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# The Impact of Market Power and Financial Flexibility on Corporate Investment Policy

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# The Impact of Market Power and Financial Flexibility on Corporate Investment Policy<sup>†</sup>

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#### Abstract

This study explores how market power and financial flexibility shape corporate investment policies among U.S. large and mature corporations, by estimating firm-specific, time-varying investment-to-added-value sensitivities. We find that firms with market power exhibit lower investment sensitivities, and this effect is more pronounced for the most financially flexible firms. We show that the firm's debt capacity is an important moderator in the relationship between market power and investment sensitivities. Our findings support theoretical predictions that market power and financial flexibility jointly influence investment decisions. The implication is that a lack of competition impedes corporate investments. For investors, these findings highlight the need to monitor both the competitive landscape and financial flexibility of firms in their portfolios.

JEL classification: D40, G31, G32

Keywords: Investments, market power, financial flexibility, added-value, debt capacity

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#### 1. Introduction

There is a broad consensus that competition significantly affects managerial incentives, aligning them with shareholders' interests (e.g., Aghion et al., 1999; Allen and Gale, 2000; Jagannathan and Srinivasan, 2000; Raith, 2003). Akdoğu and MacKay (2008) argue that in industries with limited competition, firms with market power invest less due to the high value of deferring current investments. Additionally, firms' capital structure decisions impact corporate investments, incentivizing managers to preserve financial flexibility. Previous literature highlights the importance of financial flexibility for corporate decisions (Gamba and Triantis, 2008; Bonaimé et al., 2014; Rapp et al., 2014; Arslan-Ayaydin et al., 2014; Yung et al., 2015; Denis and McKeon, 2016; Byoun, 2021) and the importance of financial constraints for corporate outcomes (e.g. Fazzariet al., 1988; La Rocca et al., 2015).

Recently, there has been a wider debate on how financial flexibility affects payouts (Fliers, 2019; Kumar and Vergara-Alert, 2020). Wu et al. (2023) show that financial flexibility improves firm value and that this effect is moderated by investment efficiency. Also, Wu et al. (2024) show that financial flexibility mitigates overinvestment, thereby enhancing investment efficiency. Additionally, market power is predicted to link financing and investments (Cooper and Ejarque, 2003; Abel and Eberly, 2011; Ma et al., 2024).<sup>1</sup> However, empirical examination of the interaction between market power and financial flexibility in shaping a firm's investment policy is lacking. We answer a straightforward question: how do market power and financial flexibility jointly determine corporate investment policies?

Using a modified version of Wurgler's (2000) model, we capture the firm's investment policy by estimating firm-specific, time-varying investment-to-added-value sensitivities, measuring investment decisions as the firm's added value changes. That is, we measure firm's change in investments for every additional dollar in added value generated.<sup>2</sup> We define market power as a firm having a significant market share in its industry. Financial flexibility is the ability to fund investments (Gamba and Triantis, 2008; De Jong et al., 2012; Fliers, 2019), we use three proxies: (1) debt capacity, measured by deviation from target debt, indicating potential to take on more debt (Byoun, 2008; Elsas and Florysiak, 2015); (2) above-target debt, indicating firms facing

<sup>&</sup>lt;sup>1</sup> Crouzet and Eberly (2023) even suggest that rising market power and its corresponding rents can account for a stable or rising rate of return on assets despite a falling user cost of capital.

 $<sup>^{2}</sup>$  To some degree our measurement of investment-to-added-value sensitivities can be interpreted as elasticities assuming that our model is correct. However, for the sake of consistency we refrain from using elasticities and consistently refer to sensitivities.

higher capital costs (Lemmon and Zender, 2004; Byoun, 2008); and (3) financing deficits, indicating firms relying on external funding due to limited internal cash flows (Byoun, 2008).

This setup allows us to link financial flexibility, market power and investments, for three reasons. First, a firm's investment optimization depends on its ability to extract future rents from these investments (Cooper and Ejarque, 2003; Abel and Eberly, 2011). Second, firms with market power have a greater ability to extract rents. Fudenberg and Tirole (1984) predict that as a consequence of their rent extracting ability, firms with market power should invest sparingly to maximize profits. Third, deferring investments is valuable for these firms as it helps (a) preserve debt capacity to fend off competitive attacks (Bolton and Scharfstein, 1990; Akdoğu and MacKay, 2008) and (b) use financial resources to drive constrained competitors out of the industry (Tirole, 1988). We thus make three contributions. First, we are the first to empirically test Cooper and Ejarque's (2003) predictions that competition links financing and investment policies. Second, we show how financial flexibility and market power interaction explains variation in investment policies. Third, we contribute to the literature that links financial flexibility, firm value, and investment efficiency (Wu et al., 2023, 2024).

We use data from CRSP and Compustat (1971-2017) to estimate firm-specific, timevarying investment sensitivities, requiring firms to have over nine years of consecutive observations. After applying these criteria, we have 2,489 firms and 23,052 firm-year observations, focusing on large, mature firms likely to exhibit a link between market power, financial flexibility, and investment policies. Our control group consists of large, mature firms without significant market share. Our main findings are as follows. There is a negative relationship between market power and investment-to-added-value sensitivities. Firms with market power have investment sensitivities 44-71% lower than the average firm, consistent with Akdoğu and MacKay (2008).<sup>3</sup>

We also show that financial flexibility significantly affects investment sensitivities. Firms with a financing deficit have investment sensitivities about 15% lower than those with a surplus, highlighting the importance of internally generated cash flows for investments (e.g. Fazzari et al., 1988; Gomes, 2001). Similarly, firms above their target debt (i.e. with limited debt capacity) exhibit 20% lower investment sensitivities, consistent with previous literature (e.g., Whited, 2006). Testing Cooper and Ejarque's (2003) predictions reveals four observations. First, firms with

<sup>&</sup>lt;sup>3</sup> This effect is economically significant. On average when a firm obtains market power, a \$1 increase in added value will result in \$0.47 diverted away from investments.

depleted debt capacity and market power have 4.8% lower investment sensitivities than their peers. Second, firms with a financing deficit and market power have 3.7% higher investment sensitivities. Third, fully constrained firms with market power show 55% higher investment sensitivities for every standard deviation increase in debt capacity. Fourth, faced with a negative shock to income, firms with market power and a financing surplus operating above their target debt show significantly higher investment sensitivities as their debt capacity is recovered. This demonstrates that the firm's debt capacity is an important moderator in the relationship between market power and investments.

From our analysis, we draw three conclusions for large, mature firms. First, firms with market power have significantly lower investment-to-added-value sensitivities. Second, market power induces a principal link between financing and investments. Third, investment sensitivities are determined by market power, financial flexibility, and the ability to absorb negative shocks through the firm's debt capacity. The wider implication for policymakers is that avoiding to stimulate competition may reduce investment-to-added-value sensitivities, causing firms with market power to focus more on rent extraction and less on investment.

#### 2. Hypotheses

There is an extensive literature that suggests that competition incentivizes managers to align more closely with shareholders (e.g. Graham et al., 1983; Nickell, 1996; Berger and Hannan, 1998; Aghion et al., 1999; Jagannathan and Srinivasan, 1999; Allen and Gale, 2000; Raith, 2003). Empirical evidence finds competition indeed mitigates governance mechanisms (Giroud and Mueller, 2010; Chhaochharia et al., 2011). Akdoğu and MacKay (2008) show that in industries where firms have market power, investments are lower as deferring investments allows firms to extract current rents and preserve debt capacity, protecting against future predatory attacks (Bolton and Scharfstein, 1990). This aligns with the "deep-pockets" theory, where financially flexible firms outlast constrained competitors (Tirole, 1988). Fudenberg and Tirole (1984) suggest that firms with market power benefit from investing sparingly, potentially leading to suboptimal decisions (Akdoğu and MacKay, 2008). Additionally, competition erodes the option value of investments quickly (Williams, 1993; Baldursson, 1998; Kulatilaka and Perotti, 1998; Grenadier, 1996, 2002; Lambrecht and Perraudin, 2003). Thus, in the absence of competition, firms with market power tend to delay investments as the option values remain intact. Our hypothesis is then:

#### H1: Market power is negatively related to investment sensitivity.

It is well established that a firm's financial flexibility significantly impacts corporate investment decisions (e.g., Fazzari et al., 1988; Kaplan and Zingales, 1997; Whited, 1992; Hubbard et al., 1995; Erickson and Whited, 2000; Gomes, 2001; Alti, 2003; Almeida et al., 2011; Denis and Sibilkov, 2010). Wu et al. (2023) found that investment efficiency and corporate governance mechanisms moderate the impact of financial flexibility on firm performance, while Wu et al. (2024) noted that financial flexibility reduces overinvestment, enhancing efficiency. Financial flexibility is defined as a firm's ability to fund its investments (Gamba and Triantis, 2008; De Jong et al., 2012; Fliers, 2019), and is typically proxied by the firm's deviation from its target debt, the status of firms operating above target debt, and firms with financing deficits forced to raise external funds (Byoun, 2008).

