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Competition and Corporate Governance: Effects on Financial Position and Profitability

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Declaration of Authorship

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Abstract

Using a novel approach towards competition and the Sarbanes Oxley Act (SOX) as a shock to internal governance we examine the interaction between product market competition and corporate governance mechanisms. Our results provide a support for notions of substitution model of dividends and firms' financial policies being shaped by competition environment. We find evidence that companies facing higher competition threats experience a larger profitability improvement, a notion that is inconsistent with a traditional substitution relationship of governance and competition.

JEL Classification	D22, G32, G34, G35
Keywords	Competition, Governance, Fluidity, Profitability, Financial Flexibility

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Abstrakt

V práci se zaměřujeme na interakci konkurence a corporate governance za využití šoku corporate governance plynoucího z přijetí zákona Sarbanes Oxley a nového inovativního přístupu ke konkurenci. Naše výsledky potvrzují substituční model dividend a tezi, že finanční pozice firem je ovlivňována konkurenčním prostředím. Dále naše výsledky indikují komplementární vztah mezi konkurencí a corporate governance, kdy společnosti operující v agresivnějším prostředí realizují větší zisky, což je nekonzistentní s tradičním substitučním vztahem konkurence a governance.

Klasifikace JEL	D22, G32, G34, G35
Klíčová slova	Konkurence, Governance, Fluidita, Ziskovost, Finanční Flexibilita

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Chapter 1

Introduction

The importance of competition as an efficiency contributor for overall economy has been stressed by economists from times of Adam Smith. As Vickers (1995) argues, a lack of competition is known to have an adverse impact on overall welfare of all market participants while only a dominating company benefits from imperfect situation. Further as Hart (1983) and Hermalin (1992) argue competition will minimise slack within a company and result in overall increase of effectiveness. Similarly to competition, the area of corporate governance has been a subject to extent study by academics. Gillan (2006) argues that a split between ownership and management of a company gives a rise to a specific relationship that impacts not only a company and all directly involved stakeholders, but also the entire economy. Failures of internal mechanisms or direct violation and exploitation of rules resulted in high-profile corporate scandals. Cases such as Enron bankruptcy remind the necessity of having clear governance rules in place, understand rules' impact to ideally structure the rules.

While some interactions of governance and competition are well documented and supported by empirical data, in some areas literature still cannot offer unified explanation.In terms of profitability there is a strong evidence of a substitutional relationship between governance and competition as argued by Griffith (2001), Giroud & Mueller (2010) and Chhaochharia *et al.* (2009). If a company operates in a competitive environment, competition will ensure that profitability is maximised and there is no need for strict governance rules to minimise agency costs. In terms of financial flexibility, literature does not offer a unified view on the topic, and we will investigate numerous approaches discussed in literature.

An issue that is commonly raised both for corporate governance and competition are used variables and proxies. Especially for corporate governance, the effort to capture and measure some aspects is troublesome. Managerial behaviour is often hidden from investors and public and cannot be easily identified as managers try to effectively conceal possible value-destroying investment decisions. This calls innovative approaches towards measurement of governance quality. Competition is often proxied by concentration measures such as the Herfindahl indices (HHI). However, as Berger (2014) argues, the use of HHI can be problematic due to various possibilities of constructing the index and the aspect of competition captured - concentration. A simple concentration ratio may not account for an intensity of competition which can be aggressive even in situations where there is a limited number of players. For example, while only few telecommunications operators are active in a market, competition is often fierce, and with four and more operators competition becomes economically irrational, as noted by *Financial Times*' Lex column[1]. If the relationship would be investigated using the HHI, one could conclude that the market is highly concentrated and thus not competitive enough.

In this paper we aim to revisit established relationships outlined above. Our key contribution will be stemming merging impacts of governance and competition as well as opting for novel measures of capturing both competition and corporate governance - fluidity and a corporate governance shock. Fluidity, introduced by Hoberg *et al.* (2014), is a text-based variable that focuses and captures exogenous dynamic threats for a company arising from competitors. The governance shock will be used as a natural experiment, based on Chhaochharia *et al.* (2009). Fluidity as well as a natural experiment alleviate a crucial issue of endogeneity that is known to affect especially corporate governance studies. These attractive features of measures allow us to shed a different light on already documented and supported notions such as substitutional relationship between governance and competition in terms of profitability. We will also use these to investigate not unified field of financial flexibility. Both measures are developed and commented on further in the thesis.

The remaining part of the paper is organised as follows. The section two offers review of literature on competition and corporate governance topics. The section three provides a hypothesis motivation. The section four comments on data and key variables. In the section five we provide empirical results. The section six concludes.

[1]Full text can be found using the following link

Chapter 2

Literature review

2.1 Competition and Governance Interaction

There have been several attempts to theoretically formalise the relationship between corporate governance and competition. Hart (1983) considers two different types of firms. Entrepreneurial firms are classic profit-maximising firms and do not suffer from the existence of agency costs. On the other hand managerial firms face principal-agent issues as the managers and owners are not aligned. Owners are able to observe revenues generated by the firm but are unable to observe firm's costs. He shows that if the marginal costs are perfectly correlated across firms and if there are enough entrepreneurial firms then there will limited opportunities for managerial firms to exert slack. As he points out, competition will make the performance of firms interdependent through the price and consequently will reduce slack.

Hart's results are revisited by Scharfstein (1988). He relaxes the assumption regarding managerial preferences. Contrary to Hart (1983), he assumes that manager's utility function is strictly positive. Under this assumption, he shows that increased competition results in increased managerial slack.

Hermalin (1992) decomposes the effect of increased competition into four Slutsky-like effects - income effect, risk-adjustment effect, change-in-information effect and change in the relative value of actions effect. The income effect refers to the impact on manger's wealth. As competition increases, firm's expected profit decreases and thus manager's expected income decreases as well. Manager is then less likely to consume "agency goods" (forms of at-the-expense-of-shareholders behaviour such as empire building, quiet life, slacking etc.). The second effect of competition is risk-adjustment effect. This effect refers to the

possibility that competition changes the executive's decision by changing the riskiness embedded in realising different actions. Last two effects are change-in-information effect and change in the relative value of actions effect. The former refers to the improved information structure as a result of more competition. The latter refers to the possibility that competition may change the difference between the expected value of different actions. All effects are ambiguous in sign. However if the agency goods are normal goods (a notion which has empirical support) author shows that the income effect will dominate remaining 3 effects. Increased competition will then result in decreased agency costs and thus better alignment of shareholders' and managers' interests.

Overall theory suggests that corporate governance and competition have a substitutional relationship in which increased competition allows for mitigation of agency problems.

2.2 Measures of Competition and Governance

2.2.1 Measures of Competition

Herfindahl index is one of the most common variables used to capture completion. This index however came recently under the scrutiny. According to Berger (2014), Herfindahl index is designed to measure industry concentration and thus may not be able to represent industry competition. Herfindahl index is theoretically based in Cournot equilibrium in which a level of competition is negatively affected by the concentration. However one of the underlying assumptions is that firms are symmetric and move simultaneously. If firms have different marginal costs, increased competition shifts profits to the more efficient firms thus would increase concentration.

Berger (2014) also questions the number of ways used to calculate the index. Academics may choose to use different datasets and industry classifications to construct the index. Moreover the industry classifications tend to be static which may fail to capture dynamics of industry. While investigating different indices author finds surprisingly low correlations below 30% which could be driving empirical results.

