block ranking is no longer inverted and crossover between the power blocks can be observed for the book model specification. In fact, model fitness for data from the second quintile (Q2) ranks third ahead of Q3. These results suggest that at the individual level, where the effects of within industry power ranking and level of industry concentration on firm's financing decision get diluted, the value optimization perspective dominates. Additionally, because firms can generate value through tax shields (optimal leverage ratio) or extracting rents in the form of profit margins, the capital structure theory represented by the within-firms model specification might misinterpret individual firm's financing decisions and generate a somewhat random ranking. This is a clear example of how accounting for combined (distribution) effects might provide a more accurate description of financing behavior, even at the individual firm level.

2.5.3 Robustness Tests

We perform robustness tests for the main empirical results in the previous sections by replicating the analyses while using two additional systems of industrial classification: the North American Industry Classification System (NAICS) and the Fama & French 48-Portfolios (FF_48) Industry Classification. The results are available in Table 2.10 - Table 2.23 of the appendix to this chapter; they offer strong support to the results obtained for the 4-digit SIC code classification. The NAICS classification leaves the characteristics of leverage variation presented in Table 2.10 relatively unchanged when compared to those in Table 2.2. The FF_48 classification (Table *2.17*) assigns an even larger weight of leverage variation to the within-industries channel but does not change the dimensional composition. Regarding the economic interaction characteristics, the same behavior is reflected in results for the NAICS classification (Table *2.11*- Table *2.13*) with both complementation and substitution effects observed along the cross-sectional dimension and only weak substitution for the time series one. Results are also replicated for the profitability factor; the industry concentration and product market competition perspectives show financial leverage to increase with profitability while at the individual firm level the value optimizing perspective dominates. Generally similar results are obtained for the FF_48 classification (Table *2.18* - Table *2.20*) except that now substitution effects appear stronger and complementation weaker.

Regarding capital structure adequacy, the same patterns identified before hold firm. The financing behavior of firms within the highest concentrated industries shows the highest fitness (Table *2.14*, Table *2.21*), the behavior of the most powerful firms within an industry ranks second (Table *2.15*, Table *2.22*). At the individual firm level (Table *2.16*, Table *2.23*), within industry position relative to market power loses relevance as its effects get diluted along the full spectrum of the sample. Within-firms, the value optimization perspective as defined by the capital structure theory dominates, but still the industry leading firms never rank last. Once again, the inclusion of the market power distribution into the regression model specifications seems to provide a more accurate description of financing behavior than its individual quintile implementation.

2.6 Chapter Conclusions

In this chapter we provide evidence in support of the existence of an economic interaction between market power and financial leverage that substantially improve our ability to describe financing behavior. Our proposed explanation builds from the first chapter finding of a threshold market power level that separates leverages into two distinct power blocks and from the relevance of both phenomena to firm value we document in the literature review chapter at the beginning of this dissertation. Because financial leverage and market power represent important sources of firm value, from an economic perspective they can be thought of as normal goods providing the same utility but at relatively different prices (costs). Evaluating our main sample data along three different channels of leverage variation we are able to describe financing behavior within three different contexts: industry concentration status, the nature of the product market competition and individual firm characteristics.

Our empirical results for the between-industries channel suggest that high levels of industry concentration (high-power block) reduce the aggregate levels of corporate debt while under competitive conditions (low-power block) market power (profit margin) is less of a factor. Furthermore, this behavior seems in compliance with the propositions of the capital structure theory. Similarly, the within-industries channel results show market power to decrease debt levels within the high-power block and not be a factor within the low-power block. These results seem consistent with the relative costs of generating profit margins to be lower than the relative costs of debt financing within the high-power block. This indicates opportunistic behavior as the cost of debt for these high profit margin and less risky firms should be the lowest. The low-power block seems to be limited in options to create value and the market seems to be aware of all the above. This opportunistic behavior might not be fully contemplated by the capital structure theory and that would explain why top power quintile (Q5) firms rank second in model fitness. Within-firms results, on the other hand, seem to highlight the value optimization perspective of individual firms financing behavior. As both industry concentration and competitive environment effects get diluted along the full spectrum of the sample, the relation between the profitability and the quasi-market measure of leverage goes back to being negative. However, the inclusion of the market power distribution into the regression model specifications seems to improve overall results. In fact, this might be the reason why when the basic regression model is applied to individual quintile data the fitness ranking appears somewhat random and the threshold value of market power doesn't seem to work.

This chapter results are robust to different systems of industry classification like the North American Industry Classification System (NAICS) and the Fama & French 48-Portfolios (FF_48) Industry Classification. Overall, our proposed economic interaction between financial leverage and market power distribution seems to improve descriptive capabilities of the typical capital structure model specifications. Furthermore, our results suggest additional dimensions to be explored by industry equilibrium models like those discussed in MacKay and Phillips (2005) and provide a road map for future research efforts directed at developing a value optimizing framework rather than expanding the capital structure phenomena.

Tables & Figures – Main Analyses

Tables

Table 2.1 Multicollinearity Tests

Multicollinearity Tests					
Variable	**VIF**	**Variable**	**VIF**	**Variable**	**VIF**
				Q1	***NA***
Profitability	***2.26***	***Markup/Margin***	***12.74***	***Q2***	***2.25***
Z-Score	***2.18***	***R&D/Sale***	***12.7***	***Q3***	***2.67***
Size	***1.43***	***Profitability***	***2.26***	***Q4***	***2.92***
Age	***1.28***	***Z-Score***	***2.18***	***Q5***	***3.27***
MA/BA	***1.09***	***Size***	***1.43***	***Size***	***1.5***
Tangibility	***1.07***	***Age***	***1.28***	***Age***	***1.3***
R&D/Sale	***1.03***	***MA/BA***	***1.09***	***Tangibility***	***1.08***
		Tangibility	***1.08***	***Profitability***	***3.59***
				MA/BA	***1.16***
				Z-Score	***2.27***
				R&D/Sale	***1.03***
Mean VIF	***1.48***	***Mean VIF***	***4.35***	***Mean VIF***	***2.09***
Book Leverage					
Adj. R2	***0.1124***	***Adj. R2***	***0.1124***	***Adj. R2***	***0.1217***
Market Leverage					
Adj. R2	***0.1984***	***Adj. R2***	***0.1984***	***Adj. R2***	***0.2278***

Multicollinearity tests for factors used in regression specifications for common leverage measures: book leverage (FD/AT) and quasi-market leverage (FD/MAT). Financial debt (FD) is computed as the sum of current debt (DLC) and long-term debt (DLTT). Market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). We also use asset tangibility, computed as the ratio of property, plant and equipment to (PPENT) to total assets (AT); profitability, estimated as operating income before depreciation (OIBDP) scaled by total assets (AT); modified Altman's Z-score, defined as [3.3*operating income (OIBDP) + sales (SALE) + 1.4*retained earnings (RE) + 1.2*working capital (WCAP)]/AT); the ratio of research and development expenses (XRD) to company sales (SALE); and the market-to-book ratio of firm assets (MAT/AT). Quintiles Q1-Q5 represent a within-industry distribution of operating profit margin which proxies for levels of market power. Decision rule is Mean VIF less than 4.00.

Table 2.2 Characteristics of Leverage Variation

Characteristics of Leverage Variation				
Panel A	***Level***			
	% of Total Variation		*% of Variation Explained*	
	Book Leverage	**Market Leverage**	**Book Leverage**	**Market Leverage**
Between Industries	*0.10*	*0.21*	*0.14*	*0.2*
Within Industries	*0.48*	*0.45*	*0.15*	*0.17*
Within Firms	*0.42*	*0.34*	*0.08*	*0.14*
Panel B	***Quintiles***			
	% of Total Variation		*% of Variation Explained*	
	Book Leverage	**Market Leverage**	**Book Leverage**	**Market Leverage**
Between Industries	*0.13*	*0.27*	*0.13*	*0.23*
Within Industries	*0.46*	*0.42*	*0.16*	*0.2*
Within Firms	*0.41*	*0.31*	*0.08*	*0.15*

This table presents results from the implementation of equations (2.1) - (2.4) both in their expanded version shown in the dissertation text and their original incarnation used in Graham & Leary (2011). Panel A shows variation and model fitness (R^2) results from implementing the basic version of the equations (Level). Panel B shows variation and model fitness (R^2) results from expanding the models (Quintiles) to include levels of market power (categories). Industries are classified according to SIC (4-digit); financial and utility firms are excluded.

