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Markets and market power

To what extent have market characteristics influenced change in market power and what are the different effects of market settings for business implications

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Abstract

While not much research has been done to identify the effects between market characteristics in relation to market power, this study aims to fill that gap. Worldwide annual accounting data from 01-2010 to 12-2019 has been obtained from Compustat, which is used to calculate the four-firm concentration ratio. The market has been split based on competition and saturation, while these characteristics have been related to changes in market power. Additionally, business level implications are assessed. Although the effects are limited, the results show that market power in competitive markets has grown more than it did in noncompetitive markets. Moreover, I find that the effect of market power on cash balances and dividend payout is highest in noncompetitive and saturated markets. The results of this study imply that a consequence, such as lower consumer well-being, is not only dependent on market power itself, but also on different market characteristics.

Keywords: Market power, Production approach, Competition, Saturation, Four-firm concentration ratio, Cash balance, Dividend payout

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1. Introduction

Over the last decades many researchers have expressed their concerns about market power (e.g. Hall, 1988; Edmond, Midrigan & Xu, 2018). Market power can be described as the ability of a firm to set and maintain prices above the level that would prevail in competition. Although market power does not have any positive implications for consumers and the economy itself (Diez, Leigh, & Tambunlertchai, 2018), Van Reenen (2018) found that market power is increasing. Stiglitz (2016) adds that established firms exploit the market by engaging in anticompetitive actions. This has negatively impacted the markets, since rising inequality across firms is seen. Consequently, market power has become a more pronounced subject for discussion in politics over the past years. Last month, the European Commissioner for Europe, Ager Margrethe Vestager, spoke about revising the rules defining firms' market power (Chee, 2021).

Competitive markets are essential for industries to be efficient. It is, therefore, conflicting that governments gave corporate giants the opportunity to radically transform the competition structure in many sectors (Brondoni, 2019). As this structure in different markets is disturbed while market power still rises, it is interesting to know in which markets the rise in market power has become most prominent. While not much research has been done to identify the effects between market characteristics in relation to market power, this study aims to fill that gap. First, this paper will try to identify whether market characteristics are correlated with market power. Then, it will look at the effects of market power on business implications between markets. Hence, the research question of this study will be defined as follows:

To what extent have market characteristics influenced change in market power and caused different effects for market power on businesses?

I find that markets with high saturation or high competition are positively correlated with change in market power. This indicates that market power has grown more in saturated and competitive markets, than in growing and noncompetitive markets. Although the impact seems limited, it could have welfare and resource allocation implications in saturated and competitive markets.

Next, I find that the effect of market power on cash balances and dividend payout is highest in noncompetitive and saturated markets. This indicates that, in these market settings, firms with high market power are most likely to have high cash balances and dividend payout. While market power has a positive relation with cash balance and dividend payout in all market settings, the welfare and resource allocation implications seem to be the largest in the setting of noncompetitive and saturated. Robustness checks have been executed for all of the abovementioned regressions.

Panel data will be exploited from the WRDS database to identify the effects of market power and its possible consequences. Specifically, worldwide annual accounting data from 01-2010 to 12-2019 has been obtained from Compustat.

To proxy for market power, a markup will be defined as sales over costs. To measure competition, the four-firm concentration ratio will be implemented. With regards to saturation, an industry sales growth measure will be created. Finally, business-level cash balances and dividend payout will directly be observable from the data.

With regards to the literature on market power, multiple studies have shown that market power is increasing (Hall, 1988; De Loecker, Eeckhout, Unger, 2020; Weche & Wambach, 2021). Moreover, market power seems to have many negative implications for the economy, such as lower consumer well-being, decreasing demand for labor, and diminishing innovation and investment (Harberger, 1955; Aghion et al., 2005; Edmond, Midrigan & Xu, 2018). This study attempts to find the effects of market characteristics on market power. Furthermore, this study tries to find the market in which

market power has most influence on a business level. This study contributes to the existing literature by further expanding the research towards different market characteristics. Additionally, the data of the past decade is used in order to obtain the most recent effects. The research shows that market characteristics have different effects on market power and indicates that the latest data seem to present different results than was projected. These different results could be due to changing markets caused by implemented policies or macroeconomic effects. The results of this study imply that a consequence, such as lower consumer well-being, is not only dependent on market power itself, but also on different market characteristics.

The remainder of this paper is structured as follows. Section 2 presents a theoretical framework around market power, the market definition, the business level implications and its effects. Section 3 will consist out of the methodology, which includes the empirical method and specifications employed in the panel analysis. In section 4 the data will be examined that is used for this study. The results of the empirical analysis are presented in Section 5 and discussed in Section 6. Section 7 focusses on the limitations of this study and offers suggestions for future research. Finally, Section 8 concludes.

2. Theoretical framework

2.1 Market Power

In economics and in industrial organization market power can be defined as the ability of a firm to raise and maintain price above the level that would otherwise prevail under competition (Khemani and Shapiro, 1993). Market power has several negative implications, that could vary within industries. Harberger (1955) found that market power has welfare effects. Market power is achieved by a company setting higher prices. Due to higher prices, consumption is lower and a suboptimal number of consumers is priced out of the market. Moreover, Aghion et al. (2005) found that market power suppresses innovation and investment. Furthermore, The Council of Economic Advisors (CEA) (2016) of the Obama administration found other problems when there is little or no competition. First, they see lower quality for consumers, when higher prices are being asked. Second, market entry is made more difficult through high entry barriers. Last, monopolists may be less demanding in chasing cost reductions, since there are no competitors who participate in the same market. According to the CEA there are several causes for market power. The most significant among them are deliberate behavior by firms, mergers & acquisitions and state or local occupational licensing.

Over the last years multiple researchers have expressed their concerns about increasing market power. Stiglitz (2016) found that some of the increase of market power is the result of progression in technology and changes in market structure, which occurs naturally. However, the consequences of this rise are clear in the data. Increasing inequality at every level, not only across individuals, but also across firms. Stiglitz concludes that there should be more of a battle towards efficiency and shared prosperity, as the markets are now functioning on a basis of exploitation. The Council of Economic Advisors (CEA) (2016) of the Obama administration is in line with these worries. In

their article they suggest to reconsider the current US competition policy, because of ongoing anti-competitive developments. The relevant agencies are compelled by presidential order to propose steps to increase competition.

Since 2000, publicly traded firms in the US were examined and it was found that 75 percent of all markets exhibited an increase in concentration. Moreover, almost half of the publicly traded companies disappeared from the market in these last two decades (Grullon et al., 2015). In the research conducted by De Loecker, Eeckhout & Unger (2020) it is found that from 1980 onwards a steady rise of market power was seen. While in 1980 there were markups of only 21% above costs, this grew to 61% in 2016. Along the same timeline, average profit rates increased from one percent of sales to eight percent.

2.2 Market Definition

2.2.1 Competition effects to market power

When the European Union was founded, the borders of many markets were expanded from one to several countries. This event has caused that the markets within the EU increased in competition. Multiple studies have shown that increased competition has reduced mark-ups of firms due to the emergence of the EU (Tybout, 2003; Lundin, 2004). This could imply that increased competition reduces market power, since mark-ups are an indication of market power. Bottasso and Sembenelli (2001) found the same effect in Italy. The authors conclude that economic integration diminishes market power of companies and raises productivity. Moreover, Wilhelmsson (2006) discovered that the drop in cost to enter the market has made contribution to the increase in competition. Other studies have found that firms seeking more competition, by expanding their products to multiple markets, have a negative effect for market power (Thomassen et al. 2017). Similar conclusions have been drawn with regards to the importance of market power

in the airline industry. When an airline industry has only few or no competitors on a route, market power is high. If this occurs, airlines have the ability to mark up price above costs (Borenstein, 1989). In addition, Kim and Singal (1993) found that when competition on these routes decreased, by two merging airlines, prices significantly increased. Indicating increase in market power, with shrinking rivalry.