The Q-theory of investments connects corporate cash flows and financing frictions to corporate investment behavior, suggesting firms equate the marginal value of capital with its marginal cost in the absence of fixed investment costs and financial frictions (DeMarzo et al., 2012). Cooper and Ejarque (2003) highlight that market power, often overlooked, influences this relationship, arguing that Q-theory misinterprets the positive correlation between cash flows and investment as financial constraints (Abel and Eberly, 2011). We posit that external financing exposure increases competitive pressure while disciplining management (Bolton and Scharfstein, 1990). Thus, combining these insights, we hypothesize:

# H2: Investment sensitivity is determined by the interaction of market power and financial flexibility.

Previous studies highlight that debt holders can discipline managers (Harris and Raviv, 1990), and investors can use this disciplinary power to compete more aggressively (Brander and Lewis, 1986; Maksimovic, 1988). Product market competition reduces rents and increases the risk of industry exit, this incentivizes firms with market power to minimize distress probabilities and costs (Froot et al., 1993; Akdoğu and MacKay, 2012). Consequently, these firms prefer preserving debt capacity to fend off future predatory behavior from competitors, aligning with the "deep-pockets" theory of predation where financially flexible firms drive constrained competitors out (Tirole, 1988).

Market leaders with sufficient financial flexibility tend to invest less, while constrained leaders are compelled to invest more to avoid liquidation (Bolton and Scharfstein, 1990). Debt providers discipline constrained market leaders to invest more by threatening liquidation in the case of continued underperformance. Non-market leaders, facing a constant high threat of liquidation, will invest more if financially flexible to avoid liquidation, otherwise diverting funds from investments to reduce debt. Our final hypothesis is then:

H3: Firms with market power and financial flexibility result have lower investment sensitivity.

#### 3. Investment sensitivity

We define investment sensitivity as a firm's change in investments in response to additional returns (i.e. increases in added value). We measure this by the correlation between changes in the firm's investment (CAPEX) and changes in the firm's added value (rents extracted), termed investment-to-added value sensitivities. This approach is based on Wurgler's (2000) model, which measures these sensitivities at the industry level.<sup>4</sup> We predict that firms will increase investments when experiencing growth and reduce them when growth declines, aligning with the marginal benefit exceeding the marginal cost.

Traditional studies use Q-type and cash flow regressions to explain investment changes, but we avoid this for three reasons. First, Wurgler's model is a good measure of a firm's investment policy, avoiding potential misspecifications and errors (Erickson and Whited, 2006; Almeida et al., 2004; Almeida et al., 2011). Second, recent theories suggest Q-theory is incorrectly specified (Cooper and Ejarque, 2001; 2003; Abel and Eberly, 2011). Third, using a model similar to Wurgler's allows us to estimate firm-specific and time-varying sensitivities.

We use the following setup:

$$\ln\left(\frac{I_{i,t}}{I_{i,t-1}}\right) = \alpha + \eta \ln\left(\frac{V_{i,t}}{V_{i,t-1}}\right) + \epsilon_{i,t} ; \forall i_t$$
(1)

<sup>&</sup>lt;sup>4</sup> While our empirical setup to measure the correlation between changes in investments and changes in the firm's added-value is akin to Wurgler (2000) there are distinct differences that make it difficult to compare the outcomes. Wurgler (2000) estimates investment-to-added-value sensitivities (a) at an industry level, here we use firm-level data; (b) over a shorter time period (1963-1995), we estimate the sensitivities using a rolling window (1971-2017); (c) only for manufacturing investments, we are interested in overall investments.

where  $I_{i,t}$  is the firm's investment defined as capital formation (capital expenditures divided by net property, plant, and equipment),  $\ln\left(\frac{I_{i,t}}{I_{i,t-1}}\right)$  is the change in the firm's investment,  $V_{i,t}$  is added value and is defined as sales revenue reduced by material costs (corrected for labor expenses) and  $\ln\left(\frac{V_{i,t}}{V_{i,t-1}}\right)$  is the change in the firm's added value.<sup>5</sup> We estimate this model using a rolling window regression framework. For example, a firm with ten consecutive observations in the Compustat database provides one estimate for  $\eta$ .

We expect  $\eta$  to be positive, this means that average firm increases its investments as their added value increases. Although reverse causality is a concern, prior literature indicates that capital investments typically become productive after two years (Mayer, 1960; Hall, 1977). Another potential concern could be that our model captures changes in the firm's added value that are a non-contemporaneous reflection of changes in the firm's future investment opportunity set. However, we find that this is not the case. Changes in the firm's added value are not a proxy for future changes in the firm's investment opportunity set ( $\rho \approx between 2\% - 6\%$ ). In subsequent analyses,  $\eta$  is our dependent variable, representing a firm's investment-to-added-value sensitivity.<sup>6</sup>

### 4. Data and empirical setup

#### Sample selection

To estimate investment-to-added-value sensitivities we obtain data for all firms in CRSP and Compustat from 1971 till 2017. First, we exclude financial firms (SIC codes 6000–6999) and utilities (4000–4999) as is common practice in the corporate finance literature. We then require firms to have at least ten consecutive years in Compustat and information available on capital expenditures, sales, material costs and total assets such that we are able to calculate robust investment-to-added-value sensitivities. Second, because of the requirement of at least ten consecutive years and the requirement for sufficient degrees of freedom, our sample is reduced to

<sup>&</sup>lt;sup>5</sup> We calculate labor expenses by multiplying the number of employees for each firm with the average yearly US wage. The data for this was obtained from <u>https://www.ssa.gov/oact/cola/awidevelop.html</u>. In a robustness test we improve the accuracy of our measured labor expenses by using industry-state specific annual wage data obtained from 72,000 files provided U.S. Bureau of Labor Statistics. We find that the same results hold.

<sup>&</sup>lt;sup>6</sup> Besides the above specification, we estimate various specifications of equation (1). As a first robustness test, we scale capital expenditures to total assets. Second, we include research and development expenditures in our measurement of capital expenditures. Third, rather than using average annual wages to correct for labor costs, we use average annual industry-state specific wages based on a two-digit North American Industry Classification System (NAICS) coding. We find that all results are robust.

4,506 unique firms with a total of 44,869 firm-year observations. Third, to avoid a look-a-head bias in our estimates we match all financial and corporate information from Compustat to the midpoint of our rolling window estimated investment sensitivities.<sup>7</sup> This significantly reduces our sample to 3,293 unique firms with 27,632 firm-year observations. Third, our sample is then further reduced by the requirement of all data being available for our control and variables of interest. Additionally, we require each firm to have at least two observations in our final sample to be able to correct for panel specific auto-correlation (PSAR1). Our final sample then consists of 2,489 unique firms with 23,052 firm-year observations.

#### Variables

As such, we focus our attention on large and mature firms, where our control group consists of large and mature firms without market power. These large and mature firms are the most likely to exhibit a principal link between market power, financing and investments. We identify a firm with market power as "having the ability to dominate its industry" by calculating its market share in terms of sales within its 2-digit SIC code. Then, we identify for each year the top one-third of each industry. We argue that firms that belong to this group have, on average, an advantage over their competitors in terms of funding and customer penetration.

