UNRAVELING THE IMPACT OF PRODUCT MARKET COMPETITION AND EARNINGS VOLATILITY ON ZERO LEVERAGE POLICIES

ALIREZA RAHIMZADEH

Thesis submitted to the University of Ottawa in partial Fulfillment of the requirements for the degree of M.Sc. in Management – Finance

Telfer School of Management
University of Ottawa

Abstract

This thesis investigates the relationship between product market competition and zero leverage behavior within firms, aiming to uncover how these dynamics interact. Additionally, it explores whether firms characterized by higher earnings volatility exhibit a more pronounced positive relationship between product market competition and the likelihood of adopting a zero-leverage strategy. To carry out this investigation, we employed product market competition data (Fluidity) from the Hoberg-Phillips Data Library and financial data from the Compustat (North America) database, spanning from 1989 to 2019. As product market competition intensifies, the probability of firms adopting a zero leverage policy increases. Furthermore, our research illuminates that the positive impact of heightened product market competition on the likelihood of zero leverage policies is accentuated in firms characterized by elevated levels of earnings volatility. This finding corroborates our initial hypothesis, substantiating the notion that increased competition significantly influences a company's earnings volatility. We also strengthened our analysis with insights from existing literature, underscoring how heightened earnings volatility intensifies the propensity to embrace a zero leverage policy. This study contributes insights to the literature, notably as the first to employ the interaction term between product market competition and earnings volatility in exploring these financial dynamics.

Keywords: product market competition, zero-leverage firms, earnings volatility, risk.

Table of Contents

List of Tables

1 Introduction

The main focus of this thesis is to investigate the relationship between product market competition (PMC) and zero leverage behavior within firms. We aim to address the question of how the level of PMC influences a firm's leverage decisions and whether earnings volatility acts as an enhancer of this effect. The idea that product market power plays an important role in reducing risk and uncertainty has been presented by (Galbraith, 1967). Firms have different positions in the product market. Firms with monopoly positions have the benefits of reduced risk in comparison with firms with lower market powers. The second type of firm engages in higher competition with rivals and is exposed to random productivity shocks which results in risky profits for them. Specifically, researchers have become increasingly keen to explore the different forms of monopoly benefits that may be extracted in the absence of product market competitive pressure from rivals.

There are several characteristics of a firm's market including features of activity and competition. Due to the diversified characteristics of markets, the question of how a firm's financial decisions interact with its product market activity has no unique answer. The answer depends on the angle of interest including interaction with competing firms, customers, or suppliers as modes of activities and price competition, Cournot competition[1], R&D races, and so on as modes of competition (Cestone, 1999).

One of the research questions in the stream of capital structure and financial policy that emerged as a puzzling phenomenon is the determinants of zero leverage behaviour. In the presence of market frictions, there are two main theories of capital structure: the trade-off theory (tradeoff

[1] Cournot competition is an economic model used to describe an industry structure in which companies compete on the amount of output they will produce, which they decide on independently of each other and at the same time.

between financial distress costs and the tax advantages of debt) (Kraus & Litzenberger, 1973) and the pecking order theory (Cost of financing increases with asymmetric information and companies prioritize their sources of financing, first preferring internal financing, and then debt, lastly raising equity as a "last resort") (Myers & Majluf, 1984). Both theories advocate the use of debt because of either tax benefits or lower costs of asymmetric information. Neither of these theories can explain why so many firms across countries follow a zero-leverage policy.

Related literature presents a statistical overview of the zero-leverage firms in the US market and other countries. Examples of listed firms in the S&P 500 index are Apple, Yahoo, Texas Instruments, Bed Bath & Beyond and Urban Outfitters and there is an increasing trend of conservative debt portion over time. In the year 2000, 701 (or 14.0%) of large public nonfinancial US firms had zero outstanding debt, including both short- and long-term debt, in their capital structure. Between 1962 and 2009, on average 10.2% of firms show no debt in their capital structure, and 32% have zero or negative net debt (Bessler et al., 2013; Strebulaev & Yang, 2013). As mentioned, this behaviour is not unique to the US market. Bessler et al. (2013) showed that in 1988, 8.5% of all firms in the sample of developed markets had zero leverage in their capital structure but the number increased to nearly 26% by the end of 2011.

Furthermore, our study investigates the second hypothesis, which posits that companies characterized by higher levels of earnings volatility will demonstrate a more pronounced positive relationship between product market competition and the inclination to adopt a zero-leverage strategy. This hypothesis is underpinned by the understanding that heightened earnings volatility amplifies the risk of financial distress, as companies may face challenges in meeting their debt obligations. Consequently, as earnings volatility intensifies, a firm's ability to assume additional debt diminishes, thus leading to an anticipated adverse relationship with its level of leverage. This

investigation seeks to shed light on how these intricate dynamics between earnings stability, market competition, and financial decisions shape firms' capital structure choices in a competitive economic landscape (Deesomsak et al., 2004; Ghasemzadeh et al., 2021).

In this thesis, firstly we review the literature on the stream of product market competition, PMC and capital structure,zero-leverage and earnings volatility. In the second part, we argue about the prediction of the relationship between product market competition and zero leverage behaviour as well as the interaction effect of earnings volatility on the mentioned relationship. Ultimately, our hypothesis is corroborated through rigorous empirical analysis, providing evidence and validation for our research findings. This study contributes to the existing body of knowledge concerning the intricate relationship among product market competition, capital structure decisions, and earnings volatility. It stands as the research endeavours to examine the hypothesis that firms experiencing heightened earnings volatility will exhibit a stronger positive association between product market competition and the propensity to embrace a zero-leverage approach.

2 Literature Review

2.1 Product Market Competition

There are some theoretical reasons for thinking that competition might improve performance, but they are not the only perspective. Nickell, (1996) presented that market power, as captured by market share, generates reduced levels of productivity. Second and much more important, the paper illustrated the evidence that competition, measured either by increased numbers of competitors or by lower levels of rents, is associated with higher rates of total factor productivity growth. As mentioned there are two sides to the link between market competition and firm performance. On the one hand, the possible predatory threats of competitors, which tend to lower

profit margins and increase uncertainty, suggest that competition is negatively related to firm performance. On the other hand, the disciplinary effect of competition suggests that more intense competition translates into better firm performance.

From an agency theory point of view, regardless of Jensen & Meckling (1976) statement about the irrelevancy of product market competition in agency costs, to the extent that product market competition reduces firm profits, it unambiguously enhances managers to work hard and take actions intended to minimize costs to avoid liquidation threats (Schmidt, 1997).

Sassi et al. (2019) documented a negative relationship between product market competition and the cost of equity capital. In addition, they proposed three channels in which the negative relation between product market competition and the cost of equity is more sensitive. These channels are governance quality, payout policy and investment decisions. The negative relation between product market discipline and the cost of equity is more pronounced in firms with lower governance quality and lower cash payouts.

Hoberg & Phillips (2010) use unique text-based metrics to study how product similarity and competition influence merger incentives. This approach improves upon traditional SIC-code measures by considering firm similarity within and across markets, current competitiveness, and potential for increased product differentiation. The findings suggest that firms with broader similarity to others are more likely to merge, indicating an "asset complementarity effect" likely due to potential synergies from complementary assets. Conversely, firms with similar competitors are less inclined to merge, reflecting a "competitive effect" as they compete for merger opportunities with similar rivals.

2.2 PMC and Capital Structure

Product markets and financial markets have an important linkage. First, output market behaviour will, in general, be affected by the financial structure. Second, foresighted firms will anticipate output market consequences of financial decisions; therefore, output market conditions will influence financial decisions.

Titman (1984) argues that low levels of debt constitute a commitment by a producer to stay in the market, which raises the value of the durable good because it means that the firm will be available to service the good in the future. Brander & Lewis (1986) analyzed the relationship between product market decisions and financial decisions for a particular industry structure in which financial decisions and product market decisions follow in sequence. The choice of financial structure can affect output markets through the limited liability effect of debt financing. As firms take on more debt, they will have the incentive to pursue output strategies that raise returns in good states and lower returns in bad states. The basic point is that shareholders will ignore reductions in returns in bankrupt states since bondholders become the residual claimants. In particular, Brander & Lewis (1986) show that a firm will use "strategic" debt to commit to an aggressive output stance and induce a favourable output reduction from its rival. This result has been illustrated by a two-stage duopoly model linking debt choice with the output decision, illustrating an incentive for firms that are subject to some output-market uncertainty to take on debt for strategic reasons.

A second possible linkage between output and financial markets is the strategic bankruptcy effect. Any one firm's vulnerability to financial distress depends on its financial policy, and its fortunes will usually improve if one or more of its rivals can be driven into financial distress. Therefore, firms might make output market decisions that raise the chances of driving their rivals into

insolvency. Since the possibility of financial distress for each firm is contingent on its financial structure, this is a second channel for finances to affect output markets (Brander and Lewis 1986).

In contrast to the findings of Brander and Lewis (1986); regarding Cournot firms, Showalter (1995) responds by highlighting that the optimal strategic debt decision for Bertrand's competitors[2] is contingent upon the specific nature of uncertainty prevailing in the output market. Moreover, price-competing firms may choose not to use any strategic debt. In Bertrand's competition, the choice of a firm to use strategic debt depends on the type of uncertainty that exists in the output market. When demand is uncertain, a firm that increases its debt optimizes over higher demand states and therefore chooses a higher equilibrium price. A rival firm thus reacts to the leveraged firm's price rise by increasing its price as well, raising the expected profit of the leveraged firm. Leverage in this case carries a strategic advantage (Showalter 1995).

