Dissertation

"Overinvestment of Free Cash Flow in Emerging Market Firms: An Empirical Analysis"

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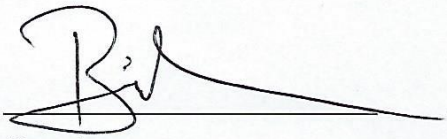
Dr. C Bulent Aybar (Chairman)		12/15/18
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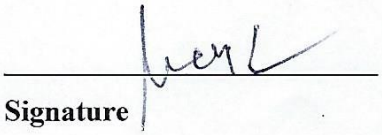
Dr. Lal C. Chugh		12/15/18
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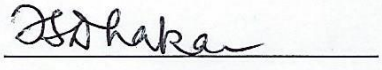
Dr. Tej S. Dhakar		12/15/2018
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Abstract

Overinvestment of Free Cash Flow in Emerging Market Firms: An Empirical Analysis

Free cash flow overinvestment stemming from agency conflicts and moderators of this relationship have been empirically confirmed in several studies for developed markets. Research on emerging market firms has however produced less coherent results. While it can be argued that these incongruities are a consequence of the samples analyzed and the methodologies applied, they might also be rooted in the theoretical underpinnings: Agency theory originates from developed market research, consequently assuming an institutional environment as well as firm characteristics different from those observed in emerging market companies.

This study empirically evaluates the investment behavior of a sample of emerging market firms with a methodology that specifically allows a test of the agency-based explanation of excess investment. The findings support overinvestment as a function of free cash flow, thereby confirming the free cash flow hypothesis in emerging market firms. Additionally, the results propose that this relationship can be negatively moderated by corporate governance mechanisms as well as ownership concentration; suggesting (similar to developed market firms) a principal - agent conflict motivated overinvestment. Debt as a "traditional" way to mend this agency problem can however not be confirmed. Furthermore, the study provides empirical evidence for a moderating effect of the institutional environment on the free cash flow overinvestment relationship via its interaction with firm characteristics. This proposes that the two are interrelated and that agency theory might not be invariant to the specific institutional setting.

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I dedicate this work to my family & friends. Without their continued love and support none of this would have been possible.

Research Summary

Firm investment is key to future growth and firm value. Making the "right" investment decisions is therefore essential for long-term success. In perfect capital markets, firm investment is independent of internally generated cash flows or externally available capital and solely determined by its marginal value (Modigliani & Miller, 1958). Since the perfect market assumption does not hold, it has previously been theorized and empirically supported that finance and investment are indeed interrelated (Love, 2003). This relationship is motivated by diverging interests of firm stakeholders, which can create agency conflicts. These increase the firm's cost of capital (monitoring costs), distort investment (Jensen, 1986), and in turn negatively affect firm value (Dechow, Richardson, & Sloan, 2008). The incentive to invest beyond an optimal level – overinvestment - stems from the fact that all stakeholders are utility maximizers. Consequently, firm insiders (managers and majority shareholders) do not always act in the best interest of outsiders (minority shareholders) (Jensen & Meckling, 1976). Insiders might grow a firm beyond its optimal size for personal benefits, such as elevated power by control over larger resources control (Stein, 2003). The agency problem is especially prevalent with the existence of free cash flow, where excess cash is invested in negative net present value projects instead of being returned to shareholders (Stulz, 1990; Jensen M., 1986). Empirically, the relationship between free cash flow and overinvestment has been supported in several studies in developed markets (Richardson, 2006; Degryse & de Jong, 2006; Pindado & de la Torre, 2009). Research on emerging market firms has yet to fully evolve (Chen, Sun, & Xu, 2016; Chunyan & Yuehu, 2010; Wei & Zhang, 2008).

When exploring this topic in an emerging market context, it is important to consider that the characteristics of emerging market firms are very different from those underlying the "traditional"

agency theory (originating from U.S. and U.K. research), where shareholders are assumed to be dispersed, and overinvestment is consequently attributed to shareholder – manager conflicts. The ownership structure in emerging market firms is comparatively more concentrated (Dharwadakar, George, & Brandes, 2000). It has been argued that large block holders have increased monitoring and control abilities, resulting in excess investment reduction (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999b). On the other hand, majority shareholders can act as entrenched managers similarly leading to principal – principal agency conflicts and overinvestment (Bebchuk, Kraakman, & Triantis, 1999; Shleifer & Vishny, 1997).

Extant empirical studies on emerging market firms suggest a presence of free cash flow overinvestment. The literature is however heavily concentrated on one geographical region (Asia) and applies diverging methodologies, which are not always fully suited to establish excess investment as a result of agency problems.

This study applies an accounting-based approach based on the work of Richardson (2006), which specifically captures unexpected investment over a large sample of emerging market firms, and is thus better able to test the agency-conflict based explanation of free cash flow overinvestment. The results show that there is a positive relationship between free cash flow and excess investment and that this relationship is stronger for positive free cash flow values. The findings, therefore, propose that firms with free cash flow tend to overinvest; thus, providing support for the free cash flow hypothesis in emerging market firms.

With a free cash flow – excess investment association established for emerging market firms, the study further looks at (potential) moderators of this relationship. Extant research in this regard has shown that debt (Jensen M., 1986; Stulz, 1990), and corporate governance (Richardson, 2006; Harford, Mansi, & Maxwell, 2008; Holopainen, 2006; Munisi, Hermes, & Randoy, 2014; Jameson

& Puthenpurackal, 2014) can be negatively related to excess investment in developed market firms. Literature on emerging market firms has produced less coherent empirical results about the overinvestment-debt and the overinvestment-corporate governance nexus (see Chai, 2013; Chen, Sun, & Xu, 2016; Cheung, Stouraitis, & Tan, 2011; Taghavi, Khodaei Valahzaghard, & Amirjahadi, 2014; Carrasco, Johnson, & Nunez, 2005). While the findings can certainly stem from the diverging research methodologies applied, they could also have theoretical underpinnings. Extant literature tends to treat the agency theory as a universal theory and thus assumes that it is invariant to the specific institutional setting of the issue investigated (Bowe, Filatotchev, & Marshall, 2010). A growing body of literature in international business has however repeatedly confirmed that there appears to be an interaction between a firm's institutional environment and its strategy and actions (Peng, Wang, & Jiang, 2007). Researchers have therefore argued that the agency theory might have to be extended to enhance the understanding of firm practices, because firms are embedded in a local framework and affected by institutional context (Zalina & Yusof, 2016; Douma, George, & Kabir, 2006).

In select contemporary studies, finance scholars have commenced exploring the impact of certain country-level corporate governance variables on overinvestment (Francis, Hasan, Song, & Waisman, 2013; Love, 2003; Wurgler, 2000). In emerging markets, governance is often weak and the institutional context can be much different from the one underlying the traditional agency theory. As a consequence, measures applied in developed countries might have had different effects, be less effective, or even ineffective.

Empirical research exploring the impact of institutional environment on firm behavior from a financial perspective is rather scarce. Some studies have indicated that there are country-specific differences in the level of firm corporate governance and the ability to enforce financial contracts.

Both are interrelated to the institutional environment and can thus affect firm investment (Djankov, Hart, McLeish, & Shleifer, 2008; Kaplan, Martel, & Stromberg, 2003).

This study, therefore, analyzes the determinants of free cash flow overinvestment under consideration of the firms' institutional environment.

In particular, the results attest a relationship between debt and overinvestment; its direction is however, contrary to developed market firms, positive. This suggests that in emerging market firms, the introduction of debt in the capital structure does not have the same monitoring - and thus mending effect - on overinvestment as observed in developed market firms.

Furthermore, the findings propose that corporate governance is (similar to developed markets) able to negatively moderate the free cash flow overinvestment relationship in emerging market firms. The extent of the moderating effect, however, varies in different institutional environments. In weak legal and regulatory environments, the effect is smaller; in stronger institutional environments it is larger. Corporate governance and government effectiveness therefore complement each other.

Finally, ownership concentration is found to have a negative effect on the free cash flow overinvestment relationship. The effect is stronger in weaker developed markets. This supports the previously theorized elevated monitoring and control abilities of large block holders. It also proposes that overinvestment in emerging markets might be predominantly driven by principal – agent conflicts (similar to developed markets). Moreover, it suggests that market development and ownership concentration are substitutes, in the sense that owners can replace the monitoring function otherwise carried out by the financial markets to curb overinvestment.

Combined, the findings provide some empirical evidence that agency theory might not be invariant to the institutional environment and that its underlying assumptions should be considered when exploring firm behavior in emerging market firms.

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I) Introduction

I.1) Introduction to the Research Problem

The firm, as a portfolio of its investments, will only increase its worth when investment is efficient (Shapiro, 2005). Realized projects without a marginal contribution will destroy firm value (Titman, Wei, & Xie, 2004), as company resources are miss-allocated and squandered for suboptimal use.

Under the theoretical assumption of perfect capital markets, firm investment is neither dependent on internally generated cash flow nor the availability of external funding, but rather on the marginal value it provides. Accordingly, firm investment and available free cash flow are unrelated when there are no information asymmetries, no frictions in raising external capital, and no moral hazard present in the market (Modigliani & Miller, 1958). For investment activity this would mean that whenever positive net present value projects are available, the firm is able to raise the required capital in the external markets, and – vice versa - any cash flow in excess of what is necessary to fund projects with marginal value is returned to investors; or put differently: in perfect markets, finance is irrelevant for the "real-world" investment decision (Love, 2003).

Since the assumption of perfect capital markets does not hold, researchers have theorized and empirically supported that finance and investment are in fact interdependent and that external capital is not a perfect substitute for internally generated funds. Based on the existence of information asymmetries between different stakeholders of a firm, Jensen & Meckling (1976) theorize the presence of agency conflicts. This can lead to investment in projects that do not have marginal value for the firm, instead of excess cash being returned to investors (Jensen M. , 1986). This is because all stakeholders are utility maximizers with conflicting interests. When free cash

flow is available, insiders (managers or majority shareholders) have the ability to invest in projects for individual benefit without baring full costs; causing overinvestment.

Due to its negative effect on firm value, scholars have previously proposed several moderators – debt and corporate governance - of the free cash flow overinvestment relationship to curb inefficient investment (Dechow, Richardson, & Sloan, 2008; Jensen, 1986).

The overinvestment hypothesis and moderators thereof have been empirically supported in several studies (Richardson, 2006). Research in this area is however highly concentrated on developed economies.

With the increased importance of emerging markets in driving trade, investment and global growth, the question that naturally arises is whether and to what extent emerging market firms are also prone to overinvestment of free cash flow, and what factors can potentially moderate that relationship. Research on emerging market firms is however still scarce and has yet to fully evolve (Chen, Sun, & Xu, 2016; Chunyan & Yuehu, 2010; Wei & Zhang, 2008).

When exploring this topic in a developing market context it is further important to consider that the characteristics of emerging market firms, as well as their environment, are very different from those underlying the "traditional" agency theory and thus the overinvestment hypothesis (which stems from U.S. and U.K. research). From a theoretical perspective, it can be argued that overinvestment in developing markets might not be driven by the same agency conflicts underlying developed market firms (Bebchuk, Kraakman, & Triantis, 1999). Consequently, the application of agency theory as a universal theory, invariant to the specific institutional setting a firm is operating in, might not be able to fully explain the emerging market firm behavior (Bowe, Filatotchev, & Marshall, 2010).

Empirical analyses to test the free cash flow overinvestment relationship as well as its potential moderators in emerging market firms are still scarce and have limited geographical reach. They further frequently fail to consider the specific institutional environment, apply varying analytical approaches, and have produced mixed - in part contradictory - results. Prevalent work on this topic is also mainly concentrated on China.

To extend prior research, the following study will therefore empirically evaluate the investment behavior in a sample of emerging market firms with a methodology suited to test the agency-based explanation of excess investment. Furthermore, factors affecting excess investment are analyzed and the effect of institutional environment on free cash flow overinvestment is assessed.

The remainder of the study is organized as follows: Section II provides the theoretical framework, section III develops the hypotheses, section IV describes the research methodology, and section V presents the empirical results. Sections VI and VII conclude the study, by discussing the findings, contributions, and limitations as well as by providing directions for future research.

II) Literature Review

II.1) Overinvestment of Free Cash Flow

II.1.1) Drivers of Firm Investment

There are two strands of research in extant literature to explain the free cash flow - excess investment relationship. The first one is based on the work of Myers & Majluf (1984). It particularly looks at the firm's ability to pursue investment and attributes investment inefficiencies to information asymmetries between firm insiders (managers) and outsiders (investor). Because of those market imperfections, investors will price the risk of not having full information into their required returns; making external capital comparatively more expensive. Hence, firms that are forced to raise external capital might have to refrain from investing - even when positive net present value projects are available. On the other hand, firms with available free cash flow will increase overall investment activity because of the relatively lower cost (Richardson, 2006), (Fazzari, Hubbard, & Peterson, 1988).

The second approach focuses particularly on whether the investment creates value for the firm and attributes inefficient investment to the existing agency conflicts among different stakeholders of the firm (Jensen M. , 1986). These agency problems arise due to the existence of information asymmetries, which allow insiders to maximize their personal utility rather than that of the outside shareholders (see section I.1.2). As such this theory makes information asymmetries a necessary, yet not sufficient condition for excess investment to occur. The argument can be further underscored by extant research on this topic which shows that ineffective investment exists even when there are no financing constraints (Richardson, 2006), (Kaplan & Zingales, 1997), (Kaplan & Zingales, 2000). Consequently, this study will be based on Jensen's (1986) line of argument

and will evaluate agency conflicts triggered by information asymmetries as the potential reason for overinvestment of free cash flow.

I.1.2) Overinvestment of Free Cash Flow – the Agency Perspective

Modern firms can be characterized by an inherent separation of ownership and control, where principals (owners) engage other people (agents) to act on their behalf (Jensen & Meckling, 1976). In the presence of information asymmetries and under the assumption that all stakeholders of the firm are utility maximizers, it can be argued that owner agents (managers) will not always act in the best interest of their principles (shareholders); creating agency costs in the form of residual loss. Managers might, in fact, have an incentive to pursue projects with a negative net present value or be motivated to refrain from investment with a positive net present value (Jensen & Meckling, 1976). While the latter is a result of risk aversion, stemming from the managers' attempt to avoid loss of wealth by investment in projects deemed "low risk" (Easterbrook, 1984), the former is driven by the managers' quest to increase resources under their control and consequently their power. The elevated power will in return augment their utility (Stein, 2003). Instead of returning cash to shareholders, managers might, therefore, have an incentive to overinvest in projects that have no marginal value to the firm (Jensen M. , 1986).

The overinvestment problem is especially prevalent when a firm produces free cash flow (i.e. cash flow in excess of what is necessary to fund all projects with a positive net present value). When managers use excess cash for investment projects as opposed to debt, they are - to a degree - detached from the pricing and monitoring mechanisms of the market, where investors would otherwise demand a positive contribution to firm value and price the risk of a project into their required rate of return (Easterbrook, 1984).

It has previously been argued that these principle-agent conflicts can be mitigated by the presence of large shareholders, who are in a better position to monitor management action as opposed to dispersed, small stock ownership (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999b). Large block holders also have a better ability, and possibly higher motivation, to control the action of management. As such, higher ownership concentration might reduce overinvestment. However, their presence can give rise to another set of insider versus outsider agency conflicts; those between equity holders.

Conflicts between shareholders arise from a misalignment of interests between controlling and non-controlling shareholders (Shleifer & Vishny, 1997). A deviation of cash flow rights from control rights thereby gives the controlling shareholders an incentive to expropriate minority shareholders (La Porta, Lopez-De-Silanes, & Schleifer, 1999). Controlling shareholders, particularly when involved in managing firms, have the ability to employ company assets to satisfy their own interests (Stulz, 1988); which lets them maximize utility. This is because they only bear a fraction of the costs of any non-monetary benefits that accrue to them (Jensen & Meckling, 1976; Bebchuk, Kraakman, & Triantis, 1999). Similar to managers, controlling shareholders might, therefore, have an incentive to invest available cash flow beyond optimal levels for personal benefits, such as growth or diversification (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999b). These principal – principal conflicts have previously been associated with inefficient strategies (Wurgler, 2000; Filatotchev, Wright, Uhlenbruck, Tihanyi, & Hoskisson, 2003) and expropriation of minority shareholders (Claessens, Djankov, & Lang, 2000; Mitton, 2002).

The distortion of firm investment caused by agency conflicts between various stakeholders of the firm can thus lead to agency costs, growth beyond optimal levels, and negative effects on firm value (Jensen M. , 1986; Jensen & Meckling, 1976; La Porta, Lopez-de-Silanes, Shleifer, &

Vishny, 2002; Lins, 2003;Titman, Wei, & Xie, 2004; Fairfield, Whisenant, & Yohn, 2004; Richardson, & Sloan, 2008).

In a developed market context, the free cash flow - overinvestment relationship has been modeled by Stulz (1990) and was empirically supported in multiple studies across different industries, time periods, and sample sizes.

Pawlina & Renneboog (2005) analyze a sample of 985 non-financial UK firms listed on the London Stock exchange over the period of 1992 to 1998. The results suggest a very strong relationship between investment and cashflow. Similarly, Richardson (2006) attests a positive relationship between free cash flow and overinvestment for U.S. non-bank firms, with a concentration of excess investment in firms with the comparatively highest level of free cash flow. His work evaluates 58,053 firm-year observations over the time period of 1988 to 2002. Examining 135 Spanish exchange listed, non-financial firms from 1990 to 1999 Pindado & de la Torre (2009) also find a positive relationship between free cash flow and over-investment. Similarly, Degryse & de Jong (2006) suggest that cash flow and investment are interrelated by evaluating data from 132 Dutch non-financial companies listed on the Amsterdam stock exchange from 1993 until 1998.

Theoretical and empirical research on excess investment is predominantly focused on developed countries. Shares of these firms are generally widely held with few –if any - block holders, which leads to an inherent examination of the overinvestment hypothesis from a principle –agent conflict perspective.

II.2) Emerging Market Firms and Overinvestment of Free Cash Flow

With the increasing importance of developing markets in the global economy the question that naturally arises is whether and to what degree overinvestment of free cash flow is also present in emerging market firms, which share some characteristics of developed market corporations but are different in others.

As mentioned above, developed market firms can be described by a dispersed ownership structure. This does not necessarily hold true for emerging market firms, where broadly spread equity is rare (Zalina & Yusof, 2016; La Porta, Lopez-De-Silanes, & Schleifer, 1999). Ownership in emerging markets appears to be much more concentrated (Dharwadakar, George, & Brandes, 2000). Empirical analyses suggest that emerging market firms - in general - are frequently family owned or have only one (few) majority shareholder(s). In firms with concentrated ownership there also appears to be little separation between ownership and control, with management being related to the family of the controlling shareholder (Claessens, Djankov, & Lang, 2000). In a detailed analysis of the ownership structures across all emerging markets, Claessens & Burcin Yurtugolu (2013) show that in East Asian countries the largest direct shareholders typically hold about 50% of equity. They can often be described as wealthy families and are typically involved in firm management. In some of the countries (e.g., India and Malaysia) there is also sizeable ownership of institutional investors and state ownership. In Latin America the largest shareholders own between 50% and 60% percent of equity. Family ownership is similarly very typical. In some Latin American countries – namely Chile, Columbia, Mexico, and Peru – financial and non-financial company ownership is also prevalent. Studies from African and Middle Eastern countries (Turkey, Kenya, and Tunisia) also confirm concentrated ownership and a divergence of cash flow rights. Similar results have been attested in other, less recent emerging market studies. La Porta, Lopez-

de-Silanes, Shleifer, & Vishny (1998) and Lins (2003) show that the majority of companies in developing economies have very concentrated ownership with at least one block holder or holdings of more than 50% by the largest three shareholders. This suggests that the ownership structures remain relatively constant over time.

It has previously been theorized that ownership concentration stems from increased difficulties and costs of enforcing agency contracts (Wright, Filatotchev, Hoskisson, & Peng, 2005). Less developed product, labor, and takeover markets in emerging economies make owner control over management difficult (Djankov & Murrell, 2002). Furthermore, the threat of having sensitive information exposed with little legal protection often prompts the hiring of related family members, where a trust relationship already exists (Yeung, 2006). Concentrated ownership is consequently a substitute control mechanism in an environment that lacks market monitoring mechanisms as well as the protective property rights and can, as such, have a dampening effect on excessive investment in an emerging market environment.

On the other hand, the circumstances in emerging markets, in particular the absence of external control mechanisms (Morck, Wolfenzen, & Yeung, 2005) and minor shareholder protection, can foster conflicts between controlling shareholders and minority shareholders because extracting firm resources for personal benefit is comparatively easier. From this perspective it can be argued that extant concentrated ownership combined with increased information asymmetries as well as weak legal and regulatory environment can prompt overinvestment of free cash flow in emerging market firms (Bebchuk, Kraakman, & Triantis, 1999) as a result of majority – minority shareholder conflicts (see section II.3.3).

In addition to principal – principal conflict driven excess investment, principle – agent conflicts might also foster overinvestment in developing market firms. This is because inefficient market

controls and inadequate constraint mechanisms can incentivize emerging market firm managers to obtain private benefits through investment beyond justifiable levels. These benefits can either be monetary or non-monetary; to include increased resources under control, feelings of accomplishment, or higher social status (Lei, Mingchao, Weing, & Yu, 2014). Furthermore, emerging market managers are often not sufficiently compensated and thus seek growth through investment to obtain additional benefits (Liu & Ouang, 2007). Moreover, they are able to realize private benefits as a result of lacking oversight. Compared to their developed market counterparts, emerging market managers might, therefore, be particularly motivated to overinvest as a result of private benefit driven agency conflicts.

Agency theory further suggests that conflicts and thus agency costs are higher with lower availability of growth opportunities for companies (Jensen M. , 1986). In comparison to developed markets, emerging market firms have historically shown higher growth rates. This gap has widened from the early 2000s to 2009, but then narrowed until 2015, where the relationship was reversed. Currently, emerging market performance exceeds developed markets once again (IMF, 2017). An analysis of emerging market firm (sales) growth rates over a 10-year period also shows that companies headquartered in emerging markets grow about twice as much as their developed market complements (Atsmon, Kloss, & Smit, 2011). It can thus be argued that the potential of overinvestment of free cash flow might be less pronounced in emerging countries as there are comparatively more growth opportunities available. Emerging market firms have however recently experienced phases of dampened growth, which might make overinvestment relatively more likely. Furthermore, studies show that emerging market firms tend to have a much lower dividend payout ratio (39% as opposed to 80% for developed markets for the period analyzed) and a much higher growth in fixed assets (12% as opposed to 7%), which can also be indicative for additional

investment activity. Consequently, the question of whether investments are "justified" by a positive net present value or made for other reasons remains (Atsmon, Kloss, & Smit, 2011).

The preceding section shows that there are several theoretical arguments supporting the overinvestment hypothesis for emerging markets; evolving empirical research in that regard seems to further point to the existence of free cash flow overinvestment. The existing studies, however, are not encompassing and show some (methodological) weaknesses. In the following section, they will first be briefly described and then evaluated:

Analyzing 865 Chinese publicly listed firms over the time period from 2000-2004 Chen, Sun, & Xu (2016) attest sensibility of over-investment to free cash flow. Furthermore, for the sample analyzed, over-investment is found to be more prevalent in firms with free cash flow. Chunyan & Yuehu (2010) similarly show that Chinese companies with free cash flow tend to overinvest. Their analysis is based on seven years of data from 2000 to 2006 and evaluates 5030 firm-year observations of non-financial institutions. Wei & Zhang (2008) look at 994 corporations in eight East Asian economies over the period from 1993 to 1996 and attest cash flow sensitivity of investments for the data analyzed. Similarly, Cai (2013) finds a positive relationship between free cash flow and overinvestment for a sample of 1411 firm-year observations of companies listed on the Shanghai and Shenzhen Stock exchange from 2003 to 2010. Taghavi, Khodaei Valahzaghard, & Amirjahadi (2014) examine 121 firms listed at the Tehran Stock exchange over the period from 2008 to 2010 and conclude a significant relationship between free cash flow and over-investment. Similarly, Fatma & Chichti (2011) find that Jensen's free cash flow hypothesis holds for a sample of 35 Tunisian firms over the timeframe from 1999-2008.

The above analysis shows that the studies are largely concentrated on Asian (Chinese) firms. This is where most firm year observations are presented. A thorough evaluation of a large sample of emerging markets however, has yet to be carried out. Furthermore, the timeframe of the analysis is focused on, or prior to, the first decade of this century, with most of the data being obtained from the early 2000s. More recent literature, covering longer time periods to capture any dynamic effects, and those evaluating data from a larger sample of firms from different geographical areas are missing. Additionally, the methodologies applied to assess whether overinvestment of free cash flow is present vary across studies. Some of the approaches utilized have previously been criticized for merely establishing investment as a proxy for free cash flow, thus being unable to specifically measure overinvestment. They, therefore, fail to truly test the agency conflict explanation of excess investment. While Chen, Sun, & Xu (2016), Cai (2013), and Chunyan & Yuehu (2010) measure overinvestment following an approach put forth by Richardson (2006) - where regression residuals are used as proxies for inefficient investment and regressed on free cash flow as well as other predictor variables (see section IV). Wei & Zhang (2008) derive their methodology from the models used by Fazzari, Hubbard, & Peterson (1988) and Hadlock (1988) where asset scaled cash flow is regressed on an investment variable amongst other variables (Tobin's Q) and interaction terms. Taghavi, Khodaei Valahzaghard, & Amirjahadi (2014) determine the existence of overinvestment based on a modified version of Richardson (2006), whereas Fatma & Chichti (2011) use a three-stage least square simultaneous model with free cash flow risk and leverage as dependent variables. Furthermore, the majority of studies which follow Richardson's overall approach, do deviate in regards to the specific variables included in the model or calculation thereof.

Despite the divergence in applied methodology and scope of analysis, the empirical results seem to overall support the notion that overinvestment of free cash flow might also be present in emerging market firms. Furthermore, the studies that specifically apply a methodology to test the agency problem as the cause of overinvestment (Chen, Sun, & Xu, 2016; Cai, 2013; and Chunyan & Yuehu, 2010) can confirm the free cash flow hypothesis. Consequently, it can be argued that there appears to be theoretical and (some) empirical evidence that free cash flow overinvestment is also present in emerging market firms.

II. 3) Determinants of Overinvestment of Free Cash Flow

Because of the negative effect on value, firms (should naturally) have an interest in curtailing inefficient investment. Therefore, the question arises whether certain factors can mend the overinvestment problem. Previous research in this regard has recognized several determinants in a developed market firm context. The following section will describe these factors and evaluate them from an emerging market perspective.

II.3.1) Debt and Overinvestment of Free Cash Flow

Jensen's (1986) theory proposes that overinvestment of free cash flow can be affected by debt. Stressing the agency problem of debt, he argues that the creation of debt without retention (e.g., debt issuance to buy back shares) can help reduce the agency cost of free cash flow by reducing the funds available to the manager at his or her discretion. Likewise, Stulz's (1990) model shows that financing policies (i.e. the application of debt) can curtail the resources under the manger's control and can thus reduce their ability to overinvest. This theorized relationship has been empirically supported for the U.S. and other developed economies: D'Mello & Miranda (2010)

find for U.S. listed, - non-regulated, non-financial, - firms that debt effectively reduces overinvestment. Similarly, Degryse & de Jong (2006) show that (higher) bank debt has a disciplinary mechanism by reducing the availability of discretionary funds to managers; resulting in lower investment cash flow sensitivity for Dutch companies.

Theoretical and empirical research on the moderating role of debt in emerging market firms produces less coherent results.

From a theoretical perspective it can be argued that the concentrated ownership structures in emerging markets may render debt a less important monitoring mechanism because controlling shareholders themselves have interest and ability to control investment. Furthermore, the concentrated ownership structure might primarily give rise to insider - outsider agency conflicts (described in section II.2). The introduction of debt may therefore not have the same effect on the free cash flow overinvestment relationship. By way of contrast, it can be argued that controlling shareholders can be viewed as entrenched managers (La Porta, Lopez-de-Silanes, Shleifer, & Vishny,1999b), creating Jensen (1986) like insider – outsider conflicts. A reduction in available cash might therefore similarly be able to curb overinvestment activity.

Empirical analyses have produced divergent findings. This can be a reflection of the diverging theories, and particular circumstances of the sample firms analyzed. In addition, it can be (partly) rooted in the application of diverse methodologies and differing variables to approximate debt (or types thereof) when assessing its effect on overinvestment as shown in the following section:

Chen, Sun, & Xu (2016) attest a negative relationship between debt and overinvestment for a sample of 865 listed non-financial Chinese firms. Similarly, Cai (2013) finds short term debt and leverage to have a significantly negative relationship to overinvestment. Yuan & Dai (2016) identify a negative relationship between commercial debt and overinvestment, but a positive

relationship between bank loans and overinvestment in Chinese listed firms. Fernandez's (2011) examines of a mixed sample of 100 firms based in Chile, Brazil, and Mexico from 1997 to 2006. and finds a strong, inverse relationship between long term debt and investment. His study also shows a correlation between investment and asset maturity, suggesting congruence with the overinvestment hypothesis. The analysis is however based on Kim & Maddala's (1992) random effects model for a dynamic panel, and only considers the aforementioned variables. A study carried out by Carrasco, Johnson, & Nunez (2005) cannot confirm any relationship between investment and debt for Chilean firms. Their methodology is based on an approach motivated by Benaventa, Johnson, & Morande (2003) and uses a number of firm-specific as well as macroeconomic variables, such as real GDP and interest rate, as control variables.

In short, while the empirical studies exploring the issue in the context of emerging markets are nascent and the reported results are in part inconclusive, there is some empirical evidence supporting the hypothesis that debt reduces the excess investment in emerging market firms.

II.3.2) Corporate Governance and Overinvestment of Free Cash Flow

Apart from debt, finance scholars have also focused on other aspects of the agency conflicts and introduced corporate governance as a mechanism to curtail free cash flow overinvestment. As described in section I.1.2, the agency cost theory suggests that insiders (managers or majority shareholders) with free cash on hand have a tendency to engage in the maximization of self-interest rather than maximization of (minority) shareholder wealth (Jensen, 1986; Jensen & Meckling, 1976; Stulz, 1990). These agency conflicts are particularly likely to occur in companies with little or inefficient governance; where monitoring and disciplinary mechanisms are absent or not properly carried out (Render, Gaeremynck, & Secru, 2010; La Porta, Lopez-De-Silanes, &

Schleifer, 1999). If the management is more committed to financial discipline and shareholder value creation, the company shows information transparency, and boards are independent, then it is difficult for majority shareholders to use firm resources to their own benefit (Francis, Hasan, Song, & Waisman, 2013). Several corporate governance mechanisms have been suggested to mitigate the conflict of interests, including board of directors as an oversight and advising committee (Munisi, Hermes, & Randoy, 2014), (equity based) compensation structures that ensure alignment of management and shareholder goals, as well as the threat of hostile takeovers, which would reduce or eliminate the power of the current management (Holopainen, 2006).

Quality and composition of corporate boards have previously been found to be important because of the boards's role of assisting in the guidance of corporations and their complex set of activities in an even more complex environment. Furthermore, independence of board members has been considered of high importance for effective firm monitoring, because autonomous board members tend to impose stricter policies (Boone, Field, Karpoff, & Raheja, 2007; Al-Najjar, 2009).

From an agency perspective, it can further be argued that agents are typically risk-averse and strive to pursue their own interest (to maximize their utility); and these interests are not always in line with those of the principals (Gomez-Mejia & Wiseman, 1997). Because of asymmetric information between principal and agents, principals have to find ways to motivate their agents to pursue goals that are in the best interest of the shareholders. When managers are presented with incentives that benefit them more than pursuing their own agenda, they will choose to act in a manner that lets them realize those incentives (assuming managers are risk-averse and rational). One way to incentivize agents to align their interests with those of shareholders is through equity-

based compensation (e.g. stock options) (Berger, Ofek, & Yermack, 1997b; Fenn & Liang 2001). Managers will consequently be able to obtain private benefits from increasing firm value.

Moreover, it has been suggested that the market for corporate control is another important corporate governance mechanism. This is because takeovers can reduce the information monopoly of the manager (insider) about the firm and also allows for the replacement of inefficient management. The threat of a takeover and related removal of the current management can discipline otherwise self-interest maximizing managers and serve as an important avenue to align agents' interest with those of principals (Butler, 1988). Consequently, the regulation of anti-takeover provisions, such as supermajority provisions, poison pills, staggered board, and fair price provisions, can have an important effect on corporate governance[1].

Empirically, there has been some support that corporate governance has a moderating effect on free cash flow overinvestment: Richardson's (2006) shows that U.S. companies with more activist shareholders display lower levels of overinvestment, while staggered boards and specially designed shareholders rights plans (poison pills) suggest higher levels of overinvestment. Similarly, Harford, Mansi, & Maxwell (2008) suggest that for U.S. listed, non-financial firms, corporate governance seems to have a moderating effect on investment. They find in particular that governance metrics based on anti-takeover provisions and capital expenditures are inversely related. They further connote that firms with high levels of excess cash and weaker corporate governance are more prone to spending cash, particularly on investments and acquisitions. Moreover, Billett, Garfinkel, & Jiang's (2011) analysis of non-financial US firm data between

[1] Supermajority provisions increase the shareholder approval requirement for a merger to a higher percentage, poison pills or shareholder rights plans gives current shareholders the right to buy new shares at a discount thereby diluting the bidders interest, staggered board allow only for a certain number of board members to be replaced at one time, and fair price provisions restrict the transfer of control to the buyer if no fair share price is paid.

1990 and 2007 shows that poor shareholder governance, as measured by RiskMetrics' corporate governance index, can be associated with overinvestment.

Similar to the analysis of debt as a moderator, studies on corporate governance and free cash flow overinvestment are mainly based on data from developed markets. Research in emerging markets has only recently been introduced and is still scarce (Francis, Hasan, Song, & Waisman, 2013).

Theoretically, it can be argued that effective corporate governance mechanisms should equally curb the pursuance of self-interests of firm insiders in an emerging market context. It is, however, less clear to what degree these mechanisms exist, can be enforced, and are similar to the ones in developed market firms (Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). This is partly rooted in the ownership structure of the firm (see section II.3.3), but also in the institutional environment, (see section II.3.4). As expected, the empirical results reported in the literature are less consistent compared to the ones from developed markets. Moreover, some of the studies only test certain aspects of corporate governance by applying single (or limited) corporate governance measures instead of an index. While it has been acknowledged that single variables, such as board independence, management duality, and stock ownership of board members are important determinants of corporate governance (Bhagat & Bolton, 2008), scholars have argued that reliance on simple measures eliminates important information about interactions between certain corporate governance mechanisms (Schnyder, 2012). The existing studies are briefly reviewed in the following section:

Cai (2013) finds that Chinese state-owned firms with a large board of directors are prone to overinvest and that corporate governance mechanisms - as measured by the independence of the board members - have no significant negative relationship to overinvestment of free cash flows.

Chen, Sun, & Xu (2016) by contrast show that Chinese state-owned firms tend to invest above justified levels and that a larger board size seems to curb overinvestment. A higher number of tradable shares is also found to be negatively related to overinvestment. Both studies might be prone to some bias stemming from the concentration on a select few corporate governance measures. Francis, Hasan, Song, & Waisman (2013) study a sample of 362 companies in 14 emerging markets for the year 2000. Using a survey-based corporate governance rating index, they find that corporate governance has an effect on the free cash flow overinvestment. The analysis is however limited to one year of data. Analyzing 455 major listed firms in 10 Asian markets over three years (2001-2004), Cheung, Stouraitis, & Tan (2011) suggest that good corporate governance leads to more efficient investment decisions and increased firm value. This relationship does however not hold for firms with concentrated ownership structures. Taghavi, Khodaei Valahzaghard, & Amirjahadi (2014) assert that certain governance factors have a negative impact on overinvestment for Iranian firms while others don't. They identify ownership concentration and percentage of non-executive directors as significant, while the existence of controlling shareholders (i.e., investors holding more than 50% of the company's shares) and director – executive officer duality shows no significant relationship to overinvestment.

The above literature review points to empirical evidence suggesting that corporate governance may mitigate the free cash flow overinvestment in the context of emerging markets; closer analysis, however, reveals that the variables used to measure corporate governance differ across analyses and in some instances also produce contradicting results. While some studies use corporate governance indices, others use particular variables to operationalize corporate governance, subjecting themselves to the aforementioned shortcomings. The research methods applied also vary substantially and do not lend themselves to meaningful comparisons: Cai (2013)

and Chen, Sun, & Xu (2016) apply Richardson's (2006) approach to model the effect of corporate governance on the free cash flow overinvestment relationship. Cai (2013) however includes a set of only three variables (board size, dual appointment, and board independence, i.e. the proportion of non-executive directors on board), while Chen, Sun, & Xu (2016) expand the variables applied to account for characteristics of the board and its members. Cheung, Stouraitis, & Tan (2011) by contrast establish a link between efficient investment and corporate governance through its effects on firm value. They operationalize corporate governance with the Credit Lyonnais Securities Asia corporate governance score and investment by the change in the firms' fixed assets. Taghavi, Khodaei Valahzaghard, & Amirjahadi (2014) approximate corporate governance by a limited set of variables; board independence, dual appointment, controlling investors, and institutional investors.

