RADBOUD UNIVERSITY

Nijmegen School of Management

How uncertainty avoidance affects firm investments after a crisis

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By I. Y. de Graaff (S4359569)

Abstract :

The relationship between uncertainty avoidance and private investments is found negative after a crisis by Inklaar and Yang (2012). This thesis has further analyzed through which channels uncertainty avoidance affects the private investments. First, the relationship between uncertainty avoidance and firm size distribution and the level of internationalization is examined on the country level. Secondly, the interaction between uncertainty avoidance and firm size/internationalization on investments is analyzed on the firm level. Results indicate that uncertainty avoidance negatively affects the firm size distribution in a country. Uncertainty avoidance weakens the positive relationship between firm size and investments. On the other hand, uncertainty avoidance strengthens the relationship between internationalized firms and investments. This indicates that uncertainty avoidance does affect the private investments of a country by its moderating effect on the relationship between firm size and investments.

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1. Introduction

The crisis that initially began with the fall of Lehman Brothers in 2008 has shown that its impact differs across nations and economic sectors, in many countries the crisis has remained a significant influence well into the middle of this current decade (Kräussl et al., 2016). The difference in impact was caused in part by the different natures of the crisis. In the EU, most governments faced huge budget deficits because of the financial crisis, which consequently lead to a new crisis, namely the European sovereign debt crisis. As one might expect, the differences in the nature of the crisis faced by countries, resulted in strong differences regarding the economic performance after the crisis.

One of the effects of this crisis is that it slows down the investments in a country both during and after the crisis. Investments are regarded as one of the drivers of economic growth and during the crisis investments both publicly and privately dropped significantly (Inklaar & Yang, 2012). The investment of firms depends, among other factors, on current and future sales. In an economic downturn, the future sales are expected and therefore projected to decrease. Consequently, the profit of firms will normally decrease which results in the reduced availability of internal funds which are available for investments.

Firms normally prefer internal funds above external funds for different reasons, but most importantly internal funds are more flexible**.** When the internal funds are not sufficient, firms can use external funds in addition to internal funds. External funds can be obtained by debt or equity. Debt is mostly provided by banks and equity is provided in the markets. According to the pecking order theory, firms prefer to finance their investments with internal funds above debt, and they prefer debt finance above equity (Myers & Maljuf, 1984). Debt is less costly for firms, and the interest payments are deductible, while equity is more costly because it results in a claim on future profits. In financial distress, the access to credit decreases as banks are unwilling (or restricted) to provide funds and raise their interest rates and financial markets are more volatile, which makes issuing equity more costly as equity will be undervalued (Myers & Maljuf, 1984).

Another critical determinant of investments is the irreversibility of investments. An investment is generally irreversible since the expenditures cannot be recovered (Dixit & Pindyck, 1994). Getting more information can give firms the advantage in deciding to invest or not because the investments expenditures cannot be recovered. In a crisis, uncertainty about future market conditions increases, and this could result in firms postponing more of their investment opportunities (Bloom et al., 2007).

Since uncertainty plays a role in the investment decision of a firm, it is not surprising that higher levels of uncertainty avoidance result in fewer investments. Uncertainty avoidance is one of the six dimensions developed by Hofstede (2001). High levels of uncertainty avoidance indicate that people in a country are feeling uncomfortable and threatened with an unknown future (Hofstede, 2001). The recent financial crisis (known in the press and to the public as the great recession) is a period in which uncertainty increases (Bloom, 2009) and thus it is likely that firms will reduce their