Table 2.3 Regression Results for the Between-Industries Channel

Between-Industries Channel				
This table reports regression results from implementing the model specification in equation (2.3) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to SIC (4-digit); financial and utility firms are excluded.				
	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			-0.00639*	0.00529**
			(-1.845)	(2.035)
Q3			-0.0214***	-0.0261***
			(-5.471)	(-8.850)
Q4			-0.0477***	-0.0677***
			(-11.25)	(-21.27)
Q5			-0.0643***	-0.0926***
			(-13.46)	(-25.81)
Size	0.00654***	0.00850***	0.0149***	0.0122***
	(7.043)	(11.79)	(25.45)	(27.82)
Tangibility	0.217***	0.199***	0.202***	0.182***
	(29.25)	(34.50)	(41.04)	(49.27)
Profitability	0.209***	-0.0755***	0.176***	0.0733***
	(12.75)	(-5.948)	(15.05)	(8.361)
Market/Book	-0.0146***	-0.0382***	-0.0107***	-0.0369***
	(-12.83)	(-43.07)	(-14.48)	(-66.40)
Z-score	-0.0287***	-0.00862***	-0.0300***	-0.0125***
	(-30.41)	(-11.77)	(-52.15)	(-28.96)
R&D/Sales	-0.00258***	-0.00215***	-0.00109***	-0.000643***
	(-6.091)	(-6.535)	(-5.789)	(-4.548)
Constant	-0.00302***	-0.000538	0.0179***	0.0349***
	(-2.860)	(-0.658)	(5.481)	(14.20)
Observations	16,416	16,415	50,520	50,515
R-squared	0.137	0.205	0.126	0.229

t-statistics in parentheses

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

Table 2.4 Regression Results for the Within-Industries Channel

Within-Industries Channel

This table reports regression results from implementing the model specification in equation (2.4) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to SIC (4-digit); financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	***Market***	***Book***	***Market***
Q2			0.0072	0.0178***
			1.605	4.478
Q3			-0.0126**	-0.0083
			-2.550	-1.574
Q4			-0.0343***	-0.0402***
			-6.125	-7.506
Q5			-0.0469***	-0.0555***
			-5.438	-8.610
Size	0.0126***	0.0068***	0.0144***	0.0093***
	8.476	9.152	10.961	12.959
Tangibility	0.1845***	0.1671***	0.1813***	0.1619***
	22.612	27.789	22.520	28.223
Profitability	0.1618***	-0.0128	0.2611***	0.0996***
	6.482	-0.820	8.139	8.451
Market/Book	-0.0112***	-0.0368***	-0.0088***	-0.0339***
	-5.104	-10.906	-4.278	-10.478
Z-score	-0.0452***	-0.0212***	-0.0482***	-0.0247***
	-11.068	-9.383	-10.899	-8.827
R&D/Sales	-0.0051***	-0.0033***	-0.0045***	-0.0028***
	-4.648	-4.168	-4.622	-4.143
Constant	-0.0128***	0.0017	0.0042	0.0179**
	-3.050	0.348	0.599	2.432
Observations	48	48	48	48
R-squared	0.154	0.174	0.164	0.196

Cell's format is [estimate/t-statistic]

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

Table 2.5 Regression Results for the Within-Firms Channel (Inflated t-Stats)

Within-Firms Channel				
This table reports regression results from implementing the model specification in equation (2.2) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to SIC (4-digit); financial and utility firms are excluded. Results exhibit inflated t-stats issues.				
	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			-0.0370***	0.0110***
			(-25.12)	(12.87)
Q3			-0.0409***	-0.00226***
			(-27.34)	(-2.589)
Q4			-0.0334***	-0.0170***
			(-22.04)	(-19.21)
Q5			-0.0155***	-0.0219***
			(-9.824)	(-23.79)
Size	0.0349***	0.0319***	0.0352***	0.0329***
	(46.77)	(73.20)	(47.29)	(75.88)
Tangibility	0.216***	0.211***	0.215***	0.208***
	(41.43)	(69.54)	(41.45)	(68.89)
Profitability	0.0132***	-0.0550***	0.0357***	-0.0292***
	(3.106)	(-22.26)	(7.920)	(-11.13)
Market/Book	0.000733**	-0.0178***	-2.89e-05	-0.0169***
	(2.041)	(-85.18)	(-0.0802)	(-80.48)
Z-score	-0.0275***	-0.0109***	-0.0276***	-0.0113***
	(-89.26)	(-60.38)	(-89.69)	(-62.91)
R&D/Sales	-0.000122***	-5.58e-05***	-0.000119***	-4.75e-05***
	(-4.830)	(-3.779)	(-4.721)	(-3.235)
Constant	0.0503***	-0.00180***	0.0760***	0.00411***
	(109.6)	(-6.731)	(69.90)	(6.493)
Observations	163,261	163,261	163,261	163,261
R-squared	0.079	0.141	0.085	0.150

t-statistics in parentheses

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

Table 2.6 Regression Results for the Within-Firms Channel (Corrected t-Stats)

Within-Firms Channel

This table reports regression results from implementing the model specification in equation (2.2) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to SIC (4-digit); financial and utility firms are excluded. Standard errors corrected for clustering effects at the industry level.

	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			-0.0370***	0.0110***
			(-7.071)	(8.468)
Q3			-0.0409***	-0.00226
			(-6.541)	(-1.528)
Q4			-0.0334***	-0.0170***
			(-5.238)	(-11.64)
Q5			-0.0155**	-0.0219***
			(-2.341)	(-17.95)
Size	0.0349***	0.0319***	0.0352***	0.0329***
	(9.903)	(18.28)	(9.958)	(18.69)
Tangibility	0.216***	0.211***	0.215***	0.208***
	(11.58)	(24.52)	(11.57)	(24.13)
Profitability	0.0132	-0.0550***	0.0357**	-0.0292***
	(0.838)	(-5.847)	(2.040)	(-3.753)
Market/Book	0.000733	-0.0178***	-2.89e-05	-0.0169***
	(0.493)	(-7.398)	(-0.0189)	(-7.283)
Z-score	-0.0275***	-0.0109***	-0.0276***	-0.0113***
	(-8.125)	(-6.928)	(-8.283)	(-7.063)
R&D/Sales	-0.000122	-5.58e-05*	-0.000119	-4.75e-05
	(-1.314)	(-1.778)	(-1.298)	(-1.645)
Constant	0.0503***	-0.00180***	0.0760***	0.00411***
	(17.44)	(-11.04)	(12.18)	(4.950)
Observations	163,261	163,261	163,261	163,261
R-squared	0.079	0.141	0.085	0.150

t-statistics in parentheses

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

Table 2.7 Quintile Regression Results for the Between-Industries Channel

Quintile Regression Results for the Between-Industries Channel

This table reports regression results from implementing the basic form of equation (2.3) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to SIC (4-digit); financial and utility firms are excluded.

Panel A

Book Leverage					
	Q1	***Q2***	***Q3***	***Q4***	***Q5***
Size	0.0198***	0.0116***	0.00869***	0.0108***	0.0254***
	(7.342)	(9.363)	(8.683)	(11.59)	(20.66)
Tangibility	0.267***	0.204***	0.158***	0.125***	0.0698***
	(16.65)	(19.38)	(16.36)	(14.38)	(6.731)
Profitability	0.0951***	0.228***	0.586***	0.512***	0.503***
	(4.217)	(6.530)	(13.44)	(14.36)	(15.21)
Market/Book	0.00148	-0.00602***	-0.0220***	-0.0232***	-0.0125***
	(0.916)	(-3.217)	(-9.847)	(-12.73)	(-7.570)
Z-score	-0.0140***	-0.0259***	-0.0636***	-0.0776***	-0.0975***
	(-12.62)	(-22.53)	(-41.62)	(-44.52)	(-42.15)
R&D/Sales	-0.000912***	-0.0507***	-0.121***	-0.145***	-0.253***
	(-3.433)	(-3.936)	(-10.71)	(-13.79)	(-17.70)
Constant	0.0443***	0.00793***	-0.0121***	-0.0389***	-0.0773***
	(7.873)	(3.062)	(-5.226)	(-13.85)	(-18.43)
Observations	7,611	10,587	11,524	11,492	9,306
R-squared	0.069	0.107	0.198	0.245	0.261

Panel B

Market Leverage					
	Q1	***Q2***	***Q3***	***Q4***	***Q5***
Size	0.0247***	0.0126***	0.00609***	0.00682***	0.0106***
	(14.49)	(11.76)	(7.390)	(9.181)	(13.25)
Tangibility	0.187***	0.212***	0.170***	0.132***	0.0971***
	(18.38)	(23.13)	(21.26)	(19.18)	(14.42)
Profitability	0.140***	0.0321	-0.0134	0.0252	0.0466**
	(9.770)	(1.059)	(-0.372)	(0.889)	(2.170)
Market/Book	-0.0178***	-0.0381***	-0.0651***	-0.0535***	-0.0313***
	(-17.42)	(-23.43)	(-34.96)	(-36.90)	(-29.10)
Z-score	-0.00186***	-0.0124***	-0.0372***	-0.0448***	-0.0481***
	(-2.650)	(-12.46)	(-29.57)	(-32.42)	(-32.06)
R&D/Sales	-0.000490***	-0.0384***	-0.0744***	-0.112***	-0.189***
	(-2.912)	(-3.432)	(-8.003)	(-13.47)	(-20.39)

Constant	0.0910*** (25.55)	0.0341*** (15.15)	0.0104*** (5.402)	-0.0196*** (-8.794)	-0.0546*** (-20.05)
Observations	7,610	10,587	11,523	11,491	9,304
R-squared	0.187	0.144	0.243	0.310	0.343

t-statistics in parentheses

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

Table 2.8 Quintile Regression Results for the Within-Industries Channel

Quintile Regression Results for the Within-Industries Channel

This table reports regression results from implementing the basic form of equation (2.4) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to SIC (4-digit); financial and utility firms are excluded.