In summary, it can be stated that, despite the variance in applied methodology, there is theoretical and – to a degree – empirical evidence that stronger corporate governance mechanisms can curb arbitrary actions of manager or controlling shareholders in emerging market firms as well and thus have a moderating effect on the overinvestment of free cash flow.

II.3.3) Ownership and Overinvestment of Free Cash Flow

As previously mentioned, research in regards to ownership structure and firm performance, suggest positive as well as negative effects of ownership concentration (see section II.2.3 and II.3). One line of argument is based on the notion that concentrated ownership motivates principals, and increases their ability to monitor and direct manager actions (Konecný & Cástek, 2016; Baghdasaryan & La Cour, 2013; Short, 1994). Consequently, agency problems between owner and agents are reduced, as managers have little ability to act against the interest of the owners.

This has previously been found to be particularly true for firms whose environment lacks adequate performance monitoring (Becht, Bolton, & Röell, 2001). Accordingly, overinvestment might be mitigated by concentrated ownership, as owners are better able to monitor manager actions.

The other line of argument suggests that majority owners can similarly extract resources at the cost of minority shareholders, when they act for their own private benefit (Claessens, Djankov, Fan, & Lang, 2002). Because of the mainly concentrated ownership structure in emerging markets, agency conflicts resulting in shareholder expropriation might therefore also be prevalent (Filatotchev, Wright, Uhlenbruck, Tihanyi, & Hoskisson, 2003). With larger equity portions, owners can easily gain control of the firm, for instance, through the appointment of family or affiliated members, to increase their own utility at the expense of the minority shareholders. Decisions of "majority shareholder approved" managers might also be less questioned by directors, who themselves are interested in reappointment (La Porta, Lopez-de-Silanes, Shleifer, & Vishny 1998; Jaggi & Leung, 2007). As a result, higher ownership concentration can foster free cash flow overinvestment.

Empirical research in this regard is largely focused on government-held assets as a form of majority ownership. An analysis of Chinese firms with concentrated ownership, particularly in the form of large state holdings, found a negative effect on investment efficiency (He & Kyaw, 2018). Evaluating eight East Asian emerging markets before the financial crises Wei & Zhang (2008) find that the investment sensitivity to free cash flow increases as the degree of divergence between cash flow rights and control rights of large shareholder increases. Empirical research on Jordanian emerging market firms, on the other hand suggests that investment efficiency increases with increased ownership concentration; regardless of the ownership type (Tayem, 2015).

Overall there appears to be some empirical evidence that ownership concentration can affect free cash flow overinvestment; particularly in the case of government ownership. The direction of the effect, however, remains unclear, with some evidence pointing toward the type of ownership (individual, government, corporation) as being the driver of the direction.

II.3.4) Institutional Environment and Free Cash Flow Overinvestment

The preceding sections show, that while there seems to be a tendency for overinvestment of free cash flow in emerging markets, there is no full consent among findings regarding factors that can potentially influence that relationship and curtail overinvestment. As previously emphasized, this may partly be a result of methodological divergence. However, it can also point toward a potential need to expand research to include other variables previously not considered; thereby accounting for the special circumstances and characteristics of firms in emerging markets.

II.3.4.1) Institutional Environment in Emerging Markets

Extant research by Peng & Heath (1996) and Khanna & Palepu (1997) has emphasized weak governance and underdeveloped institutional context in emerging markets. Moreover, Claessens & Burcin Yurtugolu (2013) show in their encompassing analysis of institutional environment that emerging markets do substantially diverge from developed markets (but also from each other) in several aspects relevant to corporate governance. Their analysis also demonstrates that emerging markets (and transitioning economies) still rank much below developed markets in market and economic development. Only some emerging markets (e.g. Korea and Hungary) are close to the developed market average in regards to per capita income, while the majority of them are still at a far lower level. GDP growth in emerging markets, on the other hand, has surpassed that in

developed economies for an extended amount of time. Trade integration overall has now reached the level of developed markets. Emerging markets do however display differences amongst each other, with East Asian economies showing a larger level of openness. Claessens & Burcin Yurtugolu (2013) further illustrate that developed countries' financial markets and systems are much more advanced compared to their emerging counterparts and that there are large differences among developing countries.

Table 1 below shows the financial market development ratings assigned to the analyzed countries by the World Bank. The table includes the rating at the beginning and end of the period of analysis (2000 and 2015 respectively). Their scale ranges from 0 to 1, with 1 being the highest rating. It can be seen that at a regional level the financial market development increased in all three regions. All levels are however still well below those of developed markets such as the United States (0.87) or U.K. (0.88). Furthermore, the table suggests that there is divergence within the respective regions. While the Brazilian level of financial development is 32% above the Americas region average, Mexico's level is 28% below. Similarly, Saudi Arabia, Egypt, and the Czech Republic, are well below the average development level for the Africa, Europe, and Middle East region, while South Africa, Russia, and Greece are substantially above. Asia shows the same divergence with China and Taiwan well below the regional average and Thailand, Malaysia, and Korea well above, with Korea's level being almost equal to that of developed markets. There are also differences over time. Over the three regions, financial market development increased from 2000 to 2015, with the largest development advance occurring in the Americas (59%). It is, however, noteworthy that some countries (Greece, Pakistan, and the Philippines) did experience a decline in market development compared to 2000.

Table 1: Comparison of Financial Market Development

Americas	Beginning	End	Change %
Brazil	0.46	0.66	43%
Chile	0.39	0.54	38%
Colombia	0.21	0.46	118%
Mexico	0.29	0.39	38%
Peru	0.21	0.43	104%
Americas Average	**0.31**	**0.50**	**59%**

Europe, Middle East & Africa Average	Beginning	End	%Change
Czech Rebulic	0.30	0.35	19%
Egypt	0.26	0.29	11%
Greece	0.59	0.58	-1%
Hungary	0.45	0.45	0%
Poland	0.35	0.48	40%
Qatar	0.44	0.45	3%
Russia	0.18	0.58	225%
South Africa	0.49	0.61	24%
Saudi Arabia	0.12	0.15	24%
Turkey	0.39	0.49	25%
United Arab Emirates	0.27	0.47	74%
Europe, Middle East & Africa Average	**0.35**	**0.45**	**28%**

Asia	Beginning	End	Change %
China	0.22	0.24	6%
India	0.39	0.40	2%
Indonesia	0.32	0.34	4%
Korea	0.69	0.84	22%
Malaysia	0.56	0.68	22%
Pakistan	0.30	0.20	-33%
Philippines	0.40	0.38	-7%
Taiwan	0.22	0.24	6%
Thailand	0.47	0.66	38%
Asia Average	**0.40**	**0.44**	**11%**

Source: World Bank's Financial Development Score (% change based on author's calculation, categorization based on MSCI emerging market index classification)

In addition to market development, Claessens & Burcin Yurtugolu's (2013) study also displays substantial differences in the legal dimension of the institutional environment. This pertains in particular to a functioning legal and judicial system. Overall, emerging markets are found to have "less strongly defined rights"; especially in several Middle Eastern, African, and Latin American countries. Shareholders rights and rights of creditors are also weak in some Latin American countries. Additionally, large differences between emerging markets and developed markets are recorded with respect to execution of the law. The ability to enforce rights (including property rights) is estimated to be twice as high in developed markets compared to emerging markets. Finally, high levels of corruption are also reported in several emerging markets.

Table 2 provides an overview of the governance effectiveness score published by the World Bank for the countries included in this study; at the beginning of the period of analysis (2000) and the end (2015). This rating assesses the countries' quality of public services, civil services, policy formulation and implementation as well as its credibility and commitment.

Table 2: Comparison of Government Effectiveness

Americas	Beginning	End	Change %	Europe, Middle East & Africa	Beginning	End	Change %	Asia	Beginning	End	Change %
Brazil	61.0	47.6	-22%	Czech Republic	74.9	79.8	7%	China	53.3	67.8	27%
Chile	84.6	79.3	-6%	Egypt	48.2	27.9	-42%	India	51.3	57.2	12%
Colombia	44.6	54.3	22%	Greece	74.4	62.5	-16%	Indonesia	46.2	53.4	16%
Mexico	63.6	59.6	-6%	Hungary	82.1	69.2	-16%	Korea, Rep.	78.5	80.8	3%
Peru	54.9	48.6	-12%	Poland	73.8	73.6	0%	Malaysia	83.1	76.0	-9%
Americas Average	**61.7**	**57.9**	**-6.3%**	Qatar	70.3	74.5	6%	Pakistan	30.3	28.8	-5%
				Russian Federation	25.1	44.2	76%	Philippines	49.7	51.9	4%
				Saudi Arabia	47.7	63.5	33%	Taiwan, China	77.4	89.4	15%
				South Africa	76.4	64.9	-15%	Thailand	63.1	66.3	5%
				Turkey	56.9	54.8	-4%	**Asia Average**	**59.2**	**63.5**	**7.3%**
				United Arab Emirates	79.5	90.9	14%				
				Europe, Middle East & Africa Average	**64.5**	**64.2**	**-0.5%**				

Source: World Bank's Government Effectiveness Rating (% change based on author's calculation, categorization based on MSCI emerging market index classification, Percentile Ranking, 100 being highest)

The table shows that there are substantial differences in the development and level of government effectiveness among the countries analyzed. Over all three regions only Asia had an overall increase in government effectiveness (7% from 59th to 64th) over the observation period. The Europe/Middle East/Africa region essentially remained at the 2000 level (65th percentile), while the Americas region experienced a decrease (-6% from 62nd to 58th). All of the average rankings are lower compared to developed markets, such as the U.S. (89th in 2000 and 90th in 2015) and U.K. (93rd in 2000 and 94th in 2015). Looking at the individual countries, it can be observed that there are also sizable differences in ratings within the regions. While Brazil's and Peru's effectiveness ranking dropped by 22% and 12% respectively, Colombia's increased by 22% over the observation period. Furthermore, when comparing country rankings to the average for the region, it can be seen that Chile's ranking (79th) is much higher, while Peru's (49th) and Brazil's (48th) is substantially below the region average. A similar diversion of rankings can be attested for the Europe/Middle East/Africa region. Some of the countries (Egypt, Greece, Hungary, and South Africa), experienced a decrease in governance effectiveness, while others (Czech, Russia, Saudi Arabia, and the United Arab Emirates) were able to improve their effectiveness over the time

period analyzed. Correspondingly, when looking at the individual country's ranking in comparison for the overall region average, dispersion around the average can be observed. Saudi Arabia's ranking (90^{th}) is about 40% higher than the average for the region and comparable to that of developed markets. Egypt (29^{th}) and Russia (42^{nd}) on the other hand, rank 57% and 34% respectively below the average of the region. A similar diversion is also evident in the Asia region. Most countries within the region improved their overall effectiveness ranking, two countries (Malaysia and Pakistan) however, dropped in the level of government efficiency. In addition, Pakistan's ranking (29^{th}) is well below that of the region's average (64^{th}), while Taiwan's (89^{th}) and Korea's (81^{st}) are significantly above.

II.3.4.2) Institutional Environment and Agency Theory

The previous section shows that there are substantial differences in the firm environment amongst emerging and developed market firms. Consequently, it can be argued that traditional measures to curb agency conflicts - as applied in developed countries - might be less effective or even ineffective in an emerging market context. This is because they are originated in developing markets and therefore assume a strong regulatory environment and developed financial markets. In this regard, scholars have previously argued that the agency theory might have to be extended to increase the understanding of firm practices because firm characteristics and behavior, such as corporate governance, are embedded in a local context and affected by factors in the institutional environment (Zalina & Yusof, 2016; Douma, George, & Kabir, 2006). While the interaction between institutional environment and firm behavior has been acknowledged in some functional international business research (Peng, Wang, & Jiang, 2007; Peng M. , 2006), (particularly in management and strategy) it is lacking in others (Dharwadakar, George, & Brandes, 2000; Bowe,

Filatotchev, & Marshall, 2010). This is particularly true for international finance (Bowe, Filatotchev, & Marshall, 2010). Prior research has shown an interrelation between institutional environment and corporate governance effectiveness from an organizational perspective (Aquilera, Filatotchev, Gospel, & Jackson, 2008). It has for instance been argued that because of the weak institutional environment, developed market corporate governance measures are often replaced by a corporate government construct based on concentrated (family) firm ownership, in some instances complemented by firm networks (business groups) or government ownership. Similarly, it has been shown that in weak legal environments with elevated levels of corruption, family ties and concentrated ownership can be beneficial in achieving firm goals (Steier, 2009).

Studies have also indicated that there are country-specific differences in the ability to enforce financial contracts (for instance in debt enforcement) as well as corporate governance and that both are interrelated to the institutional environment (Djankov, Hart, McLeish, & Shleifer, 2008; Kaplan, Martel, & Stromberg, 2003).

Scholars have therefore previously called for the integration of institutional theory and agency theory to account for specific circumstances in emerging markets (Bowe, Filatotchev, & Marshall, 2010). To the best of the author's knowledge there is little research in the literature addressing this gap.

Present studies have either focused on country-level corporate governance and sought to assess its interaction with, and effect on, firm-level governance or solely estimated the influence of institutional environment on free cash flow overinvestment thereby disregarding any firm-specific variables. Studies encompassing multiple aspects of institutional environment and their effect on free cash flow overinvestment in conjunction with other moderators are still missing. The empirical findings of the extant studies are presented below:

Love (2003) and Wurgler (2000) show that legal and contractual environment as (partially) mirrored in its financial development (functioning of markets) fosters the efficient allocation of investments via reduced financial constraints. Their analyses are based on observations from developed as well as emerging markets, with developed country observations representing the majority of data points. Francis, Hasan, Song, & Waisman, (2013) look, particularly at the interaction effect of country-level governance and firm level governance. They analyze 362 firms from 14 emerging markets for the year 2000. Their research shows that firm level corporate governance is more important in determining the firm investment sensitivity to internal cash flow in countries with weaker, country-level corporate governance; suggesting firm and country level corporate governance are interchangeable. While this analysis provides support for an interaction effect between institutional environment and firm behavior, it has to be acknowledged that the sample data is from the same year and does not explicitly measure overinvestment (Fazzari, Hubbard, & Peterson's (1988) approach is applied). Other work from Li (2012) and Goodluck, Li, Chen, & Cui's (2014) is solely focused on the institutional environment, or certain aspects thereof, as determining variables for free cash flow overinvestment. No firm-specific variables – other than free cash flow - are considered in their analyses. Furthermore, they are focused on China.

Despite the described differences in applied methodology, it is important to point out the extant research proposes a moderating effect of the firm's institutional environment on the effectiveness of firm investment. Certain variables in the environment the firm is embedded in also appear to interact with corporate level factors. This is in line with the previously brought forth arguments that an agency theory explanation of free cash flow overinvestment has to be viewed in light of the institutional environment the firm is operating in. It is precisely the institutional environment

and its interaction with firm level variables that can moderate a firm's sensitivity to overinvestment of free cash flow.

The aspects of institutional environment previously found to have an interacting with firm characteristics and firm behavior are described in the following section along with an evaluation of their potential to influence firm (over) investment.

II.3.4.3 Institutional Environment and Firm Investment

a) Government effectiveness

An important factor rooted in the institutional environment with the potential to affect free cash flow overinvestment is government effectiveness. Government effectiveness can be understood as the government's ability to develop, implement, and enforce sound policies, as well as its independence from political pressures[2]. It is directly related to the level of corruption and compliance in a country (La Porta, Lopez-de-Silanes, Schleifer, & Vishny, 1999b).

In markets where a sound rule of law exists, property rights and the enforceability of contracts are promoted, which in turn improves the laws governing a firm's (financial) activities. This directly affects the ability of (minority) shareholders to monitor and control insider behavior. Stronger regulations enable them to challenge management decision when they are not in their best interest and ensure corporate boards correctly fulfill their monitoring tasks (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). Furthermore, effective policies can also reduce information asymmetries between insiders and outsiders, making it easier for the latter to identify behavior that isn't in their best interest. Finally, in particular under the aspect of dominant owners who might be able to directly influence management decisions, improved and enforced regulations can minimize

[2] This is The World Bank's definition of Government Effective. Source: The Worldwide Governance Indicator Dataset. https://govdata360.worldbank.org/indicators/h1c9d2797?country=BRA&indicator=388&viz=line_chart&years=1996,2017

collusion between the two parties (Koh, 2003), (Bao & Lewellyn, 2017). All of the aforementioned can, therefore, help to align interests between minority shareholders and managers (or majority shareholders), reducing the potential for excess investment for individual benefit.

When the legal and judicial environment is less efficient and insiders have the ability to extract resources from the firm, investors will price this into their required returns. This increases the financing cost and can in turn negatively affect the investment efficiency (La Porta, Lopez-de-Silanes, Shleifer, & Vishny1998): It will not only curb the potential pursuance of positive net present value projects when internal funds are lacking but will also lead to excess investment when free cash flow exists, because comparatively "cheaper" internal funds serve as an additional incentive to invest in projects for personal utility maximization. Furthermore, in instances where the government is less effective and property right are less enforced, managers overall might be less afraid of being reprimanded compared to environments with better enforced regulations (Jensen, 1993). This is because they know that even when any of their actions that do not contribute to value creation are exposed, there are little legal consequences. They might, therefore, be - in general - more prone to extract resources for personal benefit and thus overinvest.

Empirical analysis of government effectiveness as a moderator of overinvestment has produced somewhat mixed results. Studying Chinese A-listed non-financial firms over the time period from 2001 to 2008, Li (2012) cannot attest any significant moderating effect. Goodluck Marco, Li, Chen, & Cui (2014), on the other hand find a negative relationship between government effectiveness and overinvestment in listed firms. Their analysis is also based on Chinese A-share listed companies over a slightly shorter time period from 2003 to 2008. Both studies operationalize of the variable government efficiency with the law index from China's marketization index report, which measures legal protection. The different result might, therefore, be based on the sample

(size) and transformation of data. An analysis from Du, Li, Lin, & Wang (2018) shows a relationship between government integrity and investment efficiency, overall, however no significant relationship to overinvestment. They also find that the relationship between government integrity and excess investment varies depending on the ownership structure of the firm. The sample analyzed covers data from Chinese listed firms between 2011 and 2014. The measurement of government integrity is based on a survey rating administered to 2654 companies. This is important to note, as the measurement is the perceived government integrity, which constitutes only one aspect of government effectiveness, and therefore makes the results not fully comparable. Research of Cambini & Rondi (2010) shows that the managers of European energy companies, located in areas with weak legal systems, were more likely to invest for personal benefit compared to those whose firms were located in areas with effective government.

Overall there appears to be some empirical support for a relationship between effective legal and judicial systems and excess investment of free cash flow in emerging market firms. The results are however based on varying methodologies and samples, and produce in part contradictory results. Moreover, it should be emphasized that all of the aforementioned empirical analyses evaluate a direct relationship between government effectiveness and excess investment. As described in the theoretical part of this section as well as in II.3.4.2) there might also be an interaction effect between the institutional environment and firm characteristics and overinvestment, which could explain the differences or lack of significant relationships. Maher & Andersson (1999) argue that government effectiveness (in the form of an effective legal and regulatory environment) interact with firm-level corporate governance, and that policy makers should specifically consider the interactions between corporate governance and its institutional context, when formulating laws pertaining to firm-level governance. Observing differences in

corporate governance mechanisms in countries around the world, Shleifer & Vishny, (1997) argue that these differences are a direct result of varying regulatory environments and that the institutional enivornment therefore directly determines the quality of corporate governance.

In summary it can, therefore, be stated that there is theoretical and (some) empirical support that government effectiveness can have a moderating effect on the free cash flow – excess investment relationship; either directly or indirectly via its interaction with firm characteristics.

b) Government Intervention

Extant research has further identified government intervention as a factor in the institutional environment which might have an effect on the investment decision. In an effective institutional environment, firm investment should follow the positive net present value dicta. This maxim however no longer holds when governments actively (or passively) intervene, and can thus lead to unproductive investment, merely satisfying government goals. In general, two types of inefficiencies have been identified (Lin & Wong, 2013): Ex ante inefficiencies, where profitable investments are not pursued due to government intervention and ex-post inefficiencies, where projects fail to produce marginal value or prospective investment projects seize to exist.

Governments often intervene to encourage investment to pursue a certain political agenda (Shleifer & Vishny, 1994). In emerging markets, governments might, for instance, seek to promote certain industries and technologies for political or developmental reasons, and consequently encourage firm investment in a particular sector, regardless of the firm's capability to achieve long term competitive advantage. Furthermore, the political interest to attain a positive standing with the population in a certain region, e.g. through increased economic activity and corresponding job creation, can lead to politically motivated investment incentives for firms. Moreover, emerging market firms interested in smooth business operations, might try to create a favorable political

environment for themselves. This can, in turn, prompt them to pursue investments without marginal value, simply to "please" political influencers (Goodluck Marco, Li, Chen, & Cui, 2014).

Government intervention can also keep firms from ending inefficient investment projects or reduce investment expenditures. Whenever reduction in investment spending collides with political agendas or government policies, firms might be prone to disregard the net present value maxim to remain in good political standing (Lin & Wong, 2013).

In general, the paths of government influence on firm investment can be classified into three categories; namely policy burden, financial incentive to achieve political goals via investments, and industry regulations (Luo & Ye, 2015).

Empirically, government invention has been linked to investment inefficiencies in several studies. Zhang & Yang (2008) for instance show that the lower the level of Chinese government intervention on the local (regional) level, the higher the investment efficiency. Similarly, Yang & Hu (2007) find that local government control and intervention promotes overinvestment of free cash flow in Chinese firms. Analyzing A listed shares of Chinese companies over a five-year period, Goodluck Marco, Li, Chen, & Cui, (2014), as well as Li (2012), confirm the results of the earlier studies in regards to the relationship between government intervention and free cash flow overinvestment. Deng, Jiang, Li, & Liao (2017) further find that government intervention in the form of an economic stimulus packet during the financial crisis of 2008 had a negative effect on firm investment efficiency.

While the aforementioned studies are mainly concentrated on China, their results do suggest that government intervention certainly seems to have an effect on investment efficiency. This can be further underlined by the fact, that previous research on institutional environment and country corporate governance has attested that government intervention is present in several emerging

markets (Claessens & Burcin Yurtugolu, 2013). Similar to government effectiveness it has to be acknowledged however that the empirical results mainly establish a direct relationship between investment efficiency and government intervention.

As previously argued (see sections II.3.2.4 and II.3.4.3a) there is however good theoretical and some empirical reasoning that government involvement might also have an indirect effect via its interaction with firm characteristics. Empirical research has shown that government intervention and corporate governance are interrelated. Chang & Wong (2002) for instance show that politics can interact with corporate governance of Chinese firms via direct party interference as well as via the presence of party representatives and politicians on the board of directors. They further show that both forms of government intervention via corporate governance, have negative impact on firm performance. Additionally, Zagorchev (2018) shows that for firms in the European Union, government intervention is overall positively related to corporate governance quality. However, when disaggregating the sample by the type of intervention (as approximated by the government ownership type; e.g. pension funds or sovereign wealth funds), he finds that whenever federal governments "directly" own a company, corporate governance is negatively affected.

In summary it can therefore for stated that there is theoretical support as well as emerging empirical evidence that government intervention is related to free cash flow overinvestment; either directly or indirectly, via its intervention with firm characteristics.

c) Financial Market Development

Theoretical models suggest that there is a relationship between a firm's financial health and the effectiveness of its investments via financing constraints (Hubbard R. , 1998). Limitations to the availability of funds provided by the market (in quantity or price) can lead to relinquishment

of investments with a positive net present value, or – as previously argued – can have a catalyst effect on investment if firms have excess cash flow. Capital restrictions are frequently a result of market imperfections stemming from information asymmetries. Consequently, information disclosure by market participants and institutions will lead to increased investment efficiency (Boot, Greenbaum, & Thakor, 1993). Information disclosure and availability are directly related to the market development level, as better functioning stock markets or a better developed network of intermediaries make more (accurate) information available. Furthermore, increased transparency (e.g., embedded in a firm's stock price and assessed via the Tobin's Q) enables participants to more accurately assess the firm's performance and whether or not its investments provide any value (Wurgler, 2000).

From an agency perspective, it can thus be argued that shareholders have a better ability to assess the efficiency of the firm investment and thus can better align their interests with those of firm insiders. La Porta, Lopez-de-Silanes, Shleifer, & Vishny (1998) suggest in that regard that an effective legal and judicial system will allow the enforcement of financial contracts and thus strengthen the rights of minority shareholders. Their research suggests that this will curb overinvestment, particularly in declining industries, rather than providing more capital to growing industries. In countries with lower financial market development and thus weaker protection of minority shareholder rights, overinvestment is likely more prevalent, because shareholders have less opportunity to prevent overinvestment in (declining) industries (Wurgler, 2000).

Empirically, Love (2003) provides evidence that financial market development reduces financial constraints which would otherwise negatively impact effectiveness of firm investment. Furthermore, findings from Greenwood & Jovanovic (1990) suggest that the development level of the financial markets is related to investment efficiency, with a higher level of market development

resulting in more efficient investment. Similarly, Goodluck Marco, Li, Chen, & Cui (2014) and Li (2012) find a positive relationship between marketization and investment efficiency.

The previous section provides theoretical as well as (some) empirical support that financial market development can relate to excess investment of free cash. Similar to the other dimensions of institutional environment, it can further be argued that there is theoretical support for an indirect relationship of market development and overinvestment via interaction with firm characteristics. Several scholars (see Drobetz, Schillhofer & Zimmermann, 2004 and Hague, Arun, & Kirkpatrick, 2008) suggest that financial market development and corporate governance are interrelated and that capital markets have the ability to influence the quality of firm level corporate standards. The better the quality of legal framework governing the financial markets and its transparency, the higher the incentive for the firm to have sound governance mechanisms in place. Furthermore, Wurgler (2000) suggests that there is also a relationship between the firm ownership characteristics and capital allocation. When state ownership decreases and capital allocation via financial market increases, investment is shifted from declining to growing sectors. This is because investment is no longer made for a political agenda, but in projects that increase firm value and because monitoring increases as well.

In summary it can, therefore, be stated that there appears to be theoretical and to a degree empirical evidence that market development has an effect (either directly or indirectly via its interaction with firm characteristics) on free cash flow overinvestment.

III) Hypotheses

III.1) Hypotheses Development

The analysis of extant theoretical research on the free cash flow hypothesis presented in part II.1 and II.2, supports the argument that overinvestment of excess cash may be present in emerging market firms. This is because agency conflicts can also be present in emerging market firms and have been found to have similar effects on firm investment behavior (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999b). Additionally, while corresponding empirical analyses have been carried out within limited geographical regions and with diverging methodologies - thereby limiting their explanatory power - extant results overall do support the free cash flow overinvestment nexus.

Hypothesis 1 can, therefore, be stated as:

H1: Overinvestment of free cash flow is present in emerging market firms

Literature review on determinants affecting the free cash flow overinvestment relationship revealed that – despite some inconsistencies in methodology and samples – several moderators on the firm level can be theoretically and, to a degree, empirically established. They include debt, corporate governance, and ownership structure of the firm.

As contended in section II.3.1), debt has previously been found to curb overinvestment in the presence of principle – agent conflicts, since managers have fewer resources available to fund inefficient projects (Jensen M. , 1986). While these types of conflicts might be replaced or supplemented by principal – principal conflicts in emerging markets, the introduction of debt could similarly curb overinvestment, as comparatively fewer funds are available to insiders (La Porta, Lopez-de-Silanes, Schleifer, & Vishny, 1999b).

Hypothesis 2 can, therefore, be stated as:

H2: Debt is negatively related to overinvestment in emerging market firms

Section II.3.2. shows that corporate governance as the means to align interests between different stakeholders of the firm can help mitigate overinvestment of free cash flow. Although this notion is theoretically accepted and holds empirically in extant research for developed markets (see Harford, Mansi, & Maxwell, 2008 and Richardson, 2006), it is still unclear to what extent (traditional) corporate governance mechanisms curb overinvestment in emerging market firms. Emerging empirical research, despite methodological divergence, seems to support a moderating effect in emerging markets as well.

Hypothesis 3 can, therefore, be stated as:

H3: Corporate governance mechanisms negatively moderate the free cash flow overinvestment relationship in emerging market firms.

Following the presented arguments in section II.3.3., it can be connoted that concentrated ownership can either positively or negatively affect overinvestments. According to the principal – principal conflict theory, a positive relationship would be expected (Claessens, Djankov, Fan, & Lang, 2002; La Porta, Lopez-de-Silanes, Shleifer, & Vishny 1998; Jaggi & Leung, 2007), while theories that equate concentrated ownership with increased oversight and control and thus alignment of interests suggest a negative relationship to overinvestment. (Konecný & Cástek, 2016; Baghdasaryan & La Cour, 2013; Short, 1994).

Hypothesis 4 can, therefore, be stated as:

H4: Highly concentrated firm ownership moderates (positive or negative) the free cash flow overinvestment relationship in emerging market firms.

Finally, despite still being largely disregarded in extant literature, the existence of other factors rooted in the institutional environment, specific to emerging market firms, can be theoretically supported as important moderators of the free cash flow overinvestment relationship (see section III.3.4). This is because the traditional agency theory implicitly assumes a firm environment similar to that of developed markets (the origin of the theory itself). Emerging market firms, however, have been found to operate frequently in a very different institutional environment (Zalina & Yusof, 2016; Douma, George, & Kabir, 2006). While empirical research in this regard is still emerging, it can be shown that institutional environment – in the form of government effectiveness, intervention, and market development – can have a (direct or indirect) effect on overinvestment.

Hypothesis 5 can, therefore, be stated as:

H5: Institutional Environment moderates the overinvestment free cash flow relationship in the following ways:

5a) A higher level of government effectiveness (directly or indirectly) negatively moderates the free cash flow overinvestment relationship

5b) A higher level of government intervention (directly or indirectly) positively moderates the free cash flow overinvestment relationship

5c) A higher level of financial market development (directly or indirectly) negatively moderates the free cash flow overinvestment relationship

III.2) Hypothesis Summary

The following is a summary of the hypotheses that will be tested in the empirical section of this research.

H1: Overinvestment of free cash flow is present in emerging market firms

H2: Debt is negatively related to overinvestment in emerging market firms

H3: Corporate governance mechanisms negatively moderate the free cash flow overinvestment relationship in emerging market firms.

H4: Highly concentrated firm ownership moderates (positively or negatively) the free cash flow overinvestment relationship in emerging market firms.

H5: Institutional environment moderates the overinvestment free cash flow relationship in the following ways:

5a) A higher level of government effectiveness (directly or indirectly) negatively moderates the free cash flow overinvestment relationship

5b) A higher level of government intervention (directly or indirectly) positively moderates the free cash flow overinvestment relationship

5c) A higher level of financial market development (directly or indirectly) negatively moderates the free cash flow overinvestment relationship

IV Research Design and Methodology

The previous section developed the hypotheses to assess whether overinvestment of free cash flow is present in a large sample of emerging market firms and how it can be affected by debt, corporate governance, and concentration on the firm level, as well as by government effectiveness, intervention and market development on the institutional level. This section will describe the overall research design and methodology, will explain why it was selected, and will define the data sample.

IV.1) Overall Research Design

The research design employed for this study is a deductive approach, applying a quantitative methodology. This is because the study intends to provide an explanation for the occurrence of a particular phenomenon –overinvestment – via assessment of explanatory relationships between key variables and does not seek to achieve an exploratory understanding of a problem in order to generate new ideas (which would warrant a qualitative approach) (Saunders & Lewis, 2012). The goal of this study is to test already established theoretical propositions in an extended framework and for a larger population size. This is done to assess whether the relationship between free cash flow and overinvestment previously attested holds for a large sample of emerging market firms and whether moderators to that relationship are similar to those previously established for developed market firms and select emerging markets.

In general, a quantitative study methodology can be carried out via a descriptive research design, where the occurrence of a particular event is to be described; or a causal research design, aiming to establish a relationship between variables (Malhotra, Hall, Shaw, & Oppenheim, 2006). The latter is precisely what this study is set out to do. Consequently, this research is of quantitative,

explanatory nature. Furthermore, the study can be characterized as longitudinal, analyzing secondary data over the period from 2000 to 2015. The timeframe is extending the one of existing studies. It also analyses a more recent time period; contrary to the majority of extant research. The study universe is all publicly listed companies that are incorporated in emerging markets. The classification of a developing economy as an emerging market is aligned with the Morgan Stanley Capital International classification of emerging markets (MSCI, 2018). A list of the 25[3] countries included in the study and their respective world region per MSCI classification is referenced in appendix A. The unit of analysis is the individual publicly listed firm that operated in an emerging market during the time period of the analysis. The sample includes only those firms that had data available for the time period analyzed, and whose primary listing was in the respective emerging market exchange. The criterion of primary home country listing is chosen so that the collected variables better represent the circumstances in the respective country. This is particularly important in regards to corporate governance and institutional environment variables. Previous studies suggest that listings in (foreign) developed markets enhance the firm's corporate governance -or certain aspects thereof - as opposed to their domestic counterparts (Fresard & Salva, 2010; Doidge, Karolyi, & Stulz, 2009).

IV.2) Description of the Research Methodology

To answer the research questions, the study follows a three-stage approach proposed by Richardson's (2006) to evaluate the relationship between overinvestment and free cash flow as well as its moderators. Richardson's approach (described below) will be slightly modified in the third stage to account for additional variables not included in his model but theoretically

[3] Saudi Arabia is currently (2018) still a standalone country, however in June of 2018 it was announced that the country would join the MSCI emerging market classification in 2019. It was therefore included in the study.

determined (in the previous section) as being a potential moderator of the relationship. Richardson's (2006) process was specifically chosen to address identified shortcomings of previously applied methodologies. Different from preceding studies to assess overinvestment and its facilitators, Richardson explicitly distinguishes between new investment (i.e. new investment projects) and maintenance investment (i.e. investments to maintain existing assets). The new investments are then further subdivided into expected investments (i.e. those with marginal value for the firms) and unexpected investments (i.e. those that couldn't be justified by their marginal contribution), which constitute overinvestment (see illustration below).

Total Investment		
Maintenance Investment (maintaining exisiting assets)	New Investment (new investment projects)	
	Expected Investment (positive marginal value)	Unexpected Investment (no marginal contribution)

Types of firm investment according to Richardson (2006)

Richardson's (2006) model is thus constructed to specifically determine overinvestment (instead of simply investment) and can, therefore, address shortcomings of previously applied approaches (see Arslan & Karan, 2007; Almeida & Campello,2007; Zhao, Chen, & Yao,2009). These studies frequently use regression between an investment variable (taken directly from the financial reports) and various explanatory variables; to include free cash flow. This type of regression, however only provides an indication that free cash flow can serve as a proxy for investment (Richardson, 2006) and that firm investment can be related to other factors (e.g. debt or corporate governance). If a distinction between investment with and without marginal value is missing, the approach is less suitable to address the agency theory explanation of overinvestment, which specifically looks at that particular type of firm investment and its relationship to free cash flow. Richardson's approach precisely seeks to identify overinvestment as such.

The methodology is based on several regression analyses. In the initial stage, the company's anticipated new investments (i.e. positive net present value projects) are determined by an expectation model via linear regression from a pooled sample of firm year observations. Anticipated (or expected) investment is thereby regarded as a function of growth opportunities as well as additional variables (as listed below), which have previously been established as determinants for investment decisions (see Richardson,2006; Bates, 2005; Hubbard, 1998; Lamont, 2000). The growth opportunities can be interpreted as the benefit of the firm's ability to make future investments (the estimation method is described below). The fitted value of the first regression is the estimate of the expected investment; the unexpected (or excess) investment is the residual value (see section IV.4.1 below).

The second stage of the analysis then determines whether unexpected investment (i.e. the residual values) is a function of free cash flow. For this stage, the residuals from the previous stage are regressed on a free cash flow variable (see definition below). This is detailed in section IV.4.2.

Stage one and stage two are used to test the first hypothesis, i.e. determine whether overinvestment of free cash flow is present in emerging markets.

The final stage of the analysis assesses whether certain moderators (debt, corporate governance, ownership structure, and institutional environment) have an impact on the relationship between overinvestment and free cash flow. To do so, the positive residuals obtained in stage 1 are regressed on free cash flow (positive) and a set of other moderator variables (as described in section IV.4.3). Stage three will be divided into two phases. Phase one will assess the impact of firm level variables and phase two will expand the analysis to institutional environment variables. For this stage, the approach from Richardson (2006) is modified and extended in the sense that

additional variables are added to the regression analysis and that only positive values of overinvestment are included (Richardson's analysis includes only positive free cash flow values). This is done to include factors that have been theoretically - and to some extent empirically - shown to have an effect on overinvestment of free cash flow and to expand the model to institutional environment factors. This is described in section IV.4.3.