To measure financial flexibility we use three proxies: (1) debt capacity, measured by deviation from target debt, indicating potential to take on more debt (Byoun, 2008; Elsas and Florysiak, 2015); (2) above-target debt, indicating firms facing higher capital costs (Lemmon and Zender, 2004; Byoun, 2008); and (3) financing deficits, indicating firms relying on external funding due to limited internal cash flows (Byoun, 2008). In Appendix A, we explain our measurements and calculations of our financial flexibility proxies. Our control variables are standard in the corporate finance literature. We use firm size, profitability, leverage, market-to-book, cash and tangibility. All definitions of our control variables can be found in Appendix B.

<sup>&</sup>lt;sup>7</sup> The added benefit of matching our variables of interest and control variables to the midpoints is that it allows us the avoid endogeneity and reverse causality issues. More specifically, it enables us to examine the cross-sectional variation with sufficient temporal dynamics.

#### Explaining cross-sectional variation in investment sensitivities.

To explain the cross-sectional variation in investment-to-added-value sensitivities, we employ a feasible generalized least squares (FGLS) approach similar to Byoun (2008) and Fliers (2019). We estimate the following equation:

$$\eta_{i,t} = \alpha_0 + \beta_1 \pi_{i,t} + \beta_z X_{i,t} + \phi + \xi + \epsilon_{i,t}$$
(1)

Because our dependent variable is estimated from equation 1, we apply a weighted estimation using  $\frac{1}{s.e.(\eta_t)}$  to put more weight on sensitivities that were estimated with less error (e.g. Saxonhouse, 1976; Hornstein and Greene, 2012; Fliers, 2019). Additionally, because  $\eta$  is obtained from a rolling window regression, it will display considerable persistence over time. To correct for this, our FGLS estimates use firm-level robust standard errors with a correction for continuously panel-specific (AR1) correlated errors, calculated a firm specific Durbin-Watson statistic  $\left(d_{i,t} = \frac{\sum_{l=2}^{T} (e_{l,t} - e_{l,t-1})^2}{\sum_{l=2}^{T} e_t^2}\right)$ . Additionally, our estimations include a vector of control variables ( $X_{i,t}$ ) to capture common corporate finance explanations for investment decisions (firm size, profitability, leverage, market-to-book, cash holdings, and tangibility).

All our estimations contain year ( $\phi$ ) and industry-fixed effects ( $\xi$ ).<sup>8</sup> Because of the lengthy time period over which  $\eta$  is estimated we include year fixed effects to absorb all unobserved temporal variation that might explain differences in investment sensitivity. Additionally, because companies might have changed the scope of their activities – which may affect their investment policy and usage of external financing, we execute two separate robustness checks. First, we correct our estimates for the firm's age (as measured by the number of years since the first appearance in the Compustat database) in order to capture life-cycle effects. Second, we use a fixed effects estimator, including firm-fixed effects, time-fixed effects and industry-year fixed effects with Driscoll-Kraay (1998) heteroskedastic and autocorrelation-consistent standard errors. This separate estimator, allows us absorb firm specific non-time varying effects, absorb time-varying effects but also absorb industry specific time-varying dynamics, we find that all effects remain.

<sup>&</sup>lt;sup>8</sup> We refrain from using firm-fixed effects as we are primarily interested in explaining between-firm variation rather than within-firm variation. In our robustness tests we also include age-decile-fixed effects to account for a potential life-cycle effect. We find that older firms have lower investment sensitivities; however, all the results presented hold. In a robustness test we use a GMM-estimator and a firm fixed effect estimator. We find that all results hold.

#### 5. Results

Baseline

[Insert Table 1 and 2]

Table 1 provides the descriptive statistics for all our variables. Overall, our sample consists of large and mature firms that are of economic importance. We specify our control firms accordingly, large and mature firms without market power. In *Table 2* we estimate the effect of market power on investment sensitivities (H1). Model I is our baseline model, which only includes control variables. Model II, III and IV use alternative definitions of market power. Using the most common industry classification scheme (SIC, Model IV), we discuss our results. Consistent with our predictions we find that firm's with market power invest approximately 3.1 percent less of their increases in added value than those firms without market power. That is, if an average firm ( $\eta = 6.6\%$ ) gains market power, investment sensitivities would drop by 3.1% ( $\eta = 3.5\%$ ), which is a reduction of 47%. This effect can be considered economically large; that is a \$1 increase in added value will result in \$0.47 diverted away from investments.

Our control variables all have the expected sign and are statistically significant. We find that large and profitable firms exhibit higher investment sensitivities. Similarly firms with more growth opportunities are more likely to exhibit higher investment-to-added-value sensitivities. For the firm's cash position we find that it has a negative effect on the firm's investment sensitivity. This finding is consistent with Cleary (2005) who documents that firms that are building up financial slack exhibit lower investment-cash flow sensitivities. Additionally we find a negative effect for the firm's tangibility. That is, firms with a substantial proportion of their assets tied up in long-term property, plants or fixed equipment invest less of their increases in added value as the investment recovery time of their assets is higher. Finally, we find that the firm's leverage is negatively related to investment sensitivities. Moreover, for firms that are highly levered the threat of liquidation is more substantial, as a consequence they are more likely to divert funds away from investments and towards debt reduction. In summary, we find abundant and robust evidence for our first hypothesis that market power is negatively related to investment sensitivity.

Before we can assess our other hypotheses, we examine the separate impact of our proxies of financial flexibility on investment sensitivities. Table 3 shows the effect of the firm's financial flexibility status on investment-to-added-value sensitivities. Models I, II and III highlight the ordinary effect of the firm's debt capacity, firms operating above their target debt (i.e. depleted debt capacity) and firms operating with a financing deficit. When we take into account the possibility that firms have depleted their debt capacity or are operating with a financing deficit (Model III), we find that a one standard deviation increase in the firm's debt capacity increases the firm's investment sensitivity by approximately 14%. Firms operating above their target debt (i.e. with depleted debt capacity) have approximately 1.2% lower investment-to-added value sensitivities. However, these effects do not take into account the asymmetric nature of capital structure decisions, as suggested by Byoun (2008). To this end, Model IV allows for the asymmetry interaction effects between debt capacity, above target debt and deficit.

We report three distinct results. First, we find that firms that have depleted their debt capacity (yet have sufficient internal funds) exhibit a higher investment sensitivity for each unit of debt capacity that they recover. This finding highlights the asymmetric nature of capital structure decisions. Where firms with increased capital costs are disciplined by debt holders to make their investments "count". That is, these firms have approximately 26% higher investment sensitivities for every one standard deviation increase in their debt capacity. Put differently, as firms with depleted debt capacity recover their ability to fund investments with debt, firms will invest more of their increases in added value. This finding is consistent with De Jong et al. (2012) who show that firm's with more debt capacity invest more in future periods.

Second, we find that when firms that are forced to raise money on external markets, yet have not depleted their debt capacity also exhibit highest investment sensitivities as their debt capacity increases. This highlights the disciplining role of external markets and the fact that financial markets stimulate growth (e.g. Jayaratne and Strahan, 1996; Rajan and Zingales, 1998; Wurgler, 2000). These firms are willing to invest approximately 35% more for every one standard deviation increase in their debt capacity. These findings are consistent with literature on financial constraints (e.g. Fazzari et al.,1988; Kaplan and Zingales, 1997; Whited, 1992; Almeida and Campello, 2007) or studies that show that the firm's debt capacity is a key determinant in the firm's investment decision (De Jong et al., 2012).

Third, we find that fully constrained firms (firms that have depleted their debt capacity and have insufficient internal funds) exhibit lower investment sensitivities as their debt capacity increases. This effect is considerable, a one standard deviation increase in the firm's debt capacity will cause these firms to have approximately 30% lower investment-to-added value sensitivities. This finding implies firms have an incentive to restore their debt capacity at the expense of their investments. This finding is consistent with the asymmetric nature of the firm's capital structure and investment decisions (e.g. Byoun, 2008).