There are, however, a few studies that suggest otherwise. For example, Badinger (2004) concludes that the impact on mark-ups has been limited, even though the markets that have been analyzed contain considerable variations. Gullstrand and Johansson (2005) found, through decreased mark-ups, that the single market of the European Union has increased competition in some sectors in Sweden. However, in line with the findings of Badinger, several sectors were found not to have been influenced by the increased competition

Overall, it can be concluded that when competition is low or declining, market power will be high or increasing. Moreover, it is logical to assume that there is more market share to be gained in noncompetitive markets. Therefore, the first hypothesis that will be researched in this study is as follows:

H1: Market power has increased more in noncompetitive markets than it did in competitive markets

2.2.2 Saturation effects to market power

Foellmi (2005) found that when the level of saturation in a market becomes larger, the elasticity of demand becomes higher for consumers. Due to the fact that these consumers have a larger range of products to choose from, firms have less opportunity to set higher prices. Moreover, Raman and Chatterjee (1995) found that when markets become more saturated the potential number of customers decreases. This is caused by several factors, such as loss of interest by customers

over time due to the availability of new competitive products. Also the ability to satisfy demand through borrowing and renting the product or to buy these product on a secondary market, has decreased the potential buyers in the market. Khouja and Smith (2007) found that when saturation occurs, optimal pricing is declining. This means that profit maximization is less possible, indicating less market power in the market.

With regards to growing markets, Ganapati (2018) found that real output growth is related to increased concentration in the market. With this increased market concentration, the author also found that markups have been higher. This effect is also seen in the airline industry. After many years of close to zero profit, the airline industry found itself in a demand boom. While the market grew, so did the price to cost ratios (Borenstein, 2011). Another recent trend has been globalization. Berry, Gaynor and Scott Morton (2019) found that “firms with a global supply chain will have access to lower-cost inputs and may then achieve economies of scale, leading to a higher markup. If such a globalized firm gains market share at the expense of domestic rivals, industry markups will rise.” The authors also found that network effects have led to new markets, in which one or a small number of firms dominate a market. This could suggest that growing modern markets have a positive effect on market power.

On the other hand, it is seen that on the supply side there are learning curve effects due to cost dynamics as a market becomes more saturated. This implies declining costs with cumulative production. Moreover, in the specific case of saturated industries firms are more active in exploring for economies of scale, since consumers are looking for cheaper alternatives. Through declining cost of products higher markups can be accomplished, which could lead to more market power (Abell and Hammond, 1979).

In conclusion, most studies indicate that saturation has a negative effect on market power. In growing markets the opposite effect is seen. Market growth is positively correlated with market concentration and higher markups. Therefore, the second hypothesis that will be researched in this study is as follows:

H2: Market power has increased more in growing markets than it did in saturated markets

2.3 Business level implications of Market Power

2.3.1 Cash Balances

The average cash-to-assets ratio has more than doubled between 1980 and 2006, according to Bates, Kahle & Stulz (2009). The authors determined that this perception is due to multiple factors. This ratio has increased because cash flows become riskier and the fact that firms change their financial structure. Hoberg, Phillips and Prabhala (2014) find that more product market threats influence the cash balances positively. Fresard (2010) confirms this finding and adds that large cash reserves lead to systemic future market share gains at the expense of industry rivals. Moreover, Campello (2006) shows that when a firm increases its financial leverage (less cash, more debt), rival firms increase investment in order to obtain market share and drive the more leveraged firm out of business. From a different perspective, Tesler (1966) and Bolton & Scharfstein (1990) argue that firms with high cash balances may increase their output to drive down industry prices. This would suggest that high cash balances have a negative effect on markups and, consequently, market power.

Overall, it is likely to assume that cash reserves lead to systemic future market share gains, implying a positive relation between market power and cash balances. Additionally, more competition implies higher cash balances, while product market threats in saturated industries increases the cash balances as well. In the context of market definition, in competitive and

saturated markets where the average level of product market threats is highest, market power is expected to have a higher positive influence on cash balances. In contrast, in noncompetitive and growing markets where the average level of product market threats is lowest, market power will have a smaller positive influence on cash balances. Therefore, the fifth hypothesis that will be researched in this study is as follows:

H3: In a competitive and saturated market, market power will have a higher influence on cash balances than in noncompetitive and growing market

2.3.2 Dividend Payout

Dividends are more likely to be paid by mature and established firms. This could be due to the financial life cycle in which young firms face relatively ample investment opportunities with scarce resources. Matured companies tend to pay more dividends, since they generally have a higher profitability and fewer attractive investment opportunities. In addition, with increasing market competition, it is found that payouts decrease (Hoberg, Phillips & Prabhala, 2014). Confirming this conclusion, DeAngelo, DeAngelo & Stulz (2006) determined that the trade-off between retention and distribution evolves over time. With accumulating profits and a decline in investment opportunities, paying dividends becomes more desirable as firms mature as well. Peress (2010) adds that firms with market power, which are often seen in concentrated industries, have a more stable cash flow and are therefore more likely to make payouts. Moreover, Fama and French (2001) find that firms with current high-profitability and low-growth rates are more likely to pay dividends, while low-profit/high-growth firms tend to retain profits.

Overall, it can be implied that firms with market power are more likely to make dividend payouts. When a market becomes more competitive, there will be fewer dividend payouts. Moreover, when firms are matured and established in a market, they tend to pay more dividends. In the context of

market definition, in competitive and saturated markets where the average level of profitability is expected to be lowest, market power is expected to have a higher positive influence on dividend payout. In contrast, in noncompetitive and growing markets where the average level of profitability is expected to be highest, market power will have a smaller positive influence on dividend payout.

Hence, the final hypothesis that will be researched in this study is as follows:

H4: In a competitive and saturated market, market power will have a higher influence on the level of dividend payout than in noncompetitive and growing market

3 Data

4.1 Data Sources

The first section of this research will examine whether market power has increased more in noncompetitive and growing markets. The second section of this study will set market power against business level variables. Therefore, worldwide annual accounting data from 01-2010 to 12-2019 has been obtained from Compustat for the purpose of both sections. Compustat is chosen as it is the only data source that offers considerable reportage of firms in the private sector.

For the analysis regarding market power two main variables are necessary, namely yearly sales and yearly costs. Where yearly sales is directly obtainable from Compustat, yearly costs needs to be constructed with multiple other variables. These costs are constructed with COGS, SG&A costs and the WACC of PPEGT. The COGS, SG&A and PPEGT are also directly obtained from Compustat. For the market level analysis, bankruptcies and mergers will be looked at. For the bankruptcy variable, end dates have been assessed within Capital IQ Identifier. For the mergers variable the data has been obtained from Capital IQ transactions. For acquiring as well as target firms, the data of related mergers has been obtained. For the analysis concerning the business level variables, the height of cash balances and dividend payouts will be looked at. Both of the variables were directly obtainable from Compustat. All firms have unique codes that enables to combine various datasets. In this dataset the GvKey, ISIN and Company ID are used. To specify for sectors, the SIC code is obtained.

4.2 Variable specification

In order to calculate market power, various variables will be used. The total sales variable is defined as the amount of sales in million US dollars a firm makes in a year. For total costs, multiple variables will be used. Cost of Goods Sold (COGS) and Selling, General & Administrative

(SG&A) costs are the direct costs components. These datapoints point out the amount of costs a firm makes over a whole year in million US dollars. To complete total costs, the costs of capital will be assessed. For the weighted average cost of capital the following formula will be used: $r_t = (I_t - \pi_t) + \Delta$. Where I_t , π_t , and Δ are respectively the nominal interest rate, the inflation rate, and a depreciation rate. Following the study of de Loecker, Eeckhout & Unger (2020) a WACC of 12% will be used.