investments in this period. Inklaar and Yang (2012) studied whether the response, investments, towards a more uncertain environment, a crisis, differs between countries. Using a dataset consisting of 74 countries for the period 1970-2005, they found that countries with a high degree of uncertainty avoidance have a significantly lower rate of private investment relative to their Gross Domestic Product (GDP) after a crisis. Three types of crises were taken into account: currency crisis, banking crisis and debt crisis. No differences were found between the three type of crisis, the influence on investments and the relation to uncertainty avoidance. While theory suggests that a currency crisis affects the decisions of multinationals to invest in their subsidiaries and a banking crisis has a more pronounced effect on shifting (relocating) savings into investments and a debt crisis will affect the access of firms to international debt markets. It seems that every type of crisis increases the uncertainty, which affects the investments of firms. Besides the nature of a crisis, Inklaar and Yang (2012) take several country characteristics into account through which uncertainty avoidance may influence investments. Such characteristics are documented governance indicators (e.g. employment protection, adjustment cost of capital), openness to trade, financial transparency, foreign direct investment and financial development. None of these factors appears to explain the relationship between uncertainty avoidance and lower private investments after a crisis (Inklaar & Yang, 2012).

The relationship between uncertainty avoidance and lower private investments is clear and seems logical if uncertainty 'is assumed' as an essential determinant of investment. Through which mechanism uncertainty avoidance results in lower investments is not clear. Van den Heuvel's (2015) further analyses of the relationship of uncertainty avoidance to lower private investments after a crisis and the mechanisms through which private investments are affected by uncertainty avoidance. This study compared Ireland and Spain, which have significant different levels of uncertainty avoidance but experienced a very similar crisis. The investment of Ireland returned earlier to the pre-crisis level than the investments in Spain. The findings of Van den Heuvel (2015) suggest that the openness of a country and the size of firms might play a role in explaining the relationship between uncertainty avoidance and investments.

This thesis will further analyze the mechanisms through which uncertainty avoidance affects investments. The findings of Van den Heuvel are the starting point of this research. Since Van den Heuvel suggested that openness and firm size might play a role, this research wants to provide an answer to whether the nature (openness and size) of a firm influences the investments after a crisis. The nature of a firm, in terms of size and international diversity-foreignness, is regarded as a predictor of the level of investments after a crisis. The reasoning is that uncertainty avoidance affects the internationalization of firms because the higher the levels of uncertainty avoidance the more resistance towards the risk of operating in the international markets. Furthermore, larger firms are expected to operate to a greater degree in international markets and therefore uncertainty avoidance is also expected to be related to the firm size within a country. The research question is as follows: How does

uncertainty avoidance affect the private investments of a country after a crisis.

  The next chapter discusses several determinants that can influence the investment decisions and provide an overview of some empirical findings while chapter 3 outlines the methodology and describes the data. In chapter 4, the results of the analysis and a discussion of the outcomes are reviewed, and the conclusions are presented in chapter 5 followed by the discussion in the last chapter.

2. Investment decision

In this chapter, the different determinants of the investment decision of a firm are discussed. First, the internal operating conditions that influence the investment decision of a firm are discussed, followed by the external operating situations that affect the investment decisions of a firm. In section 3, the determinants of firm size and international perspectives and exposure are discussed as related to their relationship with uncertainty avoidance. From there the empirical findings of the relationship between the investments, type of firm (small, large, multinationals, etc.) and internationalization of firms are presented. This chapter ends with conclusions and the formulation of the hypothesis.

2.1 Internal conditions of the firm

Many different investment theories can explain why firms choose to invest. Most of these theories can be categorized into either the internal conditions of a firm and/or the external conditions of a firm. With respect to the internal conditions of a firm, the most important determinants are (1) sales and demand, (2) the selected ways and means of financing and (3) the irreversibility of investment. These three primary determinants are discussed in this section.

2.1.1 Profitability of a firm

The investment decision of a firm can be viewed as a function of total future sales and the initial cost of the project. If the future sales of the firm are expected to rise in the short run, the firm is willing to invest in, for example, extra inventory. If the future sales are expected to increase in the long term, a firm is more likely and willing to invest in, for example, new plants or equipment. The decision of a firm to invest is therefore partly based on the future expectations. In contrast, if sales are expected to decrease, a firm may elect to decrease their investments. In other words, the expected or predicted performance of a firm is important in the decision and the ability to invest in new assets.