Stage three is applied to test the hypotheses two through five.

IV.3) Justification of the Applied Research Methodology

Before introducing the regression equations and variable descriptions, it is pertinent to address extant criticism in regards to the underlying assumptions of Richardson's (2006) model. Critics, in particular, emphasize the fact that the model, which captures suboptimal investment as the residual of the regression of an investment variable on a group of explanatory variables, assumes that - on average - this type of investment is zero (because the mean of all residuals is per definition 0). While this implicit assumption certainly has to be kept in mind when evaluating the results, it is important to note that it is inherent to the applied methodology. Linear regression, by design, estimates a line that equates the sum of squares of residual values above the lines with those below. Whenever it is used to explore the relationship between variables, any variation in a dependent variable not explained by the predictor variables is assumed to be 0 on average. The critique is thus somewhat extendible to all research methodologies that apply OLS, and consequently also to all those assessing a "simple" relationship between free cash flow and investment. The issue thus becomes more one of the qualities of the linear expectant model, as its ability to mirror the relationship between the dependent variable and its predictors directly influences the residual values.

Researchers have previously argued that some of the variables used in Richardson's model to estimate the expected investment are questionable. Previous period investment has been particularly criticized as a non-suitable predictor for current year investment; especially if the investment in the previous period was suboptimal (Bergstresser, 2006). This argument certainly does have merit, as the quality of the underlying model in regards to its ability to predict expected investment directly affects the measurement of unexpected investment. In that regard, it is important to note that the determinants of expected investment applied by Richardson have been widely acknowledged in literature (see e.g. Levine & Zervos, 1996; Lang, Ofek, & Stulz, 1994; Meyers, 1977; Lamont, 2000; and Bates, 2005) and that previous investment is specifically added to capture any firm characteristic that were not modeled but affect investment (Richardson, 2006).

It has also been implied that the approach is unable to establish which violation of the Modigliani and Millar assumptions (i.e. that of managerial opportunism (agency conflicts) or information asymmetries; materialized in capital constraints) is more important in explaining excess investment (Bergstresser, 2006). To this point, it must be emphasized that information asymmetries are also underlying agency conflicts and that Richardson's methodology estimates expected investments with a model that captures firm growth opportunities, as well as measures of financing constraints, thereby implicitly accounting for the aforementioned capital constraints. Thus, allowing for an evaluation of overinvestment from an agency perspective. Furthermore, previous research has shown that cash flow sensitivity of investment is present in firms with or without capital restraints (Zingales, 2000).

In summary it can be stated that there certainly are several underlying assumptions that have to be considered when interpreting the statistical results of this analysis. Nevertheless, the fact that this methodology specifically measures unexpected (over-) investment and its determinants, thus

allowing a better test of agency theory, seems to outweigh the aforementioned shortfalls; particularly for the research questions this study seeks to address.

The following section describes the regression equations and variables considered for the empirical analysis. A full listing with corresponding sources is included in Appendix B. The variable abbreviations as used in the statistical regressions are given in parenthesis.

IV.4) Regression Equations & Variables Considered

IV.4.1) Stage One – Estimation of Expected New Investment

The determinants of firm investment have been extensively analyzed in the literature (see e.g. Lang, Ofek, & Stulz, 1994; Hubbard, 1998; Xiao, 2009; Aivazian, Ge, & Qiu, 2005). These studies have identified several variables that should influence the investment decision of companies. They include in particular growth opportunities, leverage, and stock market valuation. Richardson's (2006) expectant investment model builds on those. Empirically, growth opportunities and stock market valuation have largely been found to be positively related to investment while leverage has previously been linked negatively to firm investment. Stock markets can foster investment because of reduced transaction costs and capital constraints (Levine & Zervos, 1996). Increasing stock market valuation can consequently increase the resources of firms available for investment. Similarly, the existence of good investment projects – i.e. those which promise to increase firm value – can prompt investment decisions (Lang, Ofek, & Stulz, 1994). High leverage and correspondingly high levels of debt, on the other hand, can curb investment as firms may not be able to raise additional funds for investment projects (Meyers, 1977). The model also has several control variables previously determined by literature (e.g. Hubbard, 1998; Bates, 2005; and

Lamont, 2000); to include cash holdings, previous period investment, firm size, and firm age. Large amounts of accessible cash enable companies to invest in (in positive net present value) projects as they become available without being dependent on the market's ability (or willingness) to provide funding sources. Furthermore, previous period investment can determine future investments as projects might require subsequent investments as well as maintenance investments to remain viable. Firm size can also be related to investment as larger firms generally have more assets available for investment in projects with marginal value. Finally, firm age should be related to investment. The business life cycle theory (originated by Chandler,1962) suggests that younger firms in their early stages require large investments to move while older firms (or rather firms at a larger stage in "life") would invest less.

Richardson's (2006) model to estimate the expected investment is subsequently applied for this part of this study; the resulting regression equation is included below. The fitted value from this regression is the expected investment, the residual is unexpected investment. This abnormal component can be positive (overinvestment) or negative (underinvestment).

Regression Equation 1:

$$\text{Investment (New)}_{t} = c + \alpha_1 \text{ Growth Opportunities}_{t-1} + \alpha_2 \text{ Leverage}_{t-1} + \alpha_3 \text{ Stock Return}_{t-1} + \alpha_4 \text{ Cash}_{t-1} + \alpha_5 \text{ Investment (New)}_{t-1} + \alpha_6 \text{Size}_{t-1} + \alpha_7 \text{Age}_{t-1} + \alpha_8 \text{Industry Indicator} + \alpha_9 \text{Year Indicator} + \varepsilon$$

Description of Variables:

Dependent Variable:

Investment (New): The dependent variable of the first regression is new investment (INV NEW). As previously described, this variable is intended to capture only the investments in new projects, not investment to maintain existing assets. Maintenance investments are therefore subtracted from the firm's total investments (Richardson, 2006):

Investments (New) = Total Investments – Maintenance Investments

Total investments (INV TOTAL) are approximated by capital expenditures (CAPEX), acquisitions (ACQ), research and development (RD) and sale of plant, property, and equipment (SALEPPE) according to the equation below:

$$\text{Total Investments}_t = [\text{Capital Expenditures (CAPEX)}_t + \text{Acquisitions}_t + \text{Research \& Development}_t - \text{Sale of Plant, Property, and Equipment}_t]$$

Research and development expenses are added because they are generally considered discretionary investment spending, but are not included in CAPEX. Similarly, money spent on acquisitions is also not part of the reported capital expenditures but does constitute firm investment. Finally, any assets sold for the period, will reduce investment and are therefore subtracted out (Richardson, 2006).

Maintenance investments are approximated by Depreciation & Amortization (DEP). Investments (new) for period t are therefore calculated as:

$$\text{Investments (New)}_t = [\text{Capital Expenditures (CAPEX)}_t + \text{Acquisitions}_t + \text{Research \& Development}_t - \text{Sale of Plant, Property, and Equipment}_t] - \text{Depreciation \& Amortization}_t$$

The resulting value for new investments for period t is scaled by average assets of period t.

Independent Variables:

Growth Opportunities: Literature has previously used several variables to approximate a firm's growth opportunities (GROWTH); typically incorporating a market price in relation to some axiom (book) value. One frequently used variable is the price to earnings ratio (P/E ratio), where a high ratio represents high growth opportunities (see e.g. Alonso, Iturriaga, & Rodriguez Sanz, 2005). The ratio captures the market's assessment of the firm's ability to generate positive cash flows from current investments in the future, and thus its future growth opportunities. Previous literature has however cautioned against approximating firm growth via the P/E ratio because the ratio can also be driven up by low expected returns (Ang & Zhang, 2011). Several previous studies have found that in periods of high P/E ratios, discount rates were low (Claus & Thomas, 2001).

Another frequently used measure of growth opportunities is Tobin's Q, which relates the market value of the firm to the replacement value of its assets (see e.g. Jose, Nichols, & Stevens, 1986; Lang & Stulz, 1994, and Berger & Ofek, 1995). The underlying explanation is thereby that the quality of investment in regards to the firm's ability to generate future profits is assessed via the firm's market valuation. This approach, even though frequently used, has not been without criticism either. In particular, it has been argued that it is based on the assumptions of perfect competitions, constant returns to scale, and the ability to measure a firm's maximized value by its stock market valuation. This means that when those conditions are not satisfied (e.g. with the existence of stock market "bubbles" or any other factors driving the market value of the firm from that of the present value of future cash flows), Tobin's Q cannot capture all relevant information about the future profitability of firm investment (Bond, Klemm, Newton-Smith, Syed, & Vlieghe, 2004). Furthermore, Richardson (2006) argues that Tobin's Q is not fully reflective of the market's expectations of growth opportunities. This is because when applying the residual income valuation

models, earnings have to be either completely transitory (book to market valuation) or completely permanent (earning to price valuation). Earnings, however, do display a degree of mean reversion (i.e. eventually move back to a mean average).

Consequently, for the purpose of this study, the growth opportunities are captured as the ratio of the value of the firm to the market value of the equity (i.e. stock price); following Richardson's (2006) approach. The firm value is thereby calculated from the book value of common equity, earnings, dividends, and a discount rate (cost of capital), via a persistence parameter obtained from auto-regressing abnormal returns. Assuming risk neutrality, homogeneous beliefs, and non-stochastic interest rates, a firm's market price can be estimated as the present value of the future expected dividends. Because the firm's (current) financial data influences the estimation of any anticipated payouts to the shareholders, it can be inferred that firm market price is directly driven by the firm's financial, or rather accounting data. Consequently, firm value can be captured as the current (accounting) value of the shareholder's equity plus the present value of any future residual profits, i.e. profits in excess of the cost of capital (or abnormal returns) (Ohlson, 1995). Because of the aforementioned dependence of the future expected profit estimation on current accounting information, it can be argued that the residual profits follow an autoregressive process where abnormal earnings of period t are dependent on those of period t-1 (Ohlson, 1995).

Applying the aforementioned assessment of firm value (absent any growth opportunities, as represented by current financial information), the firm's growth opportunities can be estimated as the ratio of the firm's value (of assets in place, V_{firm}) to its market value (Richardson, 2006)[4]. By applying the above described approach, the growth opportunities are captured as the current value of the firm's ability to make future investments and are measured by incorporating the market

[4] Following Richardson (2006), the ratio of firm value of assets in place to firm market value was used instead of the difference to allow meaningful measurement even in instances where book values are negative.

price, the value of assets in place, and current earnings. The calculation of the growth opportunities (GROWTH) is described below, with a lower value of GROWTH signifying larger growth opportunities. Consequently, the relationship between GROWTH and new investment is expected to be negative.

Growth Opportunities = V_{firm} / Stock Price,

where the value of the firm (V_{firm}) is estimated as follows:

$V_{firm} = (1-\alpha)BV + \alpha((1+r)\ X) - \alpha rd$, where BV is the book value of common equity, X is the earnings (operating income after depreciation), r is the discount rate (or risk free rate), d is dividends, and $\alpha = (\omega/(1+r-\omega))$ with ω being a fixed persistence parameter restricted to be positive and less than one.

Consistent with Richardson (2006), the auto-regression with a persistence parameter (ω) follows Ohlson (1995) and is estimated from the book value of equity, earnings (approximated by operating income after depreciation), and annual dividends. Since Richardson's analysis pertained to U.S. firms, his estimates for the persistence parameter (ω) and the risk-free rate r are not applied to the firm value calculation in this research. This is because risk-free rates are country specific (see Damodaran, 2018) and (to a degree) time period specific. Moreover, Richardson draws on the previous work of Ohlson (1995) for the persistence parameter estimate (ω) of abnormal returns. They are however also based on U.S. firms.

The calculation of r and ω are briefly described below.

Risk Free Rate Calculation:

Risk-free rates for developed markets are often assumed to be those of their government bonds with a longer term (typically 10 years), such as the U.S. Treasury rates for example. This measure is however based on the assumption that governments do not default (because they can "simply" print their currency). This supposition is questionable, particularly in an emerging market context, because a surge in domestic currency in the market will inevitably lead to its devaluation. Countries might, therefore, choose to default instead (Damodaran, 2018). Over the course of seven years (between 1996 and 2012) 58 country defaults (31 thereof in local currency) have been recorded.

Because of the aforementioned default risk inherent in local government bonds another approach often used is to "back out" the default risk of the bond yields. One frequently applied way to estimate that risk, is to either observe the Credit Default Swaps of the particular country or to use a percentage based on the sovereign credit rating (Damodaran, 2018). In both cases however – as Damodaran (2018) points out – the spread calculations are dollar based, which can lead to incorrect results when applying them to bonds in the respective domestic currencies.

Consequently, for this analysis Damodaran's build up approach will be used to estimate the risk-free rate r. It makes use of the inflation differentials between countries and scales up the U.S risk-free rate by the inflation differentials between the U.S. and the respective country (Damodaran, 2017b; Damodaran, 2017a) via the following equation:

$$\text{Risk Free Rate}_{(\text{country})} = (1+\text{Risk Free Rate}_{\text{US}}) * \frac{(1+Expected\ Inflation_{\ country})}{(1+Expection\ Inflation_{\ US})} - 1,$$

where Risk Free Rate $_{(\text{Country})}$ is the risk-free rate of the particular country in local currency (in time period t), Expected Inflation $_{\text{country}}$ is the inflation measured via the change in consumer price index for the respective emerging market (in time period t), and Expected Inflation $_{\text{US}}$, is the inflation measured via the change in the consumer price index for the U.S. (in time period t).

Persistence Parameter Estimation:

As mentioned in the previous section, Richardson's (2006) approach applies a persistence parameter of abnormal returns previously calculated by Dechow, Hutton, & Sloan (1999), appropriate for evaluating a sample of U.S. firms. For the purpose of this study the persistence parameter was recalculated to be consistent with the sample of emerging market firms. Following Ohlson's (1995) model – and assuming that other information manifests itself solely in financial statement information – the persistence parameter (ω) was estimated via autoregression as follows:

$x^a_{t+1} = \alpha + \omega\, x^a_t + \varepsilon_{t+1}$, where

$x^a_t = x_t - r(Y_{t-1})$, with x_t as the total profits of the firm at time t, r as the risk-free interest rate, and Y_{t-1} as the shareholders equity at the beginning of the period (i.e., time t-1). The parameter was estimated at .3056, with a p-value of 0.00 confirming significance at the 1% level. The corresponding regression is included in Appendix C.

Leverage: As previously mentioned, debt and investment have been found to be inversely related (Meyers, 1977). High debt levels manifest themselves in high leverage. For this study leverage (LEV) is included as the book value of short term and long-term debt rescaled by the book value of total debt and total equity (Richardson, 2006). The coefficient of the variable is expected to be negative.

Stock Returns: Stock returns (STOCK) are included as a proxy for the change in the market valuation of the firm. They are calculated as the annual change in value of the firm's stock for the period preceding the period of analysis. As higher market valuation signifies the market's

confidence in the firm to produce future earnings from investment, the relationship to new investment is expected to be positive (Richardson, 2006).

Investment (New) of the previous period: This variable is the prior firm level investment for period t-1 ($INVNEW_{t-1}$). It is captured as the Investment (New) variable of the period t-1. This is included to account for maintenance investment in Research & Development or investment to maintain assets that does not follow the reported depreciation schedule. Assuming that these investments are somewhat consistent over time, their effect can be included in the model in this manner (Richardson, 2006). The variable is expected to have a positive coefficient, as previous period investments should (to a degree) require investment expenditures in the following period.

Other Control Variables:

Richardson's (2006) model also includes cash (CASH), firm size (ASSETS), and firm age (AGE) as control variables. Cash is measured as the cash balance plus short-term investments divided by the total assets (all measured in period t-1). The measurement is similar to other studies (Arslan, Florackis, & Ozkan, 2006). The coefficient of the variable is expected to have a positive sign, as additional available funds will likely trigger (more) investment. Age is captured as the natural log of the number of years since incorporation. The relationship of this variable to investment is anticipated to be negative. This is because old companies, at a later stage in their lifecycle often have less opportunity for profitable investment projects. Finally, firm size is captured as the natural log of the firm's total assets; measured at the beginning of the period. The variable is expected to have a positive coefficient, as companies of larger size with more available assets, should be investing more.

In addition, both an industry indicator (INDUSTRY) and year indicator (YEAR) are included, accounting for any industry-specific or time related occurrences.

IV.4.2) Stage 2 – Assessment of the Free Cash Flow Overinvestment Relationship

This stage of Richardson's model is intended to determine whether there is a relationship between overinvestment and free cash flow. Overinvestment is captured as the residual from the regression in stage one. The model applied allows the relationship between free cash flow and overinvestment to be asymmetric (i.e. it allows a change in the fitted value line for free cash flow values above and below zero). This type of approach was chosen by Richardson (2006) to identify whether overinvestment is more prevalent in firms with (positive) free cash flow. A significant difference between the two slope coefficients combined with a larger coefficient of positive free cash flow would provide support for the free cash flow hypothesis (Richardson, 2006). The corresponding regression equation is included below. Stage 1 and Stage 2 combined will, therefore, be used to test hypothesis 1).

Regression Equation 2:

a) Unexpected investment = $\alpha + \delta 1\ FCF < 0 + \delta 2\ FCF > 0 + \varepsilon$,

where FCF (free cash flow) > 0 are values of free cash flow greater than zero and FCF <0 are values of free cash flow less than 0; or zero otherwise. The variable FCF<0 is expected to have a significant coefficient, which is larger than that of FCF<0 variable.

Dependent Variable:

Unexpected Investment (UEINV): Unexpected Investment is captured as the residuals of the regression ran in stage 1 to estimate the expected investment. It is the difference between the estimated (fitted) value and the observed value for the respective period t. Positive values of the unexpected investment are overinvestment, negative values are underinvestment.

Independent Variable:

Free Cash Flow: For the purpose of this study free cash flow (FCF) is viewed as the cash flow that is available after maintaining assets in place, servicing debt, and financing value generating investment projects (Richardson, 2006). The free cash flow variable is approximated by adjusting the cash flow from assets in place by the expected new investment (i.e. the fitted value from regression 1). Cash flow generated from assets in place is calculated by adjusting the operating cash flow (taken from the cash flow statement) by any research and development (R&D) expenditures (added) and maintenance investments (approximated by depreciation and amortization and subtracted). R&D expenses are added because firms have to expense them. They are thus deducted out of cash flow from operations. Maintenance investments are subtracted because they do not represent voluntary spending (Richardson, 2006). This is expressed in the equation below:

Free Cash Flow = Cash flow from Operations – Maintenance Investments + R&D Expenditure – Expected New Investment

IV.4.3) Stage 3 – Determinants of Free Cash Flow Overinvestment

The final stage of the model is intended to determine factors that can potentially moderate the free cash flow overinvestment relationship; particularly accounting for factors in the institutional environment. For this part of the analysis Richardson's regression model (2006) is modified to the degree necessary to account for the additional variables identified in the literature. Stage three of the analysis will be divided into two phases in order to initially assess which (if any) of the identified firm-level variables can influence the overinvestment – free cash flow relationship (see Stage 3a). In a subsequent step (see Stage 3b) (additional) institutional variables will be considered. This is done to specifically evaluate whether and how certain factors of the institutional environment affect the free cash flow overinvestment relationship (and its moderators).

A) Stage 3a – Firm level determinants of Overinvestment of Free Cash Flow

For this part of the empirical analysis, the positive values of the unexpected investment variable (determined in stage 1) are regressed on the free cash flow variable from the previous section and certain moderator variables. These variables are rooted in the theoretical literature analysis (see section II.3) and are assumed to have a moderating effect on free cash flow overinvestment. The corresponding regression equation and variable description are included in the section below. The regression model also includes interaction terms between the free cash flow, corporate governance, and the concentration variables to capture any potential interaction effects, thereby allowing an assessment on how the free cash flow – overinvestment relationship is influenced by it (Richardson, 2006; Balli & Sorensen, 2013). The model thus permits a more specific test of how certain factors can potentially curb overinvestment of free cash flow resulting from agency conflicts. Consequently, this approach is better able to test the hypotheses compared to models that

regress an investment variable on individual regressor variables, as this would only establish a relationship between (over)investment and the moderator.

Regression Equation 3a:

Unexpected Investment $(UEINV)_t = c + \alpha_1 FCF_t + \alpha_2$ Debt $(DEBT)_t + \alpha_3$ Corporate Governance $(CGSCORE)_t + \alpha_4$ Ownership Concentration $(CONCENT)_t + \alpha_5 (FCF*CGSCORE) + \alpha_6 (FCF*CONCEN)_t + \varepsilon$

According to previous literature, the coefficient of free cash flow is expected to be positive, as overinvestment should be dependent on (positive) free cash flow. The interaction term for the corporate governance variable with FCF is expected to have negative coefficients. This is because superior corporate governance provides less opportunity to squander funds for investment to achieve private benefits. As previously described, there are two diverging theories on how ownership concentration affects overinvestment, the concentration - free cash flow interaction term will, therefore, be determined empirically. This equation will be used to test hypotheses 2) through 4). The variables are described below.

Dependent Variable:

Unexpected Investment (Pos)(UEINV): The dependent variable is unexpected investment, it is determined as the positive residual of the regression in stage one. (For description see stage 1). It is overinvestment.

Independent Variables:

Free Cash Flow: This variable is the same as the free cash flow (FCF) variable used for the regression in stage two (for calculation see above).

Debt (DEBT): Extant studies have used several variables to assess the influence of debt on free cash flow overinvestment. Previous proxies include short-term debt and leverage (Cai, 2013), as well as commercial debt and bank loans (Yuan & Dai, 2016) and long term debt (Fernandez, 2011). While Jensen's theoretical argument of debt as a way to curb opportunistic management behavior was based on the idea of debt without retention, empirical research has since suggested that other forms of debt (e.g. bank loans or long-term debt) can also reduce firm overinvestment (Degryse & de Jong, 2006). For the purpose of this study, debt will be approximated by the natural logarithm of short and long-term debt, to assess its effect regardless of type and term. Consistent with Jensen (1986) the coefficient of debt is expected to be negative.

*Ownership concentration (CONCEN)**:*** Existing research on ownership concentration in emerging market firms has measured concentration as the number of shares held by the largest owners in relation to the total numbers of shares outstanding (see Wei & Zhang, 2008; Taghavi, Khodaei Valahzaghard, & Amirjahadi, 2014; Cheung, Stouraitis, & Tan, 2011). Correspondingly, for this study, concentration is measured by the percentage of closely held shares relative to total shares outstanding. Closely held shares are thereby classified as shares held by insiders; individuals, government, crossholdings or corporations. Consistent with the earlier theoretical explanation, the relationship to overinvestment will be empirically determined.

Corporate Governance (CGSCORE): Previous studies have applied a firm level corporate governance index derived from the survey by Credit Lyonnaise (Francis, Hasan, Song, & Waisman, 2013). Unfortunately, this limits the years for the study as the data is only available for certain years (2000, 2003). Other research has used corporate governance index data from RiskMetrics (now ISS) (Billett, Garfinkel, & Jiang, 2011); the data is however concentrated on US and other developed markets. As previously argued, corporate governance should be measured on several dimensions as opposed to only being approximated by a select few variables. This can capture information about interactions between corporate governance mechanisms (Schnyder, 2012). For this study, the Asset4 environmental, social, and corporate governance (ESC) dataset is used. The data is based on 600 datapoints per company and year. They form the basis for 287 performance indicators, which are categorized into 18 sub-categories. They, in turn, form the basis for the overall scores along the four pillars economic, environmental, social, and corporate governance performance (see Appendix D). To approximate the quality of corporate governance the score on pillar 4 (corporate governance) is used. It is the composite score of the subcategory scores for board structure and compensation policy, as well as board functions and shareholders rights and therefore able to capture the quality of corporate governance over multiple aspects. The score is between 0 and 1 with a higher score indicating a higher level of corporate governance quality. It is important to note that the collection of the data started in 2002, with an annually increasing number of emerging market firms included in the dataset. Some of the categories were however dropped in starting in 2016. While the latter does not have any effect on this research, the former does impose a data availability restriction.

Since good corporate governance is expected to reduce agency conflicts between agents and principals the coefficient of the variable is expected to be negative.

B) Stage 3b – Institutional Environment determinants of Free Cash Flow Overinvestment

This stage of the analysis is intended to assess whether and to what extent the institutional environment has an effect on free cash flow overinvestment. Institutional environment is thereby captured along three dimensions: government effectiveness, government intervention, and market development. The effect of each dimension is assessed separately via regression (see below), following an approach previously applied by Francis, Hasan, Song, & Waisman (2013). This is to specifically capture its influence on free cash flow overinvestment and its moderators. The regression equations and variable descriptions are included in the following section.

Regression Equation 3b.1) – Government Effectiveness

Overinvestment $(UEINV(pos))_t = c + \alpha_1$ Free Cash Flow $(FCF)_t + \alpha_2$ Debt $(DEBT)_t + \alpha_3$ Corporate Governance $(CGSCORE)_t + \alpha_4$ Ownership Concentration $(CONCEN)_t + \alpha_5$ Government Effectiveness $(GOVEFF)_t + \alpha_6$ $(FCF * GOVEFF)_t + \alpha_7$ $(FCF * GOVEFF * CGSCORE)_t + \alpha_7$ $(FCF * GOVEFF * CONCEN)_t + \varepsilon$

Regression Equation 3b.2) – Government Intervention

Overinvestment $(UEINV(pos))_t = c + \alpha_1$ Free Cash Flow $(FCF)_t + \alpha_2$ Debt $(DEBT)_t + \alpha_3$ Corporate Governance $(CGSCORE)_t + \alpha_4$ Ownership Concentration $(CONCEN)_t + \alpha_5$ Government Intervention $(GOVINT)_t + \alpha_6$ $(FCF * GOVINT)_t + \alpha_7$ $(FCF * GOVINT * CGSCORE)_t + \alpha_7$ $(FCF * GOVINT * CONCEN)_t + \varepsilon$

Regression Equation 3b.3) – Market Development

Overinvestment $(UEINV(pos))_t = c + \alpha_1$ Free Cash Flow $(FCF)_t + \alpha_2$ Debt $(DEBT)_t + \alpha_3$ Corporate Governance $(CGSCORE)_t + \alpha_4$ Ownership Concentration $(CONCEN)_t + \alpha_5$ Market Development $(MKTDEV)_t + \alpha_6$ $(FCF * MKTDEV)_t + \alpha_7$ $(FCF * MKTDEV * CGSCORE)_t + \alpha_7$ $(FCF * MKTDEV * CONCEN)_t + \varepsilon$

The regression equations presented above, expand the firm-level regression analysis to account for the institutional environment dimensions. In addition to the firm-level variables an institutional environment variable and its interaction with free cash flow are added. This is done to specifically capture its effect on the free cash flow overinvestment relationship. Furthermore, each equation includes a triple interaction term between free cash flow, corporate governance, and the respective institutional environment variable (e.g., government effectiveness). The intent here is to test whether there is an effect of the institutional environment via corporate governance or ownership concentration on free cash flow overinvestment (Francis, Hasan, Song, & Waisman, 2013). Equations 3b.1) through 3b.3) are used to test hypotheses 5a) through 5c) respectively. For each equation the coefficient of FCF is expected to be positive and the one of debt negative.

The coefficient for government intervention and its interaction term with free cash flow term is expected to be negative. This is because less government intervention (as measure by higher economic freedom, see below) will provide less opportunity for miss-investment of free cash flow. Similarly, the coefficient for government effectiveness and its interaction term with free cash flow is expected to be negative, as a more efficient government that establishes property rights and controls corruption should leave less opportunity for majority shareholders or managers to squander resources. Lastly, the coefficient of market development and its interaction term with free cash flow is also expected to be negative as better, more efficient markets leave less room for investment miss-management.

For the triple interaction terms, the direction of the coefficient are not clear and have to be empirically determined. This is because the triple interaction allows for offsetting effects. In the case of for instance, low government effectiveness in a country and correspondingly expected high

free cash flow overinvestment (positive relationship), the interaction with strong firm level corporate governance might overall still lower free cash flow overinvestment.

Dependent Variable:

Positive Unexpected Investment or Overinvestment as described in section 3a)

Independent Variables

The independent variables, FCF, Debt, and Corporate Governance are as described in section 3a.

Institutional Environment Variables:

Government effectiveness (GOVEFF): Previous research on institutional environment has operationalized government effectiveness as a law index assessing the overall development of institutions, protection of property rights and trademarks (Li, 2012). The index is part of the NERI marketization index for Chinese providences (Fang, annually). Since this study has a research population from various geographical regions, this index cannot be utilized. Other analyses have approximated the government effectiveness aspect of the institutional environment with data from the from World Bank's Worldwide governance indicator (representing the composite measures of voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption) (see e.g. Baik, Cho, Choi, & Kang, 2015). This indicator will also be used in this study to approximate government effectiveness. The score is representative of the average percentile rank of the respective country over all of the dimensions analyzed, thereby assessing the country's specific ranking in comparison to all other emerging markets analyzed. A higher score corresponds to a higher level of government

effectiveness. Consequently, the coefficient of the variable is expected to be negative, signifying that increased effectiveness leads to less overinvestment.

Government Intervention (GOVINT): In extant studies this variable has been approximated by an index (NERI Index of Marketization of China's Provinces, published annually by G. Fang), which operationalizes marketization along the categories of government control, economic structure, free trade, development factor market, legal framework (e.g. Li, 2012; Goodluck Marco, Li, Chen, & Cui, 2014). Another common approximation of government involvement is that of state ownership or previous connection of the manager to the government (e.g. former government employee or political party member) (Chen, Sun & Tang, 2011; Hao & Lu, 2018). These measures, however, are either specific to China and not available for other emerging markets or not the most suitable measure for a larger sample of emerging market, whose transition from state ownership and state involvement are different from China. For this study, the Economic Freedom Index, published by the Economic Heritage Foundation, will be used. Previous literature has also identified this index as a suitable measure for formal institutional environment (Garrido, Gomez, Maicas, & Orcos, 2013). The index scores a country's government intervention (or lack thereof) on a scale from 0 to 100 (higher mark means less intervention). The index is based on 12 quantitative and qualitative factors, to include business freedom, labor freedom, monetary freedom, trade freedom, investment freedom, financial freedom, government integrity, judicial effectiveness, government spending, tax burden, fiscal health, property rights. The final score is the arithmetic average of the individual scores on the twelve factors (The Heritage Foundation, 2018). The index was chosen because it includes similar categories as those used in previous research (see above), but covers all emerging markets over the time frame of the analysis. Since a higher score indicates less intervention, the relationship between the variable and overinvestment is expected to be negative.

Market Development (MKTDEV): Previous research has approximated financial market development via a stock market and financial intermediary development market index constructed according to Demirguc-Kunt & Levine (1996). It is based on market capitalization, value traded, turnover, as well as liquid liabilities and domestic credit to private sector (Love, 2003). For Chinese markets, a financial market index derived from the NERI marketization index for Chinese providences was applied. For the purpose of this study, the financial market development index published by the World Bank will be used, because it encompasses the variables of Demirguc-Kunt & Levine (1996) and is broadly available for emerging markets over the time period of this study. Similar to the previous two institutional environment variables, the relationship to overinvestment is expected to be negative, signifying that a higher level of market development decreases overinvestment.

V Empirical Results

V.1) Data and Sample Description

Data for the individual firm's financials was obtained from the Compustat and Capital IQ database via the Wharton Universities Research Data Services (WRDS). Data on the firm's stock price, market capitalization, and corporate governance was collected from the Thomson Reuters Worldscope database. Data on firm age was gathered from the Bureau van Dijk OSIRIS database; missing values were manually calculated for the respective firm years. Consistent with previous research on the topic of firm investment, data from the financial services industries (SIC codes 6000 to 6999) - where cash flow is hard to measure - were excluded and only firms whose primary listing is in the respective foreign country were included. The data for the institutional environment was obtained from the Economic Heritage Foundation's Economic Freedom Index and the World Bank's Worldwide Governance Indicator, as well as the World Bank's Global Financial Development dataset. Data on the risk-free rates (for the growth estimation) was obtained from the CIA world factbook. The timeframe of the analysis is 2000 to 2015, to expand the scope compared to existing research. A summary of the variables and respective sources is provided in Appendix B).

V.2) Determinants of Firm Investment – Regression 1

The preliminary frequency analysis of the data for stage one showed that variables GROWTH $_{t-1}$ (growth opportunities), STOCK $_{t-1}$ (stock returns), INV NEW $_{t}$ (Investment New), LEV $_{t-1,}$ (Leverage $_{t-1}$) and INV NEW$_{t-1}$ (Investment New in period t-1), were significantly positively skewed and displayed kurtosis. The analysis of outliers, showed significant extreme values in the aforementioned variables as well. The variables STOCK $_{t-1}$, INV NEW $_{t}$, LEV $_{t-1}$, and

INV NEW $_{t-1}$ were therefore trimmed at 0.1%, eliminating values above the .001st and .999th percentile. Furthermore, the variable GROWTH was winsorized at 1%, recording the values beyond the 1st and 99th percentile to the respective percentile (similar to Richardson, 2006). After the transformation the variables showed no strong correlation (above .5) and no multicollinearity, but heteroskedasticity was detected. This was confirmed by a p-value of 0.000 of the Breusch & Pagan (1979) test statistic B ($\sim \chi^2_{(1)}$) of the final model; rejecting the null hypothesis of homogeneity. The regression estimation for stage one was subsequently based on Huber-White robust standard errors. After the transformation 87,935 firm year observations (from 11,748 firms) remained in the common sample underlying the final model of Regression 1 (see Appendix E for details).

V.2.1) Descriptive Statistics

The following table displays the descriptive statistics for the investment expenditures of emerging market firms.

Table 3: Descriptive Statistics - Investment Expenditures

		INV TOTAL	CAPEX	DEP	INV NEW
N	Valid	159056	159056	159056	159056
Mean		0.0822	0.0661	0.0353	0.0432
Std. Deviation		0.7992	0.7569	0.0697	0.7933
Percentiles	1	0.0000	0.0000	0.0000	-0.0001
	25	0.0142	0.0093	0.0146	-0.0142
	75	0.0898	0.0798	0.0441	0.0446
	99	0.4772	0.3960	0.1432	0.4470

INV TOTAL is the total investment in period t calculated as the sum of Capital Expenditures (CAPEX), Acquisition (ACQ), and research &development (R&D) minus any losses from sale of PPE (SALEPPE), rescaled by average assets.
INV NEW is the (total) new investment of period t, calculated as INV TOTAL minus depreciation (DEP)

Table 3 shows that emerging market firms spend, on average, 8.22% of their assets on new investments (total). This percentage is smaller than the comparable numbers from previous studies for the United States (13.1%, reported by Richardson, 2006) and for China (10%, reported by Chen, Sun, & Xu, 2016). Capital expenditures make up the largest part of the total investment (6.6% of the asset base). Research & development and acquisitions are comparatively small. Together these investments only amount to 1.6% of the firm's assets[5]. In comparison, these components of firm investment make up about 7.3% of the firms' asset base in developed market firms. In regards to the overall composition of total investment, it can be seen that maintenance investment constitutes about 42.9% (DEP/TOTAL INV = 0.0353/0.0822) and new investment about 57% (INV NEW/ TOTAL INV) of the total expenditures. This breakdown is similar to the United States, where maintenance makes up about 44% and new investment about 56% of the total investment expenditures (Richardson, 2006).

Table 4: Descriptive Statistics - Investment Expenditures by Industry

	INV TOTAL Mean	CAPEX Mean	DEP Mean	INV NEW Mean
Admin	0.0753	0.0381	0.0233	0.0520
Agriculture	0.0819	0.0597	0.0250	0.0569
Construction	0.0586	0.0437	0.0189	0.0396
Manufacturing	0.1187	0.0636	0.0308	0.0879
Mining	0.1476	0.0863	0.0387	0.1090
Retail	0.0957	0.0714	0.0359	0.0598
Service	0.1652	0.0544	0.0361	0.1291
Transportation	0.1127	0.0737	0.0462	0.0665
Wholesale	0.0973	0.0406	0.0259	0.0714

Variables are defined as in table 3. The table shows the mean of each variable by industry

[5] The values sale of PPE (SALE PPE) are sporadic and significantly reduce the common sample size; they were therefore excluded.

Table 4 shows that the mean investment undertaken varies among the firms analyzed based on their industry categorization. Over all industries the investment expenditures range is from 5.9% of the firm's asset on the lower end to 14.8% on the upper end. The inter-industry differences observed appear to be consistent with the type of industry the firm operates in. Industries that typically require comparatively larger investments in assets – such as manufacturing, mining, service, and transportation – display larger investments in relation to their asset base, while industries that require comparatively less investment – such as wholesale, administration, and agriculture – show a lower ratio. Except for the service industry, capital expenditure (CAPEX) accounts for the largest part of the firm's total investment, ranging from 3.8% of the firm' assets to 8.6%. Expenditures for acquisitions (ACQ) and research & development (R&D) are comparatively less, ranging from 1.5% to 6.1%[6]. For service industry firms, ACQ and R&D expenditures combined make up about 11.1% of the firms' assets, while CAPEX is comparatively smaller, with expenditures (only) about 6.0% of the asset base. Furthermore, it can be seen that the ratio of maintenance investment to new investment varies among industries. Service industry firms spend about 3.57 times as much on new investment compared to maintenance investments, while retail and transportation firms spend only 1.66 and 1.46 times as much respectively. Administration, agriculture, and construction firms' expenditures on new investment are about twice as much as expenditures to maintain assets in place.