Cestone (1999) reviews the literature on corporate financing and product market competition, studying how firms' financial policy affects the market game. Firms' financial policies may affect the market game in several ways. It can make a firm more or less vulnerable to predation, commit the firm to a particular market strategy, or convey signals to the firm's competitors. Boubaker et al. (2018) explore how competition influences firms' choice between bank and public debt. Analyzing data from 3675 U.S. firms from 2001 to 2013, they find that intense competitive pressure leads firms to rely less on bank debt, indicating that competition replaces the monitoring role of banks. This effect is stronger for highly competitive firms with financial constraints and weaker governance. Moreover, product market competition is linked to long-term debt usage. In

[2] Bertrand competition is a model of competition in which two or more firms produce a homogenous good and compete in prices.

essence, the study shows that market competition acts as an alternative governance mechanism to bank monitoring.

Campello (2003) presents empirical data at both the firm and industry levels to illustrate the impact of capital structure on product market results across a wide range of industries spanning multiple years. Campello opposes the limited liability theories and favours the predatory theories because he argues that higher leverage results in reduced investments and weaker competition within the product market. Campello's research reveals that when industries have low levels of debt among competitors during economic downturns, debt financing negatively impacts a firm's sales growth compared to the industry average, but this effect is not observed during economic upswings. Clayton (2009) in a limited liability framework, demonstrates that when companies have the flexibility to choose their investments, employing leverage can also lead to diminished competition in the product market. The decision regarding the company's financial structure affects both the investment phase and the product market phase of the business. These outcomes are attributed to the inherent limited liability associated with equity. Within the product market, taking on debt commits the firm to pursue an aggressive production strategy, which subsequently results in increased production by the company itself and decreased production by its competitors. This study underscores the notion that, in a limited liability model, leverage can contribute to decreased competitiveness within the product market when companies have the choice of making investments.

Chevalier (1995) depicted that a firm's stock market value positively responds to the announcement that a rival is going to issue debt, suggesting that leverage softens product market competition. Besides, Zingales (1997) studied the survival of trucking companies after the deregulation of the

U.S. trucking industry[3] and found that leverage negatively affects the probability that a firm survives the increased competition.

Gertner et al. (1988) focused on indirect information revelation through the capital structure, rather than direct and verifiable information disclosure. Their paper builds on Myers and Majluf (1984) and introduces the product market as an audience to the firm's signalling. If product market profits are lower for a firm when capital structure reveals its value to competitors, then there is a tension between the need to signal value to investors (to increase credit availability) and the objective of maximizing profits. In contrast, the firm faces no trade-off between signalling that it has low costs to the capital market and to the potential rivals whose entry it wants to deter.

The association between two terms of interest; product market competition and capital structure is not always linear as depicted by the majority of literature. Pandey, (2004) provides insights into how the capital structure, measured by the total debt-to-assets ratio; and market structure or power, measured by Tobin's Q ratio, are related. The results support the prediction that capital structure and market structure/power have a cubic relationship; that is, at the lower and higher ranges of Tobin's Q, firms employ higher debt; and at the intermediate range, they reduce their debt. This is due to the complex interaction of market conditions, agency costs and bankruptcy costs.

Guney et al. (2011) analyzed the relationship between product market competition (measured by Tobin's Q) and the capital structure of Chinese listed firms. The study illustrated that there are significant differences in the debt ratios and product market competition across different industries.

[3] The deregulation of the trucking industry began with the Motor Carrier Act of 1980, which was signed into law by President Carter on July 1, 1980. The deregulation of the U.S. trucking sector refers to the removal or reduction of government regulations and controls that previously governed various aspects of the trucking industry, such as pricing, entry restrictions, and route assignments. This change aimed to promote competition, increase efficiency, and allow for greater market freedom in the trucking industry.

The findings indicate that the association between leverage and product market competition is not a simple linear relationship. Instead, it exhibits a non-linear pattern, potentially following a parabolic or cubic shape, which varies based on factors such as industry type, company size, and firms' growth prospects. However, when considering fixed effects and generalized method of moments (GMM) estimates, a linear and inverse correlation is observed between competition intensity and leverage ratio. These results align with the predation theory, suggesting that heightened competition leads to a decrease in the level of leverage employed by firms. Chu & Pham (2021) also investigate the role of product market competition in understanding why certain companies opt to keep their capital structure entirely devoid of debt, despite the evident benefits of utilizing debt financing. It suggests that product market competition does have a favourable impact on firms' decisions to maintain zero leverage.

Hoberg et al. (2014) examined how the product market threats faced by a firm shape its payout policy and cash holdings. Authors developed a new measure of product market threats, namely, fluidity, using firms' business descriptions provided in 10-Ks which measures the change in a firm's product space due to moves made by competitors in the firm's product markets. The central finding is that product market fluidity has an economically significant relation to dividends, repurchases, and cash holdings. Firms facing higher product market competition have a lower propensity to pay dividends or repurchase shares. These firms also pay lower dividend amounts.

2.3 Zero-Debt

The zero-leverage phenomenon is important in the literature on financial structure. It is closely related to the much-studied low-leverage puzzle, which refers to the stylized fact that on average firms have low leverage ratios relative to what would be expected from various models of capital structure. Zero leverage behaviour is the extreme side of having lower leverage and exploring the

details of this behaviour will answer the question of why some firms prefer to have no debt at all in their capital structure despite articulated benefits of debt depicted in seminal papers of finance. The identification of determinants for such behaviour will be helpful to complete the low-leverage tendency of firms in comparison to what would be expected in different conditions.

Zero-debt firms have been investigated by Strebulaev & Yang (2013) to present the main aspects of zero-leverage behaviour and its determinants. Dividend-paying firms that maintain zero leverage exhibit greater profitability, higher tax payments, and larger cash reserves compared to industry and size-matched counterparts. Moreover, these firms distribute significantly higher dividends than their proxies and thus the total payout ratio is relatively independent of leverage. These results are consistent with the findings of Graham (2000) that many profitable firms seem to be underleveraged from the viewpoint of debt tax benefits. Regarding the persistence of zero leverage behaviour, (Strebulaev & Yang, 2013) depicted that this form of conservative debt approach is a highly persistent phenomenon and conditioning on survival for five years, 30% of zero-leverage firms do not raise any debt in the next four years. Zero leverage (ZL) behaviour is not a surprising approach when the marginal tax rate for such firms is near zero because there would be no potential tax benefits for increasing debt. However, some preliminary evidence suggests that the marginal tax rates of ZL firms are likely to be higher than those of comparable firms (Strebulaev & Yang, 2013).

From the corporate governance perspective, the characteristics of a Chief Executive Officer (CEO) can explain the managerial preferences to maintain zero debt in the capital structure of a firm. Firms with higher CEO ownership and longer CEO tenure are more likely to have zero debt, especially if boards are smaller and less independent. The reason behind firms with higher CEO ownership and longer CEO tenure being more inclined to have zero debt is multifaceted. One key

factor is that when CEOs have a substantial ownership stake in the company, maintaining leverage becomes costly for them. This is because taking on debt could potentially put their ownership position and personal wealth at risk. Furthermore, the influence of CEO tenure plays a role, as longer-tenured CEOs may have established a stronger sense of control and influence over the firm's strategic decisions, including its capital structure. Additionally, the size and independence of the board also come into play, as smaller and less independent boards may be more accommodating to the CEO's preferences and strategies, enabling the easier implementation of their desired capital structure approach. Family firms are also more likely to be zero-levered. In the stream of family firms, the desire for long-term survival increases the perceived risk of default-risky debt and the likelihood of zero leverage behaviour (Strebulaev & Yang, 2013).

Bessler et al. (2013) analyzed the zero-leverage phenomenon in an international setting. Countries with a common law system, high creditor protection, and a dividend imputation or dividend relief tax system exhibit the highest percentage of zero-leverage firms. In this paper, the authors explain the increasing trend in the portion of zero-leverage firms. This trend can be linked to the Initial Public Offering (IPO) waves and the change of industry composition towards sectors in which low leverage is a more common mechanism.

Bessler et al. (2013) tried to explain the zero leverage behaviour from both sides of demand and supply. Most zero-leverage firms are financially constrained and do not have the choice to obtain debt financing (supply-side effect). These firms tend to be smaller, younger, riskier, and less profitable; they are also the most active equity issuers and maintain the largest cash holdings. These firms are constrained in terms of capacity for having debt and prefer to remain unlevered. The financially unconstrained firms that deliberately maintain zero leverage are more profitable,

distribute higher dividends, and are older with a larger size in comparison to financially constrained firms.

Dang (2013) investigates why certain companies choose not to include debt in their financial structures, despite the potential advantages of using debt financing. Examining a new dataset of UK firms from 1980 to 2007, the study reveals that while the zero-leverage approach is common, these firms are not uniform. They can be categorized into two distinct groups based on their constraints, particularly in terms of their dividend policies: payers and non-payers. Crucially, the research uncovers that these groups have differing reasons for avoiding debt. Non-payers primarily eschew debt due to financial constraints, while payers deliberately refrain from it to address investment distortions, aligning with the underinvestment and financial flexibility hypotheses. Importantly, the study highlights that macroeconomic conditions significantly influence the zero-leverage choice, particularly for the less constrained group.