In order to define saturation, two growth variables have been constructed. For the second hypothesis, saturation will be defined as the ratio sales in 2010 divided by sales in 2019. For the fourth hypothesis, the saturation variable will be indicated as the difference in total sales compared to previous year. To define competition, a four-firm concentration ratio has been constructed. This variable explains the amount of market share the four largest companies have in percent. As a higher ratio indicates a lower competitive market, these values will be subtracted from 1. This way a lower ratio indicates a lower competitive market.

The variable concerning cash balances will explain the height of the cash balance of a firm at the end of a year. The dividend payout variable will consist out of the total dividend paid in a year. This variable excludes the firm-year datapoints, where no dividend has been paid.

Multiple control variables have been used in the regression. With regards to the number of companies in an industry, the total companies within a sector have been counted. The total sales variable are the overall sales of a firm in a year and the total wages variable are the overall salaries of a firm in a year. In the first and second regression these values have been summed up per sector. For variable bankruptcies a dummy will be used, so that the data will point out a bankruptcy at a given year with '1'. Otherwise the variable will be '0'. In the regressions these bankruptcies are

totalled per industry. For the variable regarding the mergers, the amount of merger per year have been added up, so that every firm-year datapoint is connected to a number of mergers.

In this dataset information of both public as private firms are obtained. As, generally, public firms are larger than private firms, large variation within the dataset can be seen. Therefore, in order to prevent for outliers there has been winsorized. This has been done in the beginning and at the end of tail of the distribution at 1 percent (1 99). The variables which have been winsorized are Sales, COGS, SG&A, PPEGT, Cash, Dividends, Mergers per year, FFCR and Industry growth. Robustness checks have been executed for each regression.

4.3 Summary Statistics

The summary statistics of the dependent and explanatory variables are shown in Table 1. As can be seen, the averages and standard deviation for some variables are given in millions of dollars. Therefore the *Sales* average is approximately equal to \$15 billion. This is about \$1.3 billion more than the average of *Costs*. Both variables are used to create the markup to indicate market power. This variable has a maximum value of 2.04, meaning that a firm makes more than twice the sales over costs. This variable might have been higher, however, due to winsorizing of sales and costs this is the final outcome. The variable *Cash Balance* is on average \$1.7 billion, while *Dividends* has an average of \$269.7 million. This last variable has less observations than the other variables, since not every firm pays out dividend each year. The standard deviation of some variables are higher than the averages. This has as a reason that there is much variation in the data, since private (smaller) as public (larger) firms are used in the dataset. Finally, the observations of competition in 2010 and saturation in 2010 are much smaller in numbers than the other variables. This has as reason that both are sector level observations and have the same values each year.

Table 1: Descriptive Statistics

	Observations	Average	St. Dev.	min	max
Sales (\$ million)	118,848	14,986.9	27,809.8	25.2	87,218.8
Costs (\$ million)	118,848	13,610.3	25,002.3	19.0	80,269.7
Market power (Markup)	118,848	1.10	0.23	0.38	2.04
Cash balance (\$ million)	118,848	1,763.5	3,115.5	2.76	9,703.4
Dividends (\$ million)	55,267	269.7	419.2	0	1,314.1
Competition 2010 (Ratio)	371	0.092	0.12	0.00	0.74
Saturation 2010 (Ratio)	371	-0.054	5.10	-0.99	97.3

Next, in order to give a first impression of the data, market power has been plotted over time. In contrast to the findings by De Loecker, Eeckhout and Unger (2020), market power seems to stay constant over time. This indicates that market power is not rising.

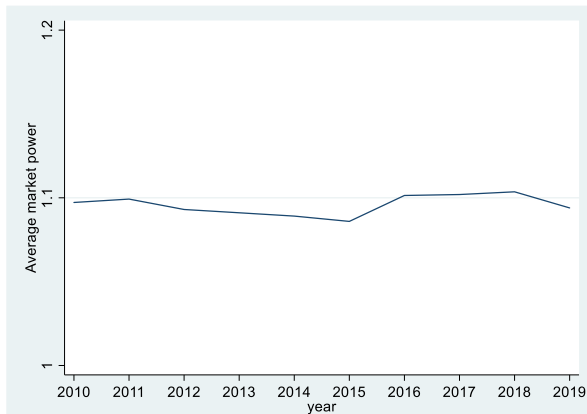


Figure 2, Market power over time

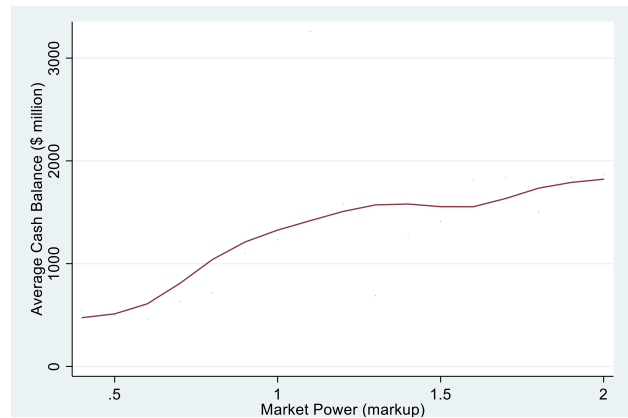


Figure 1, Average Cash Balance over Market Power

Next, the average cash balance has been plotted over market power. The average cash balance has been calculated for every 0.1 step of market power ($Total\ Sales / Total\ Costs$). As it can be seen, the average cash balance is lower when market power is also low, while the average cash balance increases as market power becomes higher. This seems logical as it is presumed that market power is positively correlated with cash balance.

4 Methodology

3.1 Measuring market power

There are three main measures of market power. The Lerner index is an approach that looks at the elasticity of demand. The Herfindahl-Hirschman Index (HHI) is a more direct measure of market power, which studies the concentration of the market. The last measure approaches the issue of market power by estimating price markups. It is known as the Production Approach and measures the ratio of the price to the marginal cost of production.

The main drawback of the Lerner Index approach is that a firm's marginal costs are fundamentally not observable due to limitations in measurement. The HHI has shortcomings as well. This index is not an appropriate estimation of market power for the macro-economy across different industries and over long time periods, where market definitions change. Therefore, this paper will rely on the production approach. This approach has two advantages . Firstly, it does not involve modeling for demand as well as specifying conduct for different markets. Secondly, this approach relies on publicly available data of accounting. Most data that is required is accessible via financial statement of firms. Although this approach relies on assumptions that in real life would not hold, it seems to be the most accurate measure for market power.

As markups will be the output to proxy for market power within the production approach, first markups will first be explained. Generally markups are the price-to-marginal cost ratio and defined as:

$$\mu \equiv \frac{P}{c}$$

With the intention of getting the accounting numbers, it is vital to multiply both factors by the total output Q . By doing this the following equation is obtained:

$$\frac{P}{c} = \frac{PQ}{cQ}$$

It is important to notice that cQ is defined as marginal costs multiplied by total output, which will be directly observable from the financial statement of a firm as total costs. The markup will then be measured as the total revenue divided by total costs.

To assess cQ three different types of costs need to be determined. Therefore, it is necessary to define where Q is dependent on. The following formula serves as the basis:

$$Q_{it} = Q_{it}(\Omega_{it}, V_{it}, K_{it}),$$

Firm i attempts to minimize its concurrent production cost in each period t in a market with N firms, indexed by $i = 1, \dots, N$. The productivity of firms is considered to be heterogeneous and measured as production technology Q_{it} . In this function Ω is calculated as the productivity of a firm. V is a vector of the variable inputs of production. These inputs include among other things: labor, intermediate inputs and materials. Lastly, K is the capital stock of a firm. An important assumption with this formula, is that within a period variable inputs adjust constantly. This is in contrast to capital that is subject to adjustment costs and additional factors. Another thing to keep in mind is that, when implementing information of variable inputs and not individual inputs, V should be considered as a scalar variable.