In additional analyses (see Appendix F) the composition of the firm's total investment was also analyzed on a country basis. The means of total firm investment over all firms analyzed range from 4.6% (Egypt) to 9.4% (Hungary) in relation to the firms' asset base. In regards to the composition of the investment it can be reported that about half of the countries spend, on average,

[6] The values for sale of PPE (SALE PPE) are sporadic and significantly reduce the common sample size; they were therefore excluded.

more on maintenance as opposed to new investment. Countries with comparatively larger new investments are the United Arab Emirates, China, Egypt, India, Poland, Russia, Qatar, Saudi Arabia, Turkey, Taiwan, and South Africa. Particularly noteworthy are Qatar and China, whose expenditures on new investment in relation to their asset base are more than double of those on maintenance investment.

V.2.2) Estimation Results

The following section will display and interpret the results from the different estimation models. The final regression equation is included in the table before the summary of the results. Detailed regression outputs are included in Appendix G.

V.2.2.1) Estimation of Investment New

Table 6: Investment New Estimation Models

Regression Equation:

$$Investment\ New\ (INV\ NEW)_t =$$

$$= c + \alpha_1\ Growth\ Opportunities\ (GROWTH)_{t-1} + \alpha_2\ Leverage\ (LEV)_{t-1} +$$

$$\alpha_3\ Stock\ Return\ (STOCK)_{t-1} + \alpha_4\ Cash\ (CASH)_{t-1} + \alpha_5\ Investment\ New\ (INVNEW)_{t-1} +$$

$$\alpha_6\ Size\ (SIZE)_{t-1} + \alpha_7\ Age\ (AGE)_{t-1} + \alpha_8 Industry\ Indicator + \alpha_9 Year\ Indicator + \varepsilon$$

Table 5: Regression Results – Models Expected Investment

Dependent Variable: Investment New t (INV NEWt)

Variable	Expected Relationship	Model 1	Model 2	Model 3	Model 4
GROWTH	-	-1.559 (-8.357)***			-0.690 (-4.436)***
INV NEW(t-1)	+			0.427 (66.289)***	0.427 (62.805)***
STOCK	+			0.008 (22.92814)***	0.007 (19.081)***
LEV	-			-0.002 (-9.150209)***	-0.001 (-8.513)***
CASH	+			0.059 (27.55061)***	0.064 (29.426)***
AGE	-			-0.005 (-6.952792)***	-0.003 (-4.383)***
SIZE	+			0.001 (2.453587)**	0.001 (6.530)***
CONSTANT		0.035 (83.765)***	0.011 (6.927)***	0.015 (12.248)***	-0.003 (-1.145)
INDUSTRY/YEAR INDICATOR		NO/NO	YES/YES	NO/NO	YES/YES
R-squared		0.01	0.012	0.234	0.2467

t-stats are reported in parenthesis
* significant at 10% level
** significant at 5% level
*** significant at 1% level

The above table shows the different models analyzed to estimate firm investment. The models reported are similar to those previously run by Richardson (2006). They were run for a

pooled data sample with robust (Huber-White) standard errors, correcting for heteroskedasticity and any serial correlation (Hayes, 2007). In unreported tests the models were also run with Tobin's Q (calculated as the ratio of market value of the firm to the book value of total assets) and sales (approximated by the log of sales revenue) as an estimate for the firm's growth opportunities, however no significant relationship and / or higher R-squared could be detected.

Model 1 assess the relationship between firm investment (INV NEW) and its growth opportunities (GROWTH). The variable displays the expected coefficient, confirming a positive relationship between growth opportunities and new investment[7]. The coefficient can be interpreted as follows: a one standard deviation change in growth opportunities (0.0016) leads to additional investment in the amount of 1.56*0.0016 = 0.0026 or 0.26% of the firm's asset base. Alternatively, following Richardson's (2006) interpretation: a change from the first to the third quartile in growth opportunities of 0.044545 (first quartile 0.000055 - third quartile 0.0446) leads to additional investment in the amount of 1.56*0.044545 = 0.069 or 6.9% of the firm's asset base. This is about double of what was reported by Richardson (2006) for developed market firms. It has to be acknowledged that the R-squared of the model is 0.01; allowing for growth opportunities to explain about 1% of the variation in new investment. This percentage is smaller compared to what has previously been found for US (developed) market firms (5%) and similar to Chinese firms (1%) (Richardson, 2006), (Chen, Sun, & Xu, 2016).

Model 2 includes only industry and annual fixed effects. It can be seen that the explanatory power of the model only slightly increases; explaining about 1.2% of the variation of new investment of the firms. Similar to the previous model, this percentage is comparatively smaller for the values found in previous studies, which report an R-squared of about 11% for this model.

[7] This is because GROWTH is the ratio of firm value to the market value of the firm, an increase in market value compared to firm value signifies additional growth opportunities. For the ratio this means it becomes smaller.

It is also important to note that not all of the industry dummies were significant, suggesting that the average new investment is not necessarily significantly different over all industry groups for the entire time period analyzed.

Model 3 includes all control variables of new firm investment previously established in literature; it does not control for annual and year fixed effects. The R-squared of the model – and thus explanatory power – increases to 24.4%. This is about 6% below the results previously found for US firms (30%) and similar to the level of Chinese firms (24%).

The final model, Model 4, includes all variables from Model 3 plus growth opportunities as well as industry fixed effects and year fixed effects. Similar to previous work, the R-squared of the final model increased compared to Model 3. In total, the investment model is able to explain 24.7% of the overall variation in new investment of emerging market firms.

Model 4 was subsequently used to generate the fitted values and the residuals for the second regression. The fitted values from this regression are the expected investment, the residual is the unexpected investment; positive residuals thereby indicate overinvestment, negative residuals underinvestment.

V.3) Free Cash Flow Overinvestment (Regression 2)

V.3.1) The free cash flow overinvestment relationship.

The following sections include a breakdown of the uses of the analyzed firms' free cash flow as well as the results of the regression analyses to test the free cash flow overinvestment relationship.

V.3.1.1) Free Cash Flow uses

Since a company cannot spend more cash than it generates, its free cash flow (source) has to equal its uses of cash. Similarly, any cash shortfalls experienced have to be financed. Following Richardson (2006), the uses of cash flow – or how cash shortfalls can be financed - can thus be broken down in different categories. They are:

- Payments to / Receipts from shareholders
- Payments to / Receipts from debt holders (principal)
- Increase / Decrease in cash and short-term investments
- Cash inflow / outflow from a decrease / increase in investments
- Other changes (exchange rate effects and other investments)

The following table shows the mean of the free cash flow variable for the total sample analyzed Subsequently, the uses of the cash generated and sources used to finance the cash shortfall are analyzed; broken down by positive free cash flow and negative free cash flow firm year observations.

Table 6: Free Cash Flow uses (the breakdown and definitions follow Richardson, 2006)

		FCF total
	N	87912
	Mean	-0.0024
	Std. Deviation	0.1016
Percentiles	1	-0.3022
	25	-0.0514
	50	-0.0012
	75	0.0500
	99	0.2677
	FCF >0	FCF < 0
N	43313	44599

	Average	Average[8]
FCF	0.070	-0.073
UEINV	0.012	-0.007
Δ Debt	0.015	-0.021
Δ Equity	0.009	-0.028
Δ Financial Assets	0.024	-0.006
Δ Investments	0.010	0.002
Δ Other	-0.001	-0.013

Free Cash Flow (FCF) is the difference between the (positive or negative) firm's cash flow from assets is place (CFAIP) and Depreciation & Amortization (DEP) – the variable is scaled by average assets
Unexpected Investment (UEINV) is the residual from regression 1
Δ Debt is the net cash returned to/ received from debtholders (calculation: long term debt reduction minus long term debt issuance minus changes in current debt, all as reported on the cash flow statement)
Δ Equity is the net cash returned to /received from the equity holders (calculation: purchase of common and preferred stock plus cash dividends minus sale of common and preferred stock, all as reported on the cash flow statement)
Δ Financial Assets is the increase / decrease in cash (calculation: change in cash & cash equivalents minus Short term investments changes, all as reported on the cash flow statement)
Δ Investments is the increase / decrease in (other) investments (calculation: increase in investments minus sale of investments, all as reported on the cash flow statement)
Other are all remaining items on the cash flow statements, they are captured as the (negative of) exchange rate effect, and other investing and financing activities.

Table 6 shows that the mean value of the free cash flow variable is negative over the entire sample. This suggests that the firms analyzed – on average – experience a cash shortfall of about .24% of their asset base. A breakdown of the sample into firms with positive vs. negative free cash flow illustrates that about 49.3% (43,313/87,912) of the firms have positive free cash flow. Firms with available cash roughly return 21% and 13% (0.015/0.070 and 0.009/0.070) thereof to debtholders and equity holders respectively. About 34% (0.024/0.070) of it is retained as financial assets (cash holdings). This finding appears to be consistent with prior research signifying (free)

[8] Average Numbers are for the common sample, i.e. only for the firm year observations that had data available in all of the listed categories

cash flow retention in emerging market firms (Ramirez & Tadesse, 2009), where available cash is kept within the firm not returned to equity holders. The amount is less compared with the financial assets retained by developed market firms (44% of their assets, Richardson, 2006)

The table further shows that 17% (0.012/0.07) of the free cash flow is used for investments that do not produce any marginal value to the firm (overinvestment). This percentage is about 3% less compared to what has previously been observed in developed market firms (20%, Richardson, 2006) and about two thirds (29%, Chen, Sun, & Xu, 2016) of what has been reported for Chinese firms. Overall, firms, on average, invest about 1.2% of their asset base in projects with no marginal value.

When analyzing the subsample of firms with negative free cash flow, it can be seen that about 30% and 38% percent of the cash shortfall is financed by debt and equity holder respectively. Furthermore, firms with negative free cash flow experience underinvestment (i.e. forgone projects with positive net present value because of lacking funds) of about 0.7% of their asset base.

V.3.2) Regression Results: Free Cash Flow Overinvestment Relationship

The following table includes the results of regression equation two. For the regression the variable free cash flow (FCF) was trimmed at the 0.001^{st} and $.999^{th}$ percentile to minimize the effect of outliers.

Table 7) Results – Regression Free Cash Flow Overinvestment

Regression Equation:

$$Unexpected\ investment\ (UEINV) = \alpha + \delta 1\ FCF < 0 + \delta 2\ FCF > 0 + \varepsilon,$$

Dependent Variable: UEINV
Method: Least Squares
Included observations: 87732 after adjustments
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.06E-05	0.000336	0.031536	0.9748
FCF>0	0.092787	0.005458	17.00018	0.0000
FCF<0	0.088299	0.005763	15.32288	0.0000

R-squared	0.019898
Adjusted R-squared	0.019876
F-statistic	890.5484
Prob(F-statistic)	0.000000
Prob(Wald F-statistic)	0.000000

UEINV is the unexpected investment (Overinvestment). It is the residual from the expected investment estimation (Regression 1)
Free Cash flow (FCF) is the difference between cash flow from Assets in place (CFAIP) and the expected investment (i.e. the fitted value from the expected investment estimation, Regression 1)
CFAIP is the Cash flow from operating activities + Research & development expenses – Depreciation & amortization (as the proxy for maintenance investment) (the variable scaled by average assets)
FCF > 0 is the FCF value for values > 0, and 0 otherwise
FCF < 0 is the FCF value for values <0, and 0 otherwise

The regression output in table 7 above attests a significant, positive relationship between FCF > 0 and unexpected investment (coefficient 0.0928). This relationship is also different (larger) than the relationship between FCF < 0 and unexpected investment (coefficient 0.088). This proposes that as the free cash flow of the firm increases in relation to its asset base; firms tend to overinvest more (similarly it also means that for increasingly negative free cash flow – in comparison to the firm's asset base – firms tend to overinvest less, or expressed differently, underinvest more). The R-squared of the regressions is .019, which means that the FCF variable

explains about 1.9% of the variation in the investment variable. While this percentage is low, it can be viewed in combination with the results from regression 1. The two phases of the analysis jointly provide support for the hypothesis that (positive) free cash flow and excess investment are related and explain about 25% of the variance in new firm investment (Richardson, 2006).

Consequently, the statistical results provide support for Hypothesis 1), suggesting that firms with free cash flow (in the sample of emerging market firms analyzed) tend to overinvest.

III.3.3) Robustness Tests

To test the robustness of the above estimate, two more tests of the relationship between overinvestment and free cash flow were performed. For the first test, quintile regression for the excess investment variable was run. For the second test rank dummy regression was carried out. The techniques and corresponding results are summarized below.

a) Quintile Regression

Based on Koenker and Basset (1978) the linear relationship between the free cash flow variable and 20^{th}, 40^{th}, 60^{th}, and 80^{th} percentile of the excess investment variable (UEINV) was assessed. This allows to predict how the respective percentiles are affected by the regression variable, and thus can contrast the relationship between large negative values of excess investment (20^{th} percentile) and large positive values of excess investment (80^{th} percentile). Slope equality tests were performed between the different slope coefficients. All tests showed significant differences of slopes. The coefficients for each quintile are summarized below; the detailed outputs are included in appendix H).

Table 8) Regression Results - Quintile Regression

Dependent Variable: UEINV

Percentile	Relationship	Cofficient FCF
20th	+	0.033 (24.413)***
40th	+	0.032 (26.595)***
60th	+	0.034 (24.207)***
80th	+	0.0434 (18.991)***

t -stats are reported in parenthesis
* significant at 10% level
** significant at 5% level
*** significant at 1% level

The results above exhibit that the relationship between free cash flow and excess investment is different for different percentiles of excess investment. For larger negative values of excess investment (underinvestment, 20th percentile, coefficient of 0.033) the relationship is stronger compared to less negative value of excess investment (underinvestment, 40th percentile, coefficient of 0.032). More importantly for larger, positive values of excess investment (overinvestment, 80th percentile) the relationship observed is stronger (coefficient of 0.0434) compared to smaller positive (coefficient of 0.034) and negative values of excess investment (coefficients of 0.032 and 0.033). The results therefore provide further support for the free cash flow hypothesis, as they show that larger values of positive (negative) free cash flow relate to more positive (more negative) excess investment.

b) Rank Dummy Regression

The effect of free cash flow on overinvestment was also assessed via regression with dummy variables. For this test, the free cash flow variable was ranked from largest to smallest and divided into five sections (largest, second to largest, etc.). For each section a dummy variable was created that was assigned the value of 1 for each value in that particular section and 0 otherwise. The regression was then run with the free cash flow variable (calculated as before, but now not separated in values above and below zero) and the dummy variables. The results are included below.

Table 9) Regression Results – Rank Dummy Regression

Dependent Variable: UEINV
Method: Least Squares
Included observations: 87890 after adjustments
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.81E-05	0.000412	-0.238339	0.8116
FCF	0.038384	0.011326	3.389013	0.0007
FCF_D1	0.007619	0.001636	4.656288	0.0000
FCF_D2	0.002250	0.000740	3.038441	0.0024
FCF_D3	-0.002323	0.000744	-3.124076	0.0018
FCF_D4	-0.006599	0.001734	-3.806414	0.0001

R-squared	0.018969
Adjusted R-squared	0.018913
F-statistic	339.8568
Prob(F-statistic)	0.000000
Prob(Wald F-statistic)	0.000000

UEINV is the unexpected investment (Overinvestment). It is the residual from the expected investment estimation (Regression 1)
Free Cash flow (FCF) is the difference between cash flow from Assets in place (CFAIP) – the expected investment (i.e. the fitted value from the expected investment estimation, Regression 1)
CFAIP is the Cash flow from operating activities + Research & development expenses – Depreciation & amortization (as the proxy for maintenance investment) (the variable scaled by average assets)
FCF_D1 is a dummy variable that assumes the value of 1 for largest 20% of FCF values and 0 otherwise
FCF_D2 is a dummy variable that assumes the value of 1 for the second largest 20% of FCF values and 0 otherwise

FCF_D3 is a dummy variables that assumes the value of 1 for the second smallest 20% of FCF values and 0 otherwise
FCF_D4 is a dummy variable that assumes the value of 1 for the smallest 20% of FCF values and 0 otherwise.

The regression results above show that there is a significant positive relationship between free cash flow and unexpected investment. The positive coefficient means that free cash flow values above 0 correspond with unexpected investment above 0 (overinvestment) and vice versa. The significant coefficients for the FCF_D1 and FCF_D2 dummies show that for large, positive free cash flow values positive unexpected investment is larger compared to FCF values near zero (base group). Correspondingly, the significant coefficients for the FCF_D3 and FCF_D4 dummies suggest, that for large, negative free cash flow values negative unexpected investment is comparatively smaller (all else equal). Similar to the previous analyses, the regression results support the free cash flow hypothesis.

V.4) Determinants of Overinvestment (Regression 3)

Before running the models to assess potential determinants of free cash flow overinvestment, the data was analyzed and transformed where necessary. All variables included in the determinant model of unexpected investment (overinvestment) were examined for skewness and kurtosis. Except for debt, none of them were significantly skewed. Debt was transformed via natural logarithm to reduce skewness to an acceptable level. The covariance matrix displayed only low covariance values between the variables included in the model, suggesting that it is not present. The Preusch-Pagan test for the null hypothesis of homoscedasticity, however, had to be rejected. As previously, the models were therefore run with Huber-White resistant standard errors. The final sample analyzed included 1455 firm-year observations (1285 and 1063 respectively for the government intervention and market development model) over a total of 649 firms. A breakdown of the firms by country as well as the outputs of the analyses are included Appendix I).

V.4.1) Descriptive Statistics

The following table shows the descriptive statics for the variables included in the firm level model and the firm and institutional environment level model.

Table 10) Descriptive Statistics – Determinants of Overinvestment[9]

	UEINV (pos)	FCF	CGSCORE	CONCEN	DEBT	GOVEFF	GOVINT	MKTDEV
Mean	0.0457	0.0424	0.2402	0.5425	3.8883	0.6350	0.6095	0.4211
Std. Deviation	0.0501	0.0830	0.2080	0.2281	1.2530	0.1524	0.0823	0.1551
Maximum	0.3205	0.5288	0.9199	1.0000	7.5297	0.8942	0.7900	0.6884
Minimum	0.0004	-0.2751	0.0118	0.0000	-1.5850	0.2085	0.4980	0.1166

[9] The values displayed are for the common sample, the full descriptive statistics as well as the values for the individual samples are included in Appendix I.

The table above shows that the mean overinvestment (UEINV) for the subsample of firms with positive excess investment is 5%. This suggests that those firms – on average – spend about 5% of the asset base on investments with no marginal value.

The corporate governance scores suggest that the emerging market firms analyzed have a comparatively low(er) level of corporate governance. The mean corporate governance (CGSCORE) score reported is 24.00% (of 100%). Unfortunately, no other studies are identifiable which use the same variable (ASSET4 ESG data based scores) over a similar sample, to directly compare corporate governance levels. Nevertheless, extant research on corporate governance quality in emerging market firms in general shows higher corporate governance ratings. Klapper & Love (2004) for instance apply the Credit Lyonnais governance score (measuring over the categories transparency, accountability, independence, social awareness) and find a mean score of 54% (of 100%) for the firms analyzed. Brown and Caylor (2006) present an average corporate governance rating for their emerging market firm sample of 22.5 with a range of 13 to 38, suggesting a score of about 60%. They use the Institutional Shareholder Service's (ISS) corporate governance data which covers audit bylaws, executive compensation, and ownership.

The mean value for the ownership concentration variable (CONCEN) of 0.5425 proposes that the largest shareholders – on average - hold about 54% of all outstanding shares, and thus the controlling majority. This level of ownership concentration is higher than the one previously reported for developed market firms (U.S.), where block holders own about 39% of all shares (Holderness, 2006a). The value is also consistent with extant research which estimates ownership concentration in emerging market firms at about 50% of all outstanding shares (Claessens & Burcin Yurtugolu (2013).

In regards to institutional environment, it can be inferred that the average level of financial development of emerging market firms is well below that of developed markets (U.S. and U.K.) The mean market development score for the sample analyzed is 42%, while that for the U.S. and U.K. is at 89%[10]. Similarly, the average scores for government effectiveness are below those of developed markets. While the U.S. and U.K. rank in the 94th and 93rd percentile respectively, emerging market firms are at the 64th percentile. Average government intervention (as approximated by the Heritage Foundation Economic Freedom Index) ranks at 61% for emerging market firms, well below the ratings for the U.S. and U.K., which both are above at 75%. This means that government intervention is still comparatively higher in emerging market firms. Combined the institutional environment measurements suggest that the emerging market firm environment differs substantially from that of the developed market firms.

V.4.2) Regression results – Determinants of Overinvestment

The following section will summarize the results of the different estimation models to assess the potential determinants of overinvestment. All regressions were run with only main effects as well as with main and interaction effects. Models with interaction terms were run regularly as well as with centered variables where the mean of the variable is subtracted from each observation. This was done to ensure that collinearity does not affect the results of the model. In the initial phase, only firm level variables were included. In the subsequent phase, firm level variables as well as the respective institutional environment variable were included. The regression models are summarized below. For detailed outputs see Appendix J.

[10] Measured by the World Bank's Financial Market Development Index

Unexpected Investment (Overinvestment) Estimation Models

Regression Equations Summary:

Firm Level (Model 3a)

$$\textit{Unexpected Investment } (UEINV)_t = c + \alpha_1 FCF_t + \alpha_2 \textit{ Debt } (DEBT)_t +$$
$$\alpha_3 \textit{ Corporate Governance } (CGSCORE)_t + \alpha_4 \textit{ Ownership Concentration } (CONCEN)_t +$$
$$\alpha_5 (FCF*CGSCORE) + \alpha_6 (FCF*CONCEN)_t + \varepsilon$$

Only positive values of UEUNVt are included in the analysis

The regressions are first run without interaction effects

Firm Level and Institutional Environment (Models 3b)

$$\textit{Unexpected Investment } (UEINV)_t = c + \alpha_1 FCF_t + \alpha_2 \textit{ Debt } (DEBT)_t +$$
$$\alpha_3 \textit{ Corporate Governance } (CGSCORE)_t + \alpha_4 \textit{ Ownership Concentration } (CONCEN)_t +$$
$$\alpha_5 \textit{ Government Effectiveness } (GOVEFF)_t + \alpha_6 (FCF*GOVEFF)_t +$$
$$\alpha_7 (FCF*GOVEFF*CCGSCORE)_t + \alpha_8 (FCF*GOVEFF*CONCEN)_t + \varepsilon$$

$$\textit{Unexpected Investment } (UEINV)_t = c + \alpha_1 FCF_t + \alpha_2 \textit{ Debt } (DEBT)_t +$$
$$\alpha_3 \textit{ Corporate Governance } (CGSCORE)_t + \alpha_4 \textit{ Ownership Concentration } (CONCEN)_t +$$
$$\alpha_5 \textit{ Government Intervention } (GOVINT)_t + \alpha_6 (FCF*GOVINT)_t +$$
$$\alpha_7 (FCF*GOVINT*CCGSCORE)_t + \alpha_8 (FCF*GOVINT*CONCEN)_t + \varepsilon$$

$$\textit{Unexpected Investment } (UEINV)_t = c + \alpha_1 FCF_t + \alpha_2 \textit{ Debt } (DEBT)_t +$$
$$\alpha_3 \textit{ Corporate Governance } (CGSCORE)_t + \alpha_4 \textit{ Ownership Concentration } (CONCEN)_t +$$
$$\alpha_5 \textit{ Market Development } (MKTDEV)_t + \alpha_6 (FCF*MKTDEV)_t + \alpha_7 (FCF*MKTDEV*CCGSCORE)_t$$
$$+ \alpha_8 (FCF*MKTDEV*CONCEN)_t + \varepsilon$$

Only positive values of UEUNVt are included in the analysis

The regressions are first run without interaction effects

Table 11: Firm Level Models (3a)

Dependent Variable: UEINV(pos)

Variable	Expected Relationship	Model 3a.1 Firm Variables only	Model 3a.2 Firm Variables with Interactions centered	Model 3a.3 Firm Variables with Interactions centered
FCF	+	0.0843 (3.000)***	0.0802 (3.227)***	0.0804 (3.242)***
CGSCORE	-	-0.0099 (-1.779)**	-0.0017 (-0.285)	-0.0028 (-0.394)
CONCENTRATION	-/+	0.0041 (0.642)	0.0163 (2.333)**	0.0166 (2.40)**
DEBT/SIZE	-	0.03487 (3.438)***	0.03735 (3.644)***	0.03728 (3.631)***
AGE	-	-0.0144 (-3.253)***	-0.0147 (-3.359)***	-0.0149 (-3.383)***
INTERACTION TERMS		**included / significant**	**included / significant**	**included / significant**
FCF*CGSCORE	-	NO	-0.1483 (-2.324)**	-0.1471 (-2.303)**
FCF*CONCEN	-/+	NO	-0.2345 (-2.136)**	-0.2341 (-2.127)**
CGSCORE*CONCEN	-/+	NO	NO	-0.0087 (-0.424)
INTERCEPT		0.0356 (3.308)***	0.0344 (3.203)***	0.0341 (3.187)***
R-squared		**0.0238**	**0.033**	**0.032**

t-scores are reported in parenthesis below the coefficients
* significant at 10% level
** significant at 5% level
*** significant at 1% level

The above table shows a summary of the results of each of the firm level estimation models. The R-squared for the interaction model is higher (0.033) than the one for the model without the interaction terms (0.0238).

Because of detected multicollinearity between debt (DEBT) and size (SIZE), they were transformed into one variable by creating the ratio (Debt/Size) between the two. Furthermore, the interaction terms and the free cash flow variable (FCF) showed high levels of multicollinearity, they were therefore centered. The VIF factors subsequently reduced to below 2.5.

In all of the simple firm level models (models 3a) FCF is significantly (1% level) and positively related to overinvestment (UEINV(pos)), supporting the agency explanation of free cash flow overinvestment[11].

Additionally, the results propose that corporate governance as a combination of multiple measures can negatively affect overinvestment (Model 3a.1). The corporate governance score coefficient in model 3a.1 is significant and negative. This suggests that -all else equal - effective monitoring mechanisms can restrict overinvestment in emerging market firms.

Furthermore, when the corporate governance variable is interacted with the free cash flow (Model 3a.2), the interaction term is negative and significant. The significance remains when controlling for interaction between corporate governance and concentration (Model 3a.3). This proposes that the effect[12] of free cash flow on excess investment varies for different levels of corporate governance. The negative sign thereby signifies that corporate governance negatively affects the free cash flow relationship or, put differently, with increasing levels of corporate governance firms tend to overinvestment less of their free cash flow. This finding therefore

[11] In the second model the coefficient of free cash flow signifies a positive effect when corporate governance and concentration are 0.
[12] Effect in the empirical section of this dissertation is regarded as a statistical effect, not in the sense of a "cause and effect".

supports hypothesis 3) and is consistent with previous findings from Chen, Sun, & Xu (2016) and Francis, Hasan, Song, & Waisman (2013).

The coefficient for the ownership variable in the simple model is positive, however it is not significant. All else equal, ownership concentration therefore does not appear to have an effect on overinvestment (Model 3.a.1). However, the coefficient for the interaction term of concentration and free cash flow is negative and significant in the interaction model. This suggests that ownership concentration as a firm characteristic moderates the free cash flow overinvestment relationship. Similar to corporate governance, the negative sign suggests there is a limiting effect: With increasing levels of ownership concentration firms tend to overinvestment less of their free cash flow. This finding therefore supports hypothesis 4) as it proposes that concentration does (negatively) affect the free cash flow overinvestment relationship. This is consistent with the explanation that higher ownership concentration increases the ability of the owners to monitor and control the managers, thus reducing principle – agent conflicts (Konecný & Cástek, 2016), (Baghdasaryan & La Cour, 2013) (Short, 1994)).

Finally, contrary to prior research, debt (as the log of long term and short-term debt)[13] appears be positively related to overinvestment[14]. The coefficient of the variable is positive and significant. Consequently hypothesis 2) has to be rejected. The result therefore proposes that increasing levels of debt increase overinvestment. This finding is unexpected, it however provides some empirical support that developed market mechanisms to mend overinvestment might not have the same effect on emerging market firms. Possible explanations might be a lower development level of financial markets, a high overall growth (potential) for the firm (Lang, Ofek,

[13] In unreported test, the variable was calculated in several ways previously identified is literature (ratio of assets to equity, the ratio of short and long term debt to short and long term debt plus equity, ratio of debt to assets, long term debt only), the relationship did not change

[14] As debt increases the ratio of debt / size increases.

& Stulz, 1996), or higher levels of diversification of the firms (Aivazian, Ge. Qiu, 2005). The aforementioned circumstances have previously all been found to foster a positive relationship between debt and overinvestment, contrary to the monitoring effect that debt otherwise exerts on management (Jensen, 1986). This will further be discussed in the conclusion section (Section VI).

In the second phase of the analysis of the determinants of overinvestment, the model is expanded to institutional environment variables (models 3b). Summaries of all models run and their interpretation are provided below, the full analysis and outputs are included in Appendix J.

Table 12 Regression Results - Firm Level Variables & Government Effectiveness (Models 3b.1)

DEPENDENT VARIABLE: UEINV(pos)[15]

Variable	Expected Relation ship	Model 3b.1.1 Firm & Institutional variables only	Model 3b.1.2 Firm with interaction & Institutional Variable with interaction Centered	Model 3b.1.3 Firm & Institutional Variables with simple & triple Interactions Centered	Model 3b.1.4 Firm & Institutional Variables with simple & triple Interactions Centered
FCF	+	0.0839 (2.975)***	0.0783 (3.6145)***	0.0527 (2.279)**	0.0451 (2.010)**
CGSCORE	-	-0.0190 (-3.068)***	-0.0114 (-1.700)*	-0.0132 (-2.007)**	-0.0160 (-1.908)*
CONCENTRATION	-/+	-0.0079 (-1.117)	0.000 (0.472)	0.0000 (0.424)	0.0001 (0.017)
DEBT/SIZE	-	0.0344 (3.409)***	0.0367 (3.605)***	0.0356 (3.588)***	0.0368 (3.502)***
AGE	-	-0.0114 (-2.510)**	-0.0116 (-2.527)*	-0.0110 (-2.386)**	-0.0116 (-2.364)**
GOVEFF	-	-0.0502 (-4.036)***	-0.0511 (-3.628)***	-0.0537 (-3.883)***	-0.0494 (-3.502)***

[15] Intercepts are included but not reported

Table 12 continued

INTERACTION TERMS		included / significant	included / significant	included / significant	included / significant
FCF*CGSCORE	-	NO	-0.1298 (-2.045)**	-0.0015 (-1.741)*	-0.1388 (-1.667)*
FCF*CONCEN	-	NO	-0.0021 (-2.049)*	-0.0597 (-0.941)	-0.0386 (-0.471)
FCF*GOVEFF	-	NO	0.0615 (0.429)	0.0533 (0.386)	0.0472 (0.329)
FCF*GOVEFF*CGSCORE		NO	NO	-0.011 (-1.865)*	-1.481 (-3.009)***
FCF*GOVEFF*CONCEN		NO	NO	-0.004 (-0.957)	-0.649 (-0.964)
GOVEFF*CGSCORE		NO	NO	NO	0.0965 (1.352)
GOVEFF*CONCEN		NO	NO	NO	0.0397 (0.610)
R-squared		**0.0347**	**0.0424**	**0.0455**	**0.046**

t-scores are reported in parenthesis below coefficients
* significant at 10% level
** significant at 5% level
*** significant at 1% level

When government effectiveness (GOVEFF) is added to the model, the basic relationships and overall significances of the variables included do not change in comparison to the pure firm level estimation (see column Model 3b.1.1). As before, FCF and debt (divided by size) are significant and positively associated with overinvestment, while corporate governance, size, and age are negatively related. Governance effectiveness has a significant negative coefficient suggesting that (all else equal) a higher level (quality) of the combined effects of rule of law, political stability, regulatory quality, accountability and control of corruption, can negatively moderate firm overinvestment. The R-squared (0.035) increases compared to the firm variable only model (0.024).

Interaction effects are subsequently added to the model; initially simple interaction terms and then triple interaction terms (models 3.b.1.2 through 3.b.1.4).

While the simple interaction effect between free cash flow and government effectiveness is not significant, the triple interaction effect is significant and negative. The R-squared for the models are 0.0424 and 0.0455 respectively (both values are above the model without interaction effects 0.0347). The higher R-squared suggests a better fit of the model with interaction terms. This can be interpreted as follows: The relationship between overinvestment and free cash flow appears to not be different for different levels of government effectiveness (simple interaction). However, the interaction of corporate governance with the institutional environment (here government effectiveness), negatively moderates the free cash flow – overinvestment relationship. This suggests that while an overall better quality of regulatory and legislative environment does not directly moderate the free cash flow overinvestment relationship, there appears to be an indirect effect via its interaction with corporate governance. The interaction term thereby suggests that they are complements, i.e. the effect of corporate governance in moderating the free cash flow

overinvestment relationship is larger in countries with stronger legal and regulatory institutional environment (and vice versa). Following Francis, Hasan, Song, & Waisman (2013) the sensitivity of the free cash flow overinvestment relationship can be roughly approximated as follows:

[+0.0527-0.0015*CGSCORE-0.011*CGSCORE*GOVEFF]

For the mean value of CGSCORE (0.2668) and GOVEFF (0.6368), this represents an average sensitivity of [0.0527 – 0.0015 *0.2668 – 0.011*0.2668*0.6368] = 0.05. This means that for firms in an environment with low levels of government effectiveness (0.2019), a one standard deviation increase in the corporate governance score (0.235) results in a decrease in the free cash flow overinvestment sensitivity of (-0.0015*0.235-0.011*0.235*0.2019) = |-0.00087| or 1.7% (|-0.00087|/0.05) relative to the aforementioned average sensitivity, all else equal. For firms acting in high level government effectiveness environments, that change is (-0.0015*0.235-0.011*0.235*0.971) = |-0.0029| or 5.4% (|-0.0029|/0.05), relative to the average sensitivity. Corporate governance thus has a higher moderating effect (relative to the average) in environment with higher government effectiveness.

The findings therefore provide support for hypothesis 5a): There is in an indirect effect (via interaction with corporate governance) of the institutional environment on the free cash flow overinvestment relationship.

Table 13) Regression Results - Firm Level Variables & Government Intervention (Models 3b.2)

DEPENDENT VARIABLE:
UEINV(pos)

Variable	Expected Relationship	Model 3b.2.1 Firm & Institutional variables only	Model 3b.2.2 Firm with interaction & Institutional Variable with interaction Centered	Model 3b.2.3 Firm & Institutional Variables with simple & triple Interactions Centered	Model 3b.2.4 Firm & Institutional Variables with simple & triple Interactions Centered
FCF	+	0.0550 (2.422)**	0.0580 (2.331)**	0.0483 (1.819)*	0.0451 (1.696)*
CGSCORE	-	-0.0164 (-1.887)*	-0.0133 (-1.442)	-0.0147 (-1.610)	-0.0164 (-1.655)*
CONCENTRATION	-/+	0.0021 (0.249)	0.0001 (0.798)	0.0001 (0.805)	0.0032 (0.325)
DEBT/SIZE	-	0.0474 (3.798)***	0.0484 (-3.848)***	0.0486 (3.848)***	0.0489 (3.864)***
AGE	-	-0.0136 (-2.181)**	-0.0135 (-2.412)**	-0.0135 (-2.075)**	-0.0140 (-2.180)**
GOVINT	-	-0.0653 (-2.619)***	-0.0589 (-2.072)**	-0.060 (-2.115)**	-0.0514 (-1.834)*

Table 13 continued

INTERACTION TERMS		included / significant	included / significant	included / significant	included / significant
FCF*CGSCORE	-	NO	-0.0573 (-0.647)	0.0092 (0.087)	0.0271 (0.257)
FCF*CONCEN	-	NO	-0.0011 (-1.183)	-0.0005 (-0.525)	-0.0407 (-0.395)
FCF*GOVINT	-	NO	-0.1579 (-0.654)	-0.1915 (-0.755)	-0.2398 (-0.919)
FCF*GOVINT*CGSCORE		NO	NO	-1.0901 (-1.049)	-1.334 (-1.164)
FCF*GOVINT*CONCEN		NO	NO	-0.0120 (-1.256)	-1.908 (-1.180)
GOVEFF*CGSCORE		NO	NO	NO	0.0539 (0.530)
GOVEFF*CONCEN		NO	NO	NO	0.1418 (1.482)
R-squared		**0.0245**	**0.0229**	**0.0227**	**0.022**

t-scores are reported in parenthesis
* significant at 10% level
** significant at 5% level
*** significant at 1% level

Similar to government effectiveness, the inclusion of government interaction does not change the basic relationships and significances of the variables included in the firm level model. FCF and debt (divided by size) are significantly positive related to overinvestment, while corporate governance, size, and age are negatively related. Government intervention has a significant negative coefficient, suggesting that the combined effects of higher level (quality) of property rights, government integrity, judicial effectiveness, fiscal health, business freedom, labor freedom, monetary freedom, trade freedom, investment freedom, and financial freedom (i.e. less intervention), can negatively moderate firm overinvestment (all else equal). Similarly, a lower level thereof is positively related to overinvestment. The R-squared of the model (0.025) only slightly increases compared to the firm level model (0.024). As before, two different sets of interaction effects are added to the model subsequently: a simple interaction term between the free cash flow variable and government effectiveness (3.b.2.2) and a triple interaction effect between free cash flow, government intervention, and corporate governance and concentration (3.b.2.3 and 3.b.2.4). Neither the simple nor the triple interaction effects are significant however. This suggests that while government intervention is a fundamental factor related to overinvestment, there is no effect via free cash flow. Hypothesis 5b) suggesting there is a moderating effect of government intervention on the free cash flow overinvestment relationship can therefore not be confirmed.