Investigation of zero leverage in the global concept opens some new streams of exploration such as culture. Culture can help explain variations in the prevalence of the zero-leverage phenomenon across developed and developing countries. El Ghoul et al. (2018) used a proxy for culture named values-based Conservatism and Mastery indices as well as a measure indicating the extent to which people trust one another. The main findings indicated that in countries that have high Conservatism or Mastery scores and in countries that enjoy high levels of trust, firms are more likely to employ a zero-leverage policy. The researchers demonstrate that individuals with higher levels of trust tend to have a greater propensity to invest in stocks and other forms of risky assets. Additionally, in countries characterized by a higher degree of trust, a larger proportion of the population participates in the stock market. Besides, the association between zero leverage behaviour and the cost of equity has been investigated which will be used further in this thesis as one of the arguments

for the proposed hypothesis. Indeed, it's been shown that firms with zero debt tend to have a lower cost of equity capital.

2.4 Earnings Volatility

In this segment, we conduct a literature review to investigate how product market competition influences earnings volatility, as well as to explore the connection between earnings volatility and a company's capital structure.

Abdoh & Varela (2017) discover that competition in the product market leads to a higher proportion of idiosyncratic volatility in relation to systematic volatility. It achieved this by examining industries that encountered reduced trade barriers, indicative of increased competition, between 1989 and 2005 due to changes in industry-level import tariffs. The findings regarding risk substantiated our initial results using the HHI index. The study contributes to at least two areas of academic research. Firstly, it introduces product market competition as a novel factor that can clarify the variations in the R-square and other metrics of stock market synchronicity observed across different markets. Secondly, it enriches the literature on stock-return correlations by illustrating the connection between competition and the patterns of asset return co-movements. Similarly, Irvine & Pontiff (2009) records a substantial rise in the idiosyncratic volatility of individual firm-level metrics such as earnings, cash flows, and sales as time progresses. Between the years 1964 and 2003, the extent of this increase in idiosyncratic volatility for earnings, cash flows, and sales is considerable, and it can account for the significant surge in idiosyncratic stock-return volatility observed in a rational stock market during the same time frame. They investigate the potential explanation that this heightened idiosyncratic volatility may be attributed to increased competition. In contrast, Gaspar & Massa (2006) explore the relationship between a company's competitive surroundings and the idiosyncratic volatility observed in its stock returns. The research

uncovers that companies with substantial market power or those situated within concentrated industries exhibit reduced levels of idiosyncratic volatility. The competition influences volatility through two distinct mechanisms. Market power serves as a risk mitigation tool, dampening the impact of idiosyncratic fluctuations. Additionally, market power diminishes uncertainty surrounding information for investors, consequently leading to lower levels of return volatility.

Hoberg et al. (2014) proposed that the fluidity or instability of product markets plays a significant role in a firm's payout policy, as it is based on their expectations of future market conditions. In situations where product markets are experiencing rapid changes, the future becomes more uncertain. It is unlikely that firms operating in such environments would have expectations of sustainable and stable earnings, which according to a survey conducted by Brav et al. (2005), were identified by 70% of executives as the most crucial factor influencing payout decisions.

3 Hypothesis Development

In this section, we try to articulate how product market competition affects the likelihood of having zero leverage as an extreme form of conservative capital structure – this is our first hypothesis. Additionally, in our second hypothesis, we investigate how earnings volatility influences the first hypothesis when introduced as an interaction term.

One of the main mechanisms that have been implied by product market competition is the disciplinary channel of competition which is effective in curbing the misbehaviours of managers. The disciplinary effect of competition substitutes for the monitoring role of governance tools. This channel proposes that managers are working efficiently to protect the return of the firm. Higher product market competition causes the firm to share its profits with rivals and managers are expected to face more risk and put more effort into protecting their positions. This mechanism

helps to decrease the agency problem between managers and shareholders due to less inclination towards moral hazards by managers in seeking private benefits. As illustrated by Sassi et al. (2019), this implication of the disciplinary power of competition is linked with a lower cost of equity required by shareholders. Thus, one of the channels in which the behaviour of zero leverage in capital structure is affected by the disciplinary mechanism of product market competition is through the reduction of agency problems and the cost of equity. El Ghoul et al. (2018) examined the implication of extreme debt conservatism for firms' implied cost of equity. It's been shown that firms with zero leverage behaviour tend to have a lower cost of equity. Zero leverage behaviour solves agency problems by decreasing the risk of default on debt from managers and increases the trust of shareholders which is classified as one of the cultural characteristics. This implies that in a high level of competition, firms tend to have zero leverage behaviour and benefit from the lower cost of equity for financing. The disciplinary effect of competition reduces the over-investment problem and hence improves investment efficiency. Based on this, it's expected to be a positive relationship between product market competition and zero leverage behaviour.

The predatory theory of finance predicts the relation between product market competition and zero leverage behaviour from a different perspective. The predatory theory is a strategy in which a company prices a product or service artificially low to gain new customers (loss leads[4]), drive competitors out of the market, or create barriers to entry for new potential competitors. The risk of underinvestment leading to a loss of investment opportunities and market share to product market rivals is referred to as predation risk. Borrowing from this concept, zero leverage firms have two positive sides by maintaining an unleveraged position. If an unleveraged firm already exists in the

[4] "Loss lead" is an item offered for sale at a reduced price that is intended to "lead" to the subsequent sale of other services or items. The loss leader is offered at a price below its minimum profit margin—not necessarily below cost.

market, as an incumbent with a “deep pocket”, the firm can assert predatory behaviour and barrier for new entrants which usually come with some level of leverage. On the other side, new entrants with zero leverage capital structure have more power to contract a fair level of market share and not be exhausted financially by incumbents. In the same vein, Xu (2012) showed higher competitive threats from rivals lead firms to rely less importantly on debt financing and issue more equity. Besides, as shown by Strebulaev & Yang (2013), Dividend-paying zero-leverage firms pay substantially higher dividends, are more profitable and have higher cash balances which in a high level of product market competition can behave more flexibly against predatory behaviours and secure their position among other rivals. Within the existing literature, researchers (Haushalter et al., 2007; Hoberg et al., 2014) have concentrated on corporate policy choices that revolve around risk management through the utilization of cash reserves. By adopting such strategies, firms aim to mitigate the potential risks associated with predatory actions. The presence of substantial cash holdings enables firms to deter predatory threats and safeguard their interests within a competitive market environment. Considering the established association between zero leverage behaviour and higher cash balances, it is anticipated that a positive relationship exists between product market competition and the adoption of zero leverage behaviour.

The subsequent argument is rooted in the concept of leverage's signalling effects. The influence of capital structure on the investment decisions of rival firms provides support for the notion that a firm's choice of capital structure communicates and signals its intentions to its competitors (Kovenock & Phillips, 1997). Regarding the investment effect models, debt commits the leveraged firms to behave less aggressively and decrease investment. Firms engaging in product market competition can signal their rivals through zero leverage behaviour that they committed for future investment and keep their profits for shareholders and as pecking order theory predicts, they prefer

to use internal financing with the lowest level of information asymmetry (Guney et al., 2011; Myers & Majluf, 1984). Based on this, it's expected to be a positive relationship between product market competition and zero leverage behaviour.

H1: The likelihood of zero-leverage behaviour increases with an escalation of competition in the product market.

In the following, we have introduced a hypothesis focused on investigating the role of earnings volatility as an interaction term when assessing how product market competition influences the likelihood of firms adopting zero leverage. Earnings volatility represents the extent to which a company's profits fluctuate over time. Managing earnings volatility is a primary concern for businesses, as it directly affects their ability to plan for the future, make strategic decisions, and mitigate financial risks. We propose that companies characterized by elevated earnings volatility typically choose to uphold lesser leverage as a strategy for risk reduction. Consequently, when we introduce earnings volatility as an interacting factor in conjunction with product market competition, we can infer that the influence of product market competition on the likelihood of firms adopting a zero leverage policy will be more accentuated among those with heightened earnings volatility, thereby extending our initial hypothesis.

In the study by Ghasemzadeh et al. (2021), the initial hypothesis demonstrates a clear and significant inverse link between a firm's earnings volatility and its capital structure, highlighting that increased earnings volatility leads to a diminished reliance on debt within the firm's financial framework. Furthermore, the outcomes of the second hypothesis reveal a noteworthy distinction in the impact of earnings volatility on the capital structure of financially distressed firms compared to their financially stable counterparts. Notably, the influence of earnings volatility on the capital structure of distressed firms appears to be less pronounced when contrasted with healthier firms.

To rationalize this finding, it can be posited that when a company encounters financial constraints, it faces a substantial risk of antagonistic reactions from its shareholders. In such a scenario, managers are compelled to prioritize financial decision-making and navigate these challenging circumstances. Consequently, as anticipated, managers of firms characterized by both high earnings volatility and financial constraints tend to curtail their utilization of debt in their financial operations to preempt the onset of financial distress and the potential threat of bankruptcy.

When a company experiences higher earning volatility, it faces challenges when trying to secure financing from external sources such as banks or investors. The reason for this is that lenders and investors often view high earnings volatility as a sign of financial risk. If a company's earnings are highly unpredictable, it may be seen as a riskier investment because there is greater uncertainty about the company's ability to meet its debt obligations or provide returns to shareholders (Subramanyam, 1996). Lenders and investors often prefer stable and predictable earnings patterns, as they provide greater assurance of the company's ability to generate consistent cash flows and meet its financial obligations. Given this higher perceived risk associated with volatile earnings, many companies opt for a zero or near-zero leverage policy. By reducing earnings volatility, managers can enhance the company's creditworthiness and attractiveness to potential investors, facilitating access to capital at more favourable terms (Deesomsak et al., 2004).