To use this measure for markups, two important parts of the equation are needed. First, sales will be directly observable as PQ . Second, the total costs will be calculated according to the different measures of Q , as follows:

$$cQ_{it} = COGS_{it} + r_t K_{it} + SGA_{it}$$

Again, firm i attempts to minimize its costs in each period t . The variable inputs of production are equal to $COGS_{it}$. Then, $r_t K_{it}$ will be equivalent to the cost of capital, by taking the WACC of K_{it} .

To complete total costs, SGA_{it} will account for the productivity of a firm.

There are three general assumptions with accompanying complications on this approach. To start with, this theory requires the assumption of constant returns to scale (CRS) when the marginal and average costs of production are equal. The absence of economies of scale means that there are no fixed costs. Furthermore, it should be assumed that all related factors of production are perfect substitutes in production. Lastly, the measure of cost is not equivalent to the marginal costs, when the costs contain elements that do not fluctuate with output as is often the case in actuality. A point of attention when in practice using the production approach, that the markup equals the profit rate when all cost items are included in the measure cQ . These assumptions are in the actual economy not likely to hold. Implications could be that measurement errors are made, which could lead to different effects. Basu (2019) adds that the production method cannot determine if markups have been stable or risen modestly over the past decades. Moreover, while Syverson (2019) find the production approach a leading candidate to explain numerous trends in the data, it remains to have substantial empirical ambiguity around the existence and magnitude of market power. Nonetheless, this approach is by multiple researchers described as the most viable to make progress on backing out economy-wide measures of market power (De Loecker, Eeckhout & Unger; 2020; Weche & Wambach 2021). Therefore, this study will use the production approach as economy-wide measures of market power are researched.

3.2 Measuring Competition

There are multiple ways to calculate competition. The two most general are the Herfindahl-Hirschman Index (HHI) and the M-Firm Concentration Ratio (CR). The CR sums up the market shares of the largest companies. The HHI squares all the firms' market share and sums it up per market. Both CR and the HHI share certain weaknesses. First, it is assumed that a market is well defined, while the distribution of market sales is the only question asked. Second, the theories

assume implicitly that there are comparable competitive conditions throughout all markets (Pavic, Galetic, & Piplica, 2016).

For the purpose of this study it is chosen to work with the the four-firm concentration ratio, as more firm in the CR would lead to even less variation in the data. This would make it harder to make a logical split between competitive and noncompetitive sectors. This concentration ratio helps to explain the degree of competition, by totaling the shares in the market of the four biggest companies. The ratio is often used in literature (e.g. Müller, 1976; Eriotis et al., 2002; Özmucur, 2007; Fuglie et al., 2012; Naldi & Flamini, 2014) and is calculated as follows:

$$Four\ firm\ Concentration\ Ratio = \sum_{i=1}^{n=4} \frac{Sales_{it}}{Industry\ sales_t}$$

Where $Sales_{it}$ is total revenue of firm (i) in period (t) and $Industry\ sales_t$ is total revenue in the market over period (t).

The shares within any given four-firm concentration ratio range between roughly equal and sharply unequal. As can be seen in the figure below, the total market share amounts about 80%. That the total market share is about 80%, means that there is a high four-firm concentration. You can conclude from this fact that this is a noncompetitive market, since there is only 20% market share left for the other firms. The unequal distribution within the four firms mostly indicates high market power to one or two firms, as is the case in figure 1 (Shepherd & Shepherd, 2003).

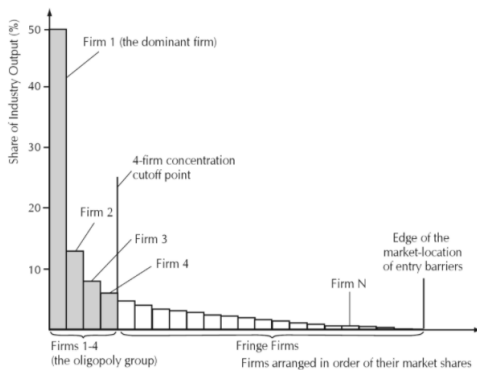


Figure 3, distribution of competition (Shepherd & Shepherd, 2003)

However, there is also the possibility that the four leading companies in a market have low combined market share. If this occurs, there will be a lot of market share for the rest of the firms in this market. This indicates that the market is highly competitive.

3.3 Measuring Saturation

In some studies saturation has been indexed as a growth variable. Raman and Chatterjee (1995), for example, related the market saturation in their research to cumulative sales per period. In each period the authors looked how the total sales would grow, which gave the indication of market saturation. Namely, if total sales were higher than previous years the market grew, but when the sales were equal to or lower than previous years it suggested saturation of the market.

In contrast to studies with growth variables, Barrow, Borges, & Meister (2016) studied the market saturation in the casino industry by several variables. The authors used gross gaming revenue per capita and gross gaming revenue per disposable personal income as a proxy for market saturation.

These proxies are however too time-consuming for the purpose of this study. Therefore saturation will be indexed as a growth variable. Specifically, there will be looked at annual sales of a market, which will be equal to aggregated sales of individual firms or total market sales. For the first two hypotheses, saturation will be indexed as the growth of sales between 2010 and 2019 of a market. This has as reason that it is possible to see how much the market has grown through the dataset from 2010 on. The formula is defined as follows:

$$\text{Market growth} = \left(1 - \frac{\text{Sales}_{i2010}}{\text{Sales}_{i2019}}\right) * 100\%$$

Where saturation is indexed by market growth, with market i .

For the third and fourth hypothesis, sales are compared to previous years. Equal or diminishing growth of sales in a market would indicate a saturated market, increasing growth would suggest a growing market. The formula that will be used, is as follows:

$$\text{Market growth} = \left(1 - \frac{\text{Sales}_{it-1}}{\text{Sales}_{it}}\right) * 100\%$$

Where saturation is indexed by market growth, with market i and period t .

3.4 Hypothesis 1 & 2

Based on the reasoning of Tybout (2003) and Lundin (2004) it is reasonable to postulate that competition has a negative correlation with market power. In order to test this, sector-level data will be looked at. The following regression compares the degree of competition in 2010 with the change of market power:

$$\begin{aligned} \Delta MP_{it} = & \beta_1 \text{Competition}_{i2010} + \beta_2 \log(\text{Companies}_{it-1}) + \beta_3 \log(\text{Wage}_{it-1}) + \beta_4 \log(\text{Sales}_{it-1}) \\ & + \beta_5 \log(\text{Mergers}_{it-1}) + \beta_6 \text{Bankruptcies}_{it-1} + \beta_7 \text{Year} + \beta_8 \text{Sector} + \varepsilon_i \end{aligned}$$

The dependent variable ΔMP_{it} is the average change in market power in sector i and year t . The average change in market power is equal to the difference of the markup value in year t compared to $t-1$. The explanatory variable is $\text{Competition}_{i2010}$, in order to see if higher change in market power is correlated with low competition. $\text{Competition}_{i2010}$ is expected to have a negative coefficient, thereby implying a negative effect of competition on the change of market power. Most of the control variables have been taken the logarithm of, to show percent change and account for skewness towards large values. Furthermore, all control variables have been lagged by one period, as the change in market power mostly refers to the previous year. Companies_{it-1} are the amount of companies in a sector and has been included to control for the size of each individual industry. Wage_{it-1} and Sales_{it-1} are respectively the total wages and the total sales in a sector. Wage_{it-1}

controls for the labour intensity of a sector, while $Sales_{it-1}$ controls for the height of sales in the markup. $Mergers_{it-1}$ and $Bankruptcies_{it-1}$ control for the amount of mergers and amount of bankruptcies in the sector. Where mergers are more pronounced in saturated markets, bankruptcies occur more often in high competitive markets. Finally, the model also controls for Year and Sector fixed effects.