To assess the role of Herfindahl index as a proxy for product market competition Berger (2014) uses a quasi-natural experiment of a passage of the US-Canada Free Trade Agreement. This allows her to construct synthetic control groups by differentiating affected and unaffected industries. While alternative

tools of measuring product market competition show the impact of the passage, Herfindahl index does not seem to indicate the increase in competition, suggesting that Herfindahl index captures different aspects of competition.

Researches often construct different proxies for competition if the competition variable is supposed to capture other aspects than concentration. The Boone index is a measure of competition comparing efficiency and profitability of firm and the industry. More intense competition means that more efficient companies will reap higher share of profits. This index was applied in Berger (2014) study.

Roberts (1999) in his study focusing on pharmaceutical industry uses two different competition variables constructed to capture different aspects of competition - innovation and avoidance of competition. To capture firm's innovation he uses Herfindahl-like measure - a market share of a newly introduced product in a given therapeutic submarket. A metric used to measure avoidance to competition takes into account an erosion of a gained market share as a function of time. Innovative firms sheltered from competition are able to capture a significant market share and maintain their market share for extended periods of time. On the other hand a less innovative firm producing generic (i.e. drugs produced after the expiration of the patent) will struggle to capture a significant market share and also will face tighter competition since barriers to entry are lowered and more firms will emerge. However these approaches are likely to be limited to the pharmaceutical industry given the availability of product-detailed data.

Hoberg *et al.* (2014) developed a new measure of product market threats – fluidity. This text-based measure focuses on changes in product space induced by competitors and offers an improvement to the measures that focus solely on a specific company and its own products. A level of competition a company is facing is also determined by competitors. An entry of a new competitor or a move by competitor into a different market can significantly impact company's product market competition.

The mechanics of the calculation allows for industry dynamics. Fluidity is not constrained by a static nature of industry classifications such as SIC or NAICS. These classifications also tend to group companies that are distant or no competitors at all. Authors also stress the ex-ante approach of this metrics. If product markets are volatile future is less certain.

To calculate fluidity, authors extract key words for companies from business description from regulatory fillings which are updated every year and are

required to be representative and relevant. Yearly changes in key words for a specific firm are then compared to yearly change of a wider industry based on Hoberg & Phillips (2010). If the firm key words are more overlapped with the changes in the wider industry, the company is facing a higher competition and thus has a higher fluidity.

The inherent uncertainty surrounding fluid companies was already documented in Mattei & Platikanova (2015). Authors find that analysts covering more fluid companies facing higher product market competition, provide more dispersed forecasts, which tend to be less accurate. Also information surrounding these firms tend to be more uncertain. These results suggest that fluidity does capture the dynamics and uncertainty arising from highly competitive product markets. If an analyst is covering companies with similar level of fluidity, Hsu *et al.* (2015) report that analysts' forecasts improve in accuracy. Also, authors find that firms with greater product similarity are associated with greater analyst coverage. Authors' results suggest that benefits from product similarity dominate higher costs of analysis. Firms with greater product similarity seem to have a better information environment, and analysts covering firms similar to other firms in their coverage portfolios provide more accurate forecasts and are also likely to enjoy better career outcomes.

These approaches suggest that the conventional approach toward competition via Herfindahl index may be suboptimal and numerous innovative variables seem to gain support in empirical research.

2.2.2 Measures of Governance

Using a broad perspective on the issues, Gillan & Starks (1998) define corporate governance as the structure of laws, rules, and factors that control a company. Shleifer & Vishny (1997) view corporate governance as a set of guarantees and ways through which providers of capital to companies reassure themselves to get an appropriate yield on their investment. While numerous other approaches and definitions exist researchers often distinguish a corporate governance structure as belonging into one of two groups: internal to a firm and external to a firm.

A simple balance sheet of a firm based on Gillan (2006), depicted in Fig. 1, illustrates this principle.

As Gillan (2006) argue, the right-hand side of the figure focuses on external type of channels that are out of the scope of a company to influence. One of the

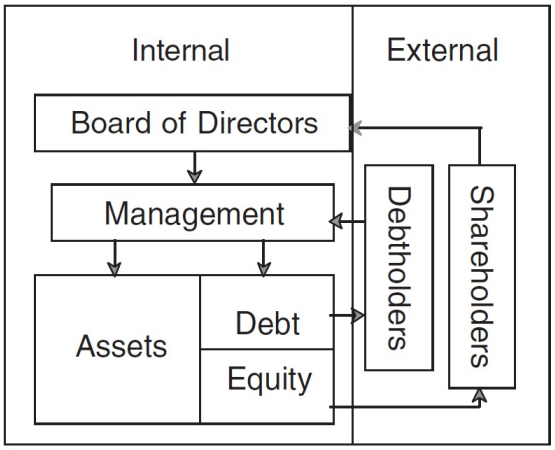

Figure 2.1: Fig. 1 - Internal and external corporate governance mechanisms

main external channels is a market for corporate control. Ineffective companies with slacking managers are very likely to be targeted by acquisitive competitors or private equity funds that through minimising managerial slack unlock value. Another channel of external corporate governance are external laws that affect the area of corporate governance. After several high-profile corporate scandals the Sarbanes Oxley act (SOX) was aimed to prevent similar failures by tighten corporate rules such as fines for auditors etc. Similarly business combination laws nd impose restrictions on certain kinds of transactions making hostile takeovers often very difficult and thus weakening the channel of market for corporate control.

The left-hand side of the diagram comprises the basics of internal governance. Managers act and make investment decisions on behalf of stakeholders. The board of directors should act as assurance for shareholders that the management would act in line with shareholders' interests. Often its composition, average tenure and background of board members affects whether the board can serve its purpose of overseeing management. The structure of managerial salary and incentives also play an important role as they might change the behaviour of managers or create a misalignment between managers' and shareholders' interests. Capital structure also affects firm's governance as different types of capital involve different relationship between investors and firms. Firms' provisions and bylaws are also a part of internal governance. These represent company's internal laws that govern a relationship between shareholders and managers.

Gompers *et al.* (2003) (GIM) create a new measure reflecting internal gov-

ernance of firm and shareholders' rights strength. They combine a large set of governance provisions – Governance index. This measure reflects a number of provisions effective in a company that weaken the strength of shareholders at the expense of management. Authors are focusing on a presence of key 24 provisions and divide them into 5 categories: delay tactics against hostile bidders, voting rights, director protection, other takeover defences and state laws. Example of a delay tactics provision is a staggered board provision that significantly prolongs the process of taking over the board of directors. Authors do not assess the strength of respective provisions or the intention of incorporation. Rather they are focusing on the impact on the balance of power. As authors argue, management may use the provision to increase the wealth of shareholders or to maintain private benefits. In any case it is effectively the management that is in control and increases its power at the expense of shareholders.

Based on the strength of shareholder rights authors divide companies into several groups. Companies where shareholders are dominant (i.e. Governance index has a low value) are called democracies. The second extreme is a dictatorship where the extensive power is reserved for the management. GIM find that democracies significantly outperformed dictatorships by 8.5% on annual basis throughout the 1990-99. They also find that dictatorships have lower profitability and sales growth.