#### [Insert Table 4]

We then continue to examine our second and third hypothesis. We test if proxies for market power and financial flexibility jointly determine investment sensitivities (H2). Furthermore we explicitly test if firms with market power and financial flexibility invest less for each additional unit of added-value generated (H3). Table 4 describes the effects of the interaction between market power and the firm's financial flexibility status. We compare firms with and without market power across different levels of financial flexibility. That is, we have a control group (CG), which is comprised of large and mature firms that have no market power, are operating with a financing surplus and have sufficient debt capacity. We report five distinct results.

First, we find that firms with market power (below target and financing surplus) exhibit approximately 4% lower investment-to-added-value sensitivities. These firms prefer preserving debt capacity (e.g. Lemmon and Zender, 2004) to fend off future predatory behavior from competitors (Bolton and Scharfstein, 1990). This finding is also consistent with De Jong et al. (2012) who show that firms with more unused debt capacity invest more in future periods. This confirms our second and third hypothesis that market power and financial flexibility jointly determine investment sensitivities. We conclude that the most financially flexible firms with market power have lower investment sensitivities compared to those without market power.

However, there are more dynamics at play. Our second finding relates to when firms are faced with a financing deficit. Firms with market power exhibit approximately 3.7% higher investment sensitivities compared to the same firms without market power. These firms have sufficient debt capacity, yet are unable to fund investments using internally generated funds. This is because firm's operating with market power are better able to extract rents from their markets

(Akdoğu and MacKay, 2008), and can subsequently use this ability to access their low-cost debt capacity. This finding is consistent with the finding that cash flows are important for corporate investments (Lewellen and Lewellen, 2016). Their counterparts however, (those with without market power) invest approximately 2.1% less of their increases in added value, compared to the control group. This suggests that internally generated funds are more important for firms without market power. Third, we find that firms with market power that are fully financially flexible (below target and surplus) exhibit lower investment sensitivities. We find that a one standard deviation increase in the firm's debt capacity reduces the firm's investment sensitivity by 26%. This highlights the firm's preference to preserve its debt capacity at the expense of investments.<sup>9</sup>

Fourth, we find that firms with market power (below target and with a deficit) exhibit lower investment sensitivities. Compared to the same firms without market power, this effect is approximately 63% (for a one standard deviation increase in debt capacity). The intuition is as follows: (a) Firms with market power (below target and deficit) are disciplined by external markets when raising funds for their investments. However, (b) given the low liquidation threat, the market discipline will be weaker when these firms have more debt capacity. For firms without market power (below target), they have sufficient debt capacity, but ar unable to borrow against their cash flows (deficit). The lack of market power induces a high threat of liquidation. Suggesting that financial markets have to stimulate firms to increase future profitability (by directing more funds towards investments) at the expense of their debt capacity. More importantly, for firms with market power delaying investments is highly valuable, as such this finding is consistent with Akdoğu and MacKay (2008).

Our fifth finding demonstrates the opposite effect when firms have depleted their low-cost debt capacity (i.e. operate above their target debt). We find that firms with market power that are fully constrained (above target and deficit) exhibit approximately 68% higher investment-to-added-value sensitivities compared to the same firms without market power for every standard deviation increase in their debt capacity. When firms experience an increase in debt capacity whilst operating above their target (and have a deficit), they are recovering their debt capacity. More

<sup>&</sup>lt;sup>9</sup> This effect however is no longer statistically significant (yet still of significant economic magnitude) when we correct for the firm's ex ante probability of operating above or below their target. The fact that this finding is no longer statistically significant when we correct for this endogenous selection problem is not surprising. Consistent with Bolton and Scharfstein (1990), firms with market power have an incentive to preserve their debt capacity. That is prior to every period, these firms choose to operate below their target debt. In our robustness tests we show that firm's that are more likely to operate below their target debt have approximately 6% higher investment sensitivities. All main results hold after this correction.

specifically, this is reducing the capital costs. That is, as firms recover their debt capacity, those with market power will start to invest more in order to reap the future benefits. This finding is consistent with De Jong et al. (2012) who show that firms with above median financial flexibility investment more in future periods.

The conclusions from Table 4 are threefold. First, financially flexible firms with market power have lower investment sensitivities. Second, internally generated funds are more important for firms without market power. Third and consistent with our third hypothesis, we find that market power and a high degree of financial flexibility induce low investment sensitivities. In summary, we find sufficient and robust evidence consistent with our hypothesis that investment sensitivity is determined by the interaction of market power and financial flexibility. We confirm that market power induces a principal link between the firm's financial flexibility status consistent with the prediction from Cooper and Ejarque (2003).

#### Shocks to income

To facilitate the identification of our effects we examine how firms make investment decisions when faced by shocks to their income. Recent literature suggests that the firm's financial flexibility absorbs shocks to the firm's income (e.g. Daniel et al., 2010; Lambrecht and Myers, 2012; Hoang and Hoxha, 2016; Fliers, 2019). We identify positive and negative shocks as changes to the firm's income larger than 2% of its total assets (at t-1). Table 5 reports the results across 4 different types of firms. Firms that report (a) an increase in profits; (b) a negative change in their income; (c) a positive shock in their income and (d) a negative shock in their income. We highlight three main results.

#### [Insert Table 5]

First, we find that when faced with normal increase in profits, firms with market power show lower investment sensitivities when fully financially flexible (-0.047). However, for a oneunit increase in debt capacity, firms that have exhausted borrowing capacity and have a financing surplus show significantly higher investment sensitivities (1.175 vs. -0.885). These firms (with market power) use internal funds for investments enabling them to capture additional rents and exhibit higher investment sensitivities. Second, when faced with a reduction in profits, firms with market power and a financing surplus will invest more than their counter parts if they have sufficient debt capacity. When this debt capacity is depleted, market power induces lower investment sensitivities. These two findings suggest that changes in the firm's profitability are absorbed differently conditional on the firm's market power status and the firm's ability to absorb shocks through the capital structure (e.g. Fliers, 2019).

Third, we find that when faced with a positive shock to profits, firms with market power, a financing surplus, and depleted low-cost debt capacity show lower investment propensities as debt capacity increases, directing funds to restore debt capacity. Firms without market power, facing liquidation threats, use additional profits to reduce debt. This is consistent with the idea that firms want to maintain or preserve their financial flexibility (e.g., Dennis, 2011; Lin et al., 2023).

Fourth, we find that firms with market power operating with a surplus and limited debt capacity exhibit higher investment sensitivities compared to firms without market power (as debt capacity increases). That is, when faced with a negative shock, these firms are disciplined by their debt overhang to have higher investment sensitivities. These findings suggest that market power induces a principal link between the firm's financial flexibility status and investment sensitivities. We find that the firm's debt capacity in particular is very important in absorbing shocks to the firm's income in order to facilitate investments.

In Appendix C, we provide a number of robustness tests dealing with endogeneity concerns and the sensitivity of our results. Even when using a firm-fixed effect estimator or when correcting for M&A and other possible cofounders such as dividends (payout and payer), business composition (single segment), age effects (age quartiles), pricing efficiency (price-cost margin), industry concentration (HHI), and market share, we find that our results hold. Additionally, we also correct for different types of endogenous selection and find that our results hold.<sup>10</sup>

#### 6. Conclusion

We show that market power induces a principal link between financial flexibility and investments. We have tested three explicit hypotheses. First, we show that firms with market power have lower investment-to-added value sensitivities. This finding is consistent with Akdoğu and MacKay (2008) who show that in industries with limited competition, the value of deferring current

<sup>&</sup>lt;sup>10</sup> All results are available upon request.

investments is high. Second, we then test Cooper and Ejarque's (2003) theoretical predictions, that a firm's investment policy is jointly determined by market power and financial variables. We then show that fully financially flexible firms with market power have significantly lower investment sensitivities. This is consistent with Bolton and Scharfstein (1990), who state that for these firms, delaying investments is particularly valuable as it allows them to preserve their debt capacity and fend off future predatory attacks on their market share. We find that indeed the firm's debt capacity is an important moderator for the effect of market power on the firm's investment sensitivities as the firm's debt capacity absorbs shocks to the firm's income (e.g. Fliers, 2019).