Regulatory bodies and capital market participants closely monitor and react to earnings volatility. Companies with highly volatile earnings may face increased scrutiny, potentially leading to regulatory interventions or negative market reactions. In fiercely competitive industries, by manipulating earnings, companies can showcase a more stable financial performance compared to their rivals, which may confer advantages such as enhanced investor attractiveness, improved access to capital markets, or a competitive edge in securing business contracts. (Lai, 2011).

Based on the aforementioned analysis regarding the correlation between product market competition and earnings management, and considering the underlying factors that contribute to the positive relationship between earnings volatility and earnings management, we formulate our hypothesis as follows:

H2: Firms with higher levels of earnings volatility will exhibit a stronger positive relationship between product market competition and the likelihood of adopting a zero-leverage approach.

4 Sample and Methodology

We reviewed some of the literature on the stream of product market competition, capital structure, and earnings volatility. Then we presented arguments about the prediction of the relationship between product market competition and zero leverage behaviour as well as how earnings volatility as an interaction term accentuates the mentioned relationship. Here, we present the empirical analysis of the stated hypotheses. PMC data have been collected from the Hoberg-Phillips Data Library available at http://hobergphillips.tuck.dartmouth.edu/. The variable that represents PMC is FLUIDITY. Product Market Fluidity data assesses the degree of competitive threat and product market change surrounding a firm and is based on Hoberg et al. (2014). The majority of competition measures focus on the industry level and fail to consider the variations among firms within the same industry. For instance, companies that dominate the market would experience a different degree of competition compared to smaller firms that are newly entering the industry. Furthermore, these industry-based measures assume that firms belonging to different industries, as defined by SIC or NAICS codes, are not competitors. However, this assumption poses problems in today's interconnected economy.

As defined in Hoberg et al. (2014), A firm's product market fluidity is simply the dot product between its own word vector N_{it} and normalized $D_{t-1,t}$:

$$Product\ Market\ Fluidity_i \equiv N_{i,t} . \frac{D_{t-1,t}}{||D_{t-1,t}||} \quad \text{Eq 1}$$

where $N_{i,t}$ is a normalized vector of firm i's use of words in year t and $D_{t-1,t}$ is a vector of the overall change in the use of words from year t-1 to year t. Intuitively, the product market fluidity of a firm in a given year is the change from the current year compared to the previous year in the overlap of the firm's products space, measured by words used to describe the firm's products in its 10-K report, and all other firms' products space. It means that the product market fluidity measures the similarity between a firm's product description and the popularity of such words among all firms. Thus, a larger overlap in a firm's product space with other firms means more rivals enter the firm's current product market, imposing more threats to the firm. Since product market fluidity uses information from 10-K reports that, as required by law, need to be updated and current, it contains forward-looking information that is beyond the historical information of the accounting data (Le et al., 2021).

This measure focuses on firm rivals and directly "measures the change in a firm's product space due to moves made by competitors in the firm's product markets." Since Hoberg et al. (2014) use the whole spectrum of 10-K firm annual reports to identify the overlap in the product space of one firm with other firms, firm rivals do not need to be in the same SIC or NAICS code with the firm. In addition, this measure quantifies the product market threats for each firm, which therefore accounts for both industry characteristics and differences among firms in the same industry (Le et al., 2021).

The data for the leverage ratio, earnings volatility and other required control variables have been extracted from the Compustat database available on Wharton Research Data Services. We merged the datasets of PMC data and firms' financial data using unique gvkey and year joining keys. The sample covers the period 1989-2019.

A firm i is considered Zero-leveraged (ZL), in a fiscal year t if it has neither long-term debt nor current liabilities at the end of the fiscal year. This is similar to the definition of Strebulaev & Yang (2013) where $ZL_{i,t}$ defines firm i in year t as a zero-leverage firm if in that year the outstanding amounts of both short-term debt (DLC) and long-term debt (DLTT) equal zero. DLTT is the amount of long-term debt exceeding maturity of one year and DLC is debt in current liabilities, including long-term debt due within one year. Almost-ZL firms (AZL) are defined with book leverage not exceeding 5% in a given year based on Strebulaev & Yang, (2013).

The definition of earnings volatility (EV) states volatility of profitability calculated for the past 10 years. The control variables are Dividend, Size, Market to Book asset ratio, Profitability, Tangibility, Age, R&D, Capital Expenditure, Asset Sale and Tax. We selected these control variables from Strebulaev & Yang (2013) because they are pertinent factors in studies related to zero leverage. All the control variables utilized in the analysis were obtained from the Compustat (North America) database, which is accessible online through the WRDS platform. The dataset spans from 1989 to 2019, covering a significant time period. The detailed description of the control variables is presented in Table 1.

For the hypothesis testing, we use logistic regression. Logistic regression provides a more straightforward interpretation of results, as the coefficients are directly associated with odds ratios, making it easier to understand and communicate the impact of predictor variables on the outcome. Secondly, logistic regression assumes that the errors follow a logistic distribution, which aligns

well with the binary nature of the dependent variable. In contrast, probit regression assumes a normal distribution of errors, which may be less suitable for binary outcomes. The multivariate logistic regression model to test the first hypothesis is as follows:

H1 (a): $ZL = \beta_0 + \beta_1 \times Fluidity + \sum \beta_n \times Controls + IndustryFE + YearFE + \varepsilon.$ Eq 2

H1 (b): $AZL = \beta_0 + \beta_1 \times Fluidity + \sum \beta_n \times Controls + IndustryFE + YearFE + \varepsilon$ Eq 3

The multivariate logistic regression model to test the second hypothesis is as follows:

H2 (a): $ZL = \beta_0 + \beta_1 Fluidity + \beta_2 EV + \beta_3 EV \times Fluidity + \sum \beta_n \times Controls + IndustryFE + YearFE + \varepsilon.$

Eq 4

H2 (b): $AZL = \beta_0 + \beta_1 Fluidity + \beta_2 EV + \beta_3 EV \times Fluidity + \sum \beta_n \times Controls + IndustryFE + YearFE + \varepsilon.$

Eq 5

The required adjustments, which involve the use of inflation-adjusted figures for firm size, serve to eliminate noise factors from smaller firms (Strebulaev & Yang, 2013), 48-industries and year fixed effects, robust (control for heteroscedasticity) and clustered standard errors at the firm level, winsorizing data at the 1st and 99th percentiles and using lagged control variables have been conducted.

We normalized regression variables based on total assets to control for differences in firm size and to ensure comparability across companies. By dividing each variable by total assets, the resulting normalized variables are expressed as proportions or percentages relative to the firm's size. Normalization helps to eliminate the bias that may arise due to variations in firm size, as larger companies tend to have higher absolute values for financial variables compared to smaller ones. Without normalization, the regression model may be influenced by the sheer scale of the firm's operations rather than the underlying relationships between variables.

By including year dummies, the panel logistic regression model can account for any time-specific shocks, trends, or seasonality that may affect the dependent variable. This helps to isolate the effect of the independent variables of interest and improves the accuracy of the estimated coefficients. By clustering standard errors at the firm level, we account for the potential correlation or dependence among observations within the same firm. This clustering adjusts the standard errors to better reflect the true variability of the estimated coefficients, taking into consideration the within-firm correlation structure.

5 Empirical Analysis

5.1 Descriptive Statistics and Univariate Analysis

Table 2 provides an overview of the descriptive statistics for the variables under consideration. Meanwhile, Table 3 offers valuable insights by presenting the pairwise correlations among these variables. As anticipated, the ZL dummy variable, earnings volatility, and fluidity (serving as a proxy for product market competition) exhibit positive correlations with statistically significant values. These findings underscore the importance of further exploring the intricate relationships between these factors, shedding light on their potential implications for the broader context of the study.

We have undertaken an univariate analysis, as illustrated in Table 4, focusing on the primary variable of PMC (Product Market Competition) alongside other control variables, differentiating them into two groups: ZL firms and Non-ZL firms. Similarly, Table 5 presents a comparable analysis for AZL firms and non-AZL firms. The results of t-tests, accompanied by their associated p-values, reveal significant disparities in mean values. Specifically, they affirm the central

hypothesis regarding the univariate analysis, indicating that levels of product market competition are notably higher among both ZL and AZL firms.

Turning our attention to dividend-related aspects, no substantial differences are observed between ZL and non-ZL firms. However, in Table 5, a noteworthy distinction emerges, revealing that non-AZL firms exhibit higher dividend levels when compared to their AZL counterparts. Regarding size, age, tangibility, and capital expenditure, it becomes evident that non-ZL and non-AZL firms tend to possess higher average values than their ZL and AZL counterparts, respectively. Conversely, variables such as market-to-book ratio, profitability age, R&D expenditures, asset sales, tax, and earnings volatility demonstrate that ZL and AZL firms, on average, maintain higher values compared to their non-ZL and non-AZL counterparts.

5.2 Multivariate Analysis

In this section, we performed multivariate logistic regression. We present the six models; two models for the ZL policy; one with main control variables and the second one with additional control variables (Table 6), two models for the AZL policy (Table 7) and two models with the full set of control variables; one to show the earnings volatility as interaction term with PMC for the ZL policy and the second one for the AZL policy (Table 8).