Authors offer three possible explanations. Provisions weakening the right of shareholders might have been put in place by managers who forecasted poor performance of companies and aimed to entrench themselves from the power of shareholders. Authors try to support this hypothesis by insider trading activity which is proven to forecast returns. Authors however do not find enough evidence to support this hypothesis. Alternatively governance provisions could be correlated with other characteristics that caused abnormal returns. Authors find only limited evidence supporting this explanation. The third possible explanation authors offer is, that abnormal returns were driven by higher agency costs associated with poor governance that were underestimated by investors. Indeed, authors found evidence for the notion that a decrease in shareholder rights caused an increase in agency costs through an increase in inefficient investments etc. Capital expenditures were negatively related with strength of shareholder rights, suggesting that dictatorships pursued substantial capex programmes. Weakly governed firms also tend to be more active in M&A. However authors suggests that rather than empire building dictatorships try

to avoid "empire collapse".

GIM findings were investigated further. Their approach could not offer strong causal explanation given the lack of random assignment. Rather, they consider their study as a "long-run event study". Core *et al.* (2006) investigate the possibility of causality i.e. the underperformance of dictatorships was caused by higher agency costs. If the underperformance of weakly governed firms was driven by investors' underestimation of agency costs then the market should be surprised by high performance of poorly governed firms or low performance of better governed firms. To test this, authors use both analysts' earnings forecasts and earnings announcement returns. They find that analysts are aware of the difference in the profitability, inconsistent with the idea that market or investors misunderstand the implication of the governance. Weakly governed firms also have approximately same takeover probability suggesting that the market for corporate control was not driving the abnormal returns. Overall authors do not find an evidence for corporate governance as a predictor of returns and suggest that the abnormal performance could be driven by the other risks or factors that could have been connected with "new economy" pricing anomaly in the of late 90's.

Cremers & Nair (2005) investigate how internal and external corporate governance factors interact. Given the nature of factors one could expect a substitution relationship between internal and external governance. Weak external corporate governance combined with strong internal governance should be substitute of strong protection against external governance and weak internal governance. Through construction of market-neutral portfolios capturing internal corporate governance (measured using public pension fund holding or blockholder holding) and external corporate governance (measured by takeover vulnerability) authors report a significant outperformance only if levels of both internal and external performance are strong. This implies a strong complementary effects between certain channels of internal and external corporate governance. It can be argued that some structures are not viewed as strong enough to assure alignment of shareholders' and managers' interests.

2.2.3 Shocks

Corporate governance empirical tests typically suffer from endogeneity. Firms that differ in their governance are likely to differ in other aspects as well and changes in corporate governance are likely to be accompanied by unobservable

changes. Researchers typically deal with this issue by including quasi-natural experiments which help to isolate the effect of corporate governance variables. One of commonly used experiments is a passage of specific laws impacting firm governance. While investigating productivity of companies Bertrand & Mullainathan (2003) and Giroud & Mueller (2010) use the passage of anti-takeover laws as a shocks. These laws make the hostile takeover more challenging. Through eliminating one of channels of managerial discipline enforcement through the market for corporate control these laws are creating a room for managerial slack. Chhaochharia *et al.* (2009) use the passage of the Sarbanes-Oxley Act (SOX) in 2002 as a natural experiment for investigating firm profitability and corporate governance in concentrated and non-concentrated industries. SOX was passed as a result of major corporate failures and scandals. SOX aimed at tightening corporate governance by increasing fines, requiring higher degree of responsibility from management and strengthening the role of the independent audit.

Similar experiments are also used in competition studies. Berger (2014) uses a passage of US-Canada Free Trade Agreement as shock to competition while Griffith (2001) uses the passage of a European Union Single Market programme as a shock for product market competition.

2.3 Competition and governance as substitutes

As Jensen (1986) argue, one of main goals of a company is to generate sufficient funds. Since these funds are at a discretion of managers in case of misalignment of managerial and shareholders' interests, self-interested managers may pursue sub-optimal investment decisions such as a value-destroying acquisition or pursue a quiet life and thus not realising company's full profit potential. Self-interested managers can also use the funds to entrench themselves and to have necessary capacity available. In case of hostile takeover, self-interested managers can use the cash reserves and distribute them to shareholders. Through use of quasi-natural experiments product market competition and corporate governance were established to align incentives and force managers to behave accordingly.

Roberts (1999) investigates a relationship between product-market competition and firm-level persistent profitability in the U.S. pharmaceutical industry. Roberts (1999) offers two explanations why firms may demonstrate persistent abnormal profitability – they are ether highly innovative or they are sheltered

from competition. According to the innovation explanation, firms which develop new innovative products are able to earn higher profits as these products tend to face low or no competition. As Roberts (1999) argues, even though the Schumpeterian approach suggests that these returns would later diminish due to higher competition it does not suggest that a profit profile of a firm would eventually follow as the firm may produce new similarly successful products. On the other hand, the anti-competition explanation suggests that relatively high profits are stemming from a lack of competition. Results provide evidence for innovation explanation as innovative propensity does positively influence long-term profit rates. Author does not find any evidence supporting the anti-competition explanation. A measure used to capture innovation propensity is a market share of a newly developed drug - i.e. Herfindahl index on a product level. The product which is able to capture a higher market share at the time of its release is considered to be more innovative. A metrics used to measure avoidance to competition takes into account a market share erosion as a function of time. Firms sheltered from competition are able to maintain their market share for an extended period of time and therefore are able to exhibit abnormal profitability.

Giroud & Mueller (2010) investigate how effective product market fluidity is when it comes to reducing managerial entrenchment and slack using the passage of business combination laws ("BC laws") as a quasi-natural experiment. Typically BC laws are passed on a state level and impose restrictions and moratoriums on certain kinds of transactions such as asset sales or mergers, thus making hostile takeovers often very difficult or even impossible. Effectively BC laws introduce obstacles in a market for corporate control and consequently weaken corporate governance. Authors investigate the effect of incorporating BC laws on operating performance of firms and how this effect differs in competitive and non-competitive industries. Authors report that after the passage of the law there is a negative effect on operating performance measured by ROA which drops by 0.6%, implying that these laws may create opportunities for managerial slack. This effect is magnified when industry concentration is taken into account. Using Herfindahl quintiles ROA drops the most significantly, by 1.5%, in the highest quintile. For the lowest quintile which represent highly competitive industries there is virtually no effect. Authors also focus on which aspect of managerial slack passage of BC laws affect. Managers can pursue suboptimal decisions such as value-destroying takeovers or other forms of empire building. This would be observed via an increase in capital expendi-

tures or higher M&A activity. Another possibility is the quiet life hypothesis which proposes that managers delay or avoid undertaking difficult activities such as haggling with suppliers or negotiating with labour union. These can be observed through an increase in overhead costs such as selling, general and administrative costs or advertising. Authors find evidence supporting the quiet life hypothesis since the passage of BC laws is associated with an increase in overhead costs but only in non-competitive industries. This suggests that corporate governance and competition are substitutes. In concentrated industries an adverse shock to corporate governance caused a drop in operating performance suggesting that a low level of competition (even though measured by Herfindahl index focusing on concentration) could not compensate for a level of corporate governance.