As such, we make three important contributions. First, to the best of our knowledge, this is the first study to empirically show that firms with market power invest less as their added value increases, and that market power introduces a principal link between financing and investments (e.g. Bolton and Scharfstein, 1990; Cooper and Ejarque ,2003; Akdoğu and MacKay, 2008). This link has previously been overlooked in the empirical literature. Second, we thus contribute to the literature on how financial flexibility improves firm value (e.g. Wu et al., 2023) and how financial flexibility enhances investment efficiency (e.g. Wu et al., 2024). Third, our study contributes to the understanding of how financing frictions make it valuable for firms to choose policies that preserve financial flexibility (e.g., Dennis, 2011; Rapp et al., 2014). More broadly, we contribute to the literature on the effect of competition to corporate outcomes (e.g. Kumar and Vergara-Alert, 2020; Zhang and Zhou, 2022) and recent developments on the relationship between financial flexibility and investments (e.g. Ferrando et al., 2017; Ma et al., 2024).

This study has a number of limitations. First, our conclusions only pertain to large and mature firms due to data requirements, as such our ability to generalize our findings is limited. Second, whilst we have attempted to address endogeneity concerns and reverse causality problems with several robustness test, we recognize that our empirical treatment is not perfect. Third, we recognize that our proxies for market power (i.e. market share using different industry classification systems) are crude measures of the firm's actual power within an industry. However, this research also presents a way forward. First, we have demonstrated a method to estimate firm specific and time-varying investment sensitivities, overcoming several shortcomings of Wurgler's (2000) model. Second, future research can focus its attention on policy evaluation and assess how exogenous changes in the regulatory environment that shape competition changes corporate investment policies and added-value sensitivities. Third, by estimating investment sensitivities,

future research can also investigate how corporate outcomes change conditional on the firm's sensitivities. Finally, future research may wish to investigate how board members and corporate governance arrangements weakens the link between market power, financial flexibility and investment sensitivities (e.g. Feng et al., 2021).

Overall, we conclude that the role of market power cannot be ignored when examining a firm's investment policies and the importance of financial flexibility. This conclusion is important as it suggests that when policymakers avoid to stimulate competition, corporate investments may be significantly impeded. For investors, these findings highlight the need to closely monitor both the competitive landscape and the financial flexibility of firms in their portfolios. Companies with substantial market power and high financial flexibility may adopt investment strategies that defer investments. However, such firms may also underinvest compared to their peers, which could impact long-term growth prospects. Investors should therefore weigh the benefits of financial flexibility against the risks of reduced investment activity. Additionally, understanding the regulatory environment and potential shifts in market competition is crucial, as these factors can significantly influence a firm's strategic investment decisions. Consequently, investors might consider advocating for policies that encourage competition, thereby promoting a more dynamic and potentially profitable investment environment.

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## Tables

## **Table 1: Descriptive statistics**

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Variable	Mean	median	p25	p75	SD	Ν
Investment sensitivity	0.066	0.086	-0.568	0.734	1.261	23,052
Market power (GIC)	0.638	1.000	0.000	1.000	0.481	23,052
Market power (NAISC)	0.707	1.000	0.000	1.000	0.455	22,990
Market power (SIC)	0.741	1.000	0.000	1.000	0.438	23,052
Debt capacity	-0.005	0.006	-0.030	0.035	0.101	23,052
Above target	0.451	0.000	0.000	1.000	0.498	23,052
Deficit	0.706	1.000	0.000	1.000	0.455	23,052
Firm size (ln)	6.661	6.614	5.267	8.009	2.004	23,052
Profitability	0.053	0.059	0.027	0.092	0.094	23,052
Leverage	0.212	0.200	0.085	0.307	0.162	23,052
Market-to-book (ln)	0.383	0.301	0.043	0.649	0.471	23,052
Cash	0.072	0.037	0.014	0.096	0.088	23,052
Tangibility	0.318	0.278	0.171	0.425	0.198	23,052

	Ι	II	III	IV
Variables	Baseline	GIC	NAICS	SIC
Market power		-0.012*	-0.018**	-0.031***
		(-1.948)	(-2.162)	(-3.557)
Firm size (ln)	0.050***	0.052***	0.053***	0.054***
	(20.254)	(19.236)	(18.614)	(19.105)
Profitability	0.021*	0.022*	0.021*	0.021*
	(1.816)	(1.897)	(1.844)	(1.857)
Leverage	-0.100***	-0.101***	-0.098***	-0.097***
	(-5.966)	(-6.008)	(-5.794)	(-5.761)
Market-to-book	0.023***	0.023***	0.024***	0.024***
	(4.590)	(4.692)	(4.915)	(4.882)
Cash	-0.091***	-0.089***	-0.090***	-0.094***
	(-3.995)	(-3.874)	(-3.871)	(-4.154)
Tangibility	-0.082***	-0.083***	-0.079***	-0.084***
	(-3.113)	(-3.152)	(-2.917)	(-3.143)
Observations	23,052	23,052	22,990	23,052
Number of unique firms	2,489	2,489	2,460	2,489
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Chi-Squared	4,414	4,370	4,187	4,376

## Table 2: Market power and investment sensitivity

Note: The results above are generated using generalized feasible least squares with robust standard errors (clustered at the firm level) and a continuous panel specific (AR1) correlation structure. The dependent variable is estimated sensitivity from equation 1. Standard errors are weighted by the inverse of the estimation error  $\eta 1$  from equation 1. All variables are defined as in Appendix B.

Variables	Ι	Π	III	IV
Debt capacity	0.048***	0.095***	0.094***	-0.070
1 5	(3.490)	(6.137)	(6.082)	(-1.503)
Above target	~ /	0.013***	0.012***	0.013**
C		(4.958)	(4.628)	(2.360)
Deficit			-0.004	-0.010*
			(-1.293)	(-1.785)
Above target x Debt capacity				0.168***
				(3.240)
Deficit x Debt capacity				0.231***
				(3.774)
Above target x Deficit				0.001
				(0.155)
Above target x Deficit x Debt capacity				-0.194***
				(-2.802)
Market power	-0.032***	-0.032***	-0.031***	-0.029***
	(-3.587)	(-3.600)	(-3.530)	(-3.262)
Observations	23,052	23,052	23,052	23,052
Number of unique firms	2,489	2,489	2,489	2,489
Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Chi-Squared	4,337	4,057	4,078	4,481

### Table 3: Financial flexibility status and investment sensitivity

Note: The results above are generated using generalized feasible least squares with robust standard errors (clustered at the firm level) and a continuous panel specific (AR1) correlation structure. The dependent variable is estimated sensitivity from equation 1. Standard errors are weighted by the inverse of the estimation error  $\eta 1$  from equation 1. All variables are defined as in Appendix B. Leverage has been orthogonalized to all control variables and deviation of the target debt. All estimations contain year- and industry-fixed effects.

#### Table 4: Interaction effects between market power and financial flexibility

	Baseline effect		
	Market power	Non market power	Difference
Surplus			
Below target	-0.040***	CG	
Above target	0.008	0.008	0.000
Difference	-0.048**		
Deficit			
Below target	0.017	-0.021**	0.037*
Above target	-0.000	-0.000	0.000
Difference	0.017	-0.020	
	Debt capacity		
	Market power	Non market power	Difference
Surplus			
Below target	-0.173*	0.029	-0.199
Above target	0.126	0.097	0.029
Difference	-0.296	-0.068	
Deficit			
Below target	-0.112	0.305***	-0.415**
Above target	0.160	-0.291***	0.45**
Difference	-0.270	0.595***	
Observations		23,052	
Number of unique firms		2,489	
Controls		YES	
Year FE		YES	
Industry FE		YES	
Chi-Squared		5,268	

Note: The results above are generated using generalized feasible least squares with robust standard errors (clustered at the firm level) and a continuous panel specific (AR1) correlation structure. The dependent variable is estimated sensitivity from equation 1. Standard errors are weighted by the inverse of the estimation error  $\eta 1$  from equation 1. All variables are defined as in Appendix B. Leverage has been orthogonalized to all control variables and deviation of the target debt. The estimation contains year- and industry-fixed effects.