Panel A

Book Leverage

	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0234***	0.0067***	0.0093***	0.0162***	0.0214***
	13.383	4.782	6.514	7.842	12.778
Tangibility	0.3264***	0.1594***	0.0793***	0.0702***	0.0956***
	18.204	10.170	5.448	5.901	4.763
Profitability	0.081***	0.3133***	0.7145***	0.7017***	0.5926***
	2.933	7.738	8.448	9.278	13.580
Market/Book	0.0013	-0.0056	-0.0319***	-0.036***	-0.0176***
	0.707	-1.588	-9.283	-11.505	-7.369
Z-score	-0.0347***	-0.044***	-0.0781***	-0.084***	-0.0781***
	-8.339	-10.025	-11.441	-12.248	-16.579
R&D/Sales	-0.004***	-0.0095***	-0.0107***	-0.0092***	-0.0063***
	-3.449	-5.765	-5.741	-7.601	-6.054
Constant	0.0085	0.0096	-0.0163***	-0.0468***	-0.0669***
	1.320	1.644	-3.473	-10.656	-17.347
R-squared	0.160	0.134	0.213	0.237	0.226
Years	48	48	48	48	48

Panel B

Market Leverage

	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0184***	0.0049***	0.0051***	0.009***	0.0097***
	12.939	4.317	4.991	7.012	15.503
Tangibility	0.2331***	0.1749***	0.1054***	0.0822***	0.1277***

	19.180	13.764	10.472	10.692	15.678
Profitability	0.0576***	0.0247	0.126***	0.2184***	0.1771***
	4.525	1.377	4.380	7.214	9.871
Market/Book	-0.0214***	-0.0501***	-0.075***	-0.0661***	-0.0315***
	-8.852	-10.548	-12.965	-13.881	-12.041
Z-score	-0.0152***	-0.0289***	-0.0469***	-0.0495***	-0.0351***
	-7.094	-9.110	-12.747	-13.388	-12.552
R&D/Sales	-0.0023**	-0.0072***	-0.0092***	-0.0083***	-0.0059***
	-2.508	-5.844	-9.606	-10.293	-9.551
Constant	0.0341***	0.0285***	0.0054	-0.0218***	-0.0427***
	4.488	5.021	1.035	-4.583	-12.886
R-squared	0.172	0.151	0.223	0.275	0.239
Years	48	48	48	48	48

Cells' format is [estimate/t-statistic]

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

Table 2.9 Quintile Regressions Results for the Within-Firms Channel

Quintile Regressions Results for the Within-Firms Channel

This table reports regression results from implementing the basic form of equation (2.2) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to SIC (4-digit); financial and utility firms are excluded.

Panel A

Book Leverage					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0438***	0.0344***	0.0250***	0.0269***	0.0302***
	(6.576)	(7.702)	(3.386)	(5.306)	(8.496)
Tangibility	0.314***	0.237***	0.166***	0.134***	0.132***
	(13.04)	(11.40)	(3.501)	(4.214)	(4.829)
Profitability	-0.0282	0.169***	0.216***	0.124*	0.150*
	(-1.406)	(4.704)	(4.968)	(1.874)	(1.896)
Market/Book	0.00378***	0.00264	-0.00598	-0.0118***	-0.00250
	(2.686)	(1.193)	(-0.817)	(-2.654)	(-1.175)
Z-score	-0.0196***	-0.0366***	-0.0535***	-0.0537***	-0.0537***
	(-6.865)	(-8.607)	(-8.683)	(-5.737)	(-4.907)
R&D/Sales	-0.000101	-0.000906**	-0.00817**	-0.00610***	-0.000969**
	(-1.210)	(-2.026)	(-2.454)	(-5.105)	(-2.549)
Constant	0.0754***	0.0409***	0.0354***	0.0453***	0.0639***
	(13.46)	(13.91)	(11.31)	(21.80)	(18.55)

Observations	32,050	32,974	33,206	33,120	31,911
R-squared	0.086	0.092	0.086	0.099	0.095

Panel B

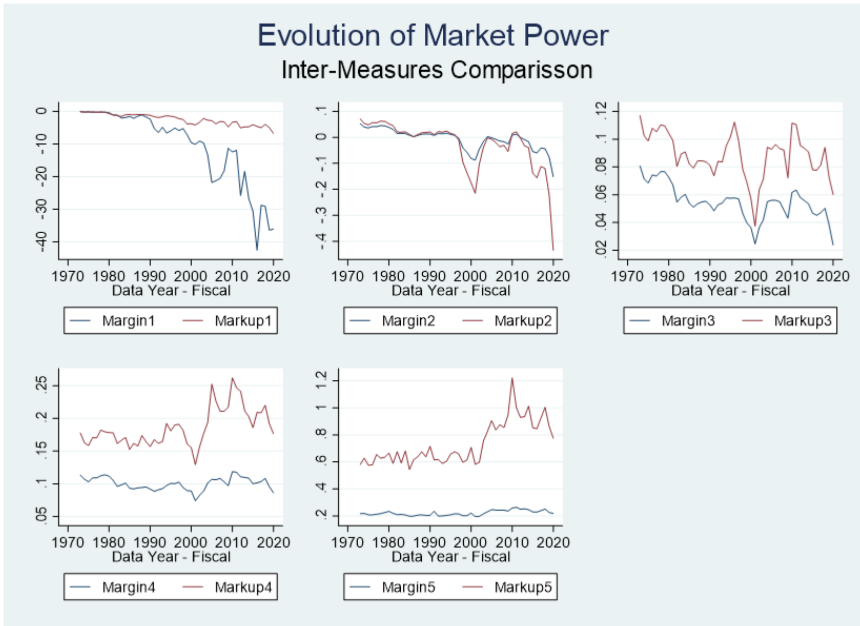
	Market Leverage				
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0368***	0.0361***	0.0311***	0.0257***	0.0222***
	(7.723)	(12.64)	(12.37)	(11.35)	(10.34)
Tangibility	0.236***	0.272***	0.213***	0.146***	0.148***
	(21.79)	(20.13)	(11.47)	(10.88)	(7.999)
Profitability	-0.0159	-0.0447***	-0.0526**	-0.0219	-0.00335
	(-1.235)	(-3.024)	(-2.284)	(-0.556)	(-0.109)
Market/Book	-0.0111***	-0.0189***	-0.0337***	-0.0336***	-0.0136***
	(-7.634)	(-4.833)	(-5.475)	(-7.042)	(-6.809)
Z-score	-0.00708***	-0.0177***	-0.0284***	-0.0306***	-0.0215***
	(-7.012)	(-8.294)	(-8.674)	(-5.151)	(-4.293)
R&D/Sales	-3.74e-05	0.000233**	-0.00355***	-0.00446***	-0.000359**
	(-1.586)	(2.164)	(-6.661)	(-4.290)	(-2.061)
Constant	0.00835***	0.0138***	0.00231**	-0.00897***	-0.0157***
	(5.640)	(14.62)	(2.069)	(-9.220)	(-14.85)
Observations	32,050	32,974	33,206	33,120	31,911
R-squared	0.130	0.136	0.180	0.198	0.158

Robust t-statistics in parentheses

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

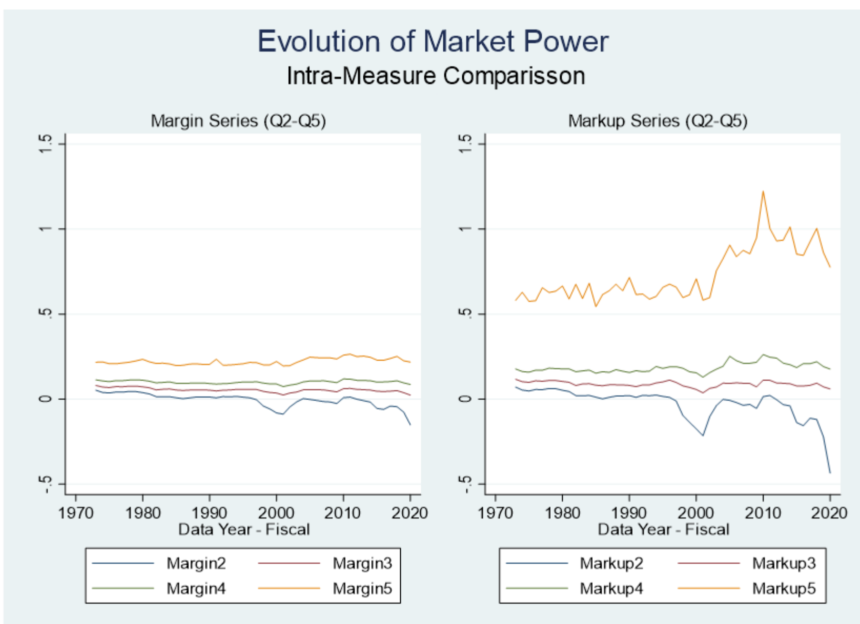
Figures

Figure 2.1 Evolution of Market Power (Inter)



The evolution of operating profit margin (OIADP/SALE) and estimated markup (OIADP/COGS) measures are compared to each other with respect to magnitude and stability. Four out of five quintiles show the markup magnitude to be consistently larger than that of profit margin which is the expected relation between the two measures.