Similarly, Chhaochharia *et al.* (2009), investigate the effect of the positive shock to corporate governance – the passage of Sarbanes Oxley act (SOX). SOX was aimed at tightening corporate governance rules after series of high-profile corporate scandals. To investigate the impact of the shock authors divide industries between concentrated and non-concentrated using the Herfindahl index. Authors find that the passage of SOX is associated with the increase in efficiency and these gains are stronger in the concentrated industries which is consistent with the notion of the governance - competition substitution relationship. Authors also investigate which agency good seems to be driving these results. And consistent with Giroud & Mueller (2010) they found that efficiency gains are due to a drop in overhead costs. This provide a further support for the quiet life hypothesis. Authors also perform several checks to their results. They corroborate a similar study using the passage of the Cadbury Committee recommendations in the UK. Similarly as SOX, the Cadbury Committee was aimed at developing the set of standards for better corporate governance which were widely accepted by leading British firms. Authors report results consistent with their main findings. The firms in the concentrated industries experience significantly larger efficiency gains. Results correspond to those of Giroud & Mueller (2010), where adverse shock to corporate governance was used. And correspondingly, concentrated industries benefited most from the positive shock as managers of companies in competitive industries are already aligned with shareholders thanks to higher PMC.

The corporate governance - competition substitution effect with regards to profitability was also tested by a positive shock to PMC. Griffith (2001) focuses on the UK establishment during 1980-96 using the introduction of the EU's

Single Market Programme ("SMP") as an instrument for a change in product market competition. The SMP similarly to the US - Canada free trade agreement was aimed to decrease trade barriers by allowing foreign companies to enter members markets. Authors focus on two different effects of competition on productivity. On the one hand profits are decreased through increased competition. However competition also aligns interest of owners and management and effectively reduce agency costs. Author divides firms into four categories whether they have a principal-agent structure and whether they should have been affected by the SMP. The SMP was indeed found to increase product market competition in affected industries in the UK. This increase of product market competition was accompanied by an increase of productivity but only in companies that did have the principal-agent set up. Conclusion is that product market competition mitigates agency costs and thus have a positive impact on productivity. It is often assumed that managers when not closely monitored will pursue targets that are not aligned with the shareholders' interests (i.e. consume agency costs). A reported drop in profitability is usually linked to agency costs, such as the empire building. If managers follow this type of behaviour firms grows in size through pursuing costly acquisitions which often prove to be value-decreasing. Nevertheless there are other channels through which agency costs can impact the profitability.

Using plant-level data and controlling for endogeneity through the passage of antitakeover laws Bertrand & Mullainathan (2003) investigate what agency goods managers consume. After the passage of takeover laws authors find 1% increase in blue-collar wages and 4% increase in white-collar wages. Both rates of plant destruction and creation fall and roughly offset each other. Regarding the profitability, return on capital falls by 1%. Empire building behaviour of managers does not explain data well because of a lack of expansion of companies. Rather, the idea of "quiet life" seems to be consistent with data. When managers enjoy quiet life they are avoiding performing percievingly difficult tasks such as closing of factories or haggling with suppliers. Giroud & Mueller (2010) also found evidence for the quiet life hypothesis, reporting increase in overhead costs after the passage of business combination laws.

These studies are consistent with the notion that corporate governance and product market competition are close substitutes. The substitution relationship was further strengthened by using shocks to both PMC and corporate governance. The use of Herfindahl index may however drive these results as shown by Berger (2014). The focus of the Herfindahl index on concentration

may be misleading measure of competition and more sophisticated measures such as fluidity may shed more light to issue.

2.4 Payout as a function of governance and competition

Researchers focusing on financial flexibility identify both competition and corporate governance as important drivers affecting companies' financial and payout policies. However there is a disagreement concerning the impact on financial policy when one interacts corporate governance together with competition. Two main contradictory models getting the most empirical evidence are the outcome model and the substitution model.

According to Grullon & Michaely (2007), in the substitution model dividends are used as a *substitute* for external corporate governance factors such as laws or regulation. Similarly dividends can be used as signalling tools in markets with less information. In the outcome model however the payout structure is the *outcome* of a current environment a company faces. Therefore if the environment allows for a managerial slack (e.g. a lack of competition) managers will take advantage of this situation and limit payout in order to consume agency goods. Grullon & Michaely (2007) continue and illustrate the contradiction of these models by stressing the opposite outcomes the models predict. The outcome model predicts a negative relationship between payout and competition which is stronger for firms with more severe agency costs. The implication of the substitution model is a positive relationship between concentration and payouts as firms facing low competition will opt for a higher distribution to shareholders.

Both models gained empirical evidence. The substitution model is supported by findings of John, K., & Knyazeva (2006), Hoberg *et al.* (2014).

John, K., & Knyazeva (2006) investigate different ways of distribution policies and how does corporate governance affect them. They consider dividends to be a form of commitment while buybacks can be viewed as more flexible. Not adhering to the pre-set dividend policy typically causes a strong negative reaction from the market. However dividends are more sufficient when it comes to mitigating the corporate governance failures. As a starting point authors use Jensen (1986) free cash flow theory. The presence of distribution to shareholders mitigates agency costs because otherwise managers may pur-

sue value-destroying investments. However they argue that the theory does not differentiate between buybacks or dividends. Authors however argue that there is a difference between dividends and buybacks in terms of pre-commitment. Flexible structure of buybacks makes them a less effective tool for addressing corporate governance. However if agency issues are rather mild and there is strong corporate governance put in place there is no need for a company to commit to relatively costly dividends. Authors find that weak corporate governance firms will pay on average higher dividends to mitigate agency costs. This relationship is stronger for companies with sizeable free cash flow. Authors also find that managers who are under scrutiny from external monitoring via the market for the corporate control are likely to opt for repurchases and repurchase more shares.

Hoberg *et al.* (2014) investigate the impact of product market competition on financial flexibility. As a proxy for product market competition authors construct a new measure – fluidity. Opposed to other conventional tools dynamics, fluidity is a forward-looking and competitor-focused measure. They found an evidence that companies facing more product market threats have a smaller propensity to pay dividends or repurchase shares. Also the amount of cash used for either dividends or buybacks is lower, suggesting that companies are avoiding a pre-commitment arising from dividends and maintaining a sufficient financial flexibility. Companies facing fluid markets are also less likely to initiate dividend. Authors argue that firms are maintaining conservative financing policies to position themselves better should a sudden adverse event affect their environment. As volatility of product market disappears company may be more willing to pay out the returns to shareholders. Authors also stress the difference between maturity of company and fluidity. Even mature and well-established firms may face threats stemming from innovative technology or entry of rivals.

The outcome model was supported by findings of La Porta *et al.* (2000), Grullon & Michaely (2007) and Harford *et al.* (2008).

La Porta *et al.* (2000) take advantage of a different legal protection of minority shareholders across countries. Authors find a positive relationship between dividend distribution and protection of minority shareholders. This is consistent with the notion of outcome model as dividends payments can be considered as an outcome of better minority shareholders protection. Further authors find that in countries with a strong minority shareholders protection fast growth companies pay less dividends than slow growth companies. This is consistent with the idea that legally protected investors are willing to wait

for their dividends while poorly protected investors prefer to obtain dividends regardless of investment opportunities. Authors associate this misallocation of investment to agency costs arising from poor legal protection.