## Table 5: Shocks to the firm's income

	<i>Increase</i> Baseli	es in profits ine effect			<i>Reductio</i> Baseli	<i>n in profits</i> ne effect	
	Market power	Non market power	Difference		Market power	Non market power	Difference
Surplus			_	Surplus			_
Below target	-0.047**	CG		Below target	-0.038	0.007	-0.037
Above target	0.012	-0.014	0.022	Above target	-0.004	0.043	-0.043
Difference	-0.052		_	Difference	-0.03	-0.036	_
Deficit			_	Deficit			_
Below target	0.013	-0.031	0.043	Below target	-0.004	0.033	-0.033
Above target	0.047	-0.030	0.077	Above target	0.001	-0.052	0.051
Difference	-0.034	0		Difference	-0.001	0.083	
	Debt	capacity			Debt	capacity	
	Market power	Non market power	Difference		Market power	Non market power	Difference
Surplus			_	Surplus			_
Below target	-0.328	0.105	-0.425	Below target	0.895*	-0.557*	1.445**
Above target	1.175**	-0.885**	2.055**	Above target	-1.910**	1.702**	-3.612**
Difference	-1.162**	0.85*		Difference	2.805**	-2.252**	
Deficit			_	Deficit			_
Below target	-0.055	0.455	-0.505	Below target	-0.045	-0.211	0.17
Above target	-0.111	-0.275	0.16	Above target	0.450	-0.416	0.86
Difference	0.060	0.725		Difference	-0.490	0.2	

#### Table 5: Shocks to the firm's income (continued)

	<i>Positive shocks</i> Baseline ef	(>2%) fect Non market			Negative sh Baseline	ock (>2%) e effect Non market	
	Market power	power	Difference		Market power	power	Difference
Surplus				Surplus			
Below target	-0.017	0.015	-0.025	Below target	0.056	-0.032	0.086
Above target	-0.028	0.035	-0.055	Above target	0.041	-0.080	0.121
Difference	0.01	-0.020	_	Difference	0.015	0.05	_
Deficit			_	Deficit			
Below target	0.024	-0.018	0.034	Below target	-0.087*	0.050	-0.13
Above target	-0.040	0.035	-0.075	Above target	0.096	-0.023	0.116
Difference	0.064	-0.045		Difference	-0.176	0.070	_
	Debt capac	rity					
		Non market				Non market	
	Market power	power	Difference		Market power	power	Difference
Surplus			7	Surplus			7
Below target	0.294	-0.379*	0.664	Below target	-0.621	0.481	-1.101
Above target	-1.284**	1.473***	-2.753***	Above target	1.500	-1.692**	3.19*
Difference	1.574*	-1.843***		Difference	-2.120	2.171*	
Deficit				Deficit			_
Below target	-0.540	0.363	-0.903	Below target	0.860	-0.449	1.3
Above target	0.638	-0.512	1.148	Above target	-0.780	0.872	-1.652
Difference	-1.178	0.873		Difference	1.640	-1.312	
Observations				19,513			
Controls				YES			
Year FE				YES			
Industry FE				YES			
Chi-Squared				4,843			

Note: The results above are generated using generalized feasible least squares with robust standard errors (clustered at the firm level) and a continuous panel specific (AR1) correlation structure. The dependent variable is estimated sensitivity from equation 1. Standard errors are weighted by the inverse of the estimation error  $\eta$ 1 from equation 1. All variables are defined as in Appendix B. Leverage has been orthogonalized to all control variables and deviation of the target debt. Shocks to the firm's income are defined as a change in the firm's net income larger than 2% with a one year lag. The estimation contains year- and industry-fixed effects.

#### **Appendix A: Measuring Financial Flexibility**

**Debt capacity:** As a proxy to the firm's financial flexibility we calculate how much it deviates from its target debt. We follow Byoun (2008) and Elsas and Florysiak (2015) and estimate the following equation for the firm's target debt:

$$\left[\frac{D}{A}\right]_{i,t}^* = \lambda X_{i,t} + \epsilon_{i,t}$$
(A1)

where  $\left[\frac{p}{A}\right]_{i,t}^{*}$  is the firm's target debt and  $X_{i,t}$  is a vector of control variables as defined in Byoun (2008). We include the industry median debt ratio, marginal tax rate, operating income, market-to-book, total assets (ln), depreciation, fixed assets, research and development expenses (including a dummy variable when reported zero or missing), dividends, and Altman's Z-score (as in MacKie-Mason (1990)). However, due to the fact that our dependent variable is a fractional response variable, censored at both the left (zero) and the right (one) side of the distribution, we follow Elsas and Florysiak (2015) and estimate a double censored Tobit-regression given by

$$\begin{bmatrix} \underline{D} \\ \overline{A} \end{bmatrix}_{i,t} = \begin{cases} 0, & \begin{bmatrix} \underline{D} \\ \overline{A} \end{bmatrix}_{i,t}^* \leq 0 \\ \begin{bmatrix} \underline{D} \\ \overline{A} \end{bmatrix}_{i,t}^*, & 0 < \begin{bmatrix} \underline{D} \\ \overline{A} \end{bmatrix}_{i,t}^* < 1 \\ 1, & \begin{bmatrix} \underline{D} \\ \overline{A} \end{bmatrix}_{i,t}^* \geq 1 \end{cases}$$
(A2)

Our target debt measure is then the fitted value from the doubly censored Tobit, as depicted in equation 2 and 3. Our first proxy for the firm's financial flexibility is then given by the difference between the firm's target debt  $\left(\left[\frac{D}{A}\right]_{i,t}^{*}\right)$  and the firm's observed debt level  $\left(\left[\frac{D}{A}\right]_{i,t}^{*}\right)$ . This measure can also be interpreted as the firm's debt capacity. We argue that firms with more debt capacity are better able to fund their investments.<sup>11</sup>

$$Debt \ capacity = \left[\frac{D}{A}\right]_{i,t}^* - \left[\frac{D}{A}\right]_{i,t}$$
(A3)

The intuition follows De Jong et al. (2012) who show that firms high debt capacity invest more in future periods (i.e. delay investments) and Lemmon and Zender (2004) show that firms have an incentive to preserve (current) financial flexibility in order to secure (future) investments.

<sup>&</sup>lt;sup>11</sup> DeAngelo et al., (2011, p258) point out that "the firm's ex ante optimum debt level reflects the value of the option to use its debt capacity to borrow ex post and deliberately, but temporarily, move away from target to fund investment."

Dasgupta et al. (2011) show that when firms are more constrained (i.e. have lower debt capacity) a smaller fraction of cash flows is absorbed by investment and more cash is directed towards leverage reduction. Alternatively, firms that have more debt capacity are better able to fund their investments using external funding. As a consequence, if a firms have an incentive to preserve their debt capacity (Lemmon and Zender, 2004), we expect firms with more debt capacity to invest more as their added value increases. However, this effect is conditional on the degree to which firms have access to this low-cost debt capacity. That is, firm's that may have depleted their debt capacity (i.e. are operating above their target debt) or can operating with a financing deficit.

**Above target debt:** In order to assess whether firms have depleted their (low-cost) debt capacity, we estimate a binominal variable based on the firms deviation from its target debt.

Above target debt = 
$$\begin{cases} 1, \qquad \left[\frac{D}{A}\right]_{i,t}^* - \left[\frac{D}{A}\right]_{i,t} < 0\\ 0, \qquad \left[\frac{D}{A}\right]_{i,t}^* - \left[\frac{D}{A}\right]_{i,t} \ge 0 \end{cases}$$
(A4)

This variable captures the firm's preferences for reducing its debt burden rather than to invest its assets (Byoun, 2008). Moreover, this idea is consistent with Lemmon and Zender (2004) and De Jong et al. (2012) who argue that firms prefer to retain their debt capacity.