Figure 2.2 Evolution of Market Power (Intra- Partial)



The evolution of the quintile series for each proxy measure are compared to verify that they do not cross each other which is a required condition for the creation of power quintiles. Special attention is paid to the markup series as the both quintile distributions are sorted on operating profit margin.

Appendix to Essay 2

Tables

Table 2.10 Characteristics of Leverage Variation (NAICS)

Characteristics of Leverage Variation (NAICS)				
Panel A	***Level***			
	% of Total Variation		***% of Variation Explained***	
	Book Leverage	**Market Leverage**	**Book Leverage**	**Market Leverage**
Between Industries	*0.11*	*0.20*	*0.15*	*0.26*
Within Industries	*0.47*	*0.44*	*0.15*	*0.18*
Within Firms	*0.42*	*0.36*	*0.08*	*0.14*
Panel B	***Quintiles***			
	% of Total Variation		***% of Variation Explained***	
	Book Leverage	**Market Leverage**	**Book Leverage**	**Market Leverage**
Between Industries	*0.14*	*0.25*	*0.14*	*0.26*
Within Industries	*0.45*	*0.41*	*0.16*	*0.20*
Within Firms	*0.41*	*0.33*	*0.09*	*0.15*

This table presents results from the implementation of equations (2.1) - (2.4) both in their expanded version shown in the dissertation text and their original incarnation used in Graham & Leary (2011). Panel A shows variation and model fitness (R^2) results from implementing the basic version of the equations (Level). Panel B shows variation and model fitness (R^2) results from expanding the models (Quintiles) to include levels of market power (categories). Industries are classified according to NAICS; financial and utility firms are excluded.

Table 2.11 Regression Results for the Between-Industries Channel (NAICS)

Between-Industries Channel (NAICS)

This table reports regression results from implementing the model specification in equation (2.3) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to NAICS; financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			0.000338	0.0104***
			(0.0864)	(3.473)
Q3			-0.0169***	-0.0239***
			(-3.786)	(-7.007)
Q4			-0.0402***	-0.0624***
			(-8.259)	(-16.81)
Q5			-0.0561***	-0.0739***
			(-10.30)	(-17.76)
Size	0.00945***	0.00729***	0.0176***	0.0144***
	(8.037)	(8.061)	(25.02)	(26.86)
Tangibility	0.203***	0.187***	0.183***	0.177***
	(25.14)	(30.02)	(35.10)	(44.50)
Profitability	0.0551***	-0.163***	0.186***	0.0622***
	(2.679)	(-10.30)	(13.40)	(5.876)
Market/Book	-0.0237***	-0.0567***	-0.0147***	-0.0420***
	(-14.20)	(-44.13)	(-16.62)	(-62.11)
Z-score	-0.0266***	-0.00957***	-0.0323***	-0.0154***
	(-21.45)	(-10.03)	(-45.18)	(-28.17)
R&D/Sales	-0.000541***	-0.000192	-0.000872***	-0.000430**
	(-2.614)	(-1.208)	(-3.432)	(-2.212)
Constant	-0.00487***	-0.000252	0.0107***	0.0259***
	(-3.764)	(-0.253)	(2.935)	(9.328)
Observations	11,540	11,539	35,147	35,143
R-squared	0.153	0.263	0.143	0.259

t-statistics in parentheses

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

Table 2.12 Regression Results for the Within-Industries Channel (NAICS)

Within-Industries Channel
(NAICS)

This table reports regression results from implementing the model specification in equation (2.4) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to NAICS; financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	***Market***	***Book***	***Market***
Q2			0.0088**	0.0201***
			2.190	5.507
Q3			-0.0122**	-0.0065
			-2.650	-1.283
Q4			-0.0326***	-0.0375***
			-5.667	-6.974
Q5			-0.0419***	-0.0459***
			-4.808	-7.359
Size	0.012***	0.0064***	0.0135***	0.0085***
	7.875	9.308	9.913	12.927
Tangibility	0.1889***	0.1715***	0.187***	0.1683***
	20.677	23.771	20.769	24.548
Profitability	0.1665***	-0.0069	0.2591***	0.0925***
	7.843	-0.403	9.647	8.747
Market/Book	-0.0131***	-0.039***	-0.011***	-0.0364***
	-5.496	-12.212	-4.937	-11.710
Z-score	-0.0431***	-0.0201***	-0.046***	-0.0234***
	-12.909	-11.218	-12.620	-10.479
R&D/Sales	-0.0041***	-0.0027***	-0.0036***	-0.0023***
	-5.003	-4.511	-5.015	-4.528
Constant	-0.01**	0.0059	0.0038	0.0174**
	-2.608	1.301	0.573	2.478
Observations	48	48	48	48
R-squared	0.149	0.181	0.158	0.201

Cell's format is [estimate/t-statistic]

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

Table 2.13 Regression Results for the Within-Firms Channel (NAICS)

Within-Firms Channel
(NAICS)

This table reports regression results from implementing the model specification in equation (2.2) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to NAICS; financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			-0.0364***	0.0115***
			(-5.822)	(7.813)
Q3			-0.0407***	-0.00283*
			(-5.284)	(-1.861)
Q4			-0.0324***	-0.0181***
			(-4.150)	(-10.97)
Q5			-0.0129	-0.0194***
			(-1.526)	(-11.37)
Size	0.0349***	0.0309***	0.0351***	0.0319***
	(9.452)	(15.44)	(9.434)	(15.84)
Tangibility	0.215***	0.212***	0.215***	0.210***
	(11.40)	(23.23)	(11.39)	(23.34)
Profitability	0.0430***	-0.0357***	0.0658***	-0.0128**
	(2.840)	(-4.520)	(4.434)	(-1.973)
Market/Book	-6.71e-05	-0.0187***	-0.000844	-0.0178***
	(-0.0434)	(-6.633)	(-0.539)	(-6.562)
Z-score	-0.0294***	-0.0120***	-0.0294***	-0.0124***
	(-7.619)	(-5.804)	(-7.888)	(-5.903)
R&D/Sales	-0.000131***	-6.36e-05***	-0.000126***	-5.50e-05***
	(-13.57)	(-8.285)	(-12.56)	(-9.244)
Constant	0.0566***	-0.00181***	0.0816***	0.00325***
	(15.18)	(-10.17)	(10.34)	(3.445)
Observations	154,333	154,333	154,333	154,333
R-squared	0.083	0.142	0.089	0.151

t-statistics in parentheses

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

Table 2.14 Quintile Regression Results for the Between−Industries Channel (NAICS)

Quintile Regression Results for the Between-Industries Channel (NAICS)

This table reports regression results from implementing the basic form of equation (2.3) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to NAICS; financial and utility firms are excluded.

Panel A

	Book Leverage				
	Q1	***Q2***	***Q3***	***Q4***	***Q5***
Size	0.0171***	0.0124***	0.0122***	0.0177***	0.0265***
	(6.757)	(8.977)	(9.877)	(13.17)	(15.62)
Tangibility	0.282***	0.195***	0.111***	0.112***	0.0549***
	(17.81)	(17.60)	(10.89)	(11.06)	(4.582)
Profitability	0.140***	0.129***	0.840***	0.436***	0.529***
	(5.627)	(3.102)	(15.94)	(9.522)	(12.07)
Market/Book	-0.00260	-0.0112***	-0.0301***	-0.0261***	-0.0149***
	(-1.510)	(-4.162)	(-11.27)	(-10.55)	(-7.190)
Z-score	-0.0179***	-0.0213***	-0.0747***	-0.0657***	-0.0978***
	(-13.59)	(-16.56)	(-36.50)	(-31.92)	(-29.92)
R&D/Sales	-0.000746**	0.0145	-0.0384***	-0.0742***	-0.192***
	(-2.283)	(1.191)	(-3.957)	(-7.319)	(-13.07)
Constant	0.0341***	0.00712***	-0.00931***	-0.0350***	-0.0729***
	(6.058)	(2.723)	(-3.583)	(-9.474)	(-13.66)
Observations	5,662	7,899	8,123	7,523	5,940
R-squared	0.104	0.105	0.226	0.230	0.256