Table 14) Regression Results - Firm Level Variables & Market Development (Models 3b.3)

DEPENDENT VARIABLE: UEINV(pos)

Variable	Expected Relationship	Model 3b.3.1 Firm & Institutional variables only	Model 3b.3.2 Firm with interaction & Institutional Variable with interaction Centered	Model 3b.3.3 Firm & Institutional Variables with simple & triple Interactions Centered	Model 3b.3.4 Firm & Institutional Variables with simple & triple Interactions Centered
FCF	+	0.1001 (3.049)***	0.0690 (3.088)***	0.0779 (3.137)***	0.0782 (3.132)***
CGSCORE	-	-0.0081 (-1.093)	-0.0017 (-0.218)	-0.0019 (-0.195)	-0.0016 (-0.146)
CONCENTRATION	-/+	0.0085 (1.194)	0.0002 (2.833)**	0.0208 (2.443)	0.0196 (2.182)**
DEBT/SIZE	-	0.0433 (3.605)***	0.0441 (3.763)***	0.0423 (3.527)***	0.0425 (3.357)***
AGE	-	-0.0184 (-3.640)**	-0.0170 (-3.464)***	-0.0170 (-3.206)***	-0.0170 (-3.199)***
MKTDEV	-	-0.0062 (-0.917)	-0.0119 (-1.681)*	-0.0118 (-1.310)	-0.0103 (-0.920)

Table 14 continued

INTERACTION TERMS		included / significant	included / significant	included / significant	included / significant
FCF*CGSCORE	-	NO	-0.1416 (-1.485)	-0.0970 (-0.805)	-0.0992 (0.809)
FCF*CONCEN	-	NO	-0.0026 (-2.282)**	-0.0198 (-2.254)**	-0.0192 (-2.146)**
FCF*MKTDEV	-	NO	0.1532 (1.0730)	0.0236 (0.201)	0.0187 (0.155)
FCF*MKTDEV*CGSCORE		NO	NO	-0.4139 (-0.809)	-0.3832 (-0.681)
FCF*MKTDEV*CONCEN		NO	NO	-0.0061 (-1.733)*	-0.0067 (-1.746)*
GOVEFF*CGSCORE		NO	NO	NO	-0.0053 (-0.108)
GOVEFF*CONCEN		NO	NO	NO	0.0171 (0.409)
R-squared		**0.029**	**0.039**	**0.041**	**0.039**

t-scores are reported in parenthesis
* significant at 10% level
** significant at 5% level
*** significant at 1% level

When the market development variable is added to the model, the direction and overall significances for free cash flow, debt (ratio of debt / size) and age do not change. Concentration remains with a positive but not significant coefficient. Corporate governance is no longer significant in the model (compared to the firm level only model). Market development itself is also not significant. This suggests that for the sample analyzed there is no attestable relationship between the market development level and overinvestment (all else equal). The R-squared of the model (0.029) increases compared to the firm level model (0.024). Similarly, the interaction term between free cash flow and market development is insignificant. This proposes that the free cash flow overinvestment relationship is not different for different levels of market development overall. However, the interaction of ownership concentration with the institutional environment (here market development), negatively moderates the free cash flow – overinvestment relationship. This suggests that while overall better developed financial markets do not directly moderate the free cash flow overinvestment, there appears to be an indirect effect via their interaction with ownership concentration.

The sensitivity of the free cash flow overinvestment relationship can be roughly estimated as follows (Francis, Hasan, Song, & Waisman, 2013):

[+0.0779-0.01983*CONCEN+0.0061*CONCEN*MKTDEV].

For the mean value of CONCEN (0.5662) and MKTDEV (0.4041), this represents an average sensitivity of [0.0779 – 0.01983 *0.5662 + 0.0061*0.5362*0.4040] = 0.068 (all else equal). This also means that for firms in an environment with low levels of market development (0.1166), a one standard deviation increase in ownership concentration (0.229) results in a change in the free cash flow overinvestment sensitivity of (-0.01983*0.229+0.00606*0.229*0.1166) = |-0.0044| or 6.4% (|-0.0044|/0.068) relative to the aforementioned average sensitivity. For firms

acting in highly developed financial markets (0.854), that change is (-0.01983*0.229+0.00606*0.229*0.854) = -0.0034 or 4.9% (-0.0034/-0.068). This suggests that the effect is higher in low level market development environments and lower in high level market development environment. Ownership concentration thus seems to be more effective in lower developed markets, and can therefore act as a substitute for institutional weaknesses.

Hence, the findings provide support for hypothesis 5c): There appears to be an indirect moderating effect of market development (via ownership concentration) on free cash flow overinvestment.

VI Discussion

Section V) presented the empirical results of the study. The following part will evaluate and discuss the findings in light of the previously provided theoretical background.

VI.1) Overinvestment of Free Cash Flow

The combined results from regression 1 and regression 2 suggest that overinvestment of free cash flow is present in emerging market firms and that overinvestment is most prevalent when free cash flow is available. The findings also support the notion that firms tend to overinvestment more with increasing levels of free cash flow. Combined, these results appear to be consistent with Jensen's (1986) overinvestment hypothesis, suggesting that agency conflicts between stakeholders of the firm can lead to investment without any marginal value.

Furthermore, the results confirm previous empirical findings on this topic by Richardon (2006) for the U.S. and Chen, Sun & Xu (2016), Cai (2013) and Chunyan & Yuehu (2010) for

China. The sample for this study is comprised of firms of all 25[16] countries currently included in the MSCI emerging market index over a 15-year time frame. Consequently, this analysis extends previous research on emerging market firms, and relieves some regional, time, or methodological restrictions. It further signifies that agency conflict driven overinvestment is a phenomenon that persists over time and regardless of whether the firm is located in an emerging market or developed market. As such it has the potential to negatively affect firm performance and value in emerging market firms (Jensen, 1986; Jensen & Meckling, 1976; Titman, Wei, & Xie, 2004; Fairfield, Whisenant, & Yohn, 2004; Richardson, & Sloan, 2008).

The findings are also interesting to consider in light of the magnitude of overinvestment. The results of this study suggest that the degree to which firms overinvest appears to be lower in the emerging market firms analyzed, compared to their developed market counterparts. This is consistent with the results from Chen, Sun & Xu (2016) and suggests that emerging market firms – on average - invest about 1.2% of their asset base in excess investments. Their developed market counterparts overinvest – on average - about 1.5% of their assets (Richardson, 2006). While the comparison certainly has to be considered in light of the period of analysis, it still can be noted that overall the magnitude of excess investment appears to be less in developing market firms.

The results further show that firms with free cash flow – on average – retain 34% thereof in the form of cash and short- term investments. While a detailed theoretical debate over the reasons for cash holdings is not part of this study, it is important to note that there are two diverging explanations provided in literature as to why firms retain cash. One argument is that firms hold short term financial assets as a method of reduction of uncertainty stemming from the volatility of (future) availability of cash flow (Morris, 1982; Opler, Pinkowitz, & Willamson, 1999; Campello,

[16] Saudi Arabia is currently (2018) still a standalone country, however in June of 2018 it was announced that the country would join the MSCI emerging market classification in 2019. It was therefore included in the study.

2003). Cash is therefore regarded as the means to protect against (future) shocks. On the contrary, agency conflict rooted research suggests that cash is held for status and interest protection. Retained, available cash is thereby viewed as a particularly suitable vehicle because it is not subject to any restrictions or supervisory activity otherwise placed on the funds obtained through the capital markets (Jensen, 1986). Empirical research in this regard suggests that corporate cash holdings in (Chinese) emerging market firms are more driven by agency conflicts than by protection against future uncertainties (Liu, 2008; Wu, Zhan, & Zhang, 2007).

Regardless of the theoretical explanation, it is important to note that in both cases cash is not returned to equity holders but kept within the company. This study suggests that the extent of cash stockpiling appears to be comparatively less for emerging market firms. The firms analyzed retain less (not more) of the available cash in relation to their assets compared to developed market firms (34% vs. 44% observed by Richardson, 2006). This is in line with findings from previous studies by e.g. Ramirez & Tadesse (2009), who show that all emerging market firms analyzed – except China - have lower mean cash holdings in relation to their firm assets than developed market firms in the sample.

VI.2) Determinants of Overinvestment

The results of the regressions in phase three suggest that there are several variables that can affect overinvestment. They will be discussed below.

VI.2.1) Corporate Governance

The analysis on the firm level showed that corporate governance has a negative effect on overinvestment. Furthermore, it also negatively moderates the free cash flow overinvestment

relationship. Collectively, the results from the firm level model propose that corporate governance can in fact increase investment efficiency in emerging market firms. This finding is interesting for several reasons:

First, it shows that effective corporate governance can moderate free cash flow overinvestment, even in firms whose institutional environments are less developed.

Additionally, it proposes that the combined effects of "traditional" corporate governance mechanisms (board function and structure, executive compensation, and shareholder protection), known to be effective monitoring and control tools for developed market firms, similarly seem to curb overinvestment in emerging market firms. This is an important outcome and confirms previous results from Francis, Hasan, Song, & Waisman, (2013) and Cheung, Stouraitis, & Tan, (2011). Taken together, the findings provide strong evidence that firms in developing markets can improve their investment efficiency and ultimately value when effective systems for aligning interests among stakeholders of the firm are in place.

Furthermore, the results also give empirical support for the moderating effect of corporate governance from an agency theory perspective. Since the cross term between corporate governance and free cash flow has a negative (significant) coefficient, it can be inferred that free cash flow overinvestment is lower for higher levels of corporate governance. This suggests that corporate governance is in fact able to moderate the agency conflict driven free cash flow overinvestment. Higher levels of corporate governance reduce the ability of managers to use available cash (free cash flow) for investment without marginal value, thereby providing support for previous findings on moderators of the agency conflict motivated free cash flow overinvestment (Richardson, 2006, Chen, Sun, & Xu, 2016; Francis, Hasan, Song, & Waisman, 2013; Cheung, Stouraitis, & Tan, 2011).

Finally, the results establish the effectiveness of corporate governance as a construct of multiple, interacting mechanisms. Researchers have previously argued that capturing the interrelations between the individual mechanisms is important to fully understand the effects of corporate governance on firm behavior (Schnyder, 2012). The outcomes of this study provide some empirical support in this regard. They show that the combined workings of multiple corporate governance measures (board structure and compensation policy, as well as board functions and shareholders rights) can moderate the free cash flow overinvestment relationship. The findings might therefore also help to explain previously diverging results for the effect of corporate governance, particularly for studies that approximated corporate governance via a select few numbers of variables (Cai, 2013; Chen, Sun, & Xu, 2016).

VI.2.2) Ownership Concentration

As previously described, literature has provided theoretical and empirical support for a positive as well as a negative effect of ownership concentration on free cash flow overinvestment. (Claessens, Djankov, Fan, & Lang, 2002; Konecný & Cástek, 2016; Short, 1994).

The empirical results from this study appear to support the latter. While ownership concentration has no effect in the main effects model, the interaction term between concentration and free cash flow is significant and negative. This proposes that for higher levels of ownership concentration, the free cash flow-overinvestment relationship is negatively moderated, i.e. excess investment is less strongly related to free cash flow. The negative moderating effect of ownership concentration further suggests that free cash flow overinvestment in emerging market firms might primarily be driven by principal – agent conflicts and not principal – principal conflict, as the relationship would have to be positive to support the latter.

This finding is contrary to results reported by several emerging market researchers, who previously attested a positive relationship between ownership and excess investment (see Filatotchev, Kapelyushnikov, Dyomina, & Aukutsionek, 2001a). It is however in line with research presented by Tayem (2015) who attests a positive relationship between investment efficiency and ownership concentration.

A possible explanation for the divergence of the results might be rooted in the measurement of ownership concentration. Previous studies frequently associate ownership concentration with large government holdings (He & Kyaw, 2018). Concentration for this study is measured as the ratio of closely held shares to total shares outstanding, regardless of the ownership type.

The outcomes from this study also propose that ownership concentration can have different effects on free cash flow-overinvestment in developed versus emerging market firms. In an encompassing study over multiple countries (U.S., Canada, Australia, and the majority of continental Europe) Gugler, Mueller, & Yurtoglu (2008) show that with higher (insider) ownership concentration in firms, the investment performance becomes negative. They separately measure entrenchment effect (of owner-managers) and wealth effect[17] and find that with rising insider ownership the entrenchment effect supersedes the wealth effect in the U.S. and other English speaking countries (U.K., Australia).

VI.2.3) Debt

In the statistical regression models for the firm level only as well as for the combined firm and institutional level, debt is always observed to have a significant positive effect on overinvestment. This finding is not expected, as debt has previously been theorized and empirically

[17] This effect is based on the notion, that managers who hold shares of their company are more prone to act in the "best interest" of the company as they identify as shareholders when they strive for wealth maximization. This will align the interests between insiders and outsiders.

supported to curb overinvestment (Jensen, 1986; D'Mello & Miranda, 2010; Fernandez, 2011; Chen, Sun, & Xu, 2016). From an agency perspective debt – without retention – reduces the free cash available to managers (and controlling shareholders) and should thus reduce excess investment spending.

The observed inconsistency with extant research can have several reasons: While previous literature has approximated debt via several variables, it is important to note that Jensen (1986) specifically theorizes debt without retention – i.e. the introduction of debt into the capital structure – as a moderator of free cash flow overinvestment. This implicitly assumes that the firm does not retain the funds raised by the debt issuance but instead returns them to shareholders. From this perspective it can be argued that the observed effect could be a result of the approximation of the variable via the short term and long-term debt in the capital structure. This measure is unable to a) distinguish between bonds and other forms of debt and b) does not capture the use of funds obtained (i.e. whether they were returned to shareholders).

Nevertheless, the agency-based argument of debt as a moderator has previously been extended to other forms of debt. This is because creditors (or any type of debt capital provider) can be assumed to exert some monitoring mechanisms, because of increasing bankruptcy costs with rising levels of debt (Jensen, 1986). Moreover, extant studies which approximated debt in a similar way have found a negative relationship. The following section will therefore discuss factors which can potentially influence the effect of debt on overinvestment.

Lang, Ofek, & Stulz, Leverage (1996) find that the negative debt – investment relationship only exists for low growth firms, i.e. for firms where the market either does not recognize the (true) growth potential or where there is none, but not for high growth firms or firms in high growth industries. Consequently, for this study, the observed positive relationship between debt and

overinvestment could be a result of the (assumed) growth performance of the firms. As previously noted, companies headquartered in emerging markets grow about twice as much as their developed market counterparts (Atsmon, Kloss, & Smit, 2011). If firms have (or are assumed to have) growth potential, or operate in high growth areas, creditors might be prone to provide funds, without undertaking an in depth due diligence on whether or not the capital is extended for projects with marginal value. This phenomenon might be aggravated by less functioning capital markets and inherent information asymmetries that provide weaker opportunities for creditors to carry out a full analysis (see section II.3.4.c).

Another explanation for the positive relationship might be the level of debt. Previous research on peripheral European countries (Spain, Italy, Greece, Portugal, and Slovenia) has found that debt reduces investment only above a certain level of leverage. The firms analyzed only experienced negative effects on investment when the debt to asset level increased above 80%. Below that threshold, the effect of debt on investment was dependent on firm characteristic as well as the macroeconomic environment (Gebauer, Setzer, & Westphal, 2017). Consequently, it can be theorized that firms with a debt to asset ratio below a certain threshold do not experience a dampening effect of debt on (over)investment. The mean of debt to assets in the firm sample analyzed is 0.51 or 51%, which is below the threshold identified by Gebauer, Setzer, & Westphal, (2017).

In summary, the findings and explanations suggest that the agency-based explanations of the negative effect of debt on overinvestment of free cash flow might not be invariant to the specific firm characteristics and the environment it operates in.

VI.2.4) Institutional Environment

A) Government effectiveness

The significance of government effectiveness in the simple (main effects) model suggests an inverse relationship between the quality of the legal and judicial system and excess investment. This indicates that firms operating in an environment which promotes a sound rule of law tend to overinvest less. As previously discussed, this could be a result of the increased monitoring and controlling abilities of (minority) shareholders via the promotion of property rights and contract enforcement. In such an environment stakeholders' interests are aligned better (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000; Koh, 2003). The findings are therefore consistent with previous findings from Goodluck Marco, Li, Chen, & Cui (2014) which attest a negative relationship between overinvestment and regulatory environment for Chinese firms.

Furthermore, the significant negative interaction of government effectiveness with corporate governance in moderating the free cash flow-overinvestment relationship proposes that firm characteristics (or behavior) and institutional environment are not independent from one another. Firms that operate in a weak institutional environment (here measured as government effectiveness) experience a weaker moderating effect of corporate governance on free cash flow-overinvestment compared to firms operating in a stronger institutional environment. This means that the institutional environment complements the firm level corporate governance in its effect on free cash flow-overinvestment. When firms operate in an environment that has effective policy making and enforcement systems in place, the effect of corporate governance on agency conflict based free cash flow-overinvestment is stronger as compared to a weaker policy environment. As previously argued, this could be because the better regulations make it easier for (minority) shareholders to challenge management decisions and to ensure that boards carry out their functions

correctly, but also because managers (majority shareholders) are more likely to face consequences if their behavior does not align with value creation (Jensen M., 1993; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000).

It is important to note that the findings are different compared to those of Francis, Hasan, Song, & Waisman (2013) who attest a substituting effect for internal and external governance mechanisms, suggesting firms can benefit from strong corporate governance in weak institutional environments.

B) Government Intervention

The outcomes of the analyses suggest that (all else equal) there appears to be a positive relationship between government intervention and excess investment. This indicates that government activities to promote certain industries or technologies can lead to excess investment. This finding is consistent with previous studies carried out on Chinese firms (Zhang & Yang, 2008; Goodluck Marco, Li, Chen, & Cui, 2014). It also shows that a general relationship between excess investment and government intervention exists in other emerging markets. For the firm sample analyzed there is, however, no evidence of a specific moderating role from an agency perspective (i.e. via the interaction with free cash flow and firm characteristics). This could be a result of the sample of the firms analyzed and / or measurement of government intervention, but it might also stem from the "means" of how government involvement can lead to overinvestment.

Many of the previous studies look at government intervention in China, which has a planned economy with market elements, often referred to as a mixed economy (Chow, 2011). This sample is different, as China is only one of 25 countries analyzed. Although it has to be acknowledged that government intervention exists in all emerging market firms, the level of intervention might

be different. Many of the countries included in this study are qualified as a market or capitalistic economy, rather than centralized planning economy[18]. Additionally, it has previously been found that while overall state ownership (as a form of government intervention) has been reduced over the last two decades, it remains strong – particularly in utility, transportation, and infrastructure. Furthermore, even non-state-owned Chinese firms are still heavily influenced by the government (Allen, Qian, & Qian, 2005). Moreover, when looking at the economic freedom index (the measurement of government involvement for this study), China has an average rating of 52% which is below the average reported for the entire sample (57%). The comparatively higher score could signal less involvement and therefore no significant effect via interaction with free cash flow or other firm characteristics.

In addition, the measurement itself could have an influence on the result. Extant studies frequently measure government ownership via firm state -ownership or connectedness of the manager to the government (see e.g. Chen, Sun, & Tang, 2011; Hao, Lu, 2018), while this study uses the economic freedom index.

Finally, the observed result could be due the way government intervention is related to excess investment. The results of this study are consistent with Chen, Sun & Tang (2011), Hao & Lu (2018), in the sense that there is a main effects relationship between government intervention and investment efficiency while similarly attesting a main effect relationship with available cash flow. This study has similar findings. It does, however, not show any significant interaction effect with cash flow or other firm characteristics. This could be an indication that government interaction does not necessarily lead to overinvestment via the use of free cash flow, but rather to overinvestment stemming from e.g. government loans or otherwise extended credit. This is be

[18] https://www.cia.gov/library/publications/the-world-factbook/fields/2116.html

consistent with the results from Deng, l., Jiang, P., Li, S., & Liao, M. (2017), who find a strong relationship between excess investment and government intervention in Chinese firms via an economic stimulus packet during and after the financial crises. Their research also shows that once the economic stimulus package (in the form of tax incentives and low interest rate loans) was introduced, firms relied less on internal cash flow to finance (excess) investment but rather on bank loans. Consequently, it can be argued that the overall availability of external funds to finance investment could be a reason as to why there is a main -effects relationship between investment and government intervention but not via interaction of determinant variables.

C) Market Development

The empirical findings propose that although no direct relationship between market development and excess investment can be observed, there appears to be an effect via its interaction with ownership concentration. The results suggest that for lower levels of market development, the effects of ownership concentration on free cash flow-overinvestment are stronger compared to higher development levels. In other words, the ability of concentrated owners to monitor manager behavior, has a larger inhibiting effect in less developed market environments. These findings are consistent with a substitution effect of ownership concentration. The outcomes therefore provide empirical support for the argument made by from La Porta, Lopez-de-Silanes, Schleifer, & Vishny (1999b) and Steier (2009) that ownership concentration can - to a certain extend - replace shortfalls in a firm's institutional environment. Concentrated owners are better able to monitor and control management behavior. This is particular true when the firms are family owned or have only one or two large owners who are also involved in management. In this scenario managers are under close supervision and have consequently less opportunities to extract

resources for personal benefit. As described in section II.2) Claessens, Djankov & Lang, 2000 find that the aforementioned type of ownership structure is very prevalent in East Asian as well as Latin American countries, which could explain the empirical findings. The results further support previous findings from Francis, Hasan, Song, & Waisman (2013) which suggest a substitution effect between firm level corporate governance and country level governance (as approximated via legal environment and effective implementation of law).

In summary, the results of the combined analysis of the firm and institutional variables as well as their interactions suggest that there is in fact a moderating effect of some institutional variables on firm behavior. Combined, the findings therefore provide some empirical support that agency theory is not invariant to the institutional environment the firm operates in. As such the findings provide an empirical basis for the theoretical arguments previously brought forth by Zalina & Yusof (2016) and Douma, George, & Kabir (2006), suggesting that agency theory should be viewed in light of the institutional context the firms are embedded in to better understand firm behavior. This further supports the notion from Bowe, Filatotchev, & Marshall (2010) that the integration of institutional theory and agency theory could result in a better understanding of firm behavior. The interaction between the specific environment emerging market firms operate and its behavior could thus be better captured. Finally, there appears some empirical justification that the acknowledged interaction between institutional environment and firm behavior in management and strategy (Peng, Wang, & Jiang, 2007; Peng M. , 2006) should be extended to the firm's financial actions as well.

VII Limitations, Contributions & Directions for Future Research

VII.1) Limitations

As with any research, the results of this study have to be interpreted with regards to the sample analyzed. While the sample size for the free cash flow hypothesis test is (to the best of the author's knowledge) the largest currently extant in literature, the sample size for the determinants of overinvestment is not. This is partly rooted in the limited availability of corporate governance score data for emerging market firms as well as the methodology, which requires the exclusion of negative residuals in the third phase of the analysis. Consequently, in order to be considered in the sample, the firm had to simultaneously have a firm year observation where the residual from the first regression was positive and a corporate governance score (and ownership concentration measure) available. Accordingly, the results for the final phase of the analysis were derived from a much smaller sample. When making inferences about emerging market firms as a whole this has to be considered.

Additionally, the timeframe of this analysis is different from many of the extant studies. This has to be kept in mind as time specific effects (such the external shock of the 2008 financial crisis) as well as the period of analysis can introduce bias in regards to the comparability of results. Most of the existing research on this topic has focused on sample periods in the early 2000s, while this study encompasses a timeframe from 2000 to 2015. This study therefore includes a time period of external shock (2008) while the ones from the early 2000s do not.

Some of the observed differences to extant studies can thus, in part, result from the difference in the period of analysis. This is particular important when comparing the outcomes from this research to those of developed market firms. The largest study for developed markets (Richardson, 2006), which was most often used to compare the results from this study against,

covers a time period from 1988 to 2002. Since firm behavior and external environment can change over time the comparison of results has to be considered in light of the different analysis period.

Finally, despite the fact that all firms are classified as emerging markets by the MSCI, it has to be acknowledged that there are still differences in the development level of the respective markets. As section II.3.4 shows there continue to be considerable differences between the emerging markets in regards to the development level of their institutional environment. Furthermore, the size of the individual markets and consequently number of firms included in the sample are not equal, particularly in regards to the determinants of overinvestment (the third phase of the analysis). Here South Africa, India, Korea, and Taiwan make up about 52% of the sample. Consequently, the results from this study might not be representative of the entire emerging market population.

VII.2) Contributions

This study contributes to the current literature by complementing and expanding extant research on free cash flow-overinvestment in emerging market firms. It addresses previous limitations by providing an encompassing evaluation of the free cash flow-overinvestment relationship for a large sample of emerging market firms; thereby employing a methodology developed by Richardson (2006) to particularly evaluate overinvestment of free cash flow as an agency problem, as opposed to simply testing for a relationship between cash flow and investment.

Moreover, in regards to factors potentially influencing overinvestment of free cash flow, existing literature is completement in the following ways:

1) The study applies a consistent approach over all emerging market firms from MSCI emerging market countries focused specifically on overinvestment (and factors potentially

affecting it). This allows inferences about a larger group of firms and helps to explain and evaluate extant – in part – contradicting results.

2) The research also provides empirical data to evaluate the "call" for an extension of current theory. It has previously been argued that agency theory needs to be extended as it cannot fully provide an understanding of observed phenomena. This is because firm behavior cannot be disconnected from its context, particularly its institutional environment. Consequently, institutional theory and agency theory might have to be integrated (Zalina & Yusof, 2016; Bowe, Filatotchev, & Marshall, 2010). The study specifically addresses this by establishing that there is in fact a moderating effect of institutional environment via corporate governance and ownership concentration on free cash flow overinvestment and its determinants attestable. The results are therefore (with the mentioned limitations) supportive of the argument that agency theory is not invariant to the institutional setting of the specific issue investigated.

At the company level the findings show firm owners (equity holders) that overinvestment exists and thus has the potential to affect the firm value and the ability to obtain external financing. Through the confirmation (corporate governance and ownership concentration) and rejection (debt) of certain moderators of the free cash flow-overinvestment relationship shareholders can also gain a better understanding on how to align their interests with those of managers and majority shareholders to secure efficient investment allocation. This, to a degree, also justifies often costly monitoring activities to reduce overinvestment.

Finally, from an investor's perspective, the results help to evaluate investment in emerging markets. They show that overinvestment is present in emerging market firms and thus has the

potential to affect shareholder value. This can be helpful for the investor's risk assessment and for fund allocation decisions.

VII.3) Directions for Future Research

This study has revealed that free cash flow-overinvestment is a phenomenon that seems to persist over time and across developed and emerging market firms. Furthermore, it showed that there are certain moderators of this relationship. Hence, the results provide a useful basis for future research. Possible directions of further analysis are outlined below:

A) Increased sample size to assess moderators

As previously described (see section VII.2), the second part of the analysis, assessing the moderators of the free cash flow - excess investment relationship, is based on a comparatively smaller sample because of limited data availability. Forthcoming research could therefore extend the results presented here when additional composite corporate governance scores and ownership concentration measures become available for emerging market firms. The amount of data generated for the Asset4 ESG dataset for instance has been steadily increasing since the early 2000s and currently covers more than 7000 firms, with about 25% located in emerging markets[19].

Furthermore, the classification of a market as emerging followed the MSCI classification. This was done in accordance with extant research and to ensure the highest possible level of comparability. Nevertheless, there are other, widely accepted, classifications of markets from e.g. the International Monetary Fund (IMF)[20] and the World Bank[21], which do not completely mirror

[19] https://www.refinitiv.com/content/dam/gl/en/documents/methodology/esg-scores-methodology.pdf
[20] https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/groups.htm
[21] The World Bank does not classify as emerging (or not emerging) but rather by its gross national income per capita. https://datahelpdesk.worldbank.org/knowledgebase/articles/114958-what-are-emerging-markets

the one from the MSCI. Future research could therefore extend the analysis to other emerging or developing markets. In addition, little attention has been paid to other African, Eastern European, Asian, and Middle Eastern countries, which have not yet been classified as emerging (titled as frontier markets by MSCI for instance[22]). Several of these countries have experienced continued growth over the past decade (Worldbank, 2018). Consequently, research on those markets could provide further useful insights on the relationship between free cash flow and overinvestment in a different institutional environment setting.

For this study corporate governance was approximated via a composite score over four main pillar categories (board function, board structure, executive compensation, and shareholder rights). Other studies have measured corporate governance over slightly different dimensions. It would therefore be interesting to see if the results remain the same when different types of composite measures are applied. Literature has, for instance, previously used the Credit Lyonnais Securities Asia (CLSA) Corporate Governance Scores and Standard & Poor's Transparency Ranking (see e.g. Cheung, Stouraitis, & Tan, 2011) or the ISS Governance QualityScore to approximate firm governance. The former measures governance over seven categories: financial discipline, financial transparency, board independence, board accountability, responsibility & measures in case of mismanagement, treatment of minority shareholders, and social awareness, the latter over four: board structure, compensation/renumeration, shareholder rights & takeover defenses, and audit & risk oversight. Despite availability limitations in regards to time and region, these measurements are interesting because they assess corporate governance over somewhat different or broader categories. This allows for an extended test of how mechanisms can affect free

[22] https://www.msci.com/market-classification

cash flow overinvestment, but also a further confirmation of the moderating effect of corporate governance on excess investment.

Moreover, this analysis was limited to the formal institutional environment (i.e. government effectiveness, government intervention, and market development). Firms however also operate in a socio-cultural environment that consists of informal norms. Developing and emerging countries have previously been found to differ in their informal environment (Kogut & Singh, 1998). Emerging research (Estrin & Prevezer, 2010) suggests that there is an interaction between formal and informal institutions and that informal institutions are essential in creating firm characteristics, such as effective corporate governance mechanisms. It has therefore been argued that informal institutions play a particularly important role in emerging markets, where the development level of formal governance is still comparatively low and laws are not well enforced. In such an environment they have a special function as either a catalyst or inhibitor of formal institutions (Estrin & Prevezer, 2010). Furthermore, as argued in the theoretical section, there is a central role of formal institutions in strategy (Peng, 2006). The same argument made previously can therefore be extended to the informal firm environment as well. Consequently, there appears to be some theoretical support for a direct or indirect effect of the social or cultural environment on firm investment efficiency. More research is however necessary to assess the specific informal factors as well as the potential paths of influence.

Finally, the effects of excess investment on firm valuation provide room for additional study. While several studies on developed market firms suggest a negative relationship between volume of investment (triggered via available free cash flow) and value, as well as investment opportunity and value (see e.g. Dechow, Richardson, & Sloan, 2008; Titman, Wei, & Xie, 2004; Del Brio, De Miguel, & Pindado, 2003), research on emerging market firms is however still in its

initial stages. Results from e.g. Cheung, Stouraitis, & Tan (2011) indicate that there is a general relationship between firm investment and firm value via interaction with corporate governance for Asian emerging market firms. More examination is however necessary to specifically determine the effect of excess investment on firm market valuation in emerging markets.

In this regard it would also be interesting to compare the valuation effects of developed and emerging market firms; particularly because the results of this study propose that emerging market firms, compared to developed market firms (Richardson, 2006), tend to overinvest less of their free cash flow and consequently their asset base. The question that therefore arises is whether and how this affects firm valuation in emerging market firms compared to developed market firms.

VII.4) Conclusion

This study examined the investment behavior of a group of 25 emerging market firms over a period of 15 years. The empirical results indicate a significant relationship between free cash flow and excess investment in the sample firms analyzed, thus providing empirical support for Jensen's (1986) free cash flow hypothesis. The outcomes confirm previous findings for firms in developed as well as in select emerging markets and consequently suggest that overinvestment of free cash flow is a phenomenon that persists over time and regardless of the firm's environment.

The analysis of the moderators of the free cash flow overinvestment relationship revealed that corporate governance as well as ownership concentration can be effective ways of reducing excess investment. Furthermore, the study specifically included an evaluation of the interaction effects of those firm characteristics with free cash flow overinvestment. This allowed for a better test of the agency-based explanation of their moderating effects. The attested significant

interactions therefore suggest that the two measures are particularly suited to affect free cash flow driven overinvestment.

Contrary to previous studies, debt as a "traditional" way to mend overinvestment could not be confirmed. The observed, positive relationship between debt and excess investment, could be a result of the firm environment (high growth environment) or of the overall level of debt. The results therefore provide some empirical support that some of the "traditional" ways to mend overinvestment might not similarly work in emerging market firms.

Finally, the results also suggest that the institutional environment can influence a firm's free cash flow - overinvestment behavior via its firm characteristics. The findings show that the effect of corporate governance on excess investment is lower in weaker legal environments (and vice versa) and that concentrated ownership has a stronger negative effect on overinvestment in lower developed financial markets as opposed to higher developed markets. Collectively, these results propose that a firm's financial behavior is related to its environment and that agency theory might not be invariant to the specific institutional setting.

Bibliography

Aguilera, R., Kabbach, L., & Crespi-Cladera, R. (2012). Corporate ownership and uncertainty: Evidence from Emerging Markets. *University of Chicago, Working Paper*.

Aivazian, V., Ge, Y., & Qiu, J. (2005). The impact of leverage on firms investment. *Journal of Corporate Finance*, 27-291.

Allen, E., Qian, J., Qian, M. (2005). Law, Finance, and Economic Growth in China. J*ournal of Financial Economics 77*. 57-116.

Almeida, H., & Campello, M. (2007). Financial Constraints, asset tangibility, and corproate investment. *Review of Financial Studies*, 1429-1460.

Al-Najjar, B. (2009). The association between dividend payout and outside directorships. *Journal of Applied Accounting Research*, 4-19.

Alonso, P., Iturriaga, F., & Rodriguez Sanz, J. (2005). Financial decisions and growth opportunities: a Spanish firms' panel data analysis. *Applied Financial Economics*, 391-407.

Ang, A., & Zhang, X. (2011). Price-Earnings Ratio: Growth and Discount Rates. *Columbia University Working Paper*.

Aquilera, R., Filatotchev, I., Gospel, H., & Jackson, G. (2008). An organizational approach to comparative corporate governance: Costs, contingencies, and complementarities. *Organization Science*, 475-492.

Arslan, O., & Karan, M. (2007). Does free cash flow anomaly exist in an emerging market? *International Research Journal of Finance and Economics*, 163-171.

Arslan, O., Florackis, C., & Ozkan, A. (2006). The role of cash holdings in reducing investment-cash flow sensitivity: Evidence from a financial crisis period in an emerging market. *Emerging Markets Review, 7*, 320-338.

Atsmon, Y., Kloss, M., & Smit, S. (2011, May). *McKinsey Quarterly*. Retrieved from McKinsey: https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/parsing-the-growth-advantage-of-emerging-market-companies

Azoury, N., & Bouri, E. (2015). Principal–principal conflicts in Lebanese unlisted family firms. *Journal of Management and Governance*, 461-493.

Baghdasaryan, D., & La Cour, L. (2013). Competition, Ownership and Productivity. A panel Analysis of Czech Firms. *Journal of Economics and Business*, 86-100.

Baik, B., Cho, K., Choi, W., & Kang, J. (2015). The role of institutional environments in Cross-Border Mergers: A perspective from Bidder's Earning management behavior. *Management International Review*, 615-645.

Balli, H., & Sorensen, B. (2013). Interaction effects in econometrics. *Empirical Economics*, 583-603.

Bao, S., & Lewellyn, K. (2017). Ownership structure and earnings management in emerging markets - An institutionalized agency perspective. *International Business Review*, 27-46.

Bates, T. (2005). Asset sales, investment opportunities, and the use of proceeds. *Journal of Finance*, 105-135.