Regarding the relationship between saturation and the change in market power Khouja and Smith (2007), Foellmi (2005), and Raman and Chaterjee (1995) highlight the common finding that saturation of the market leads to less market power. In order to study whether the degree of saturation of a market has led to less market power, the same formula as for competition in 2010 is regressed. However, competition is replaced by saturation in this expression:

$$\Delta MP_{it} = \beta_1 Saturation_{i2010} + \beta_2 \log(Companies_{it-1}) + \beta_3 \log(Wage_{it-1}) + \beta_4 \log(Sales_{it-1}) \\ + \beta_5 \log(Mergers_{it-1}) + \beta_6 Bankruptcies_{it-1} + \beta_7 Year + \beta_8 Sector + \varepsilon_i$$

The dependent variable ΔMP_{it} is the same as in the first regression and is the average change in market power in sector i and year t . The explanatory variable is $Saturation_{i2010}$. The relationship between $Saturation_{i2010}$ and the dependent variable has been studied and is expected to have a negative coefficient, thereby implying a negative effect of saturation on the change of market power. The control variables are exactly the same as in the first regression, and will, therefore, control for the same factors.

3.5 Hypothesis 3 & 4

Based on the findings of Hoberg, Phillips and Prabhala (2014), it is reasonable to assume that more product market threats influence the cash balance positively. As market power is considered as a threat, it is therefore believed that cash balances will be higher. Moreover, it is also reasonable to

believe that higher markups are caused by higher sales, which, consequently, influences the cash balance positively. Thus, the third regression will be done under four different market definitions, to indicate the differences between the four different market definitions.

$$\begin{aligned} Cash_{it} = & \beta_1 MarketPower_{it} + \beta_2 \log(Companies_{it}) + \beta_3 \log(Wage_{it}) + \beta_4 \log(Sales_{it}) \\ & + \beta_5 \log(Mergers_{it}) + \beta_6 Bankruptcies_{it} + \beta_7 Year + \beta_8 Sector + \varepsilon_i \end{aligned}$$

The dependent variable is $Cash_{it}$ and is the amount of a cash balance for firm i in year t . The explanatory variable in this regression is $MarketPower_{it}$. As already has been described, market power will be the markup of sales over cost. With regards to the log values used in the first hypotheses, the same will be used in this regression to respond to skewness towards large values. However, in this regression no lagged values will be used. The control variables itself will be the same as used in the previous regressions.

For the last hypothesis, the indication between for different markets will be made as well. This will be done regressing market power on dividend payout. The regression is as follows:

$$\begin{aligned} Dividend_{it} = & \beta_1 MarketPower_{it} + \beta_2 \log(Companies_{it}) + \beta_3 \log(Wage_{it}) + \beta_4 \log(Sales_{it}) \\ & + \beta_5 \log(Mergers_{it}) + \beta_6 Bankruptcies_{it} + \beta_7 Year + \beta_8 Sector + \varepsilon_i \end{aligned}$$

The dependent variable is $Dividend_{it}$ and is the height of dividend payout for firm i in year t . The explanatory variable in this regression is again $MarketPower_{it}$. The control variables are also the same as in the first regression, and will, therefore, control for the same factors. $MarketPower_{it}$ is expected to have a positive coefficient, thereby implying a positive effect of market power on dividend payout.

5 Results

5.1 Market level analysis

The regressions regarding the first two hypotheses will be regressed in tables 2 & 3. In these tables four different columns are shown, each with different fixed effects. In the first column no fixed effects are regressed. In the second and third column year fixed effects and sector fixed effect are regressed, respectively. In the last column both fixed effects are considered.

5.1.1 The effect of competition

In table 2 the first hypothesis is regressed. Namely, whether market power has grown more in competitive markets than it did in noncompetitive markets. The coefficient estimates of the competition variable in 2010 are all highly significant and positive. This indicates that when competition within a market was high in 2010, average in-sector market power grew more than it did in low competition sectors in the same year. This is inconsistent with hypothesis 1, where it was expected that noncompetitive markets would grow more in market power. Therefore, the hypothesis is rejected.

A 1 percentage point increase in competition in 2010, leads to a 0.0001 unit increase in the market power ratio in a given sector, *ceteris paribus*. In absolute terms this translates to an average increase in sales of 46 million dollars per percentage point in competition. The different combinations of year and sector fixed effects do not appear to impact the effect of growth in competition on changes in market power. Moreover, the amount paid to employees in the sector seems to have a stronger effect on the difference in market power.

Table 2: sectors with high competition in 2010 are positively correlated with change in market power

	(1)	(2)	(3)	(4)
	Δ Market power	Δ Market power	Δ Market power	Δ Market power
Competition in 2010	0.0001*** (2.61)	0.0001*** (2.67)	0.0001** (2.50)	0.0001*** (2.71)
Log companies in sector (1 st lag)	-0.0027 (-0.84)	-0.0028 (-0.86)	-0.0047 (-1.22)	-0.0049 (-1.25)
Log wage bill in sector (1 st lag)	0.0009*** (2.95)	0.0007** (2.02)	0.0009*** (2.62)	0.0006* (1.68)
Log total sales in sector (1 st lag)	-0.0002 (-0.18)	0.0000 (0.00)	0.0000 (0.02)	0.0003 (0.25)
Log total mergers in sector (1 st lag)	-0.0010 (-0.36)	-0.0006 (-0.23)	0.0008 (0.26)	0.0012 (0.37)
Total bankruptcies in sector (1 st lag)	0.0006 (1.28)	0.0003 (0.66)	0.0008 (1.40)	0.0005 (0.84)
Constant	0.0049 (0.50)	0.0057 (0.54)	-0.0102 (-1.25)	-0.0090 (-1.02)
Year fixed effects		x		x
Sector fixed effects			x	x
<i>N</i>	3125	3125	3125	3125

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.1.2 The effect of Saturation

In table 3 the second hypothesis is explained. Namely, whether market power has increased more in saturated markets than it did in growing markets. The coefficient estimates of the saturation variable in 2010 are significant and positive in the first two columns. This indicates that when a market was saturated in 2010, average in-sector market power grew more than it did in growing sectors in the same year. This result is inconsistent with hypothesis 2, where it was expected that growing markets would increase more in market power.

Table 3: sectors with high saturation in 2010 are positively correlated with change in market power

	(1)	(2)	(3)	(4)
	Δ Market power	Δ Market power	Δ Market power	Δ Market power
Saturation in 2010	0.0001** (2.37)	0.0001** (2.31)	0.0001 (1.47)	0.0001 (1.36)
Log companies in sector (1 st lag)	-0.0017 (-0.56)	-0.0018 (-0.55)	-0.0038 (-1.00)	-0.0039 (-1.00)
Log wage bill in sector (1 st lag)	0.0008*** (2.80)	0.0006* (1.85)	0.0009*** (2.60)	0.0006 (1.63)
Log total sales in sector (1 st lag)	-0.0002 (-0.17)	0.0000 (0.01)	0.0000 (0.00)	0.0002 (0.22)
Log total mergers in sector (1 st lag)	-0.0010 (-0.38)	-0.0007 (-0.28)	0.0007 (0.23)	0.0010 (0.32)
Total bankruptcies in sector (1 st lag)	0.0008 (1.49)	0.0005 (0.85)	0.0009 (1.56)	0.0006 (1.00)
Constant	0.0040 (0.40)	0.0051 (0.47)	-0.0130 (-1.49)	-0.0116 (-1.24)
Year fixed effects		x		x
Sector fixed effects			x	x
<i>N</i>	3125	3125	3125	3125

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A 1 unit increase in saturation in 2010, leads to a 0.0001 unit increase in the market power ratio in a given sector, *ceteris paribus*. In absolute terms this translates to an average increase in sales of 46 million dollars per unit in saturation.