Panel B

	Market Leverage				
	Q1	***Q2***	***Q3***	***Q4***	***Q5***
Size	0.0222***	0.0124***	0.00839***	0.00952***	0.0109***
	(12.30)	(10.45)	(8.310)	(9.733)	(9.766)
Tangibility	0.216***	0.183***	0.131***	0.130***	0.112***
	(19.18)	(19.15)	(15.72)	(17.75)	(14.24)
Profitability	0.173***	-0.0647*	0.170***	-0.147***	0.0121
	(9.820)	(-1.804)	(3.939)	(-4.413)	(0.420)
Market/Book	-0.0207***	-0.0606***	-0.0723***	-0.0568***	-0.0316***
	(-16.93)	(-26.06)	(-33.00)	(-31.58)	(-23.10)
Z-score	-0.00500***	-0.0133***	-0.0447***	-0.0322***	-0.0506***
	(-5.350)	(-11.96)	(-26.65)	(-21.46)	(-23.55)
R&D/Sales	-0.000361	0.0169	-0.0358***	-0.0463***	-0.104***

	(-1.557)	(1.600)	(-4.498)	(-6.266)	(-10.78)
Constant	0.0832***	0.0248***	0.00692***	-0.0107***	-0.0355***
	(20.78)	(10.96)	(3.254)	(-3.967)	(-10.11)
Observations	5,661	7,898	8,123	7,522	5,939
R-squared	0.212	0.173	0.291	0.350	0.389

t-statistics in parentheses

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

Table 2.15 Quintile Regression Results for the Within-Industries Channel (NAICS)

Quintile Regressions for Within-Industries Channel (NAICS)

This table reports regression results from implementing the basic form of equation (2.4) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to NAICS; financial and utility firms are excluded.

Panel A

Book Leverage

	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0242***	0.0075***	0.0097***	0.0152***	0.0186***
	14.526	5.004	5.478	7.502	15.512
Tangibility	0.3096***	0.1533***	0.0881***	0.1129***	0.0682***
	15.341	8.169	6.178	8.602	3.524
Profitability	0.0997***	0.3684***	0.7396***	0.7066***	0.5852***
	3.566	6.283	11.964	12.128	15.426
Market/Book	-0.0006	-0.0105***	-0.0394***	-0.036***	-0.016***
	-0.287	-2.985	-9.398	-12.205	-7.667
Z-score	-0.0342***	-0.0442***	-0.0766***	-0.081***	-0.0837***
	-8.837	-9.542	-14.509	-14.948	-19.259
R&D/Sales	-0.0031***	-0.0062***	-0.0058***	-0.0059***	-0.0072***
	-3.379	-6.858	-7.105	-5.973	-6.886
Constant	0.0098	0.008	-0.0217***	-0.0445***	-0.0486***
	1.605	1.275	-4.559	-11.888	-17.850
R-squared	0.159	0.144	0.213	0.219	0.219
Years	48	48	48	48	48

Panel B

Market Leverage

	Q1	**Q2**	**Q3**	**Q4**	**Q5**

Size	0.0192***	0.0049***	0.0048***	0.0075***	0.008***
	15.845	4.445	3.996	6.778	18.974
Tangibility	0.2244***	0.1747***	0.1165***	0.1131***	0.1105***
	15.412	11.808	11.742	11.108	14.781
Profitability	0.0642***	0.0234	0.1696***	0.2142***	0.1581***
	5.687	1.171	5.598	7.261	7.291
Market/Book	-0.0234***	-0.0551***	-0.0771***	-0.0621***	-0.0296***
	-8.383	-11.476	-12.259	-16.467	-13.449
Z-score	-0.0145***	-0.0273***	-0.0483***	-0.0471***	-0.0395***
	-8.253	-10.048	-15.795	-15.983	-12.940
R&D/Sales	-0.0017**	-0.0051***	-0.0069***	-0.006***	-0.0067***
	-2.186	-6.989	-10.594	-11.115	-12.453
Constant	0.0347***	0.0277***	0.0058	-0.0159***	-0.026***
	4.940	5.066	1.155	-3.964	-6.646
R-squared	0.178	0.162	0.244	0.275	0.244
Years	48	48	48	48	48

Cells' format is [estimate/t-statistic]
*** p<0.01, ** p<0.05, * p<0.1

Table 2.16 Quintile Regression Results for the Within-Firms Channel (NAICS)

Quintile Regressions for Within-Firms Channel (NAICS)

This table reports regression results from implementing the basic form of equation (2.2) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to NAICS; financial and utility firms are excluded.

Panel A

	Book Leverage				
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0464***	0.0321***	0.0274***	0.0255***	0.0269***
	(6.309)	(6.303)	(6.274)	(6.560)	(4.621)
Tangibility	0.308***	0.218***	0.174***	0.129***	0.139***
	(12.30)	(8.091)	(5.647)	(4.436)	(5.014)
Profitability	0.0102	0.202***	0.238***	0.140***	0.192***
	(0.479)	(4.540)	(4.015)	(2.752)	(3.191)
Market/Book	0.00401**	0.00220	-0.0109**	-0.0140***	-0.00304
	(2.194)	(0.799)	(-2.283)	(-3.805)	(-1.255)
Z-score	-0.0219***	-0.0377***	-0.0576***	-0.0558***	-0.0618***
	(-7.385)	(-9.064)	(-8.537)	(-7.798)	(-6.226)

R&D/Sales	-0.000107***	-0.00630***	-0.00816***	-0.00273***	-0.00114***
	(-13.09)	(-6.738)	(-20.63)	(-3.912)	(-3.799)
Constant	0.0819***	0.0470***	0.0411***	0.0534***	0.0741***
	(12.17)	(14.82)	(18.61)	(20.47)	(15.45)
Observations	32,075	32,572	32,513	31,509	25,664
R-squared	0.090	0.090	0.111	0.104	0.102

Panel B

	Market Leverage				
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0372***	0.0341***	0.0291***	0.0239***	0.0206***
	(7.701)	(12.22)	(12.38)	(9.582)	(6.595)
Tangibility	0.241***	0.260***	0.202***	0.132***	0.168***
	(18.42)	(18.28)	(11.78)	(8.484)	(8.053)
Profitability	-0.00231	-0.0307	-0.0151	0.0200	0.0245
	(-0.215)	(-1.565)	(-0.509)	(0.616)	(0.953)
Market/Book	-0.0118***	-0.0213***	-0.0377***	-0.0334***	-0.0133***
	(-6.798)	(-4.964)	(-6.232)	(-7.695)	(-6.892)
Z-score	-0.00814***	-0.0189***	-0.0311***	-0.0333***	-0.0247***
	(-6.479)	(-8.558)	(-8.176)	(-6.629)	(-4.840)
R&D/Sales	-3.86e-05***	-0.00168***	-0.00348***	-0.00235***	-0.000345**
	(-8.282)	(-3.023)	(-9.184)	(-4.876)	(-2.544)
Constant	0.00727***	0.0133***	0.00101	-0.0105***	-0.0144***
	(4.013)	(12.76)	(0.892)	(-11.23)	(-9.695)
Observations	32,075	32,572	32,513	31,509	25,664
R-squared	0.138	0.137	0.190	0.203	0.157

Robust t-statistics in parentheses

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

Table 2.17 Characteristics of Leverage Variation (FF_48)

Characteristics of Leverage Variation (FF_48)				
Panel A	**Level**			
	% of Total Variation		***% of Variation Explained***	
	Book Leverage	**Market Leverage**	**Book Leverage**	**Market Leverage**
Between Industries	*0.07*	*0.12*	*0.24*	*0.44*
Within Industries	*0.53*	*0.54*	*0.15*	*0.20*
Within Firm	*0.41*	*0.34*	*0.09*	*0.15*
Panel B	**Quintiles**			
	% of Total Variation		***% of Variation Explained***	
	Book Leverage	**Market Leverage**	**Book Leverage**	**Market Leverage**
Between Industries	*0.08*	*0.16*	*0.12*	*0.34*
Within Industries	*0.52*	*0.51*	*0.16*	*0.22*
Within Firm	*0.40*	*0.32*	*0.10*	*0.16*

This table presents results from the implementation of equations (2.1) - (2.4) both in their expanded version shown in the dissertation text and their original incarnation used in Graham & Leary (2011). Panel A shows variation and model fitness (R^2) results from implementing the basic version of the equations (Level). Panel B shows variation and model fitness (R^2) results from expanding the models (Quintiles) to include levels of market power (categories). Industries classified according to Fama-French 48-industry system; financial and utility firms are excluded.