Bebchuk, L., Kraakman, R., & Triantis, G. (1999). Stock pyramids, cross-ownership, and dual class equity: The creation of agency costs of separating control from cash flow rights. *Working Paper 6951, National Bureau of Economic Research*.

Becht, M., Bolton, P., & Röell, A. (2001). Corporate governance and control. In *Handbook of Economics and Finance, vol. 1,* (pp. 3-109). Amsterdam: Elsevier.

Benaventa, J., Johnson, C., & Morande, F. (2003). Debt Composition and balance sheet effects of exchange rate depreciation: a firm level analysis for Chile. *Emerging Markets Review*, 397-416.

Berger, P., & Ofek, E. (1995). Diversification's effect on firm value. *Journal of Financial Economics*, 39-65.

Berger, P., Ofek, E., & Yermack, D. (1997b). Managerial entrenchment and capital structure decisions. *Journal of Finance*, 1411-1438.

Bergstresser, D. (2006). Discussion of "Overinvestment of Free Cash Flow". *Review of Accounting Studies*, 191-202.

Bhagat, S., & Bolton, B. (2008). Corporate Governance and Firm Performance. *Journal of Corporate Finance, 14*, 257-273.

Billett, M., Garfinkel, J., & Jiang, Y. (2011). The influence of governance on investment: Evidence from hazard model. *Journal of Financial Economics, 102*, 643-670.

Black, B., Gledson de Carvalho, A., & Gorga, É. (2012). What matters and for which firms for corporate governance in emerging markets? Evidence from Brazil (and other BRIK countries). *Journal of Corporate Finance*, 934-952.

Bond, S., Klemm, A., Newton-Smith, R., Syed, M., & Vlieghe, G. (2004). The roles of expected profitability, Tobin's Q and cash flow in econometric models of company investment. *Bank of England - Working paper series, Working paper no. 222*.

Boone, A., Field, L., Karpoff, J., & Raheja, C. (2007). The determinants of corporate board size and composition, an empirical analysis. *Journal of Finance and Economics*, 66-101.

Boot, A., Greenbaum, S., & Thakor, A. (1993). Reputation and discretion in financial contracting. *American Economic Review*, 1165-1183.

Bowe, M., Filatotchev, I., & Marshall, A. (2010). Integrating contemporary finance and international business research. *International Business Review, 19*, 435-445.

Breusch, T., & Pagan, A. (1979). A Simple Test for Heteroskedasticity and Random Coefficient Variation. *Econometrica*, 1287–1294

Butler, H. (1988). Corporation-Specific Anti-Takeover Statutes and the Market for Corporate Charters . *Wisconsin Law Review*, 365-383.

Cambini, C., & Rondi, L. (2010). Incentive Regulation and Investment: Evidence from European Energy Utilities. *Journal of Regulatory Economics*, 1-26.

Campello, M. (2003). Capital Structure and Product Markets Interactions: Evidence. *Journal of Financial Economics,*, 353-378.

Carrasco, O., Johnson, C., & Nunez, H. (2005). Determinants of Firms' Investment: A Panel Data Analysis for Chile. *Estudios de Administracion, 12*(1), 87–122.

Cai, J. (2013). Does Corporate Governance Reduce the Overinvestment of Free Cash Flow? Empirical Evidence from China. *Journal of Finance and Investment Analysis*, 97-126.

Chang, E., Wong, S. (2002) Corporate Governance, Political Interference, and Corporate Performance of China's Listed Companies. *Working Paper No. 1037*. Hongkong Institute of Economics and Business Strategy.

Chen, S., Sun, Z., Tang, S., Wu, D. (2011). Government intervention and investment efficiency: Evidence from China. *Journal of Corporate Finance 17*. 259-271.

Chen, X., Sun, Y., & Xu, X. (2016). Free cash flow, over-investment and corporate governance in China. *Pacific-Basin Finance Journal, 37*, 1-128.

Cheung, Y.-L., Stouraitis, A., & Tan, W. (2011). Corporate Governance, Investment, and Firm Valuation in Asian Emerging Markets. *Journal of International Financial Management & Accounting* , 246-273.
Chow, G. C. (2011). Economic Planning in China. *CEPS Working Paper Series No. 219*. June 2011
Chunyan, C., & Yuehu, L. (2010). Over-Investment of Free Cash Flow - An Empirical Evidence from Chinese Listed Companies. *2010 International Conference on Management and Service Science (MASS 2010)*, (pp. 1-4). Wuhan, China.
Claessens, S., & Burcin Yurtugolu, B. (2013). Corporate Governance in Emerging Markets: A Survey. *Emerging Markets Review*, 1-33.
Claessens, S., Djankov, S., & Lang, L. (2000). The spearation of ownership and control in East Asian corporations. *Journal of Financial Economis*, 81-112.
Claessens, S., Djankov, S., Fan, J., & Lang, L. (2002). Disentangling the incentive and entrechment of large shareholdings . *Journal of Finance*, 2741-2772.
Claus, J., & Thomas, J. (2001). Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets. *Journal of Finance*, 1629-1666.
Damodaran, A. (2017a). Estimating Risk free Rates. *Stern School of Business*.
Damodaran, A. (2017b, May). Local Currency Bond Rates - January 2017 - podcast. New York City, NY, US.
Damodaran, A. (2018, January 24). *January 2018 Data Update: The Currency Conundrum.* Retrieved from Harvest Exchange: https://finance.yahoo.com/news/january-2018-data-4-currency-110700288.html
Dechow, P., Hutton, A., & R., S. (1999). An empirical assessment of the residual income valuation model . *Journal of Accounting Economics*, 1-34.
Dechow, P., Richardson, S., & Sloan, R. (2008). The persistence and pricing of the cash component of earnings. *Journal of Accounting Research, 7*, 209–233.
Degryse, H., & de Jong, A. (2006). Investment and internal finance: Asymmetric information or managerial discretion? *International Journal of Industrial Organization, 26*, 125-147.
Del Brio, E., De Miguel, A., Pindado, J. (2003). Investment and firm value an analysis using panel data. *Applied Financial Economics. 913-923.*
Demirguc-Kunt, A., & Levine, R. (1996). Stock Market Development and Financial Intermediaries: Stylized Facts. *World Bank Economic Review*, 291-321.
Deng, l., Jiang, P., Li, S., & Liao, M. (2017). Government intervention and firm investment. *Journal of Corporate Finance*, in press.
Dharwadakar, R., George, G., & Brandes, P. (2000). Privatization in emerging economies: An agency theory perspective. *Academy of Management Review*, 650-669.
Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International Corporate Governance and Corporate Cash. *Journal of Financial and Quantitative Analysis*, 111–133.
Djankov, S., & Murrell, P. (2002). Enterprise resturcturing in transition: a quantitative survey. *Journal of Economic Literature*, 739-792.
Djankov, S., Hart, O., McLeish, C., & Shleifer, A. (2008). Debt enforcement around the world. *Journal of Political Economy*, 1105-1149.
D'Mello, R., & Miranda, M. (2010). Long-term debt and overinvestment agency problem. *Journal of Banking & Finance, 34*, 324-335.

Doidge, C., Karolyi, A., & Stulz, R. (2009). Has New York become less competitive in global markets? Evaluating foreign listing choices over time. *Journal of Financial Economics*, 253-277.

Douma, S., George, R., & Kabir, R. (2006). Foreign and domestic ownership, business groups, and firm performance: Evidence from a large emerging market. *Strategic Management Journal*, 637 - 657.

Drobetz, W., Schillhofer, A., Zimmermann, H. (2004). Corporate Governance and Expected Stock Returns: Evidence from Germany. *European Financial Management*, 267-293

Du, J.; Li, W; Lin, B; Wang, Y. (2018). Government integrity and corporate investment efficiency. *China Journal of Accounting Research,* 213-232

Easterbrook, F. (1984). Two Agency-Cost Explanantions of Dividends. *The American Economic Review, 74*(4), 650-659.

Fairfield, P., Whisenant, J., & Yohn, T. (2004). Accrued earnings and growth :implications for future profitability and marke tmispricing. *Accounting & Review*, 353-371.

Fatma, B., & Chichti, J. (2011). Interactions between Free Cash Flow, Debt Policy, and Structure of Governance: Three Stage Least Sqaure Simultaneous Model Approach. *Journal of Management Research, 3*(2), 1-34.

Fazzari, S., Hubbard, R., & Peterson, B. (1988). Financing constraints and corporate investment . *Brookings Paper on Economic Activity 1*, 141-195.

Fenn, G., & Liang, N. (2001). Corporate payout policy and managerial stock incentives. *Journal of Financial Economics*, 45-72.

Fernandez, V. (2011). The Driving Factors of Firm Investment: Latin American Evidence. *Emerging Markets Finance & Trade, 47*(5), 4–26.

Filatotchev, I., Wright, M., Uhlenbruck, K., Tihanyi, L., & Hoskisson, R. (2003). Governance, organizational capabilities, and restructuring in transition economies. *Journal of World Business*, 331-347.

Francis, B., Hasan, I., Song, L., & Waisman, M. (2013). Corporate Governance and Investment-Cash Flow Sensitivity: Evidence from Emerging Markets. *Emerging Markets Review*, 57-71.

Fresard, L., & Salva, C. (2010). The value of excess cash and corporate governance: Evidence from US cross-listings. *Journal of Financial Economics*, 359-384.

García-Meca, E., & Sánchez-Ballesta, J. (2009). Corporate Governance and Earnings Management: A meta-analysis. *Corproate Governance: An international review*, 594-610.

Garrido, E., Gomez, J., Maicas, J., & Orcos, A. (2013). The institution based view of strategy: How to measure it. *Business Research Quarterly*, 82-101.

Gebauer, S., Setzer, R., & Westphal, A. (2017). Corporate debt and investment: a firm level analysis for stressed european countries. *European Central Bank, Working Paper Series*, No 2101.

Gomez-Mejia, L. R., & Wiseman, R. M. (1997). Reframing Executive Compensations: An Assessment and Outlook. *Journal of Management*, 291-374.

Goodluck Marco, K., Li, Y., Chen, K., & Cui, Y. (2014). Institutional Environment and Overinvestment in Emerging Markets-Empirical Evidence from Chinese Listed Companies . *Research Journal of Finance and Accounting* , 88-96.

Greenwood, J., & Jovanovic, B. (1990). Financial Development, Growth, and the Distribution of Income . *Journal of Political Economy*, 1076-1101.

Gugler, K., Mueller, D., & Yurtoglu, B. (2008). Insider Ownership, ownership concentration and investment performance: An international comparison. *Journal of Corporate Finance*, 688-705.

Hadlock, C. (1988). Ownership, liquidity, and investment. *RAND Journal of Finance*, 487-508.

Hague, F., Arun, T., Kirkpatrick, C. (2008). Corporate Governance and Capital Markets: A Conceptual Framework. *Semanticscholar*. Vol 5, issue 2

Hao, Y., Lu, (2018). The Impact of Government Intervention on Corporate Investment Allocations and Efficiency: Evidence from China. Financial Management. 388+

Harford, J., Mansi, S., & Maxwell, W. (2008). Corporate governance and a firm's cash holdings. *Journal of Financial Economics, 87*, 535-555.

Hayes, A. C. (2007). Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behaviour Research Methods, 39*, 709-722.

He, W., & Kyaw, N. (2018). Ownership structure and investment decisions of Chinese SOEs. *Research in International Business and Finance*, 48-57.

Holderness, C. (2006a). A Contrarian View of Ownership Concentration in the United States and Around the World. *AFA 2006 Boston Meetings Paper*, 51 pages.

Holopainen, H. (2006). *Essays on corporate governance, stakeholders, and restructuring.* Helsinki, Finland: University of Helsinki.

Hu, J., & Moa, N. (2015). An Empirical Research on the Effect of Debt Source Heterogeneity on Enterprise Behavior of Investment Distortion. *Journal of Management Science,*, 47-57.

Hubbard, R. (1998). Capital-market imperfections and investment. *Journal of economic literature*, 193-225.

Hubbard, R. (1998). Capital-market imperfections and investment. *Journal of Economic Literature*, 193-225.

IMF. (2017). *World Economic Outlook.*

Jaggi, B., & Leung, S. (2007). Impact of Familty dominance on earnings management by audit committees: Evidence from Hong Kong. *Journal of International Accounting*, 27-50.

Jameson, M., & Puthenpurackal, J. (2014). Controlling Shareholders, board structure, and firm performance: Evidence from India. *Journal of Corporate Finace, 27*, 1-20.

Jensen, M. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review, 76*(2), 323-329.

Jensen, M. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, 831-881.

Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behvior, agency costs, and ownership structure. *Journal of Financial Economics*, 305-360.

Jose, M., Nichols, L., & Stevens, J. (1986). Contributions of Diversification, Promotion, and R&D to the Value of Multiproduct Firms: A Tobin's q approach. *Financial Management*, 33-42.

Kaplan, S., & Zingales, L. (1997). Do investment-cash flow sensistivities provide useful measures of financing constraint? *Quarterly Journal of Economics*, 169-215.

Kaplan, S., & Zingales, L. (2000). Investment- cash flow sensitivities are not valid measures of financing constraints. *Quarterly Journal of Economics*, 707-712.

Kaplan, S., Martel, F., & Stromberg, P. (2003). How do legal differences and learning affect financial contracts? *SSRN Eletronic Journal*.

Khanna, T., & Palepu, K. (1997). Why focused strategies may be wrong for emerging markets. *Harvard Business Review*, 41-51.
Khanna, T., & Palepu, K. (2000). The future of business groups in emerging markets: long-run evidence from Chile. *Academy of Management Journal*, 268-285.
Kim, B., & Maddala, G. (1992). Estimation and Specification Analysis of Models of Dividend Behavior BAsed on Censored Panel Data. *Empirical Economics, 17*, 111-124.
Klapper, L., & Love, I. (2004). Corporate governance, investor protection, and. *Journal of Corporate Finance*, 703-729.
Kogut, B., & Singh, H. (1998). The Effect of National Culture on the Choice of Entry Mode. *Journal of International Business Studies*, 411-432.
Koh, P. (2003). On the association between institutional ownership and aggressive corporate earnings management in Australia. *The British Accounting Review*, 105-128.
Konecný, L., & Cástek, O. (2016). The effect of ownership structure on corporate financial performance in the czech republic 1. *Ekonomicky Casopis*, 477-498.
La Porta, R., Lopez-De-Silanes, F., & Schleifer, A. (1999). Coporate ownership around the world. *Journal of Finance*, 471-517.
La Porta, R., Lopez-de-Silanes, F., Schleifer, A., & Vishny, R. (1999a). The quality of government. *Journal of Law, Economics, and Organization*, 113-1155.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and Finance. *Journal of Political Economy, 106*, 1113-1155.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999b). Agency Problems and Dividend Policies Around the World.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2002). Investor protection and corporate valuation. *Journal of Finance*, 1147-1170.
Lamont, O. (2000). Investment plans and stock returns. *Journal of Finance*, 2719-2748.
Lang, L., & Stulz, R. (1994). Tobin's Q, Corporate Diversification, and Firm Performance. *Journal of Political Economy*, 1248 - 1280.
Lang, L., Ofek, E., & Stulz, R. (1996). Leverage, Investment, and Firm Growth. *Journal of Financial Economics, 3-29*.
Lei, Z., Mingchao, C., Weing, Y., & Yu, J. (2014). Managerial private benefits and overinvestment. *Emerging Markets Finance and Trade*, 126-161.
Levine, R., & Zervos, S. (1996). Stock market development and long-run growth. *World Bank Policy Research Paper 1582*.
Li, K. (2012). Institutional Environments Effect on the Investment Efficiency of Listed Companies. In H. Tang, *Technology for Education and Learning* (pp. 7-12). Berlin, Germany: Springer Verlag.
Lin, C., & Wong, S. (2013). Government intervention and firm investment: Evidence from international micro-data. *Journal of International Money and Finance*, 637-653.
Lins, K. (2003). Equity Ownership and Firm Value in Emerging Markets. *The Journal of Financial and Quantitative Analysis, 38*(1), 159-184.
Liu, H., & Ouang, L. (2007). A study on the relationship between managerial private benefits and overinvestment. *Systems Engineering - Theory and Practice*, 44-58.
Love, I. (2003). Financial Development and Financing Constraints: Evidence from the structural investment model. *Review of Financial Studies, 16*(3), 756-791.

Luo, Q.-A., & Ye, H.-F. (2015). Corportate Governance, Institutional Environment, Behavioral Corproate Finance, and Inefficient Investment. *Journal of Service Science and Management*, 452-459.
Maher, M., Andersson, T. (1999) Corporate Governance: Effects on Firm Performance and Economic Growth, OECD
Malhotra, N., Hall, J., Shaw, M., & Oppenheim, P. (2006). *Marketing Research: An applied orientation.* Frenchs Forest, N.S.W.: Pearson Education, Australia.
Meyers, S. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics*, 147-175.
Mitton, T. (2002). A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis. *Journal of Financial Economics*, 215-241.
Modigliani, F., & Miller, M. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review, 48*(3), 261-297.
Morck, R., Wolfenzen, D., & Yeung, B. (2005). Corporate governance, economic entrenchment, and growth. *Journal of Economic Literature*, 655-720.
MSCI. (2018). *MSCI Index Classification*. (MSCI Inc.) Retrieved March 2018, from MSCI : https://www.msci.com/market-classification
Morris, J. (1982). The Role of Cash Balances in Firm Valuation. *Journal of Financial*, 535-545.
Munisi, G., Hermes, N., & Randoy, T. (2014). Corporate boards and ownership structure. *International Business Review, 23*, 785-796.
Myers, S., & Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 187-221.
Ohlson, J. (1995). Earnings, book values, and dividends in security valuation. *Contemporary Accounting research*, 661-687.
Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The Determinants and Implications of Corporate. *Journal of Economics*, 3-46.
Pawlina, G., & Renneboog, L. (2005). Is Investment-Cash Flow Sensitivity Caused by Agency Costs or Asymmetric Information? Evidence from UK. *European Financial Management, 11*(4), 483-513.
Peng, M. (2006). *Global Strategy.* Cincinnati: South-Western Thomson.
Peng, M., & Heath, P. (1996). The growth of the firm in planned economies in transition: Institutions, organizations, and strategic choice. *Academy of Management Review*, 492-528.
Peng, M., Wang, D., & Jiang, Y. (2007). An institution-based view of international business strategy: A focus on emerging economies. *Journal of International Business Studies*.
Pindado, J., & de la Torre, C. (2009). Effect of ownership structure on underinvestment and overinvestment: empirical evidence from Spain. *Accounting and Finance*, 363-383.
Ramirez, A., & Tadesse, S. (2009). Corporate cash holdings, uncertainty avoidance, and the multinationality. *International Business Review*, 387-403.
Render, A., Gaeremynck, A., & Secru, P. (2010). Corporate Governance Ratings and Comany Performance: A Cross-European Study. *Corporate Governance: An International Review, 18*(2), 87-106.
Richardson, S. (2006). Over-investment of free cash flow. *Review of Accounting Studies, 11*(2/3), 159-189.
Santiago-Castro, M., & Brown, C. (2007). Ownership structure and minority rights: A Latin American view. *Journal of Economics and Business*, 430-442.

Saunders, M., & Lewis, P. (2012). *Doing Research in Business Management.* Edinburgh Gate: Pearson.
Schnyder, G. (2012). Measuring Corporate Governance: Lessons from the Bundles Approach. *Working Paper Series - Working Paper No. 438 University of Cambridge*.
Scott, W. (2014). *Institutions and Organization - Ideas, Interest, and Identities.* Thousand Oaks, CA: Sage.
Shapiro, A. (2005). *Capital Budgeting and Investment Analysis.* Pearson.
Shleifer, A., & Vishny, R. (1994). Politicians and Firms. *The quarterly journal of economics*, 995-1025.
Shleifer, A., & Vishny, R. (1997). A survey of corporate governance. *Journal of Finance, 52*, 737-783.
Short, L. (1994). Ownership, control, financial structure and the performance of firms. *Journal of Economic Surveys*, 203-249.
Steier, L. (2009). Familial Capitalism in global institutional contexts: Implications for corporate governance and entrepreneurship in East Asia. *Asia Pacific Journal of Management* , 245-263.
Stein, J. (2003). Agency, Information and Corporate Investment. In M. H. G.M. Constantinides, *Handbook of the Economics of Finance: Corporate Finance* (pp. 111–165). Amsterdam: Elsevier.
Stulz, R. (1988). Managerial control of voting rights - Financing policies and the market for corporate control. *Journal of Financial Economics, 20*, 25-54.
Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economix*, 3-27.
Taghavi, M., Khodaei Valahzaghard, M., & Amirjahadi, N. (2014). An investigation on the effect of the corporation governance structure and free cash flow on over-investment. *Management Science Letters*, pp. 567-572.
Tayem, G. (2015). Ownership concentration and investment sensitivity to market valuation. *Journal of Ownership & Control*, 1228-1240.
The Heritage Foundation. (2018). *Economic Freedom Inxed*. Retrieved from https://www.heritage.org/index/about
The World Bank Group. (2018). *Africa's Pulse, 17,*
Titman, S., Wei, K., & Xie, F. (2004). Capital investments and stock returns. *Journal of Financial and Quantitative Analysis, 39*, 677-700.
Wei, K., & Zhang, Y. (2008). Ownership structure, cash flow, and capital investment: Evidence from East asian economies before the financial crisis. *Journal of Corporate Finance 2008*, 118-132.
Wright, M., Filatotchev, I., Hoskisson, R., & Peng, M. (2005). Strategy research in emerging economies: challenging the conventional wisdom. *Journal of Management Studies* , 1-33.
Wu, X., Zhan, Z., & Zhang, Y. (2007). An Empirical Study on the Motivation tion of Cash Holdings by Listed Companies in China, Based on the Perspective of Capital Market Information Asymmetry. *Journal of the Shanxi University of Finance and Economics*, 88-93.
Wurgler, J. (2000). Financial Markets and Allocation of Capital. *Journal of Financial Economics*, 187-214.
Xiao, F. (2009). Does the stock market affect investment by Chinese firms? Some new evidence. *International review of applied economics*, 197-213.

Yang, H., & Hu, Y. (2007). Institutional Environment and Overinvestment of Free Cash Flow. *Management World 09*, 99-106.
Yeung, H. (2006). Change and continuity in South East Asian Chines business. *Asia Pacific Journal of Management*, 229-254.
Young, M., Peng, M., Ahlstrom, D., Bruton, G., & Jiang, Y. (2008). Corporate Governance in Emerging Economies: A review of the Principal - Principal Perspective. *Journal of Management Studies*, 196-220.
Yuan, Y., & Dai, X. (2016). Managerial power, debts with different sources and overinvestment: Evidence from Chinese listed enterprises. *13th International Conference on Service Systems and Service Management.* Kunming, China, China: IEEE.
Zagorchev, A. (2018). The Impact of Government Intervention on Corporate Governance: Evidence from the EU. *ResearchGate*
Zalina, N., & Yusof, M. (2016). Context Matters: A Critique of Agency Theory in Corporate Governance Research in Emerging Countries. *International Journal of Economics and Financial Issues* , 154-158.
Zhang, D., & Yang, S. Y. (2008). The largest shareholders equity, governance mechanisms, and corporate over-investment. *Modern Economic Science*, 2-9.
Zhao, Y., Chen, K., & Yao, L. (2009). Effect of takeover pretection on earnings overstatements: evidence from restating firms. *Review of Quanitative Finance and Accounting* , 347-369.

Appendix A)

List of countries and their respective region - according to the MSCI emerging market index[23] - included in the analysis:

Number	Country	Region
1	Brazil	Americas
2	Chile	
3	Colombia	
4	Mexico	
5	Peru	
6	Czech Rebulic	Europe, Middle East & Africa
7	Egypt	
8	Greece	
9	Hungary	
10	Poland	
11	Qatar	
12	Russia	
13	South Africa	
14	Saudi Arabia	
15	Turkey	
16	United Arab Emirates	
17	China	Asia
18	India	
19	Indonesia	
20	Korea	
21	Malaysia	
22	Pakistan	
23	Philippines	
24	Taiwan	
25	Thailand	

[23] https://www.msci.com/market-classification (accessed June 13th, 2018). Saudi Arabia is included because it was categorized as an emerging market at the time of the study and will be included in the index starting 2019

Appendix B)

Overview of the regression variables and their respective sources

Variables	INPUT	SOURCE
Investment New	CAPEX, Acquisitions, Research & Development, (Gain / Loss from) Sale of Property, Plant, & Equiptment, Depreciation & Amortization	Compustat & Capital IQ
Growth Opportunities	Value of the Firm / Stock Price, where Firm Value inputs are Risk Free Rate, Book value of Equity, Operating Income, and Dividends	Thomson Reuters Worldscope & CIA Factbook
Leverage	Book Value of Short and Long Term Debt, Book Value of Equity	Compustat & Capital IQ
Stock Return	Change in Stock Value (Year to Year)	Thomson Reuters Worldscope
Cash	Cash and Short Term Securities	Compustat & Capital IQ
Firm size	Book Value of Total Assets	Compustat & Capital IQ
Firm age	Years since inception	Bureau van Dijk OSIRIS
Industry Indicator	Industry Code (NAICS)	Compustat & Capital IQ
Change in Debt	Long term Debt reduction minus, Long term Debt issuance Changes in Current Debt (Cash Flow Statement)	Compustat & Capital IQ
Change in Equity	Purchase of Common and Preferred Stock, Cash Dividends, Sale of Common and Preferred Stock (Cash Flow Statement)	Compustat & Capital IQ
Change in Financial Assets	Cash & Cash Equivalents, Short term Investment Changes (Cash Flow Statement)	Compustat & Capital IQ
Investment	Increase in Investments, Sale of Investments (Cash Flow Statement)	Compustat & Capital IQ
Other Uses / Sources of Cash	Exchange Rate Effect, Other Investing and Financing Activities (Cash Flow Statement)	Compustat & Capital IQ
Year Indicator	Years of Reporting	Compustat & Capital IQ
Free Cash flow	Cash Flow from Operations, Maintenance Investments, Research & Development	Compustat & Capital IQ
Debt	Short and Long Term Debt	Compustat & Capital IQ
Operating Income	Operating Income after Depreciation	Compustat & Capital IQ
Dividends	Dividends (Balance Sheet)	Compustat & Capital IQ
Risk Free Rate (U.S.)	US Treasury Bond (10years)	Investing.com
Expected Inflation (U.S. and Emerging Countries)	Change in Consumer Price Index	CIA World Factbook
Ownership Concentration	Percentage of closely held shares relative to total shares outstanding	Thomson Reuters Worldscope
Corporate Governance	Overall Corporate Governance score (it is the composite score of the subcategory scores for board structure and compensation policy, as well as board functions and shareholders rights)	Asset 4 ESG dataset (Thomson Reuters)
Government Intervention	Economic Freedom Index	Heritage Foundation
Government Effectiveness	Governance Indicator	World Bank
Market Development	Market Development Index	World Bank

Appendix C)

Regression output for persistence parameter estimation

Regression Statistics	
Multiple R	0.403878154
R Square	0.163117563
Adjusted R Square	0.163112916
Standard Error	8933482.299
Observations	180059

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.80084E+18	2.8E+18	35095.08	0
Residual	180057	1.43698E+19	7.98E+13		
Total	180058	1.71707E+19			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-71693.96037	21055.09646	-3.40506	0.000662	-112961.4685	-30426.45221	-112961.4685	-30426.45221
X Variable 1	0.305635831	0.001631478	187.3368	0	0.302438172	0.30883349	0.302438172	0.30883349

This regression was run in excel.

The output shows a coefficient (and thus persistence parameter) of .305 with a p-value of 0.00, making it significant at the 1% level.

Appendix D)

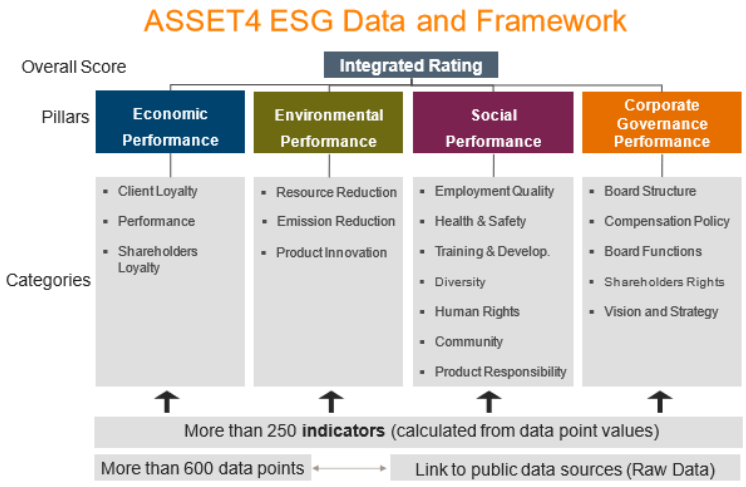


Figure 2: Overview of ASSET4 ESG data and framework. Over 250 indicators are rolled up into the category scores, which are subcomponents of the four pillars. The overall company score, called the *Integrated Rating*, is derived from a roughly equal-weighted blend of the four pillar scores.

Source: https://www.thomsonreuters.com/content/dam/openweb/documents/pdf/tr-com-financial/report/starmine-quant-research-note-on-asset4-data.pdf

Appendix E)

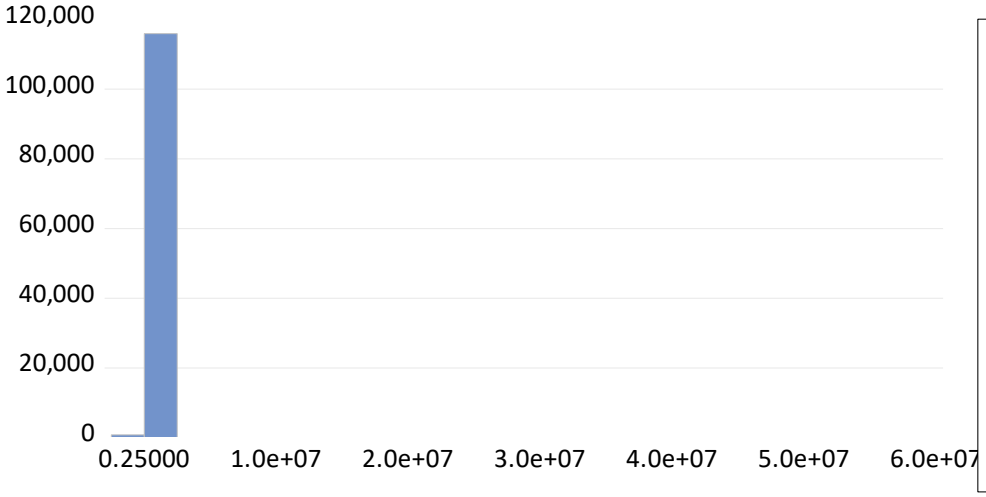
Firm breakdown by country

Country	Number Firms
ARE Count	40
BRA Count	250
CHL Count	146
CHN Count	2230
COL Count	33
CZE Count	17
EGY Count	119
GRC Count	224
HUN Count	25
IDN Count	368
IND Count	2183
KOR Count	1342
MEX Count	93
MYS Count	968
PAK Count	250
PER Count	74
PHL Count	159
POL Count	415
QAT Count	20
RUS Count	210
SAU Count	99
THA Count	293
TUR Count	265
TWN Count	1645
ZAF Count	280

The above table includes the number of firms included in the analysis of stage 1 (and stage 2) broken down by country. There is a total of 11,748 firms included in the sample. The countries are identified by their three-digit ISO country code.