Grullon & Michaely (2007) build on findings of La Porta *et al.* (2000) and argue that product market competition, similarly as shareholder protection, can be viewed as a disciplinary factor. Authors' results suggest that corporate payouts are the outcome of product market competition. This is based on the idea that competition can put pressure on managers to avoid consuming agency costs and pursue value-creating investments at a risk and the cost of overinvesting are increased as a result of product market competition. Moreover authors find that the effect of competition on payouts is stronger for firms with higher agency costs. Grullon & Michaely (2007) results therefore complement results of La Porta *et al.* (2000) that both legal protection of shareholders and an intense competitive environment can exert pressure on managers to distribute cash to shareholders and pursue decision aligned with the interests of shareholders. To capture product market competition authors opt for four-digit SIC HHIs.

Harford *et al.* (2008) focus on the management of internal funds in a company. More specifically authors focus on how does efficacy of corporate governance impacts an arising conflict between shareholders and managers. It is not clear how will self-interested managers behave when there are discretionary excess cash reserves. Managers face a trade-off between benefits of current spending via acquisitions and accumulating cash reserves to provide future flexibility. To answer this question authors develop two main hypotheses – spending hypothesis and flexibility hypothesis. According to the flexibility hypothesis self-interested managers will prefer flexibility over current consumption. Generated cash will therefore be accumulated on the balance sheet of a company in order to offer a buffer in case of an adverse shock for the management. The spending hypothesis predicts an opposite outcome. Self-interested managers will put more weight on expansion and the empire building and generally try to deploy the excess cash as quickly as possible.

Authors find evidence supporting the spending hypothesis, i.e. weaker corporate governance structures are negatively related with a level of cash holdings. When investigating the impact of governance on the investments decisions authors find that poorly governed firms tend to acquire assets through acquisitions and capital expenditures rather than through R&D. Authors couple this with evidence that acquisitions made by poorly governed firms are value-destroying

and that R&D is a value-increasing long term investment. Authors then conclude that investment decisions made by poorly governed firms with excess cash are not optimal from shareholder's perspective. As corporate governance variables authors choose following: board characteristics, ownership concentration, executive compensation, antitakeover provisions – G Index, E index.

We can be therefore conclude that there are different views on dividends and distribution policy as a function of agency problems and competition. Both major views - substitution model and outcome model - seem to be supported by the empirical studies. However studies typically opt for different Herfindahl indices and the use of fluidity can shed a new light on this issue.

Chapter 3

Hypotheses development

We will focus on the interaction of corporate governance and product market competition in two main parts - financial flexibility and operating performance. The relationship of corporate governance and competition in terms of operational profitability has been an evidence of a substitution effect. However the application of Herfindahl index could be a possible issue given its reported shortcomings and thus we will extend these results by opting for fluidity. The topic of financial flexibility would incorporate a relatively straightforward notion of Hoberg *et al.* (2014) with a divided view on the impact of corporate governance.

3.1 Financial Flexibility

We will start with an analysis of a financial position of company and balance sheet strength from the perspective of governance and competition interaction.

We use the notion supported by results of Hoberg *et al.* (2014) that product market competition force managers to maintain sufficient financial flexibility when facing competitive environment. Companies that are operating in more intense competitive environment should have a higher demand for financial funds in order to maintain a cash pillow.

Next we will incorporate governance in a form of a shock associated with the passage of SOX. Literature does not offer a unified prediction concerning the impact and two main approaches seems to have significant empirical evidence.

The substitution effect suggests that a positive shock to corporate governance would result in a decrease of dividend payout. The companies are no longer required to compensate poor governance rules by relatively high divi-

dends and the increase of governance quality provides investors with a higher level of certainty that excess funds are less likely to be squandered and not consumed in a form of agency goods, such as empire building. This view is supported by results of John, K., & Knyazeva (2006) suggesting that weak corporate governance firms will pay on average higher dividends to mitigate agency costs. This relationship is stronger for the companies with size able free cash flow. Authors also find that managers who are under scrutiny from external monitoring via the market for the corporate control are likely to opt for repurchases and repurchase more shares. Incorporation of product market fluidity and results of Hoberg *et al.* (2014) yield prediction that this effect would be stronger for companies with higher fluidity given their increased demand for financial flexibility caused by adverse competitive environment.

The outcome model predicts different results. Since dividends are viewed as an outcome of the current governance setup of the company, or by extension the competition, a positive shock to corporate governance would cause an increase in payout since companies are forced to employ more democratic policies and shareholders are given a room to demand a higher dividend. La Porta *et al.* (2000) find empirical evidence that legally protected investors are willing to wait for their dividends while poorly protected dividends prefer to obtain dividends regardless of investment opportunities. Authors associate this misallocation of investment to agency costs arising from poor legal protection. Grullon & Michaely (2007) complement the findings of La Porta *et al.* (2000) suggesting that corporate payouts are the outcome of both legal protection of shareholders and competitive environment. This effect would be stronger in less competitive environment since less fluid companies would be under a higher pressure to distribute excess cash in contrast to companies constrained by higher product market competition.

H1 *Following a positive corporate governance shock, a higher level of fluidity will be associated with high level of cash holdings.*

The hypothesis tests for "strengthening" the effect of the shock in the appropriate direction, based on results of Hoberg *et al.* (2014). If companies are to accumulate cash (substitution model), this effect is likely to be stronger for companies with higher fluidity as their demand for financial flexibility is greater.

3.2 Operating Performance

Now we will turn to the second aspect - operating performance and profitability. As Griffith (2001), Giroud & Mueller (2010) and Chhaochharia *et al.* (2009) argue there is a strong substitution relationship between competition and governance. The relationship is stressed using shocks both to corporate governance and PMC. Griffith (2001) argue that a positive shock to PMC results in increased profitability in firms with agency costs. Also Giroud & Mueller (2010) report that a negative shock to corporate governance is associated with a significant drop in profitability only in concentrated industries which are assumed to have lower levels of competition while a positive shock documented in Chhaochharia *et al.* (2009) is associated with the strongest improvement in profitability for companies in concentrated industries.

We will extend these results by incorporating fluidity as a measure of competition. As we argue, Herfindahl index used in Giroud & Mueller (2010) and Chhaochharia *et al.* (2009) and articles may not be the ideal proxy capturing the competition. Differences in Herfindahl index construction can significantly drive results and the index failed to take into the account shocks in product markets. This leads to following hypothesis:

H2 *Profitability gains resulting from a corporate governance shock are likely to be higher for firms facing lower product market fluidity.*

This hypothesis predicts results similar to those of Griffith (2001), Giroud & Mueller (2010) and Chhaochharia *et al.* (2009). Applying fluidity as a key competition variable will however adjust for shortcoming of Herfindahl index as documented in Berger (2014).

3.3 Quiet Life or Empire Building?

If indeed it would be the case that there is an increase in operating performance we will try to examine which agency goods were associated with lowered profitability. The empire building is often mentioned being the most important one, however there is some evidence of Bertrand & Mullainathan (2003), Giroud & Mueller (2010) and Chhaochharia *et al.* (2009) that it could be quiet life. The idea of quiet life is consistent with the notion that managers enjoy quiet life they are avoiding performing percievingly difficult tasks such as closing of fac-

tories haggling with suppliers. Since we are extending the results of Giroud & Mueller (2010) who report quiet life driving profitability down we expect similar case using fluidity.