Table 2.18 Regression Results for the Between-Industries Channel (FF_48)

Regression Results for the Between-Industries Channel (FF_48)

This table reports regression results from implementing the model specification in equation (2.3) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to Fama-French 48-industry system; financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			-0.0378*** (-6.083)	-0.0277*** (-6.312)
Q3			-0.0507*** (-6.782)	-0.0583*** (-11.03)
Q4			-0.0723*** (-8.721)	-0.0937*** (-16.00)
Q5			-0.0820*** (-8.599)	-0.109*** (-16.15)
Size	0.0203*** (8.418)	0.0132*** (7.658)	0.0205*** (15.22)	0.0182*** (19.10)
Tangibility	0.168*** (12.81)	0.160*** (17.24)	0.167*** (18.75)	0.139*** (22.18)
Profitability	0.244*** (5.482)	-0.0736** (-2.322)	0.154*** (5.513)	0.0630*** (3.193)
Market/Book	-0.0133*** (-3.995)	-0.0558*** (-23.51)	-0.0126*** (-6.553)	-0.0494*** (-36.35)
Z-score	-0.00662*** (-2.706)	0.00529*** (3.039)	-0.0170*** (-11.93)	-0.00289*** (-2.871)
R&D/Sales	0.00172** (1.980)	0.000795 (1.290)	-0.00385*** (-4.766)	-0.00126** (-2.216)
Constant	-5.27e-10 (-3.30e-07)	-5.85e-10 (-5.15e-07)	0.0485*** (7.890)	0.0588*** (13.52)
Observations	2,064	2,064	9,610	9,610
R-squared	0.237	0.442	0.120	0.339

t-statistics in parentheses

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

Table 2.19 Regression Results for the Within-Industries Channel (FF_48)

Regression Results for the Within-Industries Channel (FF_48)

This table reports regression results from implementing the model specification in equation (2.4) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to Fama-French 48-industry system; financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	***Market***	***Book***	***Market***
Q2			0.01**	0.0191***
			2.170	4.822
Q3			-0.008	-0.0062
			-1.445	-1.151
Q4			-0.0286***	-0.0381***
			-4.840	-6.680
Q5			-0.0368***	-0.0465***
			-4.168	-6.511
Size	0.0125***	0.0072***	0.0138***	0.0093***
	7.909	9.302	9.865	12.782
Tangibility	0.2025***	0.1752***	0.2002***	0.1722***
	32.275	33.558	32.759	34.625
Profitability	0.106***	-0.0174	0.2024***	0.0954***
	6.211	-0.914	11.459	9.404
Market/Book	-0.0164***	-0.0441***	-0.0144***	-0.0415***
	-7.313	-13.030	-6.954	-12.621
Z-score	-0.0381***	-0.0213***	-0.0418***	-0.0255***
	-15.689	-11.143	-14.394	-10.199
R&D/Sales	-0.0043***	-0.003***	-0.0037***	-0.0025***
	-4.919	-4.627	-4.989	-4.734
Constant	-0.017***	0.	-0.0049	0.0133
	-4.200	-0.008	-0.677	1.652
Observations	48	48	48	48
R-squared	0.155	0.203	0.164	0.221

Cell's format is [estimate/t-statistic]

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

Table 2.20 Regression Results for the Within-Firms Channel (FF_48)

Regression Results for the Within-Firms Channel (FF_48)

This table reports regression results from implementing the model specification in equation (2.2) in both the expanded version shown in the text (Quintiles) and the original version (Level) found in Graham & Leary (2011). Quintiles represent a distribution of industry operating profit margins which we consider to proxy for the actual distribution of market power. Industries are classified according to Fama-French 48-industry system; financial and utility firms are excluded.

	Level		***Quintiles***	
	Book	**Market**	**Book**	**Market**
Q2			-0.0378***	0.0102***
			(-5.114)	(6.102)
Q3			-0.0412***	-0.00243
			(-4.496)	(-1.132)
Q4			-0.0329***	-0.0175***
			(-3.406)	(-9.170)
Q5			-0.0117	-0.0188***
			(-1.191)	(-8.501)
Size	0.0379***	0.0313***	0.0381***	0.0322***
	(14.22)	(14.51)	(13.95)	(14.75)
Tangibility	0.228***	0.208***	0.227***	0.206***
	(15.99)	(21.61)	(16.28)	(21.38)
Profitability	0.0344*	-0.0403***	0.0557***	-0.0160**
	(1.979)	(-3.863)	(3.272)	(-2.135)
Market/Book	-0.00181*	-0.0212***	-0.00280**	-0.0203***
	(-1.749)	(-5.092)	(-2.466)	(-5.021)
Z-score	-0.0301***	-0.0130***	-0.0301***	-0.0134***
	(-6.068)	(-4.540)	(-6.239)	(-4.590)
R&D/Sales	-0.000136***	-6.80e-05***	-0.000132***	-5.86e-05***
	(-13.42)	(-7.509)	(-12.14)	(-8.741)
Constant	0.0512***	-0.00178***	0.0764***	0.00375***
	(10.42)	(-10.68)	(7.793)	(3.538)
Observations	172,790	172,790	172,790	172,790
R-squared	0.093	0.150	0.100	0.158

t-statistics in parentheses

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

Table 2.21 Quintile Regression Results for the Between−Industries Channel (FF_48)

Quintile Regression Results for the Between-Industries Channel (FF_48)

This table reports regression results from implementing the basic form of equation (2.3) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to Fama-French 48-industry system; financial and utility firms are excluded.

Panel A

	Book Leverage				
	Q1	***Q2***	***Q3***	***Q4***	***Q5***
Size	0.00951**	0.00916***	0.0137***	0.0101***	0.0270***
	(2.056)	(3.327)	(4.851)	(4.384)	(11.19)
Tangibility	0.209***	0.197***	0.0551***	0.0468***	-0.0396**
	(8.515)	(9.536)	(2.665)	(3.097)	(-2.304)
Profitability	0.105**	0.193*	0.845***	0.820***	0.407***
	(2.170)	(1.834)	(7.028)	(9.496)	(6.042)
Market/Book	0.00791*	-0.00315	-0.0202***	-0.0324***	-0.0182***
	(1.784)	(-0.580)	(-3.367)	(-6.970)	(-5.835)
Z-score	0.00422*	-0.0179***	-0.0865***	-0.0883***	-0.106***
	(1.837)	(-5.492)	(-17.99)	(-18.23)	(-23.38)
R&D/Sales	-0.00190*	0.0772***	-0.262***	-0.323***	-0.645***
	(-1.826)	(2.773)	(-9.226)	(-14.77)	(-23.26)
Constant	0.0696***	0.0213***	-0.0167***	-0.0579***	-0.0733***
	(6.974)	(4.125)	(-3.404)	(-10.47)	(-9.540)
Observations	1,786	1,923	1,946	1,995	1,960
R-squared	0.085	0.108	0.219	0.291	0.440

Panel B

	Market Leverage				
	Q1	***Q2***	***Q3***	***Q4***	***Q5***
Size	0.0227***	0.0123***	0.0106***	0.00699***	0.0118***
	(7.183)	(5.588)	(5.530)	(3.870)	(7.189)
Tangibility	0.116***	0.177***	0.0910***	0.0697***	0.0522***
	(6.906)	(10.74)	(6.496)	(5.860)	(4.447)
Profitability	0.113***	-0.0603	0.255***	0.340***	-0.0985**
	(3.416)	(-0.720)	(3.132)	(4.992)	(-2.143)
Market/Book	-0.0373***	-0.0580***	-0.0742***	-0.0730***	-0.0322***
	(-12.32)	(-13.38)	(-18.28)	(-19.94)	(-15.13)
Z-score	0.00464***	-0.000476	-0.0414***	-0.0528***	-0.0439***
	(2.961)	(-0.183)	(-12.72)	(-13.84)	(-14.16)
R&D/Sales	-0.000233	0.0969***	-0.132***	-0.266***	-0.418***

	(-0.327)	(4.374)	(-6.877)	(-15.43)	(-22.09)
Constant	0.0928***	0.0337***	-0.00453	-0.0480***	-0.0518***
	(13.60)	(8.178)	(-1.366)	(-11.01)	(-9.858)
Observations	1,786	1,923	1,946	1,995	1,960
R-squared	0.293	0.221	0.304	0.401	0.487

t-statistics in parentheses

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

Table 2.22 Quintile Regression Results for the Within-Industries Channel (FF_48)

Quintile Regression Results for the Within-Industries Channel (FF_48)

This table reports regression results from implementing the basic form of equation (2.4) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to Fama-French 48-industry system; financial and utility firms are excluded.