The probability of the ZL policy increases with the intensification of product market competition which is consistent with our prediction and the main hypothesis (Table 6). Regarding the other control variables; as predicted by Strebulaev and Yang (2013), firms that follow the ZL policy are smaller, have a higher market-to-book ratio, are more profitable, have less tangible assets, and pay higher dividends. Besides, these firms have a higher R&D ratio, capital expenditure ratio, asset sales ratio and taxes paid ratio. These results are similar for AZL firms (Table 7). The age of firms

seems to have a negative effect on the probability of AZL policy and this effect is not significant for ZL firms.

Smaller firms, facing competition from larger rivals, may opt for a ZL policy as a strategic financial decision to maintain flexibility and avoid financial risks associated with debt. Firms implementing a ZL policy often exhibit a higher market-to-book ratio. This suggests that the market values the firms' assets more than their accounting values, potentially due to market expectations of future growth and profitability. Firms with a ZL policy are more likely to be profitable. By avoiding debt obligations and interest payments, these firms can allocate their resources more efficiently, resulting in higher profitability. Firms following a ZL policy typically possess fewer tangible assets. This characteristic reflects their focus on intangible assets such as intellectual property, brands, and technology. Intangible assets are often associated with industries characterized by high levels of product market competition and rapid technological advancements. Firms with a ZL policy tend to pay higher dividends. Since these firms have lower financial obligations, they can distribute a larger portion of their profits to shareholders in the form of dividends. Firms adopting a ZL policy allocate more resources to research and development (R&D), capital expenditures, and asset sales. These strategies allow them to invest in innovation, expand their operations, and optimize their asset portfolio. Additionally, these firms may have higher tax liabilities due to their improved profitability.

Our research validates the second hypothesis and provides evidence that the positive influence of product market competition on the likelihood of ZL and AZL policies becomes more pronounced in firms characterized by higher levels of earnings volatility. This conclusion is supported by the presence of a positive and statistically significant coefficient for the interaction term between PMC proxy and earnings volatility. Additionally, PMC and earnings volatility themselves exhibit

positive and significant coefficients, indicating that greater levels of product market competition and increased earnings volatility jointly steer firms towards adopting ZL and AZL policies, as outlined in Table 8. This aligns with our projection and substantiates the idea that heightened competition exerts an influence on a company's earnings volatility. Additionally, we have presented arguments rooted in the existing literature that highlight how elevated earnings volatility increases the likelihood of adopting a zero leverage policy. As articulated in the hypothesis development section, in fiercely competitive markets, firms encounter greater difficulties in maintaining a consistent and predictable earnings trajectory. The presence of numerous competitors vying for market share can result in pricing pressures, shifts in customer preferences, and heightened uncertainty. These variables contribute to fluctuations in demand, sales, and ultimately, earnings. In industries characterized by intense competition, companies may engage in price wars to secure a competitive edge. The act of reducing prices to attract customers can erode profit margins, thereby affecting the stability of earnings. Moreover, competitors may employ aggressive pricing tactics to squeeze the profit margins of their rivals, further amplifying the levels of earnings volatility. Additionally, it has been noted that there exists an inverse association between a firm's earnings volatility and its capital structure, underscoring how increased earnings volatility prompts a reduced reliance on debt within the firm's financial framework.

Intensified product market competition often drives firms to invest in innovation and technological advancements to differentiate themselves. However, the introduction of new products, services, or technologies can disrupt existing market dynamics, leading to uncertain revenue streams and increased earnings volatility during transitional periods.

Heightened product market competition can create an environment of market uncertainty, which may affect investor expectations and perceptions of future earnings stability. Investors may

perceive firms operating in highly competitive industries as riskier due to the potential for volatile earnings, leading to increased stock price volatility.

Firms facing intense product market competition may need to make operational and strategic adjustments to stay competitive. These adjustments, such as cost-cutting measures, restructuring efforts, or changes in business models, can introduce short-term disruptions and fluctuations in earnings.

Similarly, the models presented in Table 8, corresponding to the second hypothesis, reveal that firms adhering to the ZL and AZl policies exhibit characteristics such as smaller size, a higher market-to-book ratio, enhanced profitability, reduced tangible assets, and elevated dividend payments. Furthermore, these firms demonstrate a greater R&D expenditure ratio, capital expenditure ratio, asset sales ratio, and taxes paid ratio.

The aforementioned results are associated with an element of risk. Increasing product market competition can create a higher-risk environment for firms, leading to greater earnings volatility. As competition intensifies, firms may face challenges in maintaining stable and predictable earnings. The need to adapt quickly and invest in research and development, marketing, and other competitive strategies can result in fluctuating earnings. Moreover, in a highly competitive market, firms may adopt a zero-leverage capital structure, relying solely on equity financing to mitigate financial risks and maintain flexibility. By avoiding debt, firms aim to minimize interest payments and financial obligations, enabling them to swiftly respond to market changes. However, the absence of leverage also means that earnings fluctuations can have a more pronounced impact on shareholders' returns, as the firm's equity becomes more exposed to market conditions. Therefore, increasing product market competition not only contributes to higher earnings volatility but can also influence firms to adopt a zero-leverage capital structure as a risk management strategy.

It's worth mentioning that I examined the output while taking into account a matched sample through the method of propensity score matching, and the results remain consistent.

6 Robustness check

6.1 (HHI) as a proxy for product market competition

To validate our results, we conducted a robustness check using the Herfindahl-Hirschman Index (HHI) as a proxy for product market competition. However, we explained our preference for using fluidity measurement as a proxy for product market competition compared to HHI.

The HHI is a measure of market concentration and is commonly used to assess the level of competition in an industry. It is calculated by summing the squared market shares of all the firms operating in the same industry. It approaches zero when a market is occupied by a large number of firms of relatively equal size and reaches its maximum of 10,000 points when a market is controlled by a single firm. In order to achieve normalization, we performed a division of the numbers by 10,000. The resulting value ranges from 0 to 1, where 0 indicates perfect competition with numerous small firms, and 1 represents a monopoly with a single firm dominating the market. The HHI provides insights into market power, as higher values indicate increased concentration and potentially reduced competition. In other words, a higher HHI value suggests that a smaller number of firms hold a significant share of the market. This concentration implies that there are fewer competitors vying for market share, resulting in lower levels of product market competition. The relationship between a higher HHI and lower product market competition can be understood as follows: as industry concentration increases, dominant firms gain more control over the market. With fewer competitors to contend with, these dominant firms can exercise greater pricing power and influence market dynamics to their advantage. As a result, other firms face greater barriers to

entry or expansion, limiting their ability to compete effectively. Regulatory bodies and policymakers often use the HHI to evaluate mergers, acquisitions, and antitrust issues in order to safeguard market competition (Laksmana & Yang, 2014; Le et al., 2021).

To ensure that the normalized Herfindahl-Hirschman Index (HHI) aligns in the same direction as fluidity, we multiply its values by -1. This adjustment is made to maintain consistency and facilitate the comparison between the normalized HHI and fluidity. By multiplying the values by -1, the direction of both variables becomes aligned. As the levels of fluidity and normalized Herfindahl-Hirschman Index (HHI) increase, there is a corresponding increase in market competition. The results in Table 9 demonstrate that employing an alternative proxy for product market competition does not alter our findings. It reveals that, while controlling for firm characteristics, there is an increased likelihood of the ZL/AZL policy implementation with the escalation of product market competition as measured by the HHI. This outcome aligns with our prediction and supports the main hypothesis. In relation to the second hypothesis, the coefficients for the HHI variable, earnings volatility and the interaction term between the HHI variable and earnings volatility appear to be positive and statistically significant which corroborates our primary finding.

6.2 Addressing endogeneity issues

One of the main challenges in investigating the relationship between competition and our dependent variables is the endogeneity problem. There is a potential challenge of reverse causality in the relationship between product market competition, zero leverage behavior, and earnings volatility. In this context, it could be argued that firms with higher earnings volatility may be more likely to adopt a zero leverage policy because they need to reduce financial risk. On the other hand, it's also plausible that firms adopting a zero leverage policy are doing so to be more competitive

in a highly competitive market, which could lead to higher earnings volatility due to the challenges and risks associated with such markets. To address this issue, we employ an instrumental variable for product market competition in this section. We select the number of firms within each industry (Industry_firms) as our instrument for competition based on (Le et al., 2021). This choice is motivated by the strong correlation between this measure and competition, as a higher number of companies within an industry typically indicates a more competitive environment. Additionally, this instrument is less likely to have a direct impact on a firm's policy regarding zero leverage (ZL) strategy and earnings volatility, as the number of firms in an industry is external to individual firms and can be considered exogenous to their leverage policy and earnings volatility.

To validate the use of the number of firms within each industry as a valid instrumental variable in our sample period, we conducted an initial test. Table 10 presents the results, demonstrating a significant positive correlation between this variable and firms' fluidity. Consistent with our hypothesis, higher numbers of firms within an industry correspond to increased competition among firms.

Building upon the model presented in Table 10, where the number of firms within each industry serves as an instrumental variable for fluidity, we employ the two-stage least squares (2SLS) method to examine the effects of product market competition on our hypotheses. The results from the second stage, presented in Table 11, reveal that even after controlling for endogeneity, the coefficient of fluidity remains significant and positive in relation to firms' zero leverage policy. We employ the Cragg-Donald Wald F-statistic and the Stock and Yogo test to assess the strength of our instruments for Model 12. The results presented in Table 11 indicate that we reject the null hypothesis of weak instruments. This rejection implies that the number of firms within each industry serves as a valid instrument for measuring fluidity. It's worth noting that the Stock-Yogo

test offers various critical values, reflecting different levels of tolerance for potential inference biases in instrumental variable (IV) estimation. Using a 10% critical value keeps the bias at a minimal level, while a 25% critical value allows for a larger bias. Given that the Cragg-Donald Wald F statistic falls between the critical values of 10% and 15% (closer to the 10% value), this confirms the relevance and strength of the instrumental variable.