**Deficit:** To assess the firm's availability of internal funds we calculate the firm's external financing demand. Consistent with prior literature (e.g., Myers and Majluf, 1984; Byoun, 2008), we argue that firms that operate with a financing deficit are forced to fund their investments by raising capital from external markets. We measure the financial deficit/surplus using the following cash flow identity:

$$OCF_{i,t} - I_{i,t} - \Delta W_{i,t} = -\Delta D_{i,t} + DIV_{i,t} + \Delta E_{i,t}$$
(A5)

$$FD_{i,t} = DIV_{i,t} + I_{i,t} + \Delta W_{i,t} - OCF_{i,t}$$
(A6)

where  $OCF_{i,t}$  is the firm's operating cash flow after interest and taxes;  $I_{i,t}$  is net investments;  $\Delta W_{i,t}$  is the change in net working capital;  $\Delta D_{i,t}$  is the net long-term debt issues;  $DIV_{i,t}$  is the dividend payments made; and  $\Delta E_{i,t}$  is the net equity issuance.<sup>12</sup> From equations 6 and 7 we can see that a

<sup>&</sup>lt;sup>12</sup> As in Byoun (2008) we follow Frank and Goyal (2003). Specifically, we treat missing values that are not reported or combined with other data items in the definition of OCF as zero. Our approach, in full, replicates the methodology presented in Byoun (2008), including the corrections for different cash flow reporting formats. For a more elaborate description of all corrections, see Byoun (2008).

negative financial deficit implies a financial surplus. Our indicator for firms with a financial deficit is then the following:

$$Deficit = \begin{cases} 1, & FD > 0\\ 0, & FD \le 0 \end{cases}$$
(A7)

We expect that firms with a financing deficit have insufficient internal funds to be able to fund their investments. As such, firms operating with a financing deficit will be less prone to direct funds towards investments when increases in added value occur. However, we expect this effect to be conditional on the firm's debt capacity. Where firms with more debt capacity, yet operating with a financing deficit are expected to be more willing to invest more, these firms are forced to raise funds externally and face the disciplining effect of financial markets.

Variables	Definition
Investment sensitivity	$\eta$ from Equation 1
	Market power
SIC	1 if the firm belongs to the top 33% of its 2-digit SIC industry and zero otherwise
GIC	1 if the firm belongs to the top 25% of its 2-digit GIC industry and zero otherwise
NAICS	1 if the firm belongs to the top 33% of its 2-digit NAICS industry and zero otherwise
	Financial flexibility
Deviation from target debt	Equation A3
Above-target debt	Equation A4
Financing deficit	Equations A7
Leverage	Long-term debt plus current portion of long-term debt to total assets
	Standard control variables
Total assets	Log total assets
Profitability	Net income to total assets
Market-to-book	The market value of assets equals total assets minus total equity minus balance sheet deferred taxes and investment tax credit plus the market value of common equity plus preferred stock liquidating value (replaced by the redemption value of preferred stock when missing)
Cash	Cash holdings to total assets
Tangibility	Net property plant and equipment to total assets
	Robustness variables
Payout ratio	Common dividends paid to net income
Payer	1 if payout is $> 0$ , zero otherwise
Firm age	Number of years listed in the Compustat/CRSP universe
Single-segment firm	1 if and only if a firm is operating in only one business segment
Price-cost-margin	Sales minus costs of goods sold minus selling and administrative expenses minus depreciation to sales
Four-digit HHI	Sum of squared market share at 4-digit SIC industries
Market share	Sales to total industry sales based on 2 digit SIC codes

# **Appendix B: Variable definitions**

#### **Appendix C: Endogeneity concerns and robustness**

[Insert Table C1 and C2]

The analysis presented might potentially suffer from endogeneity and robustness problems. To address these potential issues we execute a wide variety of robustness tests. First, *Table C1*, replicates Table 4 using a firm-fixed effect estimator, to ensure that our results hold when correcting for firm-specific unobservables and reverse causality. We find that all our results hold. Another, potential concern is a simultaneity bias where our variables of interest (financial flexibility measures) predict product market success or that our measure of investment sensitivities predicts the firm's product market success. To this end we estimate a series of logit models to predict the probability that a firm will have market power up to ten years in the future. We find that our variables of interest are unrelated to our different measures of market power.<sup>13</sup> Additionally, there may be non-linear effects when using a firm's debt capacity as a proxy to explain investments (e.g. Fliers, 2019). To take this into account we estimate our models with indicator variables for deciles of debt capacity. Figure C1 shows that we find a consistent negative and linear effect.

We execute various robustness tests to investigate the sensitivity of our results. *Table C2* shows the results. In Model 1 we include two inverse Mills ratios from a probit regressions, explaining the selection choice of firms to operate above their target debt and firms operating with a financing deficit (e.g. DeAngelo, et al., 2011). That is, we correct for a possible endogenous selection problem, where firms ex ante select themselves into a group of firms that operate above their target debt (deficit) because they have large investment opportunities.<sup>14</sup> In addition, we include various possible other control variables: dividends (payout and payer), business composition (single segment), age effects (age quartiles), pricing efficiency (price-cost margin), industry concentration (HHI), and market share. Additionally, we correct for acquisition expenses and the acquisition behavior (reported acquisition expenses) as this could be an important source of investments for large and mature firms. We find that our main results hold.<sup>15</sup>

<sup>&</sup>lt;sup>13</sup> All results are available upon request.

<sup>&</sup>lt;sup>14</sup> Our instrument is the total income taxes paid. This variable is uncorrelated to the estimated investment sensitivities (3.2%) and to the error term of the model presented in Table 4 (4.3%), but it is predictive for the firm's choice of operating with financing deficits and above-target debt. <sup>15</sup> In unreported tests we examine alternative specifications of equation 1. We include R&D in our capital expenditures, use alternative deflators. For our main analysis, we correct of the firm's market share, debt capacity and target debt and confirm our estimations using a GMM procedure.

A final concern could be that there a significant covariate imbalances between our treatment (firms with market power) group and our control group (firms without market power). To this end, we calculate average treatment effects of market power conditional on the firm's financial flexibility. Our control group consists of firms without market power, and with financing surplus and sufficient debt capacity. Our propensity score model matches firms on the set control variables used in Table 2, the industry, and the year in which the firms were observed. We require 12 matches for each treated firm to ensure that the treatment effects are not driven by outliers. We find that all results hold.<sup>16</sup>

<sup>&</sup>lt;sup>16</sup> All results are available upon request.

	Baseline effect	t			
	Market power	Non market power	Difference		
Surplus					
Below target	-0.218**	CG			
Above target	0.104	-0.077	0.174		
Difference	-0.314**		_		
Deficit					
Below target	0.183**	-0.144**	0.323**		
Above target	-0.056	0.064	-0.114		
Difference	0.233	-0.204*			
	Debt capacity	,			
	Market power	Non market power	Difference		
Surplus					
Below target	0.371	-0.614	0.981		
Above target	-0.279	0.762*	-1.032		
Difference	0.641	-1.372*	_		
Deficit					
Below target	-0.802	1.118**	-1.918*		
Above target	1.189	-1.302**	2.489*		
Difference	-1.989	2.418**	_		
Observations		23,052			
Number of unique firms		2,489			
Log-Likelihood		-29,843			
Controls		YES			
Year FE		YES			
Firm FE		YES			

# Table C1: Interaction effects between market power and financial flexibility (robustness, firm-fixed effects)

Note: The results above are generated using a firm-fixed effect estimator, where the standard errors are clustered at the firm level. The dependent variable is estimated sensitivity from equation 1. All variables are defined as in Appendix B. Leverage has been orthogonalized to all control variables and deviation of the target debt. Shocks to the firm's income are defined as a change in the firm's net income larger than 2% with a one year lag. The estimation contains year- and firm-fixed effects.