H3 *A drop in operating performance is mainly associated with managers pursing the quiet life.*

We therefore expect a significant increase in overhead costs such as S&GA or advertising. It may be the case actually empire building would prevail suggesting significant capital expenditures and acquisition outflow. This hypothesis predicts results similar to those of Bertrand & Mullainathan (2003) and Giroud & Mueller (2010).

Chapter 4

Data and methodology

4.1 Fluidity

We use fluidity as a measure of product market competition as defined by Hoberg *et al.* (2014). It differs from the conventional Herfindahl index in two important aspects. Firstly, it is based on different industry classifications. The Herfindahl index is commonly based on industry classification systems such as NAICS or SIC. Fluidity is based industry definition used in on Hoberg & Phillips (2010). They construct industry networks base using products similarity, which is based on comparison of business descriptions contained in the annual 10-K report. As authors argue, one of the key advantages of this approach is dynamics. Networks are determined every year as opposed to staleness of SIC or NAICS classifications. This approach also allows for a unique set of rivals for an individual company which better reflects a competitive environment.

Secondly, fluidity is text-based and oriented towards competitors. Herfindahl index approximates the level of competition using a market share of a company based on sales. Fluidity uses a different approach. Hoberg *et al.* (2014) extract key words used in the business description of companies and construct their product space. After constructing the product space authors measure to what extent is company's product space affected by competitors. Thus fluidity captures a level of threats company faces because of rivals' action and not due to company's own product instability.

More formally, authors introduce fluidity by starting with defining a scalar J_t as a number of unique key words present in all firms' business descriptions in year t. Let W_{it} represent a vector identifying which of J_t words are used by a firm i in year t. Element of W_{it} is equal to 1 if a firm uses the word and 0 if

it does not. The vector W_{it} is then normalised and defined as N_{it}. To capture dynamics of the industry, authors define the aggregate difference vector $D_{t-1,t}$ ("change vector") as:

$$D_{t-1,t} = \left| \sum_j (W_{j,t} - W_{j,t-1}) \right|$$

This vector measure changes in usage of a word j in year t. To arrive at product market fluidity (the "overlap") authors calculate the dot product between normalized vector $D_{t-1,t}$ and the firm normalized word vector N_{it}:

$$\text{Product market fluidity}_t \equiv \left\langle N_{it} \cdot \frac{D_{t-1,t}}{\|D_{t-1,t}\|} \right\rangle$$

Fluidity is greater when an overlap between firm's words and a change vector is greater. Computation of the change vector on a yearly basis incorporates a significant degree of dynamics into fluidity. In contrast concentration ratios are often computed with a lower frequency such as 3 of 5 years (e.g. economic censuses).

4.2 Corporate governance shock

Following Chhaochharia *et al.* (2009), we use the passage of SOX as a natural experiment. As they argue, SOX significantly increased penalties for officers charged with fraud, heightened scrutiny over audits both internal and external and strengthen disclosure of insider trading. Thus it can be viewed as exogenous shock to corporate governance to examine the relationship between governance and fluidity. Chhaochharia *et al.* (2009) further examine other possibility that there may be other unobservable factors that are specific to the period of passage of SOX and the U.S. economy. They corroborate results with British alternative to SOX - Cadbury Committee recommendation. They further conduct a placebo test in order to find out if the results could be driven by 2001 recession that preceded the passage of SOX. Further they test whether change in industry structure was an influencing factor. In all cases, authors find that the passage of SOX is robust to all of these three factors.

4.3 Controls

Key financial data are sourced from Compustat database. These were matched with fluidity through unique identifier *gvkey*. The fluidity dataset provided by

Hoberg *et al.* (2014) which contains fluidity observations throughout 1997 to 2008 for 51,677 firm-year observations. Following Chhaochharia *et al.* (2009), for the purposes of incorporation of the corporate governance shock we shorten a time frame from 2001 till 2006 . Variables were further winsorized at 1 and 99 percentiles to eliminate economically irrational observations.

To control for firm characteristics following variables were used:

- Maturity: As a proxy for maturity of the company we used a natural logarithm of number of years the company is listed in the Compustat.
- Size: As a proxy for size we opted for logarithm of book value of assets (LAT) and squared logarithm of book value of assets (LAT2)
- Loss dummy: In case a company realised a loss (i.e. negative net income) during a relevant fiscal year, we assign value of 1.
- GDP growth rate: In case of financial flexibility we include a control for business cycle defined as a yearly growth of US. GDP, sourced from the US. Bureau of Economic Analysis.

Maturity and size controls defined above were applied in Chhaochharia *et al.* (2009) study and further complemented by the loss dummy, applied in Hoberg *et al.* (2014).

Table 4.1: Summary statistics

	Mean	SD	Min	Max
Fluidity	7.15	3.46	0.32	27.51
Cash / Assets	0.17	0.21	0	0.94
Assets	1 192	4 246	0.07	31 880
Age	11.45	10.32	1	54
ROA	−0.05	0.67	−5.06	0.43
EBIT margin	−0.77	4.46	−37.46	0.46
EBITDA margin	−0.63	4.12	−34.58	0.66
Sales turnover	1.16	0.94	0	5.14
COGS to sales	0.94	1.98	0.07	17.81
SG&A to sales	0.52	1.38	0.02	11.39
Advertising to sales	0.03	0.07	0	0.56
Cashflow from investing	−0.10	11.30	−4 788	82

Chapter 5

Results

5.1 Model

In investigating the model we will be focusing on estimation of the equation:

$$y_{it} = \beta_1 \cdot SOX_t + \beta_2 \cdot Fluidity_{it} + \beta_3 \cdot SOX_t \cdot Fluidity_{it} + \gamma \cdot X_{it} + \\ + \alpha_i + \alpha_t + \epsilon_{it}$$

where i indexes a firm, t indexes year, y_{it} is a variable of interest, SOX_t represent a dummy equaling 1 if year is greater than 2001 (incorporation of SOX), $Fluidity_{it}$ is product market fluidity and $SOX_t \cdot Fluidity_{it}$ is an interaction. A X_{it} represent vector of controls.

5.2 Financial Flexibility

Following Hoberg *et al.* (2014), we investigate a financial position of a company as a function of exogenous governance shock and competition a company faces.

SOX coefficients are positive and significant suggesting that companies are holding more cash as a result of positive corporate governance shock. This is consistent with substitution effect as cash is accumulated on a balance sheet of a company and not distributed to shareholders. Results are similar to those of Hoberg *et al.* (2014), as overall cash level held is positively related to product market fluidity implying that companies facing more fluid environment are holding more cash.

Interaction coefficient however suggests that the passage of SOX allowed companies to employ cash. These are in contrast to what was predicted by the hypothesis 1. More fluid companies were predicted to have higher demand

for financial flexibility and we cannot reject the hypothesis that $\beta_2 + \beta_3 = 0$. This suggests that after accounting for corporate governance, fluidity seems to have no impact on financial position of company. The fact that in Chhaochharia *et al.* (2009) provided evidence that impact of SOX passage was independent of recession and business cycle drivers we cannot attribute the impact to business cycle. We therefore reject hypothesis H1.