Regarding our second hypothesis, the use of the instrumented fluidity variable has been examined (Table 11), and it's noteworthy that this adjustment does not alter our core findings. The coefficients associated with the instrumented fluidity variable, earnings volatility, and the interaction term all persist as positive and statistically significant. These consistent results bolster the validity and robustness of our findings, reinforcing the notion that heightened product market competition and increased earnings volatility play significant roles in influencing the adoption of ZL policies, as initially posited.

In addition, a lag of one year is applied to all independent variables, excluding the industry and year dummies. This technique aims to minimize potential issues arising from endogeneity, which refers to the interdependence between the independent variables and the error term in a statistical model. By incorporating lagged variables, potential endogeneity concerns are mitigated, allowing for a more robust analysis of the relationship between the independent variables and the outcome variables.

7 Conclusion

In this manuscript, we conducted a review of the literature pertaining to product market competition, zero leverage, and earnings volatility. We utilized product market competition data (Fluidity) from the Hoberg-Phillips Data Library (Hoberg & Phillips, n.d.) and identified zero-

leverage firms (ZL) based on Strebulaev & Yang, (2013). Additionally, earnings volatility was defined as the past 10-year profitability's variability, with control variables obtained from the Compustat (North America) database. The dataset covered the period from 1989 to 2019, providing a comprehensive timeframe for our analysis.

Our findings revealed that the probability of implementing the ZL policy increases with the intensification of product market competition, aligning with our first hypothesis. Our research validates the second hypothesis and provides evidence that the positive influence of product market competition on the likelihood of ZL and AZL policies becomes more pronounced in firms characterized by higher levels of earnings volatility. This conclusion is supported by the presence of a positive and statistically significant coefficient for the interaction term between the PMC proxy and earnings volatility. Additionally, PMC and earnings volatility themselves exhibit positive and significant coefficients, indicating that greater levels of product market competition and increased earnings volatility jointly guide firms toward adopting ZL and AZL policies. This aligns with our projection and substantiates the idea that heightened competition exerts an influence on a company's earnings volatility. Moreover, we presented arguments rooted in the existing literature that underscores how elevated earnings volatility increases the likelihood of adopting a zero leverage policy. To ensure the robustness of our results, we conducted a robustness check using the Herfindahl-Hirschman Index (HHI) as an alternative proxy for product market competition, although we favoured the fluidity measurement. The robustness check confirmed the stability of our findings. Concerning the endogeneity issue, we employed an instrumental variable, and our findings were subsequently validated.

This study contributes valuable insights to the literature concerning the interplay between product market competition, zero leverage behaviour, and earnings volatility. Notably, this was the first

study to employ the interaction term between product market competition and earnings volatility. However, it is important to acknowledge the limitations of our research. While product market fluidity offers distinct advantages over industry-level measures of competition, such as the Lerner's index or Herfindahl-Hirschman Index, it may have disadvantages. This measure does not include small or private firms without 10-K reports available. It also does not consider geographical markets for firm products; firms selling the same products in different locations may not be competitors. Furthermore, there may be other unexplored factors that influence both competition and capital structure, which were not covered in this manuscript.

8 References

Abdoh, H., & Varela, O. (2017). Product market competition, idiosyncratic and systematic volatility. *Journal of Corporate Finance, 43*, 500–513.

Bessler, W., Drobetz, W., Haller, R., & Meier, I. (2013). The international zero-leverage phenomenon. *Journal of Corporate Finance*, *23*, 196–221.

Boubaker, S., Saffar, W., & Sassi, S. (2018). Product market competition and debt choice. *Journal of Corporate Finance, 49*, 204–224.

Brander, J. A., & Lewis, T. R. (1986). Oligopoly and financial structure: The limited liability effect. *The American Economic Review*, 956–970.

Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*, *77*(3), 483–527.

Campello, M. (2003). Capital structure and product markets interactions: Evidence from business cycles. *Journal of Financial Economics*, *68*(3), 353–378.

Cestone, G. (1999). Corporate financing and product market competition: An overview. *Giornale Degli Economisti e Annali Di Economia*, 269–300.

Chevalier, J. A. (1995). Capital structure and product-market competition: Empirical evidence from the supermarket industry. *The American Economic Review*, 415–435.

Chu, V. T., & Pham, T. H. L. (2021). Zero leverage and product market competition. *SN Business & Economics*, *1*, 1–18.

Clayton, M. J. (2009). Debt, investment, and product market competition: A note on the limited liability effect. *Journal of Banking & Finance*, *33*(4), 694–700.

Dang, V. A. (2013). An empirical analysis of zero-leverage firms: New evidence from the UK. *International Review of Financial Analysis*, *30*, 189–202.

Deesomsak, R., Paudyal, K., & Pescetto, G. (2004). The determinants of capital structure: Evidence from the Asia Pacific region. *Journal of Multinational Financial Management, 14*(4–5), 387–405.

El Ghoul, S., Guedhami, O., Kwok, C., & Zheng, X. (2018). Zero-leverage puzzle: An international comparison. *Review of Finance, 22*(3), 1063–1120.

Galbraith, J. K. (1967). The new industrial state. *Antitrust L. & Econ. Rev.*, *1*, 11.

Gaspar, J., & Massa, M. (2006). Idiosyncratic volatility and product market competition. *The Journal of Business, 79*(6), 3125–3152.

Gertner, R., Gibbons, R., & Scharfstein, D. (1988). Simultaneous signalling to the capital and product markets. *The RAND Journal of Economics*, 173–190.

Ghasemzadeh, M., Heydari, M., & Mansourfar, G. (2021). Earning volatility, capital structure decisions and financial distress by SEM. *Emerging Markets Finance and Trade*, *57*(9), 2632–2650.

Graham, J. R. (2000). How big are the tax benefits of debt? *The Journal of Finance*, *55*(5), 1901–1941.

Guney, Y., Li, L., & Fairchild, R. (2011). The relationship between product market competition and capital structure in Chinese listed firms. *International Review of Financial Analysis, 20*(1), 41–51.

Haushalter, D., Klasa, S., & Maxwell, W. F. (2007). The influence of product market dynamics on a firm's cash holdings and hedging behavior. *Journal of Financial Economics*, *84*(3), 797–825.

Hoberg, G., & Phillips, G. (n.d.). *Hoberg-Phillips Data Library*. Retrieved January 1, 2022, from http://hobergphillips.tuck.dartmouth.edu/

Hoberg, G., & Phillips, G. (2010). Product market synergies and competition in mergers and acquisitions: A text-based analysis. *The Review of Financial Studies*, *23*(10), 3773–3811.

Hoberg, G., Phillips, G., & Prabhala, N. (2014). Product market threats, payouts, and financial flexibility. *The Journal of Finance*, *69*(1), 293–324.

Irvine, P. J., & Pontiff, J. (2009). Idiosyncratic return volatility, cash flows, and product market competition. *The Review of Financial Studies*, *22*(3), 1149–1177.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kovenock, D., & Phillips, G. M. (1997). Capital structure and product market behavior: An examination of plant exit and investment decisions. *The Review of Financial Studies*, *10*(3), 767–803.

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, *28*(4), 911–922.

Lai, L. (2011). Monitoring of earnings management by independent directors and the impact of regulation: Evidence from the People's Republic of China. *International Journal of Accounting, Auditing and Performance Evaluation*, *7*(1–2), 6–31.

Laksmana, I., & Yang, Y. (2014). Product market competition and earnings management: Evidence from discretionary accruals and real activity manipulation. *Advances in Accounting*, *30*(2), 263–275.

Le, D. V., Le, H. T. T., & Van Vo, L. (2021). The bright side of product market threats: The case of innovation. *International Review of Economics & Finance*, *71*, 161–176.

Myers, S. C., & Majluf, N. S. (1984). *Corporate financing and investment decisions when firms have informationthat investors do not have* (0898–2937). National Bureau of Economic Research.

Nickell, S. J. (1996). Competition and corporate performance. *Journal of Political Economy*, *104*(4), 724–746.

Pandey, I. (2004). Capital structure, profitability and market structure: Evidence from Malaysia. *Asia Pacific Journal of Economics and Business*, *8*(2), 78.

Sassi, S., Saadi, S., Boubaker, S., & Chourou, L. (2019). External Governance and the Cost of Equity Financing. *Journal of Financial Research*, *42*(4), 817–865.

Schmidt, K. M. (1997). Managerial incentives and product market competition. *The Review of Economic Studies*, *64*(2), 191–213.

Showalter, D. M. (1995). Oligopoly and financial structure: Comment. *The American Economic Review*, *85*(3), 647–653.

Strebulaev, I. A., & Yang, B. (2013). The mystery of zero-leverage firms. *Journal of Financial Economics*, *109*(1), 1–23.

Subramanyam, K. (1996). The pricing of discretionary accruals. *Journal of Accounting and Economics*, *22*(1–3), 249–281.

Titman, S. (1984). The effect of capital structure on a firm's liquidation decision. *Journal of Financial Economics*, *13*(1), 137–151.

Xu, J. (2012). Profitability and capital structure: Evidence from import penetration. *Journal of Financial Economics*, *106*(2), 427–446.

Zingales, L. (1997). *Survival of the fittest or the fattest?*

9 Tables

Table 1 Variables' Definitions

The table below outlines the formula for each variable, utilizing the abbreviated names of Compustat primitive variables.