In the last two columns, however, no significant result is found. Only the wage bill variable under sector fixed effects is significant, meaning that the amount paid to employees is a factor that increases the change in market power. As the significance of saturation falls away, it can be

concluded that, overall, there is no correlation between saturation of the market in 2010 and the change in market power. Therefore, the hypothesis is rejected.

5.2 Business level analysis

In the appendix 2.1 and 2.2, tables 5 and 6 are shown. In these tables market power has a highly significant and positive correlation with cash balances and dividend payout. As market power is indexed as the markup between sales and costs, it seems logical that higher market power would lead to higher cash balances and dividend payout. However, it is interesting to see where the highest explanatory value is, in order to most significantly compare the different markets for hypothesis 3 and 4. Therefore the adjusted R^2 has been given. This value seems to be highest for year fixed effects and sector fixed effects. Hence, for hypothesis 3 and 4 year and sector fixed effects will be included in the regressions.

In table 4 & 5, Columns (1) – (4) are different sets of market definitions. These are, respectively, noncompetitive & growing markets, competitive & growing markets, noncompetitive & saturated markets and competitive & saturated markets

5.2.1 Effects on Cash Balance

In table 4 the third hypothesis is regressed. Namely, whether market power will have a higher influence on cash balances in competitive and saturated markets. The coefficient estimates of the market power variable are all highly significant and positive. This indicates that market power has a positive correlation to cash balance, meaning that higher market power leads to higher cash balances in all markets.

Table 4: Market power has the most influence on cash balance in a noncompetitive & saturated market

	(1)	(2)	(3)	(4)
	Cash balance	Cash balance	Cash balance	Cash balance
Market power	920.0*** (19.88)	477.3*** (9.89)	2038.3*** (11.53)	1091.7*** (3.67)
Log companies in sector	-1204.7*** (-20.53)	-815.2*** (-7.19)	-930.9*** (-4.42)	-3496.1 (-1.36)
Log total sales firm	1019.5*** (49.65)	707.0*** (19.59)	1015.9*** (11.93)	1915.7** (2.07)
Log wage bill firm	-7.866 (-1.09)	-25.06** (-2.13)	-51.23** (-2.19)	-11.89 (-0.08)
Log mergers in sector	92.64** (1.96)	173.6* (1.76)	-274.0 (-1.57)	245.7 (0.29)
Bankruptcies in sector	9.241 (0.69)	-2.403 (-0.38)	36.49 (0.53)	56.91 (0.50)
constant	-8996.1*** (-41.76)	-5846.3*** (-19.37)	-8900.8*** (-8.43)	-12484.8 (-1.17)
Year fixed effects	x	x	x	x
Sector fixed effects	x	x	x	x
<i>N</i>	63696	47180	5566	1606

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

There are, however, large differences between the markets. In noncompetitive and growing markets it was expected that market power had the least influence on cash balance. In contrast, in these markets market power has almost twice as much value than it does in competitive and growing markets. It seems that in competitive markets, market power has less influence on cash balance. This might be confirmed by the first control variable, the amount of firms in the market. This variable has a negative and highly significant correlation with cash balance in all markets, indicating that more firms in a market leads to lower amounts of the cash balance.

In competitive and saturated markets it was expected that market power had the most influence on cash balance. However, this is not the case. In column 3, where the noncompetitive and saturated market is explained, the influence of market power on cash balances is the highest. Specifically, an additional unit of market power, leads to approximately \$2 bn increase on the cash balance. Despite the fact that market power is not the highest influencer on cash balances in competitive and saturated markets, the results are consistent with hypothesis 3. Namely, in a competitive and saturated market, market power has a higher influence on cash balances than in noncompetitive and growing market. Where one additional unit of market power correlates with a \$920 million increase on the cash balance in noncompetitive and growing markets, the same correlation is about \$170 million higher in competitive and saturated markets, *ceteris paribus*.

5.2.2 Effects on Dividend Payout

In table 5 the fourth hypothesis is regressed. Namely, whether market power will have a higher influence on dividend payout in competitive and saturated markets. The coefficient estimates of the market power variable are nearly all highly significant and positive. This indicates that market power has a positive correlation to cash balance, meaning that higher market power leads to higher cash balances in all markets. However, in the fourth column, where market power is regressed to dividend payout in the setting of competitive and saturated markets, no relevant significance is found.

As is seen by the results shown in table 4, large differences are visible between the different markets in table 5. In noncompetitive and growing markets it was expected that market power had the least influence on dividend payout. However, in this market definition, one additional unit of market power results in approximately \$110 million more on dividend payout than it has in competitive and growing markets, *ceteris paribus*. It seems that in competitive markets, market

power has less influence on cash balance. As is the case in table 4, this might be confirmed by the first control variable, the amount of firms in the market. This variable has a negative and highly significant correlation with cash balance in the first three markets, indicating that more firms in a market leads to lower dividend payout. In column 3, where the noncompetitive and saturated market is explained, the influence of market power on dividend payout is the highest. It seems that when a market becomes more saturated, an increase in market power indicates higher dividend payouts.

Table 4: Market power has the most influence on dividend payout in a noncompetitive & saturated market

	(1)	(2)	(3)	(4)
	Dividend payout	Dividend payout	Dividend payout	Dividend payout
Market power	276.7*** (22.67)	163.9*** (12.78)	359.2*** (6.99)	107.9 (1.47)
Log companies in sector	-164.6*** (-14.77)	-95.35*** (-4.24)	-178.7*** (-3.73)	-168.7 (-0.43)
Log total sales firm	144.0*** (34.49)	99.61*** (14.31)	192.2*** (8.72)	-220.4 (-0.91)
Log wage bill firm	3.809*** (2.84)	2.809 (1.24)	-21.59*** (-4.58)	42.07* (2.26)
Log mergers in sector	0.207 (0.02)	-28.02 (-1.37)	32.41 (0.82)	-58.55 (-0.41)
Bankruptcies in sector	0.533 (0.18)	1.104 (0.82)	-8.983 (-0.62)	10.22 (0.39)
Constant	-1451.0*** (-31.36)	-644.4*** (-9.68)	-2031.3*** (-6.93)	3508.8 (1.04)
Year fixed effects	x	x	x	x
Sector fixed effects	x	x	x	x
<i>N</i>	29673	21934	2430	757

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In competitive and saturated markets it was expected that market power had the most influence on dividend payout. These variables are, however, all insignificant. Therefore, it is not possible to say whether the results are consistent with the fourth hypothesis.

6 Discussion

In this section, the results of the empirical analysis will be discussed. Overall, the results provide clarification for the role of market power in different markets. Market power has influence on certain market characteristics, although this effect is relatively small. Moreover, in this paper it is established that market power does have various effects in different market definitions. Consequently, policy recommendations concerning market power will be formulated.

First of all, in this paper it is found that market power has increased more in competitive markets than it did in noncompetitive markets. The results indicated a correlation between competition in 2010 and change in market power. This would suggest that firms in sectors with high levels of competition in 2010 gained more market power over the years. This is, however, contradictory to what was expected. For instance, Tybout (2003) and Lundin (2004) argued that increased competition leads to reduced markups. Moreover, in the appendix can be seen that on average the four firm concentration ratio has become less over the years, implying that competition has increased. Given the rationale of the literature, and the fact that the results suggest that competition is increasing, it is reasonable to assume that market power would increase more in noncompetitive markets than it would in competitive markets. Badinger (2004), however, argues that the impact of competition on mark-ups has been limited, even though the markets that have been analyzed contain considerable variations. This finding is more in line with the results of this research. The influence that competition has on market power is restricted, as it affects the markup ratio with 0.0001. Although this translate in absolute terms to an average value worth of \$46 million per percentage point, the impact is relatively limited.