Table 5.1: Financial flexibility

Dep. var.	Cash / Assets		
Indep. var.			
SOX	0.068***	0.052***	0.052***
	(11.29)	(12.40)	(15.83)
Fluidity	0.002**	0.002***	0.002***
	(2.14)	(2.88)	(4.17)
SOX * Fluidity	−0.002***	−0.002***	−0.002***
	(−2.79)	(−3.37)	(−5.21)
GDP growth	−0.004***	−0.003***	−0.003***
	(−6.13)	(−5.22)	(−5.51)
Size	0.043***	0.040***	0.040***
	(4.10)	(−3.90)	(12.37)
Size squared	−0.006***	−0.005***	−0.005
	(−5.97)	(−5.71)	(−15.74)
Maturity	−0.075***	−0.050***	−0.050***
	(−6.49)	(−5.88)	(−10.70)
Loss	−0.025***	−0.025***	−0.025***
	(−11.11)	(−11.10)	(−12.54)
N	28734	28734	28734
R^2	0.1246	0.1175	0.1175
Fixed effects - firm	+	+	+
Fixed effects - year	+	−	−
Clustered errors	+	+	−

We applied fixed effect model and errors are clustered by company (the second column). We further complement the main model with two way fixed effect model - firm and year (the first column). Numbers in brackets correspond to *t*-statistics.

5.3 Operating Performance

To capture the impact on profitability, we employ 4 different measures:

- ROA - return on assets, defined as $EBITDA_t$ / $Total\ assets_t$
- EBIT margin, defined as $EBIT_t$ / $Sales_t$
- EBITDA margin, defined as $EBITDA_t$ / $Sales_t$
- Sales turnover, defined as $Sales_t$ / $Total\ assets_t$

One can view ROA as an aggregate measure of profitability as it is clear that following holds:

$$ROA_t = EBITDA_t \ / \ Total\ assets_t = EBITDA_t \ / \ Sales_t * \\ * \ Sales_t \ / \ Total\ assets_t = EBITDA\ margin_t \ * Sales\ turnover_t$$

ROA can be viewed as a product of operating profitability (EBITDA margin) and effectiveness in resources allocation (Sales turnover).

Prior to SOX, we can observe negative and significant relationship between fluidity and profitability. More fluid companies that are facing more aggressive environment and are thus less profitable. This supports an intuitive notion that competition is has a negative impact on overall profitability. After the passage of SOX, we observe a drop in profitability as SOX coefficients are negative and significant. This is consistent with an introduction of new costs associated with an incorporation of SOX provision. However through the interaction coefficient the impact of fluidity is significantly reduced, though being still negative.

These results however are not consistent with a traditional view of substitutional relationship. The interaction dummy coefficient is positive and significant suggesting rather a complementing effect - companies with higher product market fluidity benefit more from a positive corporate governance shock. We therefore reject the hypothesis that efficiency gains resulting from a corporate governance shock are likely to be higher for firms facing lower product market fluidity.

Further we find similar relationship between our controls as presented in Chhaochharia *et al.* (2009) and Giroud & Mueller (2010). There is a significant non-linear relation between size and performance, where the asset coefficient is positive and the assets-squared coefficient is negative. Further we find a support for a positive relationship between maturity and profitability.

Overall we can conclude that from a perspective of operating performance, there seems to be a difference in aspects covered by previously used concentration approach via HHI.

Table 5.2: Operating performance

Dep. var.	log(1+ ROA)	log(1+ EBIT margin)	log(1+ EBITDA margin)	log(1+ Sales turnover)
Indep. var.				
SOX	−0.057***	−0.085***	−0.083***	−0.005
	(−7.84)	(−8.20)	(−8.75)	(−1.04)
Fluidity	−0.015***	−0.019***	−0.016***	0.002**
	(−9.49)	(−8.73)	(−8.82)	(2.08)
SOX * Fluidity	0.010***	0.014***	0.012***	0.013*
	(8.86)	(7.75)	(7.52)	(1.64)
Size	0.268***	0.130***	0.110***	−0.081***
	(9.37)	(6.18)	(5.45)	(−4.15)
Size squared	−0.018***	−0.009***	−0.007***	−0.004**
	(−7.96)	(−5.19)	(−4.23)	(−2.30)
Maturity	−0.040**	0.084***	0.085***	0.114*
	(−2.50)	(4.16)	(4.28)	(11.09)
Loss	−0.112***	−0.153***	−0.119***	−0.035***
	(−27.60)	(−26.24)	(−24.82)	(−12.18)
N	24913	23416	23645	25368
R^2	0.2481	0.2137	0.1943	0.0174
FE - firm	+	+	+	+
FE - year	−	−	−	−
Clus. errors	+	+	+	+

We applied fixed effect model and errors are clustered by company. Numbers in brackets correspond to t-statistics.

5.4 Quiet Life or Empire Building?

From a previous section, we did not found that a substitutional relationship regarding operating performance and governance. Rather we found a statistically significant complementing effect. Despite this we will try to investigate what agency goods were consumed prior to passage of SOX. There is empirical support for both quiet life and empire building. The idea of quiet life is consistent with the notion that managers enjoy quiet life they are avoiding performing percievingly difficult tasks such as closing of factories haggling with suppliers. The empire building is consistent with the notion that managers pursue suboptimal investment decision in order to build an empire, typically via acquisition of companies.

We will pay attention to following variables:

- COGS margin, defined as $Cost\ of\ goods\ sold_t$ / $Total\ assets_t$
- SGA margin, defined as $Selling\,general\ and\ admin\ expense_t$ / $Sales_t$
- Advertising margin, defined as $Advertising\ expense_t$ / $Sales_t$
- Investing intensity, defined as $Cashflow\ from\ investing_t$ / $Total\ assets_t$

When investigating results we can observe that SOX coefficient are positive and significant consistent with the results from the previous section. Results suggest that it was mainly selling, general and administrative expenses that is consistent with the introduction of additional costs associated with SOX. These are unlikely to be found in cost of good sold.

Table 5.3: Quiet life or empire building

Dep. var.	log(1+ COGS/Sales)	log(1+ SGA/Sales)	log(1+ Adv/Sales)	log(1+ CFI/ Assets)
Indep. var.				
SOX	0.014***	0.052***	0.010***	−0.006
	(3.49)	(7.44)	(4.43)	(−1.10)
Fluidity	0.002***	0.008***	0.001***	0.003***
	(3.30)	(6.89)	(3.07)	(2.84)
SOX * Fluidity	−0.002***	-0.006***	-0.001***	−0.001
	(−2.84)	(−5.53)	(−3.23)	(0.73)
Size	−0.016	−0.094***	0.016**	−0.097***
	(−1.43)	(−4.78)	(2.41)	(−5.57)
Size squared	0.001	0.007***	−0.001	0.001
	(1.42)	(4.30)	(−1.21)	(0.95)
Maturity	−0.021**	−0.099***	−0.042***	0.112***
	(−2.46)	(−6.06)	(−8.18)	(10.30)
Loss	0.028***	0.056***	0.007***	0.010***
	(15.88)	(18.80)	(6.60)	(2.78)
N	24995	24995	9782	25366
R^2	0.0013	0.2543	0.0176	0.0007
FE - firm	+	+	+	+
FE - year	−	−	−	−
Clus. errors	+	+	+	+

We applied fixed effect model and errors are clustered by company. Numbers in brackets correspond to t-statistics.