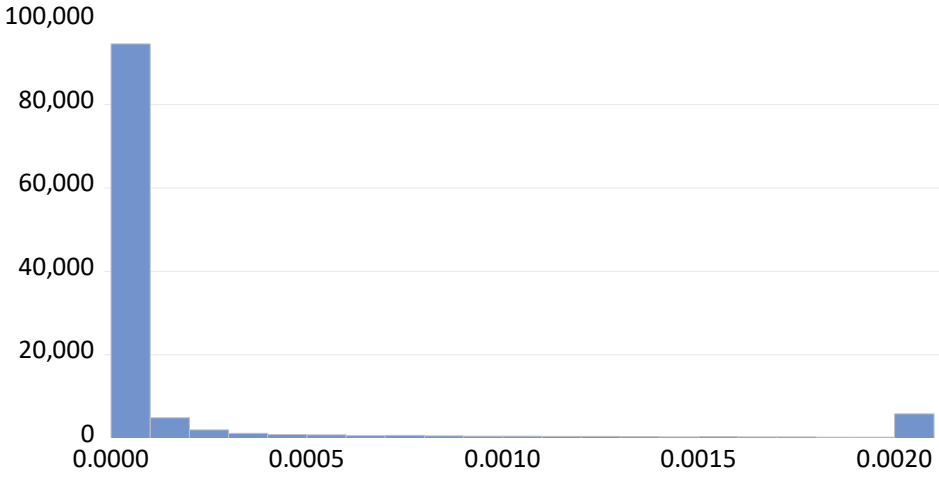
E.1) Skewness and Kurtosis Test

Variable Growth before winsorizing at the 0.01st and .99th percentile



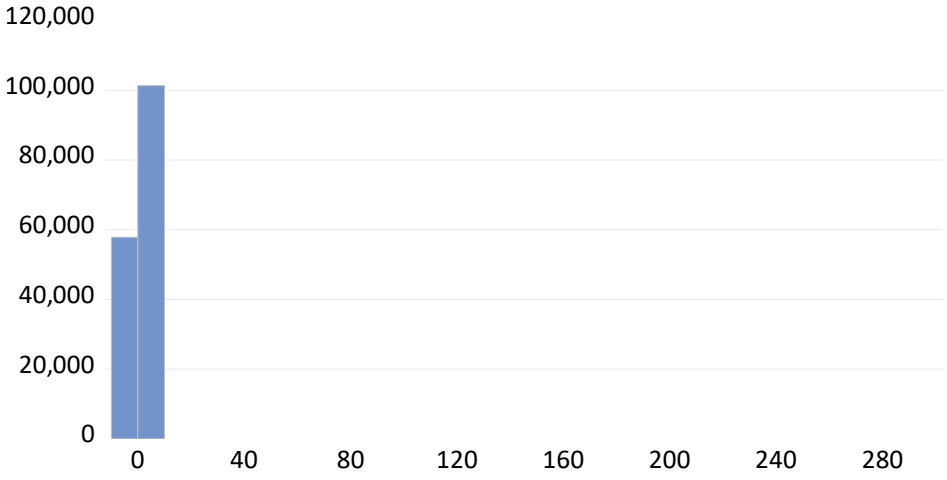
Series: GROWTHT_1	
Sample 1 182215	
Observations 116627	
Mean	1328.144
Median	1.20e-05
Maximum	58904720
Minimum	-8.119576
Std. Dev.	237993.2
Skewness	196.5692
Kurtosis	41707.43
Jarque-Bera	8.45e+12
Probability	0.000000

Variable Growth after winsorizing for outliers at the 0.01st and .99th percentile



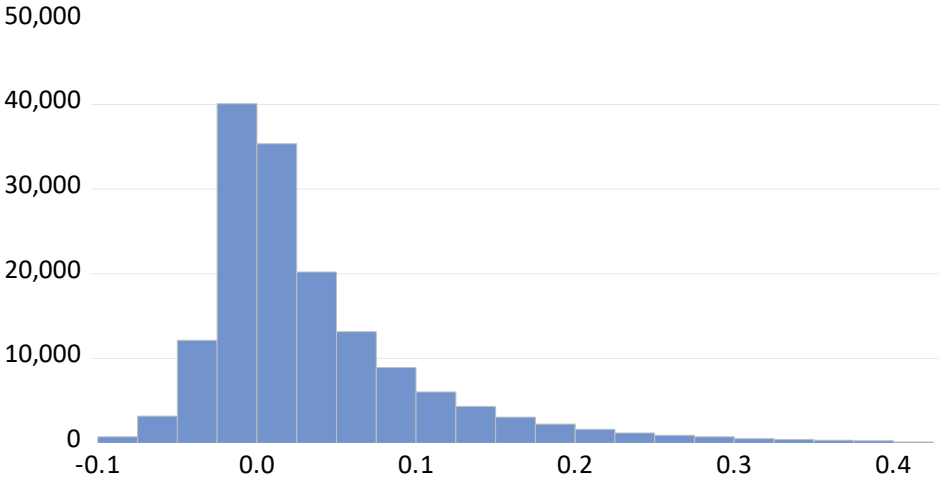
Series: GROWTHT_1_W1P	
Sample 1 182215	
Observations 116627	
Mean	0.000201
Median	1.20e-05
Maximum	0.002018
Minimum	4.68e-07
Std. Dev.	0.000507
Skewness	2.877603
Kurtosis	9.944504
Jarque-Bera	395309.7
Probability	0.000000

Variable Investment New before trimming for outliers at the 0.001st and .999th percentile



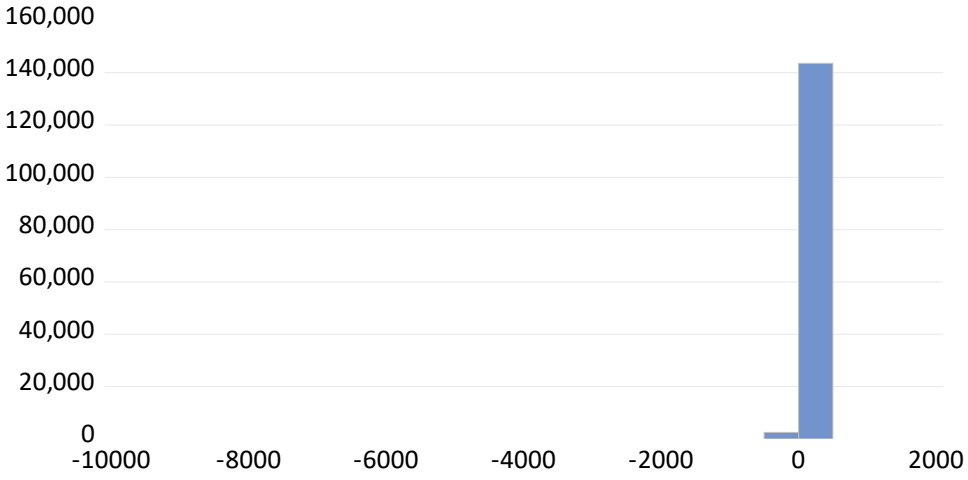
Series: INVNEWAST	
Sample 1 182215	
Observations 159056	
Mean	0.043171
Median	0.013169
Maximum	296.2173
Minimum	-1.842224
Std. Dev.	0.793300
Skewness	334.1061
Kurtosis	122627.8
Jarque-Bera	9.97e+13
Probability	0.000000

Variable Investment New after trimming for outliers at the 0.001st and .999th percentile



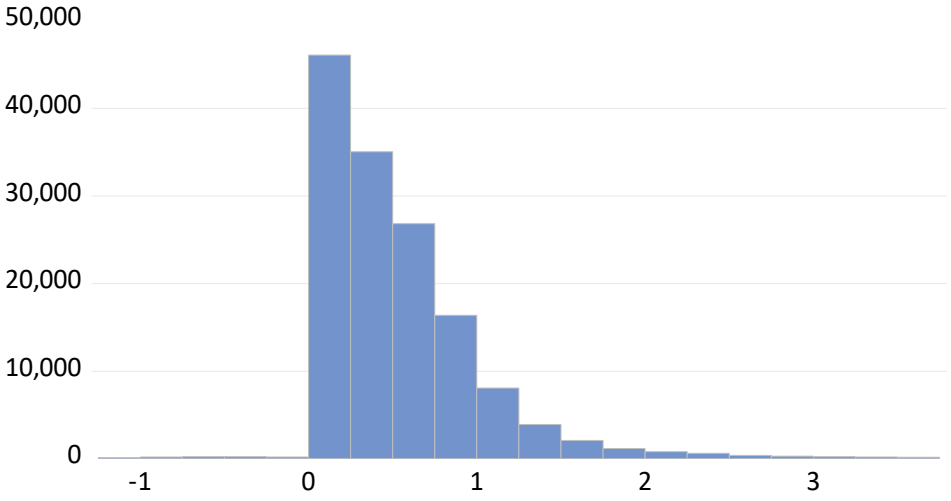
Series: INVNEWAST_T01P	
Sample 1 182215	
Observations 155873	
Mean	0.035521
Median	0.013169
Maximum	0.416121
Minimum	-0.089112
Std. Dev.	0.071448
Skewness	1.897813
Kurtosis	7.615131
Jarque-Bera	231901.4
Probability	0.000000

Variable Leverage before trimming for outliers at the 0.001st and .999th percentile



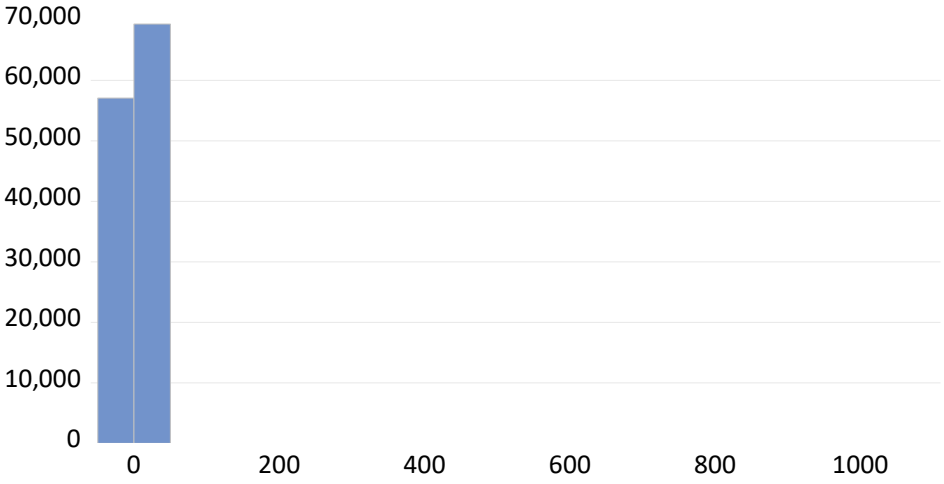
Series: LEVT_1	
Sample 1 182215	
Observations 146078	
Mean	0.508786
Median	0.421705
Maximum	1704.333
Minimum	-9744.090
Std. Dev.	28.21176
Skewness	-287.7896
Kurtosis	98373.65
Jarque-Bera	5.89e+13
Probability	0.000000

Variable Leverage after trimming for outliers at the 0.001st and .999th percentile



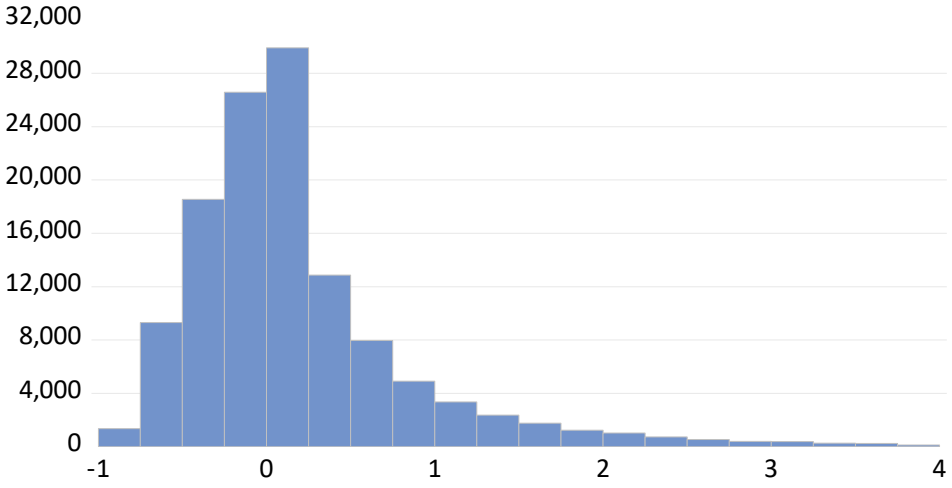
Series: LEVT_1_T01P	
Sample 1 182215	
Observations 143156	
Mean	0.521629
Median	0.421705
Maximum	3.747525
Minimum	-1.158107
Std. Dev.	0.494502
Skewness	1.860759
Kurtosis	9.338901
Jarque-Bera	322288.1
Probability	0.000000

Variable Stock before trimming for outliers at the 0.001st and .999th percentile



Series: STOCKT_1	
Sample 1 182215	
Observations 126388	
Mean	0.293241
Median	0.000000
Maximum	1065.526
Minimum	-1.000000
Std. Dev.	6.630736
Skewness	127.3297
Kurtosis	17763.38
Jarque-Bera	1.66e+12
Probability	0.000000

Variable Stock after trimming for outliers at the 0.001st and .999th percentile



Series: STOCKT_1_T01P	
Sample 1 182215	
Observations 123860	
Mean	0.173378
Median	0.000000
Maximum	3.900000
Minimum	-0.850435
Std. Dev.	0.680523
Skewness	1.949786
Kurtosis	8.215467
Jarque-Bera	218859.4
Probability	0.000000

E.2) Correlation Test

	INVNEWT_T01P	GROWTHT_1_W1P	INVNEWT_1_T01P	LEVT_1_T01P	STOCKT_1_T01P	AGET_1	CASHT_1	SIZET_1
INVNEWT_T01P	1.000000	-0.026406	0.471466	-0.046273	0.118134	-0.072052	0.118884	0.039585
GROWTHT_1_W1P	-0.026406	1.000000	-0.025618	0.018223	-0.038239	0.090337	-0.030356	0.478774
INVNEWT_1_T01P	0.471466	-0.025618	1.000000	-0.024917	0.051796	-0.094275	0.023690	0.055348
LEVT_1_T01P	-0.046273	0.018223	-0.024917	1.000000	-0.025951	0.020267	-0.116120	0.055090
STOCKT_1_T01P	0.118134	-0.038239	0.051796	-0.025951	1.000000	0.006728	0.036116	0.013200
AGET_1	-0.072052	0.090337	-0.094275	0.020267	0.006728	1.000000	-0.137085	0.175009
CASHT_1	0.118884	-0.030356	0.023690	-0.116120	0.036116	-0.137085	1.000000	0.018216
SIZET_1	0.039585	0.478774	0.055348	0.055090	0.013200	0.175009	0.018216	1.000000

The correlations shown in the above table are those between the trimmed / winsorized variables (see section Skewness and Kurtosis of this Appendix). The Pearson correlation values displayed suggest that there is no strong positive or negative correlation between variables. All values are below .5, with the largest values showing for INV NEWt and INV NEW t-1 (.47) as well as GROWTH and SIZE (.47).

Variable codes:
Investment New t (INV NEW$_t$) is coded in the above table as INVNEWT_T01P to signify the trimming
Growth Opportunities (GROWTH $_{t-1}$) is coded in the above table as GROWTHT_1_W1P to signify the winsorizing
Investment New t-1 (INV NEW$_{t-1}$) is coded in the above table as INVNEWT_1_T01P to signify the trimming
Leverage (LEV$_{t-1}$) is coded in the above table as LEVT_1_T01P to signify the trimming
Stock Return (STOCK$_{t-1}$) is coded in the above table as AGET_1 to signify the trimming
Company Age (AGE$_{t-1}$) is coded in the above table as INVNEWT_T01P to signify the variable was not transformed
Cash holding (CASH $_{t-1}$) is coded in the above table as CASHT_1 to signify the variable was not transformed
Size (SIZE $_{t-1}$) is coded in the above table as SIZET_1 to signify the variable was not transformed

E.3) Multi – Collinearity Test

VIF Factor Analysis

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 87935			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	4.87E-06	135.7884	NA
GROWTHT_1_W1P	0.024178	1.656140	1.474338
INVNEWAST_1_T01P	4.61E-05	1.957919	1.185207
LEVT_1_T01P	2.74E-08	1.333688	1.033203
STOCKT_1_T01P	1.28E-07	1.249965	1.198427
AGET_1	5.54E-07	29.55468	1.130698
CASHT_1	4.75E-06	2.736870	1.099116
SIZET_1	5.04E-08	22.36283	1.646421

The table above displays the collinearity statistics (Variance inflation factor - VIF) for all variables included in the final model. The VIF factor analysis shows that the centered values for all variables are below the 2.5 threshold, suggesting that there is no multi-collinearity.

Variable codes:
Investment New t (INV NEW$_t$) is coded in the above table as INVNEWT_T01P to signify the trimming
Growth Opportunities (GROWTH $_{t-1}$) is coded in the above table as GROWTHT_1_W1P to signify the winsorizing
Investment New t-1 (INV NEW$_{t-1}$) is coded in the above table as INVNEWT_1_T01P to signify the trimming
Leverage (LEV$_{t-1}$) is coded in the above table as LEVT_1_T01P to signify the trimming
Stock Return (STOCK$_{t-1}$) is coded in the above table as AGET_1 to signify the trimming
Company Age (AGE$_{t-1}$) is coded in the above table as INVNEWT_T01P to signify the variable was not transformed
Cash holding (CASH $_{t-1}$) is coded in the above table as CASHT_1 to signify the variable was not transformed
Size (SIZE t-1) is coded in the above table as SIZET_1 to signify the variable was not transformed

E.4) Heteroskedasticity – Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	133.5671	Prob. F(29,87905)	0.0000
Obs*R-squared	3711.236	Prob. Chi-Square(29)	0.0000
Scaled explained SS	46200.40	Prob. Chi-Square(29)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/18/18 Time: 21:46
Sample: 15 182105
Included observations: 87935
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005012	0.000732	6.843040	0.0000
GROWTHT_1_W1P	0.341746	0.041612	8.212652	0.0000
INVNEWAST_1_T01P	0.049019	0.002006	24.43294	0.0000
LEVT_1_T01P	7.51E-06	5.19E-05	0.144693	0.8850
STOCKT_1_T01P	0.000708	0.000107	6.630125	0.0000
AGET_1	-6.22E-05	0.000252	-0.247276	0.8047
CASHT_1	0.002723	0.000802	3.396273	0.0007
SIZET_1	-0.001096	7.56E-05	-14.49302	0.0000
ANNUAL_2	0.000850	0.000446	1.906350	0.0566
ANNUAL_3	0.000475	0.000302	1.575108	0.1152
ANNUAL_4	0.000754	0.000393	1.916690	0.0553
ANNUAL_5	0.000823	0.000333	2.470634	0.0135
ANNUAL_6	0.001466	0.000405	3.622066	0.0003
ANNUAL_7	0.001045	0.000343	3.041644	0.0024
ANNUAL_8	0.002568	0.000506	5.073278	0.0000
ANNUAL_9	0.000599	0.000276	2.167661	0.0302
ANNUAL_10	0.000326	0.000273	1.191427	0.2335
ANNUAL_11	0.000984	0.000296	3.326649	0.0009
ANNUAL_12	0.000834	0.000316	2.635664	0.0084
ANNUAL_13	8.42E-05	0.000236	0.356736	0.7213
ANNUAL_15	0.000410	0.000252	1.630870	0.1029
ANNUAL_16	0.000632	0.000314	2.010725	0.0444
INDUSEFF_2	-0.001159	0.000950	-1.220230	0.2224
INDUSEFF_3	-0.000992	0.000550	-1.802707	0.0714
INDUSEFF_4	-0.000289	0.000527	-0.549512	0.5827
INDUSEFF_5	0.002610	0.000845	3.090009	0.0020
INDUSEFF_6	-7.18E-05	0.000699	-0.102789	0.9181
INDUSEFF_7	0.002156	0.000630	3.421213	0.0006
INDUSEFF_8	0.001908	0.000581	3.285284	0.0010
INDUSEFF_9	-0.000431	0.000664	-0.649484	0.5160

R-squared	0.042204	Mean dependent var	0.004251
Adjusted R-squared	0.041888	S.D. dependent var	0.021220
S.E. of regression	0.020771	Akaike info criterion	-4.910184
Sum squared resid	37.92499	Schwarz criterion	-4.906982
Log likelihood	215918.5	Hannan-Quinn criter.	-4.909206
F-statistic	133.5671	Durbin-Watson stat	1.567372
Prob(F-statistic)	0.000000		

The above table reports the results from the Preusch-Pagan-Godfrey Heteroskedasticity test. The results show that the B score has a significant p-value. Consequently, the null hypothesis of homoskedasticity has to be rejected, suggesting heteroskedasticity is present in the dataset.

Variable codes:

Investment New t (INV NEW$_t$) is coded in the above table as INVNEWT_T01P to signify the trimming

Growth Opportunities (GROWTH $_{t-1}$) is coded in the above table as GROWTHT_1_W1P to signify the winsorizing

Investment New t-1 (INV NEW$_{t-1}$) is coded in the above table as INVNEWT_1_T01P to signify the trimming

Leverage (LEV$_{t-1}$) is coded in the above table as LEVT_1_T01P to signify the trimming

Stock Return (STOCK$_{t-1}$) is coded in the above table as AGET_1 to signify the trimming

Company Age (AGE$_{t-1}$) is coded in the above table as INVNEWT_T01P to signify the variable was not transformed

Cash holding (CASH $_{t-1}$) is coded in the above table as CASHT_1 *to signify the variable was not transformed*

Size (SIZE t-1) is coded in the above table as SIZET_1 to signify the variable was not transformed

Appendix F)

F.1) Descriptive Statistics for Country Mean Investment

Descriptive Statistics Country

		INV TOTAL	CAPEX	DEP	INV NEW	ACQ and R&D
		Mean	Mean	Mean	Mean	Mean
ISO	ARE (United Arab Emirates)	0.0848	0.0681	0.0308	0.0535	0.0167
	BRA (Brazil)	0.0618	0.0535	0.0357	0.0322	0.0083
	CHL (Chile)	0.0602	0.0529	0.0375	0.0242	0.0073
	CHN (China)	0.0868	0.0712	0.0261	0.0617	0.0156
	COL (Colombia)	0.0512	0.0411	0.0267	0.0276	0.0101
	CZE (Czech Republic)	0.0648	0.0602	0.0533	0.0169	0.0046
	EGY (Egypt)	0.0463	0.0420	0.0276	0.0316	0.0044
	GRC (Greece)	0.0474	0.0371	0.0291	0.0203	0.0103
	HUN (Hungary)	0.0937	0.0735	0.0575	0.0483	0.0202
	IDN (Indonesia)	0.0695	0.0642	0.0404	0.0316	0.0054
	IND (India)	0.0712	0.0616	0.0298	0.0517	0.0096
	KOR (Korea, South)	0.0666	0.0530	0.0373	0.0293	0.0136
	MEX (Mexico)	0.0688	0.0570	0.0408	0.0309	0.0118
	MYS (Malaysia)	0.0574	0.0443	0.0315	0.0265	0.0131
	PAK (Pakistan)	0.0673	0.0619	0.0356	0.0350	0.0054
	PER (Peru)	0.0615	0.0554	0.0431	0.0188	0.0061
	PHL (Philippines)	0.0624	0.0466	0.0332	0.0331	0.0158
	POL (Poland)	0.0768	0.0642	0.0409	0.0428	0.0126
	QAT (Qatar)	0.0898	0.0774	0.0259	0.0647	0.0124
	RUS (Russia)	0.0856	0.0761	0.0380	0.0545	0.0095
	SAU (Saudi Arabia)	0.0829	0.0767	0.0362	0.0497	0.0062
	THA (Thailand)	0.0704	0.0614	0.0446	0.0263	0.0090
	TUR (Turkey)	0.0602	0.0476	0.0292	0.0364	0.0126
	TWN (Taiwan)	0.0837	0.0494	0.0379	0.0461	0.0343
	ZAF (South Africa)	0.0848	0.0622	0.0366	0.0522	0.0226

The above table shows the descriptive statistics for the mean values of firm investment composition broken down by country.

Appendix G)

G.1) Full regression outputs for all models run for Phase 1 of the analysis (Regression 1)

Model 1 Output:
This model includes only the variables Investment New t (INV NEW t) and Growth

Opportunities (GROWTH t-1).

Dependent Variable: INVNEWAST_T01P
Method: Least Squares
Date: 12/10/18 Time: 22:04
Sample (adjusted): 4 182180
Included observations: 111483 after adjustments
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.035478	0.000248	142.8340	0.0000
GROWTHT_1_W1P	-1.558518	0.131516	-11.85038	0.0000

R-squared	0.010005	Mean dependent var	0.034836
Adjusted R-squared	0.009915	S.D. dependent var	0.079512
S.E. of regression	0.079472	Akaike info criterion	-2.226797
Sum squared resid	704.0978	Schwarz criterion	-2.226625
Log likelihood	124127.0	Hannan-Quinn criter.	-2.226745
F-statistic	111.6430	Durbin-Watson stat	0.992030
Prob(F-statistic)	0.000000	Wald F-statistic	140.4314
Prob(Wald F-statistic)	0.000000		

Variable codes:
Investment New t (INV NEW$_t$) is coded in the above table as INVNEWT_T01P to signify the trimming
Growth Opportunities (GROWTH $_{t-1}$) is coded in the above table as GROWTHT_1_W1P to signify the winsorizing

Model 2 output:

This model includes only industry and year effects. The industries are grouped according to the NAIC codes.

Dependent Variable: INVNEWAST_T01P
Method: Least Squares

Sample (adjusted): 2 182209
Included observations: 158738 after adjustments
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0109	0.00157	6.92868	0.00000
ANNUAL_2	-0.0078	0.00128	-6.07093	0.00000
ANNUAL_3	-0.0113	0.00117	-9.67137	0.00000
ANNUAL_4	-0.0045	0.00117	-3.84404	0.00010
ANNUAL_5	0.0064	0.00118	5.42256	0.00000
ANNUAL_6	0.0134	0.00122	11.00095	0.00000
ANNUAL_7	0.0173	0.00124	13.97810	0.00000
ANNUAL_8	0.0209	0.00126	16.57416	0.00000
ANNUAL_9	0.0161	0.00114	14.21584	0.00000
ANNUAL_10	-0.0023	0.00100	-2.29974	0.02150
ANNUAL_11	0.0062	0.00102	6.11294	0.00000
ANNUAL_12	0.0104	0.00102	10.12887	0.00000
ANNUAL_13	0.0043	0.00096	4.49631	0.00000
ANNUAL_15	0.0026	0.00093	2.83869	0.00450
ANNUAL_16	0.0059	0.00101	5.85402	0.00000
INDUSEFF_2	0.0183	0.00233	7.85376	0.00000
INDUSEFF_3	0.0089	0.00176	5.08010	0.00000
INDUSEFF_4	0.0228	0.00149	15.37737	0.00000
INDUSEFF_5	0.0328	0.00219	15.00717	0.00000
INDUSEFF_6	0.0227	0.00189	12.00888	0.00000
INDUSEFF_7	0.0276	0.00174	15.85735	0.00000
INDUSEFF_8	0.0273	0.00170	16.02348	0.00000
INDUSEFF_9	0.0057	0.00170	3.34462	0.00080

R-squared	0.01221	Mean dependent var	0.038987
Adjusted R-squared	0.01207	S.D. dependent var	0.090707
S.E. of regression	0.09016	Akaike info criterion	-1.97436
Sum squared resid	1290.11500	Schwarz criterion	-1.97291
Log likelihood	156725.700	Hannan-Quinn criter.	-1.97393
F-statistic	89.13671	Durbin-Watson stat	1.03858
Prob(F-statistic)	0.0000	Wald F-statistic	93.27339
Prob(Wald F-statistic)	0.0000		

Model 3 output:

The model includes all control variables. It excludes the growth opportunities (GROWTH $_{t-1}$) and the industry and year indicators.

Dependent Variable: INVNEWAST_T01P
Method: Least Squares

Sample (adjusted): 10 182105
Included observations: 96822 after adjustments
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.01470	0.00120	12.24847	0.00000
INVNEWAST_1_T01P	0.42682	0.00644	66.28900	0.00000
LEVT_1_T01P	-0.00154	0.00017	-9.15021	0.00000
STOCKT_1_T01P	0.00777	0.00034	22.92814	0.00000
AGET_1	-0.00521	0.00075	-6.95279	0.00000
CASHT_1	0.05873	0.00213	27.55061	0.00000
SIZET_1	0.00046	0.00019	2.45359	0.01410

R-squared	0.234004	Mean dependent var	0.032987
Adjusted R-squared	0.233956	S.D. dependent var	0.078112
S.E. of regression	0.068367	Akaike info criterion	-2.52778
Sum squared resid	452.5183	Schwarz criterion	-2.52709
Log likelihood	122379.30	Hannan-Quinn criter.	-2.52757
F-statistic	4929.3290	Durbin-Watson stat	1.902725
Prob(F-statistic)	0.0000	Wald F-statistic	1222.504
Prob(Wald F-statistic)	0.0000		

Variable codes:
Investment New t (INV NEW$_t$) is coded in the above table as INVNEWT_T01P to signify the trimming
Growth Opportunities (GROWTH $_{t-1}$) is coded in the above table as GROWTHT_1_W1P to signify the winsorizing
Investment New t-1 (INV NEW$_{t-1}$) is coded in the above table as INVNEWT_1_T01P to signify the trimming
Leverage (LEV$_{t-1}$) is coded in the above table as LEVT_1_T01P to signify the trimming
Stock Return (STOCK$_{t-1}$) is coded in the above table as AGET_1 to signify the trimming
Company Age (AGE$_{t-1}$) is coded in the above table as INVNEWT_T01P to signify the variable was not transformed

Cash holding (CASH $_{t-1}$) is coded in the above table as CASHT_1 *to signify the variable was not transformed*
Size (SIZE $_{t-1}$) is coded in the above table as SIZET_1 *to signify the variable was not transformed*

Model 4 Output:

This model includes the growth opportunities (GROWTH $_{t-1}$) as well as all control variables and the year and industry indicators

Dependent Variable: INVNEWAST_T01P
Method: Least Squares

Sample (adjusted): 15 182105
Included observations: 87935 after adjustments
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.00253	0.00221	-1.14531	0.25210
GROWTHT_1_W1P	-0.68976	0.15549	-4.43592	0.00000
INVNEWAST_1_T01P	0.42656	0.00679	62.80517	0.00000
LEVT_1_T01P	-0.00141	0.00017	-8.51282	0.00000
STOCKT_1_T01P	0.00683	0.00036	19.08051	0.00000
AGET_1	-0.00326	0.00074	-4.38335	0.00000
CASHT_1	0.06413	0.00218	29.42629	0.00000
SIZET_1	0.00147	0.00022	6.52997	0.00000
ANNUAL_2	-0.00122	0.00155	-0.79092	0.42900
ANNUAL_3	-0.00353	0.00140	-2.52978	0.01140
ANNUAL_4	0.00205	0.00134	1.52774	0.12660
ANNUAL_5	0.00506	0.00119	4.24086	0.00000
ANNUAL_6	0.00790	0.00124	6.39282	0.00000
ANNUAL_7	0.00772	0.00115	6.68828	0.00000
ANNUAL_8	0.01232	0.00123	10.00796	0.00000
ANNUAL_9	0.00556	0.00108	5.13671	0.00000
ANNUAL_10	-0.00475	0.00099	-4.82354	0.00000
ANNUAL_11	0.00376	0.00101	3.74055	0.00020
ANNUAL_12	0.00544	0.00098	5.55481	0.00000
ANNUAL_13	0.00146	0.00090	1.62528	0.10410
ANNUAL_15	0.00275	0.00086	3.20884	0.00130
ANNUAL_16	0.00079	0.00095	0.82684	0.40830
INDUSEFF_2	0.00820	0.00241	3.40222	0.00070
INDUSEFF_3	0.00015	0.00184	0.08138	0.93510
INDUSEFF_4	0.00736	0.00165	4.46580	0.00000
INDUSEFF_5	0.01158	0.00246	4.69967	0.00000
INDUSEFF_6	0.00687	0.00203	3.37748	0.00070
INDUSEFF_7	0.00436	0.00190	2.28868	0.02210
INDUSEFF_8	0.00908	0.00182	4.97707	0.00000
INDUSEFF_9	0.00128	0.00190	0.67394	0.50040

R-squared	0.24694	Mean dependent var	0.03223
Adjusted R-squared	0.24669	S.D. dependent var	0.07514
S.E. of regression	0.06521	Akaike info criterion	-2.62198
Sum squared resid	373.8354	Schwarz criterion	-2.61878
Log likelihood	115311.8	Hannan-Quinn criter.	-2.621
F-statistic	993.9826	Durbin-Watson stat	1.935005
Prob(F-statistic)	0.0000	Wald F-statistic	285.9218
Prob(Wald F-statistic)	0.0000		

Variable codes:

Investment New t (INV NEW$_t$) is coded in the above table as INVNEWT_T01P to signify the trimming

Growth Opportunities (GROWTH $_{t-1}$) is coded in the above table as GROWTHT_1_W1P to signify the winsorizing

Investment New t-1 (INV NEW$_{t-1}$) is coded in the above table as INVNEWT_1_T01P *to signify the trimming*

Leverage (LEV$_{t-1}$) is coded in the above table as LEVT_1_T01P *to signify the trimming*

Stock Return (STOCK$_{t-1}$) is coded in the above table as AGET_1 *to signify the trimming*

Company Age (AGE$_{t-1}$) is coded in the above table as INVNEWT_T01P to signify the variable was not transformed

Cash holding (CASH $_{t-1}$) is coded in the above table as CASHT_1 *to signify the variable was not transformed*

Size (SIZE $_{t-1}$) *is coded in the above table as* SIZET_1 *to signify the variable was not transformed*

Appendix H)

H.1) Regression Output 20th percentile

Dependent Variable: UE_M108__1				
Method: Quantile Regression (tau = 0.2)				
Sample (adjusted): 15 182105				
Included observations: 78985 after adjustments				
Huber Sandwich Standard Errors & Covariance				
Sparsity method: Kernel (Epanechnikov) using residuals				
Bandwidth method: Hall-Sheather, bw=0.013325				
Estimation successfully identifies unique optimal solution				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0309	0.000123	-251.8508	0.0000
FCF_M108_1_T01P	0.0328	0.001345	24.4133	0.0000
Pseudo R-squared	0.0075	Mean dependent var		-4.97E-03
Adjusted R-squared	0.0074	S.D. dependent var		0.0333
S.E. of regression	0.0420	Objective		613.1889
Quantile dependent var	-0.0310	Restr. objective		617.7966
Sparsity	0.0860	Quasi-LR statistic		669.349
Prob(Quasi-LR stat)	0.0000			

Variable Codes:
Unexpected Investment (UEINV) is coded as UE_M108_1 above. It is the residual from model 4 from the new investment estimation (see appendix G)
Free Cash Flow (FCF) is coded as FCF_M108)_1_t01p above to signify that the variable was trimmed at the .1% level to remove outliers.

H.2) Regression Output 40th percentile

Dependent Variable: UE_M108__1				
Method: Quantile Regression (tau = 0.4)				
Sample (adjusted): 15 182105				
Included observations: 78985 after adjustments				
Huber Sandwich Standard Errors & Covariance				
Sparsity method: Kernel (Epanechnikov) using residuals				
Bandwidth method: Hall-Sheather, bw=0.02129				
Estimation successfully identifies unique optimal solution				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0170	0.0001	-160.895	0.0000
FCF_M108_1_T01P	0.0318	0.0012	26.5953	0.0000
Pseudo R-squared	0.0061	Mean dependent var		-4.97E-03
Adjusted R-squared	0.0061	S.D. dependent var		0.0333
S.E. of regression	0.0352	Objective		905.8145
Quantile dependent var	-0.0169	Restr. objective		911.3653
Sparsity	0.0605	Quasi-LR statistic		764.559
Prob(Quasi-LR stat)	0.0000			

Variable Codes see H.1)

H.3) Regression Output 60th percentile

Dependent Variable: UE_M108__1				
Method: Quantile Regression (tau = 0.6)				
Sample (adjusted): 15 182105				
Included observations: 78985 after adjustments				
Huber Sandwich Standard Errors & Covariance				
Sparsity method: Kernel (Epanechnikov) using residuals				
Bandwidth method: Hall-Sheather, bw=0.02129				
Estimation successfully identifies unique optimal solution				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0043	0.00013	-33.1642	0.0000
FCF_M108_1_T01P	0.0343	0.00142	24.2072	0.0000
Pseudo R-squared	0.0055	Mean dependent var		-4.97E-03
Adjusted R-squared	0.0055	S.D. dependent var		0.0333
S.E. of regression	0.0331	Objective		996.7021
Quantile dependent var	-0.0041	Restr. objective		1002.195
Sparsity	0.0736	Quasi-LR statistic		622.1641
Prob(Quasi-LR stat)	0.0000			

Variable Codes see H.1)

H.4) Regression Output 80th percentile

Dependent Variable: UE_M108__1				
Method: Quantile Regression (tau = 0.8)				
Sample (adjusted): 15 182105				
Included observations: 78985 after adjustments				
Huber Sandwich Standard Errors & Covariance				
Sparsity method: Kernel (Epanechnikov) using residuals				
Bandwidth method: Hall-Sheather, bw=0.013325				
Estimation successfully identifies unique optimal solution				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0179	0.0003	72.19165	0.0000
FCF_M108_1_T01P	0.0434	0.0023	18.99138	0.0000
Pseudo R-squared	0.0048	Mean dependent var		-4.97E-03
Adjusted R-squared	0.0048	S.D. dependent var		0.0333
S.E. of regression	0.0403	Objective		834.8418
Quantile dependent var	0.0182	Restr. objective		838.8953
Sparsity	0.1741	Quasi-LR statistic		291.0327
Prob(Quasi-LR stat)	0.0000			

Variable Codes see H.1)

H.5) Slope Equality Tests

Quantile Slope Equality Test				
Specification: UE_M108__1 C FCF_M108_1_T01P				
Estimated equation quantile tau = 0.8				
User-specified test quantiles: 0.2				
Test statistic compares all coefficients				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test		20.24837	1	0.000
Restriction Detail: b(tau_h) - b(tau_k) = 0				
Quantiles	Variable	Restr. Value	Std. Error	Prob.
0.2, 0.8	FCF_M108_1_T01P	-0.0105	0.0023	0.000

Quantile Slope Equality Test				
Specification: UE_M108__1 C FCF_M108_1_T01P				
Estimated equation quantile tau = 0.8				
User-specified test quantiles: 0.4				
Test statistic compares all coefficients				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test		30.51904	1	0.000
Restriction Detail: b(tau_h) - b(tau_k) = 0				
Quantiles	Variable	Restr. Value	Std. Error	Prob.
0.4, 0.8	FCF_M108_1_T01P	-0.0116	0.0021	0.000

Quantile Slope Equality Test				
Specification: UE_M108__1 C FCF_M108_1_T01P				
Estimated equation quantile tau = 0.8				
User-specified test quantiles: 0.6				
Test statistic compares all coefficients				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test		24.97561	1	0.000
Restriction Detail: b(tau_h) - b(tau_k) = 0				
Quantiles	Variable	Restr. Value	Std. Error	Prob.
0.6, 0.8	FCF_M108_1_T01P	-0.0090	0.0018	0.000

Appendix I)

ISIN	Number Firms
ARE Count	3
BRA Count	27
CHL Count	18
CHN Count	44
COL Count	7
CZE Count	2
EGY Count	4
GRC Count	11
HUN Count	3
IDN Count	14
IND Count	67
KOR Count	99
MEX Count	22
MYS Count	41
PER Count	1
PHL Count	22
POL Count	25
QAT Count	5
RUS Count	37
SAU Count	8
THA Count	7
TUR Count	15
TWN Count	86
ZAF Count	81

The above table includes a breakdown by country of the number of firms included in the analysis of stage 3. There is a total of 649 firms included in the sample. The countries are identified by their three-digit ISO country code.

I.1) Table of descriptive statistics

I.1.A) Individual Samples

Sample: 1 182215										
	UE_M108_1LT0_T1P	FCF_M108_1_T01P	CVG_N0_H_PRCT	CONCEN_REDO_N0_PRCT	LOG_DEBT	GOV_EFF	GOV_INT	MKT_DEV	L_SIZE	L_AGE
Mean	0.049778	-0.002362	0.266765	0.536183	2.345156	0.636777	0.585450	0.404031	3.347140	1.259265
Median	0.029427	-0.001246	0.189100	0.550599	2.282544	0.587379	0.552000	0.394888	3.207012	1.278754
Maximum	0.367315	0.601971	0.971000	1.388835	9.212328	0.913462	0.790000	0.853855	10.48504	3.304060
Minimum	0.000319	-0.715441	0.001700	3.00E-07	-3.000000	0.201923	0.474000	0.106951	-3.000000	0.000000
Std. Dev.	0.057821	0.101552	0.235072	0.228965	1.449879	0.145582	0.074109	0.179305	1.205093	0.361477
Skewness	2.187770	-0.299136	0.966850	-0.217139	0.210369	-0.026925	0.812192	0.805214	0.612819	-0.391041
Kurtosis	8.570694	7.356209	2.955738	2.364044	3.539814	2.499584	2.458178	2.928556	4.277012	4.580302
Jarque-Bera	65430.00	70822.23	861.5566	2064.091	2493.591	1923.248	20255.49	19308.22	22861.15	19917.98
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	1557.805	-207.6335	1474.410	44789.00	299621.8	116030.4	97062.36	72049.69	586178.0	193620.8
Sum Sq. Dev.	104.6259	906.6130	305.3609	4379.159	268572.5	3861.844	910.5413	5733.248	254328.1	20090.64
Observations	31295	87912	5527	83533	127762	182215	165791	178327	175128	153757

Variable codes:

Unexpected Investment (UEINV) is coded in the above table as UE_M108_1LT0 to signify that only positive values of unexpected investment were included in the

Free Cash Flow (FCF) is coded in the above table as FCF_M108_1_T01P to signify the variable was trimmed at .1% to reduce the effect of outliers
Corporate Governance Score (CGSCORE) is coded in the above table as CVG_N0_H_PRCT to signify the that the score obtained was transformed into a percentage by dividing it over 100
Concentration (CONCEN) is coded in the above table as CONCEN_REDO_N0_PRCT to signify the that the score obtained was transformed into a percentage by dividing it over 100
Debt (DEBT) is coded in the above table as LOG_DEBT to signify that the log of debt variable was used.
Government Effectiveness (GOV_EFF) is coded as GOV_EFF
Government Intervention (GOV_INT) is coded as GOV_INT
Market Development (MKT_DEV) is coded as MKT_DEV
Size (SIZE) is coded as L_SIZE to signify that the log of assets was taken (see appendix H)
Age (AGE) is coded as L_AGE to signify that the log of assets was taken (see appendix H)

The above table shows the values of skewness and kurtosis for all variables included in the model. For Debt, the displayed values are after the natural log of the original values were taken.