Next, for the second hypothesis no correlation has been found. This means that no relationship has been identified between saturation in 2010 and change in market power. This would suggest that

market power did not increase more in growing markets than it did in saturated markets. This result was different than projected, as, for example, Foellmi (2005) found that higher levels of saturation in a market result in higher demand elasticity for consumers. With regards to growing markets, multiple authors found that market growth is positively related to markups. Moreover, in the appendix can be seen that, on average, market growth has become higher over the years, implying that market saturation has decreased. Given the argumentation of the literature combined with the results suggesting that saturation is decreasing, it would have been plausible for market power to increase more in growing markets. However, Abell and Hammond (1979) argued that there are learning curve effects and economies of scale that need to be taken into account. These effects are more pronounced in saturated markets and, therefore, can be a cause for market power to increase in saturated markets. These effects could have withheld the effect of saturation from being significant. It is interesting to point out that in the first two columns of table 3, saturation has a positive and significant effect on change in market power. This significance goes away, as the sector fixed effects are added to the regression. This implies that the part of saturation that affects the change in market power, is mainly caused by sector-specific effects.

Thirdly, it is found that the influence of market power on cash balances is higher in a competitive and saturated market than in a noncompetitive and growing market. It is, however, unexpected that in noncompetitive and saturated markets market power has the largest effect on cash balances. This effect is almost twice as high compared to the effect in a competitive and saturated market. The expectation that market power has a positive correlation with cash balance is reasonable for every market specification. This seems natural, since markups are defined as a sales over costs. Higher sales or lower costs would therefore lead to higher cash balances. The reason that there would be differences between markets, could be explained by product market threats. Namely,

Hoberg, Phillips and Prabhala (2014) found that more product market threats influence the cash balances positively. This seems to partly be the case, as in saturated markets market power has a larger coefficient that affects the cash balance. However, product market threats do not seem the main factor that explains cash balances. In the results it can be seen that market power in noncompetitive markets affects cash balances more than competitive markets, given a growing or saturated market. This should, therefore, be explained by another factor. It might be that firms in low-competition markets have relatively less options to invest, therefore hold higher cash balances. Lastly, for the fourth hypothesis no significant results have been found for competitive and saturated markets. Therefore, it is not possible to determine whether market power has a higher influence on the level of dividend payout in a competitive and saturated market. It seems that the amount of observations could be one of the causes for the insignificance. As there is only consideration for the height of dividend payout, many firm year observations have been deleted for this regression. There are, however, interesting effects to be seen in the other results that are significant. Given a growing market, market power affects dividend payout more in a noncompetitive market than it does in a competitive market. Given a noncompetitive market, market power affects dividend payout more in a saturated market than it does in a growing market. With regards to competition, Hoberg, Phillips & Prabhala (2014) found that with increasing market competition payouts decrease, due to diminishing profitability. It was therefore assumed that market power would have a higher effect on cash balances within these markets. It is interesting to see that the amount of firms in the sector has a negative effect on cash balances. This result is in line with the literature. However, it seems that the reasoning for market power affecting dividend payout cannot be derived from this fact. A plausible explanation might be instability in cashflows (Peress, 2010). It might also be that there is a naturally occurring lower dividend payouts in these

markets. With regards to saturation, it was expected that firms in saturated markets tend to pay higher dividends. This had as reason that these firms generally have a higher profitability and fewer attractive investment opportunities (Hoberg, Phillips & Prabhala, 2014). The results seem to be in line with findings of the authors.

In conclusion, market power does not have a relevant impact on the characteristics of a market. However, in markets that are mainly noncompetitive and saturated, market power is found to have a pronounced role. This role affects businesses in setting the height of their cash balance and dividend payout more than in competitive markets. Governments should be aware of influences of market power and the dangers of noncompetitive markets. In comparison, saturation occurs naturally and is for a government hard to restrict with additional policies. My worries are in line with those of Stiglitz, as markets seem to be functioning on a basis of exploitation. Policies should therefore be supporting the battle towards efficiency and shared prosperity. Measures such as The Council of Economic Advisors (CEA) (2016) of the Obama administration are necessary for making markets more competitive and reducing the effect of market power.

7 Limitations

There are several limitations to this research that need acknowledging.

Some key limitations of the methodology lie within the production approach. First, this approach relies on the equality of marginal and average cost of production. This in turn requires constant returns to scale (CRS) in production and the absence of economies of scale. Next, this approach relies on the assumption that all related aspects of production are perfect substitutes. Moreover, the measure of cost (cQ) is not equal to marginal cost if it includes cost items that do not vary with output. These assumptions can never be guaranteed for all of the firms in the sample. Within this approach markups are calculated in order to assess market power. These markups give the ratio of sales over costs, through which market power is indicated. Clearly, market power is not only dependent on this markup and is affected by other factors as well. Furthermore, the costs within these markups are calculated on the basis of COGS, SG&A and the Capital Stock. In order to calculate the costs of capital stock a WACC is used of 12%. This percentage is relatively high compared to the average WACC across industries, which is equal to 6.9% (Castedello & Schöniger, 2019). De Loecker, Eeckhout & Unger (2020), however, choose to work with a higher WACC to compensate for other costs. This WACC, nevertheless, is not the same for firms across the dataset. Hence, there could be measurement errors of the market power variable.

For the competition and saturation measures, some limitations also need to be discussed. For the competition measure, the four firm concentration ratio has been used. This measure solely gives the ratio of market share that the largest four firms have in the total market. Therefore it can only give an indication of the extent of the competition within a market. Based on the ratio's median value, a split has been made to indicate competitive and noncompetitive markets. This split, however, does not necessarily represent the actual boundary between high and low competition.

With regards to saturation, there has been looked at the growth of a market. Whenever the market sales were equal to or less than the base value, a given firm year was labeled as saturated. When the market sales grew, this observation would be labeled as growing. This split, however, has not been controlled for inflation. Moreover, growth of the market functions only as a proxy for the degree of saturation. Saturation itself is caused by multiple factors other than growth.

For the business level regressions, limitations also have been identified. For the regression on cash balances and dividend payout, relatively few observations have been used for the competitive and saturated markets. This is a result of the splits made for competition and saturation variables. Moreover, with regards to the dividend payout regression, there has been looked at the height of dividend payout. Therefore, the firm year observations that had no dividend payout were dropped from the dataset. This might be another cause for the relatively small number of observations within this market and, consequently, the insignificance of the coefficient for market power to dividend payout.

For future research it would be helpful if the split for saturation would be done controlling for other factors. Factors to consider could be inflation, age of the market and the amount of products sold. For the competition split there could be controlled with the Herfindahl-Hirschman Index (HHI). Next, instead of only considering the height of dividend payout, it might be interesting to look at the overall dividend payout. This means that observations with no dividend payout would not be deleted from the data. As a result, a more complete view of the market towards dividend payout can be observed.

8 Conclusion

This study has looked at the effect of and influence on market power. First, it has examined whether competitive and saturated industries have grown more than noncompetitive and growing industries. Second, the effect of market power towards business level implication have been studied between four different market settings. Specifically, the effect on cash balances and dividend payout have been studied under the market definitions of competition and saturation. The theoretical basis for these effects is predominantly based on the theory and findings of De Loecker, Eeckhout and Unger (2020). According to their rationale, markups are obtained by exploiting cost minimization of a variable input of production. For competition and saturation, respectively, the four-firm concentration ratio and a growth variable have been constructed. Next, worldwide annual accounting data from 01-2010 to 12-2019 has been obtained from Compustat. The results show that high saturation and high competition are positively correlated with change in market power, although the effect is limited. Moreover, findings indicate that market power has most effect on cash balances and dividend payout in noncompetitive and saturated markets. These results are mostly contrary to what was expected in the literature.