Results consistently mirrors the results of previous section. Positive corporate governance shock lowered costs for more fluid companies. Positive and significant coefficients on interaction of SOX and Fluidity in SG&A margin and advertising expense suggest support for quiet life hypothesis. An insignificant coefficient in cash flow investing indicates a weak support for the empire building notion. However we should take these results with cation since the expected substitution relationship was not found.

5.5 Model Considerations

5.5.1 Hausman test

As a main approach we used a fixed effects model coupled with clustering of standard errors. One way to check whether fixed effects model is appropriate methodology is conducting the Hausman test. If a special condition is fulfilled, more specifically if $Cov(\alpha_i, X_{it}) = 0$, random effects model is more efficient than fixed effects model. However, if this not the case, fixed effects model is solely consistent. This is captured via the Hausman test. Under the null hypothesis being true the Hausman statistics follow χ^2 distribution with 1 degree of freedom.

$$W = \frac{(\widehat{\beta_{FE}} - \widehat{\beta_{RE}})^2}{Var(\widehat{\beta_{FE}}) - Var(\widehat{\beta_{RE}})} \overset{H_0}{\sim} \chi^2_1$$

The null hypothesis is that $Cov(\alpha_i, X_{it}) = 0$, or in other words we are able to use random effects model. The alternative is simply H_0 is not true, and random effects model is inconsistent. The table 5.4 summarises Hausman tests for all model carried out. Results offer strong evidence against the null hypothesis and a fixed effects model seems to be a preferred option for estimation.

5.5.2 Error clustering

In order to control for correlation errors within firms we also cluster the errors at the firm level. In case that data exhibit a clustering effect, it is very likely that $Cov(\epsilon_{it}, \epsilon_{iv}) \neq 0$ as there is some group source of error. As Cameron & Miller (2015) argue, this would consequently result in lower standard errors as traditional approaches would not account for this clustered source of errors and inference would be misleading.

For comparison purposes we report *t-statistics* of the interaction coefficient based on not adjusted standard errors and standard errors adjusted for clustering at firm level. This process yields approximately 5 400 clusters (i.e. different companies). When investigating the table 5.5 we found that adjusting for firm clusters still provides necessary robustness and significance.

Table 5.4: Hausman test

Model tested	χ^2_1	p-value
Cash / assets	1403.0	0.00
log(1+ROA)	519.3	0.00
log(1+EBIT margin)	505.4	0.00
log(1+EBITDA margin)	458.9	0.00
log(1+Sales turnover)	1907.6	0.00
log(1+COGS / sales)	361.1	0.00
log(1+SGA / sales)	1 066.8	0.00
log(1+Adv. / sales)	233.2	0.00
log(1+CFI / assets)	138.8	0.00

Table 5.5: Standard errors

*T-statistics of SOX * Fluidity*	Default SE	Firm-clustered SE
Cash / assets	−5.21	−3.37
log(1+ROA)	11.71	8.86
log(1+EBIT margin)	12.35	7.75
log(1+EBITDA margin)	12.29	7.52
log(1+Sales turnover)	2.42	1.64
log(1+COGS / sales)	−4.44	−2.84
log(1+SGA / sales)	−9.18	−5.53
log(1+Adv. / sales)	−4.41	−3.23
log(1+CFI / assets)	0.85	0.73

Chapter 6

Conclusion

In this paper we examined area of corporate governance and competition interaction using novel approaches towards measuring and capturing aspects of competition and fluidity. We applied fluidity, a novel approach towards competition and a natural experiment of passage of Sarbanes-Oxley act in order to shed a different light on already documented and supported notions such as a substitutional relationship between governance and competition in terms of profitability. We also used these to investigate not yet unified field of financial flexibility. Fludity as well as a natural experiment alleviated a crucial issue of endogeneity that is known to affect especially corporate governance studies.

We found a support for a substitutional model of dividends, as we found that companies after a positive shock to corporate governance strengthen their financial position by accumulating more cash on their balance sheet. Regarding product market competition we arrived at results similar to Hoberg *et al.* (2014) that more intense competition is positively associated with cash holdings of company. Further a fluidity has a negative relationship with overall profitability of company.

Results indicate that interaction of fluidity and corporate governance shock associated with SOX does not offer theoretical background relationship. Namely, we found that a positive association between fluidity and cash level held by a firm, found by Hoberg *et al.* (2014), is not present when we took into account corporate governance.

Further we found that the established substitutional relationship, documented by Chhaochharia *et al.* (2009) or Giroud & Mueller (2010), between governance and competition with regards to profitability is not present. An interaction between fluidity and governance shock actually suggests that there

is a complementary effect. The efficiency gains associated with the passage of SOX are driven mainly by lowering selling, general and administrative expenses, a notion that corresponds to a quiet life hypothesis.

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Bachelor Thesis Proposal

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Proposed topic	Impact of Product Market Fluidity on M&A Activity

Topic characteristics In the article Hoberg *et al.* (2010) developed a new way of capturing product similarity using computational linguistics. By constructing a main vocabulary of firms' 10-K business descriptions authors we able to map networks of firms that are closely related. Authors argued that this approach is more suitable than traditional SIC codes that are static and fail at capturing product market dynamics. Authors applied this metric on M&A activity and investigated whether product market similarity influences which target is acquired. They found out following:

- Highly similar firms are less likely to merge – competitive effect
- Firms that are more broadly similar to all firms in the economy are more likely to merge – asset complementarity effect
- Firms with patents, copyrights, and trademarks are more likely to be targets
- Merger value creation is higher if target increases buyers' differentiation relative to its rivals

Asset complementarity effect arises when merged companies are able to differentiate themselves from current rivals by introducing new products. If target possess needed skills or technology merger is likely to be successful, measured by long term profitability and sales growth.

Authors build on these foundations and in the recent article *Product Market Threats, Payouts, and Financial Flexibility* they introduced advanced metric for measuring a level of competition within product markets – fluidity. This tool

again uses business description and companies' similarity but it also compares year-on-year changes. If for example company business description vocabulary did not change its implied fluidity is equal to zero. However if its rival changed their descriptions in the way that their vocabularies are more similar, our firms product market fluidity would not be trivial.

Authors used this fluidity and examine companies dividends, repurchases and cash balances. They found out that fluidity decreases firm propensity to make payouts via dividends or repurchases.

Authors also found that companies facing higher fluidity markets hold more cash as a hedge. If product market threats materialize companies could use this cash to combat these threats via mergers or increased R&D spending. We are therefore expecting that increasing fluidity results in increased levels of M&A activity. We also expect that bigger companies or firms with a better access to financing would choose to pursuit the merger whereas smaller firms or firms facing financing constraints would opt for increase in R&D spending.

We are also expecting that fluidity of product markets would also impact takeovers characteristics. Hoberg and Phillips already investigated whether mergers are likely to create value, measured by sales growth and profitability. They also examine combined announcements returns and their relationship to the product similarity. They do not focus on takeovers premiums and deal dynamics (i.e. whether bid is contested, multiple bidders etc.). Here we see an opportunity for developing additional hypotheses.

Hypotheses

Fluidity levels are positively correlated with M&A activity.
Bigger companies and those with better access to sources of financing would prefer to acquire companies than increase their R&D spending.

Expected Structure

1. Introduction
2. Literature Review
3. Data and Methodology
4. The Model
5. Results Discussion
6. Conclusion

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