Panel A

Book Leverage					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0237***	0.0085***	0.0094***	0.0157***	0.0179***
	13.867	6.194	5.951	7.299	12.945
Tangibility	0.327***	0.2035***	0.1172***	0.1175***	0.0755***
	20.881	15.485	13.509	12.420	4.489
Profitability	0.0765***	0.3116***	0.6157***	0.6337***	0.5404***
	3.611	8.211	16.181	14.220	11.934
Market/Book	-0.0001	-0.0118***	-0.0416***	-0.043***	-0.0213***
	-0.058	-3.756	-10.402	-13.937	-9.178
Z-score	-0.0312***	-0.039***	-0.0698***	-0.0815***	-0.0836***
	-10.166	-12.794	-20.415	-20.449	-14.981
R&D/Sales	-0.0027***	-0.0057***	-0.0066***	-0.0072***	-0.0092***
	-3.838	-6.731	-7.308	-8.473	-8.651
Constant	0.0076	0.0028	-0.0231***	-0.0473***	-0.0544***
	1.134	0.509	-5.392	-11.229	-17.874
R-squared	0.153	0.137	0.202	0.249	0.236
Years	48	48	48	48	48

Panel B

Market Leverage					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0197***	0.006***	0.0054***	0.0081***	0.0073***

	15.257	5.729	4.732	6.563	15.633
Tangibility	0.2314***	0.2052***	0.1227***	0.1091***	0.11***
	20.095	17.809	16.951	13.934	10.759
Profitability	0.071***	0.0482*	0.1539***	0.2034***	0.1086***
	5.740	1.859	4.934	6.166	4.818
Market/Book	-0.0248***	-0.0573***	-0.0826***	-0.0723***	-0.0357***
	-9.570	-11.706	-13.304	-15.864	-11.515
Z-score	-0.0152***	-0.0283***	-0.0512***	-0.0544***	-0.0406***
	-8.059	-9.522	-14.629	-14.237	-12.896
R&D/Sales	-0.001**	-0.0047***	-0.0078***	-0.0078***	-0.0084***
	-2.449	-6.951	-13.081	-14.105	-15.014
Constant	0.0357***	0.0256***	0.003	-0.019***	-0.0274***
	4.341	4.262	0.595	-4.071	-7.529
R-squared	0.186	0.178	0.260	0.321	0.284
Years	48	48	48	48	48

Cells' format is [estimate/t-statistic]

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

Table 2.23 Quintile Regression Results for the Within-Firms Channel (FF_48)

Quintile Regressions for Within-Firms Channel (FF_48)

This table reports regression results from implementing the basic form of equation (2.2) on data generated within each industry level of market power (quintile). Each quintile is considered an independent data generating process and the model fitness (R^2) interpreted as a measure of the adequacy of the capital structure theory to describe it. Industries are classified according to Fama-French 48-industry system; financial and utility firms are excluded.

Panel A

Book Leverage

	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0480***	0.0398***	0.0322***	0.0296***	0.0264***
	(7.006)	(9.905)	(11.23)	(8.451)	(4.493)
Tangibility	0.313***	0.236***	0.198***	0.156***	0.136***
	(15.25)	(10.70)	(7.235)	(7.521)	(4.945)
Profitability	-0.0125	0.198***	0.227***	0.181***	0.191***
	(-0.675)	(3.553)	(6.621)	(3.179)	(2.994)
Market/Book	0.00211*	-0.000108	-0.0162***	-0.0151***	-0.00360
	(1.722)	(-0.0495)	(-4.616)	(-5.434)	(-1.633)
Z-score	-0.0211***	-0.0408***	-0.0571***	-0.0623***	-0.0635***
	(-6.466)	(-5.202)	(-7.798)	(-5.834)	(-5.502)

R&D/Sales	-0.000113***	-0.00632***	-0.00880***	-0.00394***	-0.00120***
	(-14.52)	(-5.748)	(-14.70)	(-3.650)	(-3.743)
Constant	0.0762***	0.0402***	0.0349***	0.0466***	0.0693***
	(8.756)	(8.825)	(11.52)	(16.09)	(13.59)
Observations	33,922	35,247	35,588	35,524	32,509
R-squared	0.093	0.110	0.133	0.134	0.108

Panel B

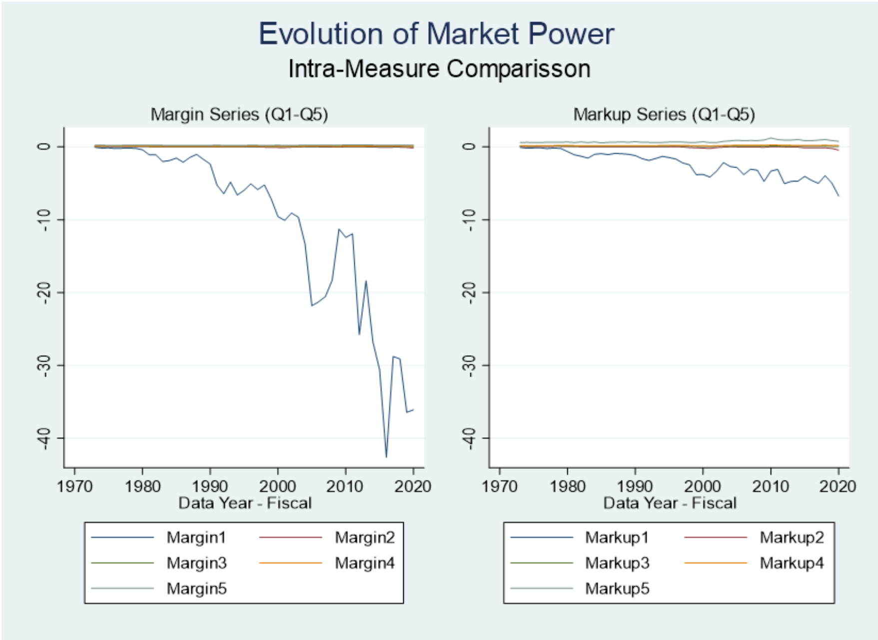
Market Leverage					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Size	0.0381***	0.0370***	0.0299***	0.0243***	0.0195***
	(6.867)	(12.61)	(9.571)	(9.021)	(5.420)
Tangibility	0.229***	0.259***	0.201***	0.145***	0.156***
	(17.50)	(18.74)	(7.871)	(8.409)	(8.465)
Profitability	-0.0103	-0.0208	-0.00855	0.0395	0.0201
	(-0.777)	(-0.971)	(-0.463)	(0.956)	(0.639)
Market/Book	-0.0138***	-0.0234***	-0.0409***	-0.0365***	-0.0157***
	(-5.778)	(-3.508)	(-4.744)	(-5.767)	(-4.600)
Z-score	-0.00834***	-0.0215***	-0.0342***	-0.0382***	-0.0264***
	(-5.258)	(-4.771)	(-6.636)	(-4.683)	(-3.813)
R&D/Sales	-4.20e-05***	-0.00135**	-0.00374***	-0.00272***	-0.000470***
	(-7.116)	(-2.692)	(-6.994)	(-3.513)	(-3.439)
Constant	0.00789***	0.0125***	0.00167	-0.00993***	-0.0130***
	(4.354)	(8.825)	(0.966)	(-10.02)	(-6.202)
	0.0381***	0.0370***	0.0299***	0.0243***	0.0195***
Observations	33,922	35,247	35,588	35,524	32,509
R-squared	0.140	0.147	0.199	0.215	0.163

Robust t-statistics in parentheses

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

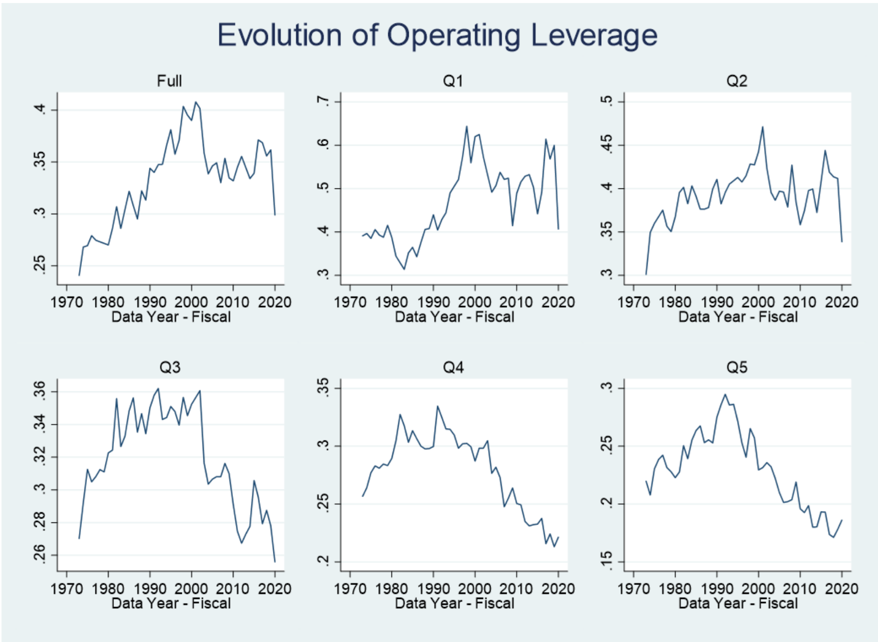
Figures

Figure 2.3 Evolution of Market Power (Intra- Full)