Variable	Definition
Dividend	The ratio of common dividends to book assets (dvc/at)
Size	Natural logarithm of book assets adjusted to 2000 dollars ($\log(AT_t \times CPI_{2000} \times CPI_t)$)
Market to Book ratio	The ratio of market assets to book assets (Tobin's q) ((lt+pstkl-txditc+csho*prcc_f)/at)
Profitability	The ratio of earnings before interests, taxes, and depreciation to book assets (oibdp/at)
Tangibility	The ratio of fixed assets to book assets (ppent/at)
Age	Natural logarithm of the number of years since the firm's record first appears in Compustat (log(fyear - IPOyear))
R&D	The ratio of research and development expenses to sales (xrd/sale)
Capital Expenditure	The ratio of capital expenditure to book assets (capex/at)
Asset Sale	The ratio of asset sales to book assets ((sppe (Sale of Property, Plant, and Equipment)+siv (Investments – Decrease))/at)
Tax	The ratio of taxes paid to book assets (txt/at)
Earnings Volatility	The volatility of profitability calculated for the past 10 years (minimum of three years of data required)

Table 2 Summary Statistics

The table presents an overview of summary statistics pertaining to a dataset that includes product market competition information (Fluidity) from the Hoberg-Phillips Data Library and financial data sourced from the Compustat (North America) database, covering the period from 1989 to 2019. For a comprehensive understanding of each variable, detailed descriptions are available in Table 1.

Variable	Obs	Mean	Std.Dev.	Min	Max
FLUIDITY	162765	7.59	4.08	.06	37.23
Earnings Volatility	103492	.08	.1	0	.83
Dividend	158630	.01	.02	0	.16
Size	157730	5.6	2.13	.91	11.01
Market to Book ratio	132026	2.01	1.65	.53	13.09
Profitability	141556	.03	.23	-1.45	.42
Tangibility	154913	.23	.24	0	.9
Age	153026	2.2	1.05	0	4.29
R&D	143634	.17	.84	0	13.05
Capital Expenditure	140924	.05	.06	0	.37
Asset Sale	110501	.04	.11	0	.91
Tax	157196	.01	.03	-.08	.13

Table 3 Pairwise Correlation Matrix

The table below displays the pairwise correlations among the dependent, independent, and control variables within this study. This dataset comprises information on product market competition (Fluidity) from the Hoberg-Phillips Data Library and financial data obtained from the Compustat (North America) database, spanning the years from 1989 to 2019. For a comprehensive understanding of each variable, detailed descriptions are available in Table 1. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) ZL	1.000												
(2) FLUIDITY	0.006**	1.000											
(3) Earnings Volatility	0.204***	0.137***	1.000										
(4) Dividend	-0.002	-0.094***	-0.158***	1.000									
(5) Size	-0.248***	0.073***	-0.451***	0.217***	1.000								
(6) Market to Book ratio	0.196***	0.136***	0.335***	-0.012***	-0.203***	1.000							
(7) Profitability	-0.124***	-0.241***	-0.486***	0.218***	0.384***	-0.231***	1.000						
(8) Tangibility	-0.180***	-0.091***	-0.137***	0.113***	0.090***	-0.176***	0.194***	1.000					
(9) Age	-0.071***	-0.230***	-0.209***	0.191***	0.326***	-0.143***	0.220***	0.120***	1.000				
(10) R&D	0.097***	0.186***	0.279***	-0.079***	-0.148***	0.210***	-0.414***	-0.106***	-0.109***	1.000			
(11) Capital Expenditure	-0.084***	0.007***	-0.051***	-0.010***	0.011***	0.028***	0.131***	0.590***	-0.056***	-0.049***	1.000		
(12) Asset Sale	0.066***	0.127***	-0.009**	0.001	0.110***	-0.004	-0.030***	-0.116***	0.005	0.041***	-0.080***	1.000	
(13) Tax	0.067***	-0.171***	-0.136***	0.184***	0.091***	0.132***	0.420***	0.054***	0.089***	-0.098***	0.117***	-0.036***	1.000

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

Table 4 Univariate analysis of ZL Policy

This table displays the results of the univariate analysis, employing t-tests, conducted on two distinct sets of companies: those classified as ZL firms and those categorized as Non-ZL firms. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. For a thorough comprehension of each variable, comprehensive descriptions can be found in Table 1. Additionally, the table provides information on p-values and standard error values.

	Non-ZL Number of firms	ZL Number of firms	Non-ZL Mean	ZL Mean	Difference	St_Err	p_value
FLUIDITY	139810	22955	7.5745	7.6495	-.0745	.029	.007
Dividend	136673	21957	.008	.0075	0	0	.4385
Size	135321	22409	5.8165	4.3015	1.515	.015	<0.0004
Market to Book ratio	111566	20460	1.875	2.766	-.891	.0125	<0.0004
Profitability	120629	20927	.044	.1245	-.0805	.0015	<0.0004
Tangibility	132231	22682	.243	.1235	.1195	.0015	<0.0004
Age	132058	20968	2.2275	2.01	.2175	.008	<0.0004
R&D	123476	20158	.1325	.3675	-.235	.0065	<0.0004
Capital Expenditure	119460	21464	.0515	.038	.013	.0005	<0.0004
Asset Sale	92000	18501	.036	.056	-.02	.001	<0.0004
Tax	135372	21824	.0135	.019	-.005	0	<0.0004
Earnings Volatility	88581	14911	.069	.128	-.059	.001	<0.0004

Table 5 Univariate Analysis of AZL Policy

This table displays the results of the univariate analysis, employing t-tests, conducted on two distinct sets of companies: those classified as AZL firms and those categorized as non-AZL firms. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. For a thorough comprehension of each variable, comprehensive descriptions can be found in Table 1. Additionally, the table provides information on p-values and standard error values.

	Non-AZL Number of firms	AZL Number of firms	Non-AZL Mean	AZL Mean	Difference	St_Err	p_value
FLUIDITY	117018	45747	7.496	7.8135	-.3175	.0225	<0.0004
Dividend	114068	44562	.0085	.0065	.002	0	<0.0004
Size	112961	44769	5.9635	4.6875	1.2765	.0115	<0.0004
Market to Book ratio	93667	38359	1.753	2.6475	-.8945	.0095	<0.0004
Profitability	100657	40899	.0535	.126	-.0725	.0015	<0.0004
Tangibility	109914	44999	.2645	.1305	.134	.0015	<0.0004
Age	111526	41500	2.273	1.9955	.2775	.006	<0.0004
R&D	103761	39873	.1025	.3295	-.227	.005	<0.0004
Capital Expenditure	99966	40958	.053	.041	.0115	.0005	<0.0004
Asset Sale	75730	34771	.0345	.0505	-.0165	.0005	<0.0004
Tax	113170	44026	.013	.018	-.005	0	<0.0004
Earnings Volatility	75609	27883	.065	.112	-.0475	.0005	<0.0004

Table 6 Logistic Regression Models for ZL Policies

The table contains results from logistic regression models, with the dependent variable being a dummy variable signifying the presence of a ZL (Zero Leverage) policy. The primary independent variable in these models is "Fluidity," which measures product market competition. Model 1 includes control variables such as Dividend, Size, Market to Book Ratio, Profitability, and Tangibility. Model 2 extends the control variables to include Age, R&D, Capex (Capital Expenditure), Asset Sale, and Tax. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. Table 1 provides descriptions of all variables in detail. The robust standard error is used for all the regression to mitigate the risk of heteroskedasticity and is reported in parentheses. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

	(1) ZL	(2) ZL
FLUIDITY	0.0250***	0.0215***
	(0.0057)	(0.0069)
Dividend	11.7891***	12.2598***
	(1.0435)	(1.3413)
Size	-0.3792***	-0.3933***
	(0.0133)	(0.0154)
Market/Book ratio	0.1325***	0.0866***
	(0.0095)	(0.0115)
Profitability	0.8102***	0.5697***
	(0.0769)	(0.0953)
Tangibility	-3.5276***	-4.0244***
	(0.1666)	(0.2288)
Age		-0.0175
		(0.0225)
R&D		0.0879***
		(0.0164)
Capex		3.3309***
		(0.4709)
Asset Sale		1.7270***
		(0.1480)
Tax		9.3141***
		(0.6736)
Constant	-1.0666**	-1.0169**
	(0.4230)	(0.5028)
Obs.	107432	71918
Pseudo R2	0.1812	0.1844
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes

Standard errors are in parenthesis - *** p<0.01, ** p<0.*05, * p<0.1*

Table 7 Logistic Regression Models for AZL Policies

The table contains results from logistic regression models, with the dependent variable being a dummy variable signifying the presence of the AZL (Almost Zero Leverage) policy. The primary independent variable in these models is "Fluidity," which measures product market competition. Model 3 includes control variables such as Dividend, Size, Market to Book Ratio, Profitability, and Tangibility. Model 4 extends the control variables to include Age, R&D, Capex (Capital Expenditure), Asset Sale, and Tax. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. Table 1 provides descriptions of all variables in detail. The robust standard error is used for all the regression to mitigate the risk of heteroskedasticity and is reported in parentheses. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