I.1.B) Common Sample

Sample: 1 182215										
	UE_M108_1LT0	FCF_M108_1_T01P	CVG_N0_H_PRCT	CONCEN_REDO_N0_PRCT	LOG_DEBT	GOV_EFF	GOV_INT	MKT_DEV	L_SIZE	L_AGE
Mean	0.045651	0.042403	0.240154	0.524532	3.888342	0.635039	0.609537	0.421124	4.795967	1.387001
Median	0.029171	0.036952	0.172650	0.540501	3.798233	0.587379	0.583500	0.427369	4.734417	1.380211
Maximum	0.320537	0.528784	0.919900	0.999998	7.529683	0.894231	0.790000	0.688434	8.152843	2.096910
Minimum	0.000351	-0.275116	0.011800	4.20E-06	-1.585027	0.208531	0.498000	0.116566	1.494906	0.301030
Std. Dev.	0.050293	0.083041	0.207918	0.228086	1.253026	0.152361	0.082272	0.155047	1.066070	0.326562
Skewness	2.250493	0.618768	1.101115	-0.362933	-0.153190	0.202163	0.468365	-0.033722	0.276038	-0.201717
Kurtosis	9.435962	6.881624	3.490237	2.469472	3.800147	1.779847	1.989312	1.844924	3.313448	2.695321
Jarque-Bera	2698.521	726.1844	222.6942	35.36494	32.11708	72.28603	83.07917	58.57024	17.63288	11.18200
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000148	0.003731
Sum	47.93371	44.52327	252.1621	550.7586	4082.759	666.7913	640.0140	442.1804	5035.765	1456.351
Sum Sq. Dev.	2.653279	7.233681	45.34829	54.57232	1647.008	24.35122	7.100409	25.21748	1192.195	111.8682
Observations	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050

Variable codes as before

I.2) Covariance Matrix

	UE_M108_1LT0	FCF_M108_1_T01P	CVG_N0_H_PRCT	CONCEN_REDO_N0_PRCT	LOG_DEBT	GOV_EFF	GOV_INT	MKT_DEV	L_SIZE	L_AGE
UE_M108_1LT0	0.002527	0.000190	-0.000368	0.000887	0.001595	-0.000835	-0.000403	0.000400	-0.001534	-0.002005
FCF_M108_1_T01P	0.000190	0.006889	0.000327	0.000255	-0.017857	8.15E-05	-8.09E-06	0.000183	-0.002896	0.000776
CVG_N0_H_PRCT	-0.000368	0.000327	0.043189	-0.002787	0.032866	-0.006453	-0.003617	0.006563	0.027174	0.003950
CONCEN_REDON0_PRCT	0.000887	0.000255	-0.002787	0.051974	0.042903	-0.012664	-0.004751	0.008131	0.024148	-0.005073
LOG_DEBT	0.001595	-0.017857	0.032866	0.042903	1.568579	-0.039156	-0.002012	-0.017296	1.181893	0.039063
GOV_EFF	-0.000835	8.15E-05	-0.006453	-0.012664	-0.039156	0.023192	0.010496	-0.004935	-0.033164	0.007971
GOV_INT	-0.000403	-8.09E-06	-0.003617	-0.004751	-0.002012	0.010496	0.006762	-0.001835	-0.003057	0.007314
MKT_DEV	0.000400	0.000183	0.006563	0.008131	-0.017296	-0.004935	-0.001835	0.024017	-0.032468	0.003624
L_SIZE	-0.001534	-0.002896	0.027174	0.024148	1.181893	-0.033164	-0.003057	-0.032468	1.135424	0.041498
L_AGE	-0.002005	0.000776	0.003950	-0.005073	0.039063	0.007971	0.007314	0.003624	0.041498	0.106541

Unexpected Investment (UEINV) is coded in the above table as UE_M108_1LT0 to signify that only positive values of unexpected investment were included in the
Free Cash Flow (FCF) is coded in the above table as FCF_M108_1_T01P to signify the variable was trimmed at .1% to reduce the effect of outliers
Corporate Governance Score (CGSCORE) is coded in the above table as CVG_N0_H_PRCT to signify the that the score obtained was transformed into a percentage by dividing it over 100
Concentration (CONCEN) is coded in the above table as CONCEN_REDO_N0_PRCT to signify the that the score obtained was transformed into a percentage by dividing it over 100
Debt (DEBT) is coded in the above table as LOG_DEBT to signify that the log of debt variable was used.
Government Effectiveness (GOV_EFF) is coded as GOV_EFF
Government Intervention (GOV_INT) is coded as GOV_INT
Market Development (MKT_DEV) is coded as MKT_DEV
Size (SIZE) is coded as L_SIZE to signify that the log of assets was taken (see appendix H)
Age (AGE) is coded as L_AGE to signify that the log of assets was taken (see appendix H)

The table above shows the covariance values of all variables included in the model. The values suggest that there is no covariance between the variables.

I.3) Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	3.069685	Prob. F(6,1448)	0.0055
Obs*R-squared	18.27470	Prob. Chi-Square(6)	0.0056
Scaled explained SS	374.7443	Prob. Chi-Square(6)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/30/18 Time: 16:30
Sample: 64 181823
Included observations: 1455

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.014808	0.004146	3.571956	0.0004
FCF_M108_1_T01P	0.015630	0.007480	2.089476	0.0368
CVG_N0_H_PRCT	-0.003171	0.002628	-1.206452	0.2278
CONCEN_REDO_N0_PRCT	-0.001476	0.002619	-0.563447	0.5732
LOG_DEBT	0.003566	0.001109	3.216830	0.0013
L_SIZE	-0.004694	0.001234	-3.802414	0.0001
L_AGE	-0.000850	0.001842	-0.461201	0.6447

R-squared	0.012560	Mean dependent var	0.003610
Adjusted R-squared	0.008468	S.D. dependent var	0.023240
S.E. of regression	0.023141	Akaike info criterion	-4.689583
Sum squared resid	0.775443	Schwarz criterion	-4.664168
Log likelihood	3418.672	Hannan-Quinn criter.	-4.680101
F-statistic	3.069685	Durbin-Watson stat	0.141089
Prob(F-statistic)	0.005464		

Variables are coded as before (see I.1)

The above table reports the results from the Preusch-Pagan-Godfrey Heteroskedasticity test. The results show that the B score has a significant p-value. Consequently, the null hypothesis of homoskedasticity has to be rejected, suggesting heteroskedasticity is present in the dataset.

Appendix J)

J.1) Full regression outputs for all models run for Phase 3 of the analysis (Regression 3a and 3b)

Model 3.a.1 Firm Variables Only:

Model before variable transformation

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0970	0.0123	7.8900	0.0000
FCF_M108_1_T01P	0.0924	0.0290	3.1907	0.0014
CONCEN_REDO_N0_PRCT	0.0007	0.0064	0.1079	0.9141
CVG_N0_H_PRCT	-0.0137	0.0059	-2.3452	0.0192
LOG_DEBT	0.0141	0.0030	4.6528	0.0000
L_AGE	-0.0124	0.0043	-2.8607	0.0043
L_SIZE	-0.0182	0.0036	-5.0135	0.0000
R-squared	0.04165	Mean dependent var		0.04551
Adjusted R-squared	0.03768	S.D. dependent var		0.06140
S.E. of regression	0.06023	Akaike info criterion		-2.77648
Sum squared resid	5.25290	Schwarz criterion		-2.75107
Log likelihood	2026.891	Hannan-Quinn criter.		-2.76700
F-statistic	10.48899	Durbin-Watson stat		0.74228
Prob(F-statistic)	0.0000	Wald F-statistic		7.09500
Prob(Wald F-statistic)	0.0000			

Variable codes:
Unexpected Investment (UEINV) is coded in the above table as UE_M108_1_w1p to signify the winsorizing at 1%
Positive Free Cash Flow (FCF>0) is coded in the above table as FCFGT0_N0_H to signify the that only firm year observations with positive free cash flow values were included
Corporate Governance Score (CGSCORE) is coded in the above table as CGV_N0_PRCT to signify the that the score obtained was transformed into a percentage by dividing it over 100
Concentration (CONCEN) is coded in the above table as CONCEN_REDO_N0_N0_PRCT to signify the that the score obtained was transformed into a percentage by dividing it over 100

Debt (DEBT) is coded in the above table as Log_DEBT to signify that the log of the leverage value was used.
Size (SIZE) is coded as L_SIZE to signify that the log of assets was used
Age (AGE is coded a L-AGE to signify that the log of years since inception was used

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1455			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.0002	92.8501	NA
FCF_M108_1_T01P	0.0008	2.0906	1.4760
CVG_N0_H_PRCT	0.0000	2.9919	1.2439
CONCEN_REDO_N0_PRCT	0.0000	6.4548	1.2044
LOG_DEBT	0.0000	110.0784	10.8175
L_SIZE	1.32E-05	243.5694	10.31996
L_AGE	0.00002	25.41061	1.04374

The VIF analysis above shows that the variation in debt (LOG_DEBT) and size (L_SIZE) are highly collinear (VIF over 10). They are therefore transformed into one variable LOG_DEBT/L_SIZE, the below output shows that the VIF is subsequently reduced (see below).

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1455			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.000116	55.90671	NA
FCF_M108_1_T01P	0.00079	1.93664	1.318703
CVG_N0_H_PRCT	3.12E-05	2.563022	1.094661
CONCEN_REDO_N0_PRCT	3.99E-05	5.196861	1.160149
LOG_DEBT/L_SIZE	0.000103	28.45053	1.21812
L_AGE	1.96E-05	22.1043	1.029391

Model after transformation and correction for collinearity

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.035564	0.010749	3.308675	0.001
FCF_M108_1_T01P	0.084254	0.028106	2.997711	0.0028
CVG_N0_H_PRCT	-0.009942	0.00559	-1.778572	0.0755
CONCEN_REDO_N0_PRCT	0.004057	0.006319	0.642059	0.5209
LOG_DEBT/L_SIZE	0.034871	0.010144	3.437691	0.0006
L_AGE	-0.014397	0.004426	-3.252802	0.0012
R-squared	0.027203	Mean dependent var		0.045505
Adjusted R-squared	0.023846	S.D. dependent var		0.061398
S.E. of regression	0.060662	Akaike info criterion		-2.762891
Sum squared resid	5.332101	Schwarz criterion		-2.741107
Log likelihood	2016.003	Hannan-Quinn criter.		-2.754763
F-statistic	8.103769	Durbin-Watson stat		0.734811
Prob(F-statistic)	0	Wald F-statistic		6.433733
Prob(Wald F-statistic)	0.000006			

Model 3.a.2 Firm Variables & Interactions:

Model before variable transformation

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0262	0.0113	2.3207	0.0204
FCF_M108_1_T01P	0.2454	0.0818	2.9996	0.0027
CVG_N0_H_PRCT	-0.0020	0.0059	-0.3474	0.7283
CONCEN_REDO_N0_PRCT	0.0157	0.0068	2.2989	0.0217
LOG_DEBT/L_SIZE	0.0374	0.0103	3.6438	0.0003
L_AGE	-0.0147	0.0044	-3.3586	0.0008
FCF_M108_1_T01P*CVG_N0_H_PRCT	-0.1483	0.0638	-2.3241	0.0203
FCF_M108_1_T01P*CONCEN_REDO_N0_PRCT	-0.2345	0.1098	-2.1363	0.0328
R-squared	0.0376	Mean dependent var		0.0455
Adjusted R-squared	0.0330	S.D. dependent var		0.0614
S.E. of regression	0.0604	Akaike info criterion		-2.7709
Sum squared resid	5.2751	Schwarz criterion		-2.7418
Log likelihood	2023.83	Hannan-Quinn criter.		-2.7601
F-statistic	8.08	Durbin-Watson stat		0.7382
Prob(F-statistic)	0.00	Wald F-statistic		4.9094
Prob(Wald F-statistic)	0.000			

The variables codes are as before, there are interactions terms between free cash flow and corporate governance and free cash flow and concentration included

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1455			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.000128	61.95434	NA
FCF_M108_1_T01P	0.006696	30.41924	23.49744
CVG_N0_H_PRCT	3.43E-05	2.823885	1.225483
CONCEN_REDO_N0_PRCT	4.68E-05	6.123438	1.433311
LOG_DEBT/L_SIZE	0.000105	29.02912	1.250766
L_AGE	1.93E-05	21.6757	1.0552
FCF_M108_1_T01P*CVG_N0_H_PRCT	0.004073	5.526039	4.879011
FCF_M108_1_T01P*CONCEN_REDO_N0_PRCT	0.012047	18.09766	15.48431

The VIF analysis shows that the variation in free cash flow and it interaction terms with corporate governance and concentration are highly collinear (VIF over 2.5). They are therefore centered (i.e. the mean of the series is subtracted from each observation), the below output shows that the VIF is subsequently reduced.

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1455			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.000115	55.87901	NA
FCF_M108_1_T01P_CENTERED	0.000617	2.869751	2.16502
CVG_N0_H_PRCT	3.50E-05	2.881948	1.25068
CONCEN_REDO_N0_PRCT_CENTERED	4.87E-05	1.64919	1.491461
LOG_DEBT/L_SIZE	0.000105	29.02912	1.250766
L_AGE	1.93E-05	21.6757	1.0552
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	0.004073	2.226249	2.157862
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	0.012047	1.873286	1.788985

Model after transformation and correction for collinearity

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0344	0.0107	3.2030	0.0014
FCF_M108_1_T01P_CENTERED	0.0802	0.0248	3.2271	0.0013
CVG_N0_H_PRCT	-0.0017	0.0059	-0.2847	0.7759
CONCEN_REDO_N0_PRCT_CENTERED	0.0163	0.0070	2.3331	0.0198
LOG_DEBT/L_SIZE	0.0374	0.0103	3.6438	0.0003
L_AGE	-0.0147	0.0044	-3.3586	0.0008
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.1483	0.0638	-2.3241	0.0203
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.2345	0.1098	-2.1363	0.0328
R-squared	0.03761	Mean dependent var		0.04551
Adjusted R-squared	0.03295	S.D. dependent var		0.06140
S.E. of regression	0.06038	Akaike info criterion		-2.77089
Sum squared resid	5.27508	Schwarz criterion		-2.74185
Log likelihood	2023.825	Hannan-Quinn criter.		-2.76006
F-statistic	8.07743	Durbin-Watson stat		0.73817
Prob(F-statistic)	0.00000	Wald F-statistic		4.90936
Prob(Wald F-statistic)	0.00002			

Model 3.a.3 Firm Variables & Interaction Effects

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.034078	0.010694	3.186778	0.0015
FCF_M108_1_T01P_CENTERED	0.080352	0.024787	3.241672	0.0012
CVG_N0_H_PRCT_CENTERED	-0.00277	0.007041	-0.393446	0.694
CONCEN_REDO_N0_PRCT_CENTERED	0.016587	0.006913	2.399576	0.0165
LOG_DEBT/L_SIZE	0.037278	0.010267	3.630964	0.0003
L_AGE	-0.014878	0.004398	-3.382789	0.0007
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.147126	0.063885	-2.302995	0.0214
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.234081	0.110055	-2.126951	0.0336
CVG_N0_H_PRCT_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.008708	0.02054	-0.423956	0.6717
R-squared	0.037676	Mean dependent var		0.045505
Adjusted R-squared	0.032352	S.D. dependent var		0.061398
S.E. of regression	0.060397	Akaike info criterion		-2.769592
Sum squared resid	5.274694	Schwarz criterion		-2.736915
Log likelihood	2023.878	Hannan-Quinn criter.		-2.7574
F-statistic	7.076582	Durbin-Watson stat		0.738148
Prob(F-statistic)	0	Wald F-statistic		4.32186
Prob(Wald F-statistic)	0.000037			

Model 3b.1.1 Firm Variables and Government Effectiveness (no interaction)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0735	0.0133	5.5241	0.0000
FCF_M108_1_T01P	0.0839	0.0282	2.9745	0.0030
CONCEN_REDO_N0_PRCT	-0.0079	0.0071	-1.1165	0.2644
CVG_N0_H_PRCT	-0.0190	0.0062	-3.0684	0.0022
LOG_DEBT/L_SIZE	0.0344	0.0101	3.4088	0.0007
L_AGE	-0.0114	0.0046	-2.5097	0.0122
GOV_EFF	-0.0502	0.0124	-4.0364	0.0001
R-squared	0.03871	Mean dependent var		0.0455
Adjusted R-squared	0.03473	S.D. dependent var		0.0614
S.E. of regression	0.06032	Akaike info criterion		-2.7734
Sum squared resid	5.26902	Schwarz criterion		-2.7480
Log likelihood	2024.661	Hannan-Quinn criter.		-2.7639
F-statistic	9.7184	Durbin-Watson stat		0.7454
Prob(F-statistic)	0.0000	Wald F-statistic		8.4922
Prob(Wald F-statistic)	0.0000			

The variables codes are as before

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1455			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.000177	98.28559	NA
FCF_M108_1_T01P	0.000795	1.980277	1.360259
CONCEN_REDO_N0_PRCT	5.04E-05	7.215794	1.486689
CVG_N0_H_PRCT	3.83E-05	3.34657	1.368704
LOG_DEBT/L_SIZE	0.000102	33.02505	1.248343
L_AGE	2.08E-05	27.38806	1.129595
GOV_EFF	0.000155	45.50986	1.658226

The VIF analysis suggests that no multicollinearity between variables is present in the model, all VIF values are below 2.5.

Model 3b.1.2 Firm Variables and Government Effectiveness (Simple Interaction)

For all of the following models the variables that interact were centered. This reduced the VIF to an acceptable level below 2.5. Furthermore, the regression was run with Huber White robust standard errors.

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.030882	0.010779	2.864958	0.0042
FCF_M108_1_T01P_CENTERED	0.078342	0.024754	3.164802	0.0016
CVG_N0_H_PRCT_CENTERED	-0.01145	0.006735	-1.70003	0.0893
CON_REDO_NO_CENTERED	3.65E-05	7.75E-05	0.471455	0.6374
LOG_DEBT/L_SIZE	0.036724	0.010186	3.605445	0.0003
L_AGE	-0.01163	0.004601	-2.526772	0.0116
GOV_EFF_CENTERED	-0.05107	0.014079	-3.627589	0.0003
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.12983	0.063477	-2.045356	0.041
FCF_M108_1_T01P_CENTERED*CON_REDO_NO_CENTERED	-0.00212	0.001035	-2.048968	0.0406
FCF_M108_1_T01P_CENTERED*GOV_EFF_CENTERED	0.061498	0.143533	0.428456	0.6684
R-squared	0.04837	Mean dependent var		0.045505
Adjusted R-squared	0.042443	S.D. dependent var		0.061398
S.E. of regression	0.060081	Akaike info criterion		-2.779392
Sum squared resid	5.216079	Schwarz criterion		-2.743085
Log likelihood	2032.008	Hannan-Quinn criter.		-2.765846
F-statistic	8.160786	Durbin-Watson stat		0.748222
Prob(F-statistic)	0	Wald F-statistic		5.806715
Prob(Wald F-statistic)	0			

Model 3b.1.3 Firm Variables and Government Effectiveness (Triple Interaction)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.031277	0.010705	2.921687	0.0035
FCF_M108_1_T01P_CENTERED	0.052719	0.023129	2.279343	0.0228
CVG_N0_H_PRCT_CENTERED	-0.01322	0.006588	-2.00696	0.0449
CON_REDO_NO_CENTERED	3.30E-05	7.77E-05	0.423989	0.6716
LOG_DEBT/L_SIZE	0.035585	0.010001	3.558066	0.0004
L_AGE	-0.01099	0.004606	-2.38557	0.0172
GOV_EFF_CENTERED	-0.0537	0.014009	-3.83311	0.0001
FCF_M108_1_T01P_CENTERED*CON_REDO_NO_CENTERED	-0.05969	0.063446	-0.94085	0.3469
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.00153	0.00089	-1.71363	0.0868
FCF_M108_1_T01P_CENTERED*GOV_EFF_CENTERED	0.053268	0.136785	0.389425	0.697
FCF_M108_1_T01P_CENTERED*CON_REDO_NO_CENTERED*GOV_EFF_CENTERED	-0.00444	0.004641	-0.95687	0.3388
FCF_M108_1_T01P_CENTERED*CVG_N0_H_CENTERED*GOV_EFF_CENTERED	-0.01102	0.005906	-1.86518	0.0624
R-squared	0.052725	Mean dependent var		0.045505
Adjusted R-squared	0.045504	S.D. dependent var		0.061398
S.E. of regression	0.059985	Akaike info criterion		-2.78123
Sum squared resid	5.192209	Schwarz criterion		-2.73766
Log likelihood	2035.345	Hannan-Quinn criter.		-2.76497
F-statistic	7.30152	Durbin-Watson stat		0.74596
Prob(F-statistic)	0	Wald F-statistic		5.205181
Prob(Wald F-statistic)	0			

Model 3b.1.4 Firm Variables and Government Effectiveness (Triple Interaction, controlling for corporate governance & concentration interaction)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 181823				
Included observations: 1455 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.032624	0.011234	2.903967	0.0037
FCF_M108_1_T01P_CENTERED	0.045056	0.022467	2.005434	0.0451
CVG_N0_H_PRCT_CENTERED	-0.01597	0.008368	-1.907967	0.0566
CONCEN_REDO_N0_PRCT_CENTERED	0.000141	0.008538	0.016562	0.9868
LOG_DEBT/L_SIZE	0.036751	0.010505	3.498533	0.0005
L_AGE	-0.01159	0.004902	-2.364324	0.0182
GOV_EFF_CENTERED	-0.04943	0.014116	-3.501556	0.0005
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.03858	0.082054	-0.470184	0.6383
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.13883	0.083272	-1.667229	0.0957
FCF_M108_1_T01P_CENTERED*GOV_EFF_CENTERED	0.047187	0.143301	0.329287	0.742
GOV_EFF_CENTERED*CVG_N0_H_PRCT_CENTERED	0.039651	0.065116	0.608932	0.5427
GOV_EFF_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	0.096537	0.055085	1.352518	0.1799
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED*GOV_EFF_CENTERED	-0.64857	0.672745	-0.964068	0.3352
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED*GOV_EFF_CENTERED	-1.48111	0.492177	-3.00931	0.0027
R-squared	0.054888	Mean dependent var		0.045505
Adjusted R-squared	0.046361	S.D. dependent var		0.061398
S.E. of regression	0.059958	Akaike info criterion		-2.780767
Sum squared resid	5.180355	Schwarz criterion		-2.729936
Log likelihood	2037.008	Hannan-Quinn criter.		-2.761801
F-statistic	6.4374	Durbin-Watson stat		0.7490
Prob(F-statistic)	0.0000			

Model 3b.2. Firm Variables and Government Intervention

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1063 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0696	0.0163	4.2727	0.0000
FCF_M108_1_T01P	0.0550	0.0227	2.4217	0.0156
CONCEN_REDO_N0_PRCT	0.0021	0.0084	0.2485	0.8038
CVG_N0_H_PRCT	-0.0164	0.0087	-1.8867	0.0595
LOG_DEBT/L_SIZE	0.0474	0.0125	3.7979	0.0002
L_AGE	-0.0136	0.0062	-2.1805	0.0294
GOV_INT	-0.0653	0.0249	-2.6189	0.0089
R-squared	0.0300	Mean dependent var		0.0484
Adjusted R-squared	0.0245	S.D. dependent var		0.0651
S.E. of regression	0.0643	Akaike info criterion		-2.6435
Sum squared resid	4.3678	Schwarz criterion		-2.6108
Log likelihood	1412.0420	Hannan-Quinn criter.		-2.6311
F-statistic	5.4398	Durbin-Watson stat		0.6790
Prob(F-statistic)	0.0000	Wald F-statistic		6.7386
Prob(Wald F-statistic)	0.0000			

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1063			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.0003	91.6887	NA
FCF_M108_1_T01P	0.0005	1.4707	1.1472
CONCEN_REDO_N0_PRCT	0.0001	7.5325	1.2492
CVG_N0_H_PRCT	0.0001	2.9005	1.1964
LOG_DEBT/L_SIZE	0.0002	31.3791	1.3592
L_AGE	0.0000	30.6408	1.3736
GOV_INT	0.0006	89.0270	1.6968

The VIF analysis shows no sign of collinearity between variables

Model 3b.2.2 Firm Variables and Government Intervention (Simple Interaction)

For all of the following models the variables that interact were centered. This reduced the VIF to an acceptable level below 2.5. Furthermore, the regression was run with Huber White robust standard errors.

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1063 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0281	0.0140	2.0029	0.0454
FCF_M108_1_T01P_CENTERED	0.0552	0.0243	2.2672	0.0236
CONCEN_REDO_N0_PRCT_CENTERED	0.0021	0.0084	0.2476	0.8045
CVG_N0_H_PRCT_CENTERED	-0.0164	0.0088	-1.8730	0.0613
LOG_DEBT/L_SIZE	0.0474	0.0125	3.7986	0.0002
L_AGE	-0.0136	0.0063	-2.1530	0.0315
GOV_INT_CENTERED	-0.0650	0.0283	-2.2950	0.0219
FCF_M108_1_T01P_CENTERED*GOV_INT_CENTERED	-0.0061	0.2337	-0.0260	0.9792
R-squared	0.02998	Mean dependent var		0.0484
Adjusted R-squared	0.02355	S.D. dependent var		0.0651
S.E. of regression	0.06434	Akaike info criterion		-2.6417
Sum squared resid	4.36781	Schwarz criterion		-2.6043
Log likelihood	1412.042	Hannan-Quinn criter.		-2.6275
F-statistic	4.6583	Durbin-Watson stat		0.6790
Prob(F-statistic)	0.0000	Wald F-statistic		5.8250
Prob(Wald F-statistic)	0.0000			

Model 3b.2.3 Firm Variables and Government Intervention (Triple Interaction)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1063 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0265	0.0141	1.8819	0.0601
FCF_M108_1_T01P_CENTERED	0.0483	0.0266	1.8189	0.0692
CVG_N0_H_PRCT_CENTERED	-0.0147	0.0091	-1.6103	0.1076
CON_REDO_NO_CENTERED	0.0001	0.0001	0.8050	0.4210
LOG_DEBT/L_SIZE	0.0486	0.0126	3.8633	0.0001
L_AGE	-0.0131	0.0063	-2.0726	0.0385
GOV_INT_CENTERED	-0.0601	0.0284	-2.1150	0.0347
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	0.0092	0.1057	0.0867	0.9309
FCF_M108_1_T01P_CENTERED*CON_REDO_NO_CENTERED	-0.0005	0.0010	-0.5251	0.5996
FCF_M108_1_T01P_CENTERED*GOV_INT_CENTERED	-0.1915	0.2538	-0.7546	0.4506
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED*GOV_INT_CENTERED	-1.0901	1.0395	-1.0487	0.2946
FCF_M108_1_T01P_CENTERED*CON_REDO_NO_CENTERED*GOV_INT_CENTERED	-0.0120	0.0096	-1.2556	0.2095
R-squared	0.0328	Mean dependent var		0.0484
Adjusted R-squared	0.0227	S.D. dependent var		0.0651
S.E. of regression	0.0644	Akaike info criterion		-2.6371
Sum squared resid	4.3550	Schwarz criterion		-2.5810
Log likelihood	1413.606	Hannan-Quinn criter.		-2.6158
F-statistic	3.2435	Durbin-Watson stat		0.6753
Prob(F-statistic)	0.0002	Wald F-statistic		4.3355
Prob(Wald F-statistic)	0.0000			

Model 3b.2.3 Firm Variables and Government Intervention (Triple Interaction, controlling for corporate governance & concentration interaction)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1063 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0280	0.0141	1.9923	0.0466
FCF_M108_1_T01P_CENTERED	0.0451	0.0266	1.6962	0.0901
CVG_N0_H_PRCT_CENTERED	-0.0164	0.0099	-1.6550	0.0982
CONCEN_REDO_N0_PRCT_CENTERED	0.0032	0.0098	0.3246	0.7455
LOG_DEBT/L_SIZE	0.0489	0.0127	3.8643	0.0001
L_AGE	-0.0140	0.0064	-2.1800	0.0295
GOV_INT_CENTERED	-0.0514	0.0280	-1.8340	0.0669
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	0.0271	0.1057	0.2566	0.7975
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.0407	0.1030	-0.3951	0.6929
FCF_M108_1_T01P_CENTERED*GOV_INT_CENTERED	-0.2398	0.2611	-0.9185	0.3586
FCF_M108_1_T01P_CENTERED*GOV_INT_CENTERED*CVG_N0_H_PRCT_CENTERED	-1.3345	1.1464	-1.1640	0.2447
FCF_M108_1_T01P_CENTERED*GOV_INT_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-1.9084	1.0152	-1.1800	0.1604
GOV_INT_CENTERED*CVG_N0_H_PRCT_CENTERED	0.0539	0.1017	0.5296	0.5965
GOV_INT_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	0.1418	0.0957	1.4820	0.1387
R-squared	0.0340	Mean dependent var		0.0484
Adjusted R-squared	0.0221	S.D. dependent var		0.0651
S.E. of regression	0.0644	Akaike info criterion		-2.6346
Sum squared resid	4.3495	Schwarz criterion		-2.5691
Log likelihood	1414.275	Hannan-Quinn criter.		-2.6098
F-statistic	2.8443	Durbin-Watson stat		0.6748
Prob(F-statistic)	0.0005	Wald F-statistic		3.8203
Prob(Wald F-statistic)	0.0000			

Model 3b.3.1 Firm Variables and Market Development

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1285 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0337	0.0118	2.8625	0.0043
FCF_M108_1_T01P	0.1001	0.0328	3.0493	0.0023
CONCEN_REDO_N0_PRCT	0.0085	0.0071	1.1936	0.2329
CVG_N0_H_PRCT	-0.0081	0.0074	-1.0925	0.2748
LOG_DEBT/L_SIZE	0.0433	0.0120	3.6049	0.0003
L_AGE	-0.0184	0.0051	-3.6395	0.0003
MKT_DEV	-0.0062	0.0068	-0.9174	0.3591
R-squared	0.0334	Mean dependent var		0.0461
Adjusted R-squared	0.0289	S.D. dependent var		0.0629
S.E. of regression	0.0620	Akaike info criterion		-2.7174
Sum squared resid	4.9154	Schwarz criterion		-2.6893
Log likelihood	1752.9040	Hannan-Quinn criter.		-2.7068
F-statistic	7.3627	Durbin-Watson stat		0.6952
Prob(F-statistic)	0.0000	Wald F-statistic		6.2582
Prob(Wald F-statistic)	0.0000			

Variance Inflation Factors			
Sample: 1 182215			
Included observations: 1285			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	0.0001	56.7176	NA
FCF_M108_1_T01P	0.0011	2.0993	1.4793
CONCEN_REDO_N0_PRCT	0.0001	5.9273	1.1420
CVG_N0_H_PRCT	0.0001	2.2763	1.0529
LOG_DEBT/L_SIZE	0.0001	35.0396	1.4274
L_AGE	0.0000	23.8987	1.1084
MKT_DEV	0.0000	5.8909	1.2439

The VIF analysis shows no significant collinearity between variables

Model 3b.3.2 Firm Variables and Market Development (Simple Interaction)

For all of the following models the variables that interact were centered. This reduced the VIF to an acceptable level below 2.5. Furthermore, the regression was run with Huber White robust standard errors.

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1285 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0323	0.0123	2.6303	0.0086
FCF_M108_1_T01P_CENTERED	0.0690	0.0223	3.0880	0.0021
CVG_N0_H_PRCT_CENTERED	-0.0017	0.0077	-0.2176	0.8278
CON_REDO_NO_CENTERED	0.0002	0.0001	2.8330	0.0047
LOG_DEBT/L_SIZE	0.0441	0.0117	3.7626	0.0002
L_AGE	-0.0170	0.0049	-3.4635	0.0006
MKT_DEV_CENTERED	-0.0119	0.0071	-1.6803	0.0932
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.1416	0.0954	-1.4854	0.1377
FCF_M108_1_T01P_CENTERED*CON_REDO_NO_CENTERED	-0.0026	0.0012	-2.2821	0.0226
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED	0.1532	0.1427	1.0735	0.2833
R-squared	0.0459	Mean dependent var		0.0461
Adjusted R-squared	0.0391	S.D. dependent var		0.0629
S.E. of regression	0.0617	Akaike info criterion		-2.7257
Sum squared resid	4.8520	Schwarz criterion		-2.6855
Log likelihood	1761.2460	Hannan-Quinn criter.		-2.7106
F-statistic	6.8124	Durbin-Watson stat		0.7042
Prob(F-statistic)	0.0000	Wald F-statistic		4.8212
Prob(Wald F-statistic)	0.0000			

Model 3b.3.3 Firm Variables and Market Development (Triple Interaction)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1285 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0338	0.0125	2.7097	0.0068
FCF_M108_1_T01P_CENTERED	0.0779	0.0248	3.1369	0.0017
CVG_N0_H_PRCT_CENTERED	-0.0019	0.0098	-0.1953	0.8452
CONCEN_REDO_N0_PRCT_CENTERED	0.0208	0.0085	2.4434	0.0147
LOG_DEBT/L_SIZE	0.0423	0.0120	3.5275	0.0004
L_AGE	-0.0170	0.0053	-3.2064	0.0014
MKT_DEV_CENTERED	-0.0118	0.0090	-1.3102	0.1904
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.0970	0.1206	-0.8047	0.4211
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.0198	0.0880	-2.2543	0.0243
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED	0.0236	0.1173	0.2011	0.8407
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.4139	0.5119	-0.8086	0.4189
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.0061	0.3494	-1.7332	0.0833
R-squared	0.0489	Mean dependent var		0.0461
Adjusted R-squared	0.0406	S.D. dependent var		0.0629
S.E. of regression	0.0616	Akaike info criterion		-2.7257
Sum squared resid	4.8369	Schwarz criterion		-2.6775
Log likelihood	1763.2580	Hannan-Quinn criter.		-2.7076
F-statistic	5.9453	Durbin-Watson stat		0.7123
Prob(F-statistic)	0.0000			

Model 3b.3.4 Firm Variables and Market Development

(Triple Interaction, controlling for corporate governance & concentration interaction term)

Dependent Variable: UE_M108_1LT0				
Method: Least Squares				
Sample (adjusted): 64 178174				
Included observations: 1285 after adjustments				
Huber-White-Hinkley (HC1) heteroskedasticity consistent standard				
errors and covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0335	0.0125	2.6820	0.0074
FCF_M108_1_T01P_CENTERED	0.0782	0.0250	3.1327	0.0018
CVG_N0_H_PRCT_CENTERED	-0.0016	0.0107	-0.1455	0.8844
CONCEN_REDO_N0_PRCT_CENTERED	0.0196	0.0090	2.1817	0.0293
LOG_DEBT/L_SIZE	0.0425	0.0120	3.5370	0.0004
L_AGE	-0.0170	0.0053	-3.1988	0.0014
MKT_DEV_CENTERED	-0.0103	0.0111	-0.9200	0.3578
FCF_M108_1_T01P_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.0992	0.1225	-0.8094	0.4184
FCF_M108_1_T01P_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.0192	0.0894	-2.1458	0.0321
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED	0.0187	0.1204	0.1555	0.8765
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED*CVG_N0_H_PRCT_CENTERED	-0.3832	0.5628	-0.6810	0.4960
FCF_M108_1_T01P_CENTERED*MKT_DEV_CENTERED*CONCEN_REDO_N0_PRCT_CENTERED	-0.0067	0.3854	-1.7458	0.0811
CVG_N0_H_PRCT_CENTERED*MKT_DEV_CENTERED	-0.0053	0.0493	-0.1084	0.9137
CONCEN_REDO_N0_PRCT_CENTERED*MKT_DEV_CENTERED	0.0171	0.0417	0.4094	0.6823

R-squared	0.0490	Mean dependent var		0.0461
Adjusted R-squared	0.0393	S.D. dependent var		0.0629
S.E. of regression	0.0617	Akaike info criterion		-2.7227
Sum squared resid	4.8362	Schwarz criterion		-2.6665
Log likelihood	1763.3500	Hannan-Quinn criter.		-2.7016
F-statistic	5.0376	Durbin-Watson stat		0.7137
Prob(F-statistic)	0.0000			