## Table C2: Robustness

Variables	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
M&A (0/1)										0.006
										(1.597)
M&A expenses									0.007	-0.008
									(0.324)	(-0.345)
Market share (log, 2 digit SIC)								-0.191	-0.209*	-0.201
								(-1.540)	(-1.672)	(-1.589)
Herfindahl index (4 digit SIC)						-0.017	-0.017	-0.017	-0.048**	-0.046*
						(-1.309)	(-1.320)	(-1.300)	(-1.992)	(-1.904)
Price-cost margin							-0.051**	-0.043*	-0.017	-0.018
							(-2.159)	(-1.821)	(-1.325)	(-1.355)
Age (3rd Quartile)					0.011**	0.012**	0.012**	0.012**	0.016***	0.016***
					(2.293)	(2.401)	(2.472)	(2.369)	(2.801)	(2.845)
Age (4th Quartile)					0.061***	0.062***	0.062***	0.061***	0.065***	0.066***
					(7.121)	(7.206)	(7.359)	(7.181)	(7.201)	(7.287)
Single segment (0/1)				-0.003	0.000	0.000	-0.000	0.000	0.001	0.002
				(-0.430)	(0.020)	(0.020)	(-0.040)	(0.046)	(0.142)	(0.218)
Dividend payment			0.006	0.007	0.006	0.003	0.003	0.003	0.003	0.002
			(1.057)	(1.172)	(1.019)	(0.452)	(0.475)	(0.464)	(0.405)	(0.268)
Dividend payer		-0.006	-0.006	-0.006	-0.011	-0.009	-0.009	-0.009	-0.008	-0.008
		(-0.769)	(-0.811)	(-0.805)	(-1.450)	(-1.260)	(-1.171)	(-1.201)	(-1.106)	(-1.083)
Inverse mills ratio - financing deficit	0.014	0.013	0.024	0.029	0.023	0.005	0.006	0.008	0.011	0.010
	(0.833)	(0.799)	(1.037)	(1.222)	(0.953)	(0.198)	(0.223)	(0.300)	(0.432)	(0.374)
Inverse mills ratio - Above target	0.061***	0.063***	0.066***	0.067***	0.062***	0.046***	0.045***	0.046***	0.045***	0.044***
	(5.742)	(6.006)	(5.575)	(5.734)	(5.423)	(3.310)	(3.249)	(3.312)	(3.138)	(2.983)

## Table C2 (continued)

Variables	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Debt capacity	0.014	0.012	0.019	0.015	0.001	0.001	0.001	0.004	0.012	0.018
	(0.198)	(0.182)	(0.269)	(0.217)	(0.020)	(0.021)	(0.015)	(0.060)	(0.184)	(0.259)
Above target	0.009	0.008	0.007	0.007	0.003	0.003	0.003	0.003	0.004	0.003
	(0.908)	(0.878)	(0.728)	(0.668)	(0.322)	(0.356)	(0.300)	(0.338)	(0.374)	(0.278)
Above target x Debt capacity	0.094	0.094	0.096	0.097	0.110	0.112	0.111	0.115	0.103	0.100
	(1.290)	(1.291)	(1.292)	(1.296)	(1.503)	(1.533)	(1.513)	(1.580)	(1.400)	(1.343)
Deficit	-0.021**	-0.020**	-0.019**	-0.019**	-0.017*	-0.019**	-0.019**	-0.019**	-0.020**	-0.019**
	(-2.235)	(-2.172)	(-2.070)	(-1.986)	(-1.821)	(-2.027)	(-2.064)	(-2.095)	(-2.254)	(-2.052)
Deficit x Debt capacity	0.288***	0.284***	0.270***	0.268***	0.288***	0.301***	0.311***	0.309***	0.301***	0.284***
	(3.061)	(3.021)	(2.979)	(2.961)	(3.453)	(3.569)	(3.699)	(3.662)	(3.538)	(3.272)
Above target x deficit	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.000	-0.000	-0.000	-0.001
	(-0.168)	(-0.159)	(-0.182)	(-0.137)	(-0.135)	(-0.111)	(-0.004)	(-0.036)	(-0.032)	(-0.057)
Above target x deficit x Debt capacity	-0.264**	-0.260**	-0.243**	-0.234**	-0.270***	-0.289***	-0.296***	-0.302***	-0.291***	-0.273***
	(-2.497)	(-2.454)	(-2.319)	(-2.229)	(-2.696)	(-2.860)	(-2.933)	(-2.983)	(-2.850)	(-2.630)
Market power	-0.044***	-0.044***	-0.040***	-0.040***	-0.040***	-0.040***	-0.041***	-0.042***	-0.046***	-0.045***
	(-3.708)	(-3.774)	(-3.311)	(-3.360)	(-3.449)	(-3.381)	(-3.454)	(-3.557)	(-4.141)	(-3.899)
Market power x Debt capacity	-0.135	-0.135	-0.143	-0.137	-0.132	-0.136	-0.131	-0.137	-0.136	-0.144
	(-1.483)	(-1.482)	(-1.557)	(-1.492)	(-1.468)	(-1.505)	(-1.457)	(-1.513)	(-1.500)	(-1.557)
Above target x market power	0.009	0.010	0.009	0.010	0.013	0.012	0.013	0.013	0.014	0.015
	(0.794)	(0.808)	(0.751)	(0.802)	(1.105)	(1.059)	(1.128)	(1.082)	(1.180)	(1.268)
Above target x market power x Debt capacity	0.102	0.105	0.094	0.092	0.090	0.096	0.091	0.091	0.090	0.097
	(1.021)	(1.051)	(0.909)	(0.889)	(0.886)	(0.941)	(0.894)	(0.893)	(0.885)	(0.934)
Deficit x market power	0.018	0.018	0.014	0.014	0.013	0.014	0.015	0.015	0.017	0.016
	(1.612)	(1.602)	(1.275)	(1.213)	(1.140)	(1.268)	(1.364)	(1.365)	(1.538)	(1.446)
Deficit x market power x Debt capacity	-0.102	-0.098	-0.072	-0.067	-0.101	-0.104	-0.117	-0.114	-0.119	-0.107
	(-0.815)	(-0.780)	(-0.576)	(-0.539)	(-0.861)	(-0.884)	(-1.005)	(-0.970)	(-0.998)	(-0.885)
Above target x market power x deficit	0.000	-0.000	0.003	0.002	0.002	0.002	0.000	0.001	0.000	-0.001
	(0.004)	(-0.012)	(0.206)	(0.152)	(0.127)	(0.134)	(0.019)	(0.064)	(0.021)	(-0.107)
Above target x deficit x Debt capacity x market power	0.148	0.141	0.119	0.106	0.158	0.162	0.175	0.178	0.192	0.178
	(1.069)	(1.014)	(0.838)	(0.750)	(1.166)	(1.197)	(1.297)	(1.309)	(1.391)	(1.279)

Variables	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Observations	23,052	23,052	23,052	23,052	23,052	23,048	23,048	23,048	23,048	23,048
Number of unique firms	2,489	2,489	2,489	2,489	2,489	2,487	2,487	2,487	2,487	2,487
Controls	YES									
Year FE	YES									
Industry FE	YES									
Chi-Squared	5,180	5,080	4,548	4,573	5,193	5,126	5,176	5,001	4527	4483

#### **Table C2 (continued)**

Note: The results above are generated using generalized feasible least squares with robust standard errors (clustered at the firm level) and a continuous panel specific (AR1) correlation structure. The dependent variable is estimated sensitivity from equation 1. Standard errors are weighted by the inverse of the estimation error  $\eta 1$  from equation 1. All variables are defined as in Appendix B. Leverage has been orthogonalized to all control variables and deviation of the target debt. Model 1 includes the inverse mills ratio for above-target debt and includes the inverse mills ratio for firms that operate with a financing deficit (obtained from probit estimation, with taxes paid as instrument); Models 2 and 3 control for dividends; Model 4 take into account the firm's diversification in terms of the number of business segments; and Model 5 includes age-decile-fixed effects to capture potential life-cycle effects; Model 6 corrects for industry concentration at the four-digit SIC level; Model 7 controls for price-cost margin; Model 8 controls for the firm's exact market share in terms of sales. Model 9 takes into account the amount of reported acquisition expenses. Model 10 and 11 corrects for acquisitions as a form of investment.



Figure C1: Effect of market power on investment sensitivities for deciles of debt capacity