	(3) AZL	(4) AZL
FLUIDITY	0.0276***	0.0265***
	(0.0047)	(0.0057)
Dividend	9.2264***	10.1871***
	(0.9548)	(1.1993)
Size	-0.3417***	-0.3481***
	(0.0112)	(0.0130)
Market/Book ratio	0.1942***	0.1315***
	(0.0091)	(0.0103)
Profitability	0.8434***	0.5029***
	(0.0674)	(0.0850)
Tangibility	-3.1766***	-3.6577***
	(0.1229)	(0.1696)
Age		-0.0215***
		(0.0043)
R&D		0.0966***
		(0.0174)
Capex		3.5923***
		(0.3620)
Asset Sale		1.4405***
		(0.1362)
Tax		10.2051***
		(0.5616)
Constant	-0.1182	-0.0997
	(0.3143)	(0.3901)
Obs.	107484	72251
Pseudo R2	0.1953	0.1952
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes

Standard errors are in parenthesis - *** p<0.01, ** p<0.*05, * p<0.1*

Table 8 Logistic Regression Models for Earnings Volatility in Interaction Term

The table contains results from logistic regression models, with the dependent variable being a dummy variable signifying the presence of the AZL (Almost Zero Leverage) policy. The primary independent variables in these models are "Fluidity," which measures product market competition, Earnings Volatility (EV) and the interaction term of Fluidity and EV. Model 5 includes control variables such as Dividend, Size, Market to Book Ratio, Profitability, and Tangibility. Model 6 extends the control variables to include Age, R&D, Capex (Capital Expenditure), Asset Sale, and Tax. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. Table 1 provides descriptions of all variables in detail. The robust standard error is used for all the regression to mitigate the risk of heteroskedasticity and is reported in parentheses. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

	(5) ZL	(6) AZL
FLUIDITY	0.0242**	0.0291***
	(0.0098)	(0.0080)
Earnings Volatility (EV)	0.0510**	0.2105*
	(0.0210)	(0.1169)
FLUIDITY × EV	0.0160**	0.0109**
	(0.0064)	(0.0045)
Dividend	12.1150***	10.0194***
	(1.4232)	(1.2811)
Size	-0.4025***	-0.3694***
	(0.0174)	(0.0148)
Market/Book ratio	0.0859***	0.1356***
	(0.0134)	(0.0120)
Profitability	0.5098***	0.4845***
	(0.1124)	(0.1017)
Tangibility	-3.9266***	-3.5977***
	(0.2411)	(0.1829)
Age	-0.0635**	-0.0408
	(0.0320)	(0.0272)
R&D	0.1032***	0.1014***
	(0.0187)	(0.0203)
Capex	3.4054***	3.7155***
	(0.5299)	(0.4160)
Asset Sale	1.8430***	1.5107***
	(0.1644)	(0.1506)
Tax	9.3940***	9.9727***
	(0.7349)	(0.6174)
Constant	-1.1635*	0.1787
	(0.6334)	(0.4117)
Obs.	59722	59966
R2	0.1887	0.1969
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes

Standard errors are in parenthesis - *** p<0.01, ** p<0.*05, * p<0.1*

Table 9 Robustness Check Models

The table presents findings derived from logistic regression models, wherein the dependent variable is represented as a dummy variable indicating either a ZL policy in Models 7 and 9 or an AZL policy in Models 8 and 10. To bolster the robustness of our analysis, we performed a validation check using the Herfindahl-Hirschman Index (HHI) as a proxy for product market competition. In these models, the key independent variable is "HHI" for Models 7 and 8, aligning with the first hypothesis. Meanwhile, Models 9 and 10, corresponding to the second hypothesis, introduce Earnings Volatility (EV) and the interaction term of HHI and EV as additional independent variables. Across all models, we maintained a consistent set of core control variables, including Dividend, Size, Market to Book Ratio, Profitability, and Tangibility. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. Table 1 provides descriptions of all variables in detail. The robust standard error is used for all the regression to mitigate the risk of heteroskedasticity and is reported in parentheses. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

	(7) ZL	(8) AZL	(9) ZL	(10) AZL
HHI	0.6499**	0.4041**	0.4496***	0.1810***
	(0.2708)	(0.1616)	(0.0428)	(0.0157)
Earnings Volatility (EV)			0.2506**	0.3611**
			(0.1044)	(0.1389)
HHI × EV			4.9747**	6.1069**
			(2.0305)	(2.7449)
Dividend	11.5926***	8.9485***	12.6183***	9.8348***
	(1.0426)	(0.9533)	(1.2129)	(1.1129)
Size	-0.3699***	-0.3327***	-0.3804***	-0.3542***
	(0.0131)	(0.0111)	(0.0151)	(0.0130)
Market/Book ratio	0.1368***	0.1993***	0.1467***	0.2030***
	(0.0095)	(0.0091)	(0.0124)	(0.0115)
Profitability	0.7323***	0.7534***	0.7216***	0.7953***
	(0.0764)	(0.0669)	(0.0945)	(0.0849)
Tangibility	-3.5654***	-3.2064***	-3.4966***	-3.0649***
	(0.1676)	(0.1236)	(0.1882)	(0.1412)
Constant	-1.2403**	-0.1600	-1.3968**	-0.0381
	(0.4992)	(0.3585)	(0.6379)	(0.4060)
Obs.	107432	107484	84210	84210
Pseudo R2	0.1806	0.1944	0.1888	0.1966
Industry Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes

Standard errors are in parenthesis - *** p<0.01, ** p<0.*05, * p<0.1*

Table 10 Correlation between Instrumental Variable and Fluidity

This table provides a validation test assessing the suitability of using the number of firms within each industry as a valid instrumental variable for Fluidity. Within the table, you can find the results of regression analyses in which the dependent variable is "Fluidity" and the primary independent variable under consideration is the count of firms operating within each industry. Model 11 includes control variables as Dividend, Size, Market to Book Ratio, Profitability, and Tangibility. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. Table 1 provides descriptions of all variables in detail. The robust standard error is used for all the regression to mitigate the risk of heteroskedasticity and is reported in parentheses. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

	(11) FLUIDITY
Industry_firms	0.0005***
	(0.0001)
Dividend	-0.5021
	(0.9016)
Size	0.3318***
	(0.0151)
Market/Book ratio	0.1106***
	(0.0082)
Profitability	-1.4534***
	(0.0693)
Tangibility	-0.0889
	(0.1275)
Constant	5.3860***
	(0.2968)
Obs.	107484
R2	0.3254
Industry Dummy	Yes
Year Dummy	Yes

Standard errors are in parenthesis - *** p<0.01, ** p<0.*05, * p<0.1*

Table 11 Instrumental Variable Models

Within the table, you'll find the outcomes of logistic regression models, where the dependent variable takes the form of a ZL policy dummy variable for Models 12 and 14 or an AZL policy dummy variable for Models 13 and 15. These models represent the second stage of 2SLS (Two-Stage Least Squares) logistic regressions, designed to address the endogeneity issue in our analysis. In these models, the primary independent variable is "Instrumented Fluidity," a variable derived from the number of firms within each industry and used as a valid instrumental variable for Fluidity, as seen in Models 12 and 13, aligning with our First Hypothesis. In Models 14 and 15, corresponding to the Second Hypothesis, we introduce Earnings Volatility (EV) and the interaction term of Instrumented Fluidity and EV as additional independent variables. All models include control variables as Dividend, Size, Market to Book Ratio, Profitability, and Tangibility. The dataset encompasses data related to product market competition (Fluidity) sourced from the Hoberg-Phillips Data Library, as well as financial data obtained from the Compustat (North America) database, covering the period from 1989 to 2019. Table 1 provides descriptions of all variables in detail. The robust standard error is used for all the regression to mitigate the risk of heteroskedasticity and is reported in parentheses. "***", "**", "*" and "." denote statistical significance levels at 0.1%, 1%, 5% and 10% respectively.

	(12) ZL	(13) AZL	(14) ZL	(15) AZL
FLUIDITY (Instrumented)	0.1632***	0.1920***	0.1615***	0.1618***
	(0.0451)	(0.0433)	(0.0540)	(0.0500)
Earnings Volatility (EV)			0.0360**	0.0434**
			(0.0161)	(0.0189)
FLUIDITY (Instrumented) × EV			0.0004*	0.0024*
			(0.0003)	(0.0016)
Dividend	12.9571***	10.4677***	12.9582***	10.4440***
	(1.2585)	(1.1250)	(1.3006)	(1.1744)
Size	-0.4265***	-0.4091***	-0.4304***	-0.4088***
	(0.0180)	(0.0168)	(0.0209)	(0.0192)
Market/Book ratio	0.1450***	0.1988***	0.1472***	0.2018***
	(0.0114)	(0.0107)	(0.0128)	(0.0118)
Profitability	0.9016***	0.9774***	0.8817***	0.9907***
	(0.0875)	(0.0794)	(0.0988)	(0.0912)
Tangibility	-3.6124***	-3.1382***	-3.5472***	-3.1023***
	(0.1854)	(0.1358)	(0.1961)	(0.1460)
Constant	-1.8565***	-0.9444**	-1.9271***	-0.7586*
	(0.5167)	(0.4167)	(0.6008)	(0.4560)
Obs.	89861	89900	79750	79750
Pseudo R2	0.1857	0.1956	0.1880	0.1969
Industry Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
Weak identification test (Cragg-Donald Wald F statistic) (Model 12):			13.236	
Stock-Yogo weak ID test critical values (Model 12):				
10% maximal IV size			16.38	
15% maximal IV size			8.96	
20% maximal IV size			6.66	
25% maximal IV size			5.53	
Source: Stock-Yogo (2005). Reproduced by permission.				

Standard errors are in parenthesis - *** p<0.01, ** p<0.*05, * p<0.1*