This study has attempted to quantify the extent to which market characteristics have been an influence on the rise of market power and whether market settings have different effects for market power on businesses. It seems that the effect of market characteristics have a limited effect on market power. However, market settings appear to be an important factor for the effect of market power on businesses. Therefore, policymakers should pay attention to the different market conditions, as the effects of market power will be different within distinct industries.

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Appendix 1 Dependent and explanatory variable graphs

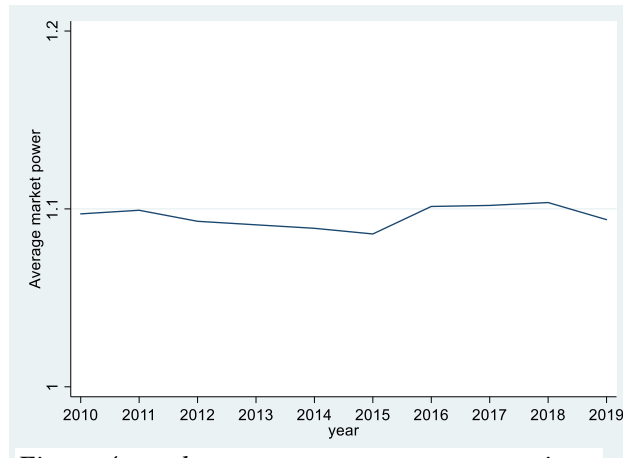


Figure 4, market power stays constant over time

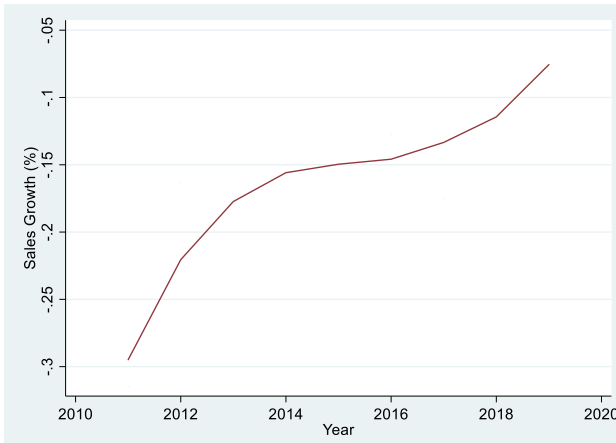


Figure 5, diminishing average sales decline over time

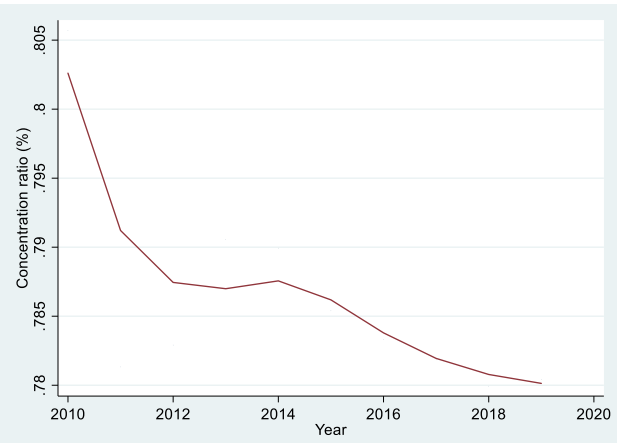


Figure 6, increasing competition over time

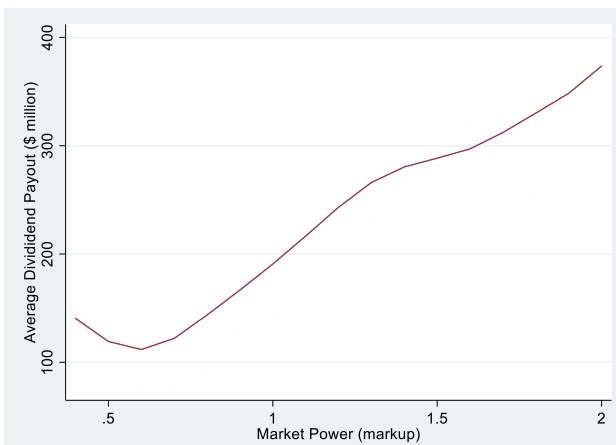


Figure 7, increasing dividend payout with higher market power

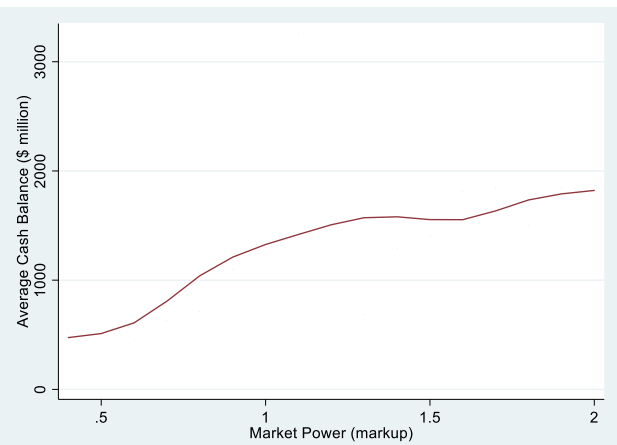


Figure 8, increasing cash balance with higher market power

Appendix 2.1 Regression market power on cash balance

Table 5: highest Adj. R^2 for cash balance with Year and Sector fixed effects

	(1)	(2)	(3)	(4)
	Cash balance	Cash balance	Cash balance	Cash balance
Market power	808.2*** (25.47)	805.9*** (25.37)	781.3*** (24.03)	780.3*** (23.98)
Log companies in sector	-1168.0*** (-29.29)	-1201.5*** (-29.25)	-1085.4*** (-24.29)	-1130.0*** (-24.22)
Log total sales firm	1023.9*** (79.31)	1015.9*** (76.91)	983.8*** (64.64)	972.3*** (61.80)
Log wage bill firm	-19.79*** (-4.57)	-14.70*** (-3.10)	-24.30*** (-4.97)	-17.71*** (-3.18)
Log mergers in sector	104.2*** (3.12)	133.8*** (3.89)	42.61 (1.15)	82.62** (2.12)
Bankruptcies in sector	9.930** (2.53)	10.29** (2.52)	10.64** (2.40)	11.41** (2.45)
constant	-8463.6*** (-71.56)	-8388.6*** (-68.96)	-8449.3*** (-48.71)	-8347.6*** (-47.41)
N	118048	118048	118048	118048
Year fixed effects		x		x
Sector fixed effects			x	x
Adj. R^2	0.378	0.378	0.401	0.402

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 2.2 Regression market power on dividend payout

Table 6: highest Adj. R^2 for dividend payout with Year and Sector fixed effects

	(1)	(2)	(3)	(4)
	Dividend payout	Dividend payout	Dividend payout	Dividend payout
Market power	253.2*** (29.42)	243.0*** (28.24)	235.5*** (27.36)	229.3*** (26.61)
Log companies in sector	-133.0*** (-17.00)	-166.3*** (-20.49)	-120.2*** (-14.13)	-157.0*** (-17.54)
Log total sales firm	141.5*** (52.99)	132.1*** (48.72)	153.4*** (47.91)	143.9*** (44.17)
Log wage bill firm	1.190 (1.46)	6.883*** (7.67)	-4.711*** (-5.14)	1.152 (1.11)
Log mergers in sector	-20.89*** (-3.12)	8.826 (1.27)	-38.56*** (-5.31)	-6.515 (-0.85)
Bankruptcies in sector	0.999 (1.20)	1.398 (1.63)	2.328** (2.48)	2.864*** (2.94)
Constant	-1317.4*** (-50.30)	-1271.9*** (-47.54)	-1423.6*** (-37.13)	-1377.9*** (-35.67)
N	54794	54794	54794	54794
Year fixed effects		x		x
Sector fixed effects			x	x
Adj. R^2	0.059	0.064	0.076	0.080

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$