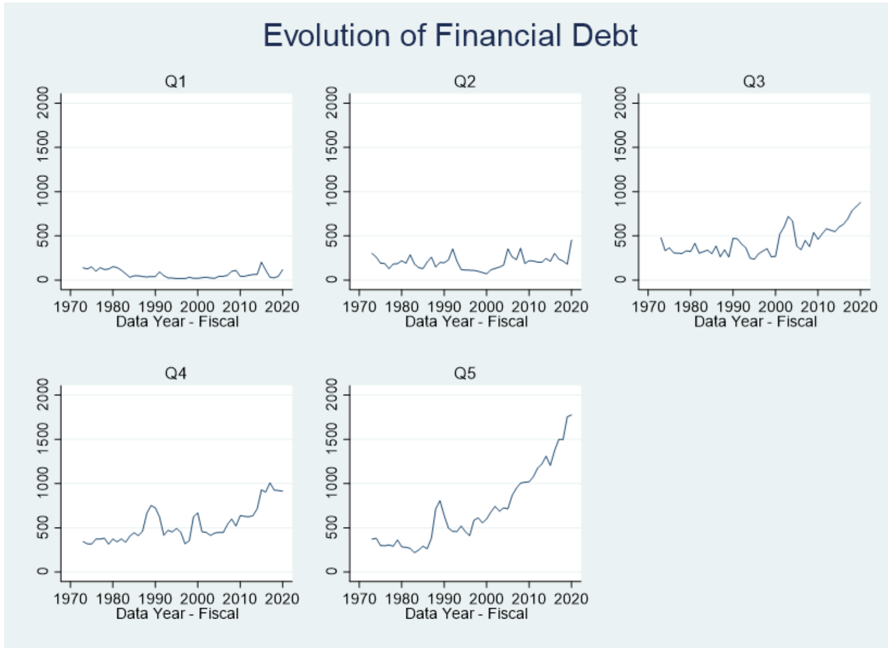
The evolution of the quintile series for each proxy measure are compared to verify that they do not cross each other which is a required condition for the creation of power quintiles. Special attention is paid to the markup series as the both quintile distributions are sorted on operating profit margin.

Figure 2.4 Evolution of Operating Leverage



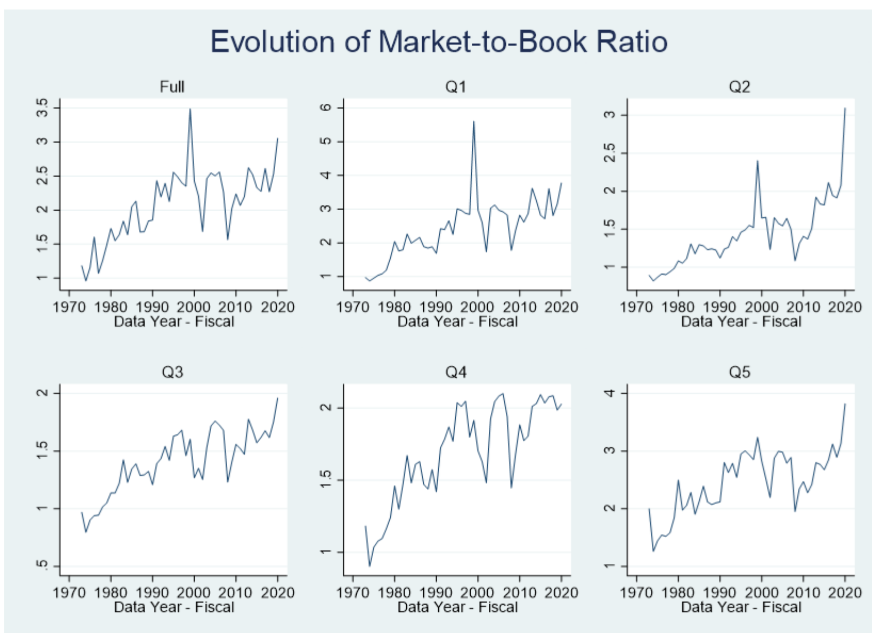
Quintile evolution of operating leverage computed as (XSGA/AT). The quintiles are estimated annually from the industry distribution of operating profit margin and are meant to proxy for the within industry distribution of market power. The figure shows that something happened around year 2000 that caused low-power block firms to pause their upward trend and those within the high-power block to reverse it.

Figure 2.5 Evolution of Financial Debt



Quintile evolution of financial debt computed as (DLC + DLTT) in 1996 dollars. The quintiles are estimated annually from the industry distribution of operating profit margin and are meant to proxy for the within industry distribution of market power. While within the low-power block debt level appears to grow with power, within the high-power block it grows over time.

Figure 2.6 Evolution of Market/Book Ratio



Evolution of market-to-book ratio computed as (MAT/AT) where market value of total assets (MAT) is calculated subtracting shareholders equity (SEQ) and adding market capitalization (MCAP) from total assets (AT). The quintiles are estimated annually from the industry distribution of operating profit margin and are meant to proxy for the within industry distribution of market power.

Dissertation Conclusions

In this dissertation work we set forward a very simple and specific goal, to identify and describe a connection between two important fields of economic research: superstar firms and capital structure. While the phenomena of superstar firms have recently captured the attention of the investigators due to its relation to several problematic trends in key economic indicators, the capital structure has been vastly investigated in connection to firm value and capital investment. Our investigation is directly related to the long held economic concept of joint decision making. After reviewing the progress of the empirical capital structure research, Graham, and Leary (2011) suggest that more attention should be paid to how the financing decision interacts with other corporate policies such as governance and payout. In fact, this same article suggests that in moving forward, research efforts should be guided by the value relevance of the issues investigated. That is exactly how connect these two important fields of investigation, through the value cannel.

Because the superstar phenomena have been linked to industry concentration, competition, profit margins and markups (Grullon, Larkin & Michaely, 2019; De Loecker et al., 2020), we develop a simple and intuitive form to attach the within industry market power distribution to our sample of nonfinancial US firms. Using categorical variables (quintiles) to account for the effects of the market power distribution we were able to perform common evolution and econometric analyses but with improved descriptive capabilities.

Chapter 1 of this dissertation focused on the analysis of the evolutionary patterns of the leverage ratio series for the different levels of market power. Besides corroborating previous research findings about the effects of macroeconomic factors (e.g., bubbles, monetary policy) on the overall economy, from a capital structure perspective, we were able to describe how firms identified with different levels of market power reacted to them. We find that the series seem to split into two different power block that behave differently in both real and statistical terms. During the sampling period under investigation, the series completely inverted their relative position, consistent with the disappearing of the natural hedge as industries transitioned from a competitive state to a concentrated state. (MacKay & Phillips, 2005) We also find that superstars firms are able to filter these macroeconomic effects better than peers, even before reaching the top level of the market power distribution. We additionally find that firms at the bottom of the distribution are strong competitors for stardom due to their innovative nature (Autor et al., 2020) and that their lower financial leverage compensates for their higher operating leverage (cost structure).

Chapter 2 of this dissertation expanded previous regression models meant to represent the capital structure predictions to include the effects of the market power distribution. Because market power, the most important characteristic of superstars, have been associated to several other patterns like increasing profit margins and industry concentration as well as decreasing shares of labor and capital in GDP, it makes sense to explore its effects along the different channels of leverage variation. We therefore follow Graham, and Leary (2011) and aggregate our data sample along the within-industries and between-industries channels. Interestingly, the division in financing behavior for the two power blocks identified by our evolutionary analysis is also present when our regression analysis is implemented. The within-industries results reveal that firms use debt strategically in order to compete within their market product competitive environment. High-power block firms progressively substitute profit margin benefits for those offered by the tax shields of debt financing. Because low-power firms lack these profit margin benefits and face higher distress costs, they use debt conservatively at statistically insignificant levels. The market leverage relation to the profitability factor is positive which indicates that market power effects on the financing decision are of strategic nature. The between-industries results reveal interesting aspects of how the competitive environment influences aggregate level leverage patterns. The aggregate level of corporate debt decreases with industry concentration once a threshold value separating healthy competition from suboptimal conditions is surpass. Below this threshold concentration level, under competitive conditions, both market power and profit margin are shown not to be a factor. The fact that the aggregate level of corporate debt is still shown to increase with aggregate profitability suggests that the enforcement of new and existing policies destined to promote healthy competition (antitrust laws) could return aggregate levels of capital investment to their optimal value.

At the conclusion of this investigation, we have proven that a simple but theoretically supported connection between two important economic phenomena allowed us to improve our understanding of them both. We were not able to identify a particular reason for the economic trends associated to the rise of the modern-day superstar firms, but by highlighting how the forces behind their creation simultaneously affect other economic phenomena we hope to provide a road map for future research. Our contribution is twofold as we have shown that the capital structure theory, although accurate, should not be considered in isolation from other corporate policies or economic perspectives. While MacKay and Phillips (2005) show that industry effects on financial structure extend well beyond the simplistic inclusion of categorical variables (fixed effects) into the regression model, we show that when categorical variables have a specific interpretation (market power distribution) they can result valuable. Finally, the strong correlation between market power and operating leverage and the fact that it seems to factor into the financing decision of low power firms which heavily depend on innovation should be explored. These firms are less likely to outsource their internal activities while superstar might be able to do so. (Zingales, 2000; Autor et al., 2020)

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