Profitability is one performance measure of a firm. If a firm has a high profitability it has more opportunities to expand, which could be in terms of both investments in plants, equipment and employees. In Neo-classical economics sales revenue and profitability are considered as some of the key determinants of investments (Modigliani & Miller, 1958). Furthermore, the investment decision is also based on the availability of funds. The availability of internal funds is determined by the profitability of a company and in turn the profits are determined by the sales and operating costs of a firm. Higher sales volumes most often result in higher profits, which can increase the availability of the internal funds available for investments. In the next section, the financing decision of firms are discussed.

2.1.2 Financing

Standard economic theory assumes that capital markets are perfect and as a result, the financial structure of substituting internal financing for external financing does not matter. The assumption of

perfect capital markets is often challenged and due to asymmetric information and agency problems which induce extra cost, capital markets are often found to be imperfect, consequently, there is a gap between the cost of internal and external financing (Hüttel, Mußhoff, & Odening, 2010). With the assumption that perfect capital markets no longer hold, a firm cannot/may not raise as much financing as it desires (Fazzari et al. (1988). Consequently, the financial structure does matter and that the investment decision is made on the basis of, among others, (1) the availability of internal finance, (2) access to new debt or equity finance and (3) other financial factors (Audretsch & Elston, 2002). As a result, the investment decisions are influenced by the availability of internal and external funds. Internal funds are usually more flexible in use and less costly due to the absence of transaction costs. There are different reasons for explaining why firms might opt for using internal or external financing and one of these is the liquidity theory, which elaborates and expands on information asymmetry and agency costs.

2.1.2.3 Asymmetric information

Due to asymmetric information[1], internal finance is preferred above external finance. The two primary problems that arise as a result of asymmetric information are (1) the rationing of credit and incorrect/wrong signalling. The asymmetric information problems experienced between firms and lenders results in an adverse selection by the lender. When market interest rates increase, and the lender is often not able to differentiate the quality (firm's probability of repaying the loan) between the borrowers and many times the result is that the borrowers that leave the credit markets are the ones with the highest quality. As a result, the borrowers that remain in the credit markets are the ones with the lowest quality, which results in subsequent increases in interest rates (Stiglitz and Weiss, 1981). One can, therefore, conclude that due to this asymmetric information problem, firms are forced to use their internal funds rather than opt for external financing. In general, large firms can more easily provide financial information on the quality of their business than can small firms. Therefore, it is often easier for larger firms to receive a fairly priced (lower interest rate) loan.

The other possibility is that asymmetric information leads firms to prefer to seek external finance debt over equity (Myers and Majluf, 1984). The issuance of debt can give the signal that an investment is profitable and indicates that the firm's worth is undervalued. While issuing equity does just the opposite and signals that the value of the firms is overvalued resulting in the lowering (dropping) of a firm's share price. In industries where investments are primarily intangible assets, this theory does not hold, because these companies have little collateral the cost of debt is higher for these companies.

The problem of information asymmetry very often increases the financial constraints for firms. Empirical evidence also shows that firms that face higher information asymmetry are more dependent on their cash flows (Devereux and Schiantarelli, 1990; Kadapakkam et al., 1998). This means that

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[1] Asymmetric information is a situation in which one party has more information than the other party involved in a transaction.

firms that cannot overcome the problem of information asymmetry are forced to use more internal funds than external funds which lead to under investments. Another potential issue is that smaller firms are not able to issue securities on the open market and get necessary financing. These firms are limited in their options and can only opt for other sources of credit, such as bank lending or borrowing from relatives (Loungani and Rush, 1995). This situation makes these companies more sensitive to a credit shock and in turn it results in a reduction of their financial resources. Investments in these companies will drop during a crisis because of their limited sources of credit.

2.1.2.2 Agency cost

Two kinds of agency costs can occur from external financing sources, namely the agency cost of debt and the agency cost of equity (Jensen and Meckling (1976). In the case of agency cost of equity, a conflict between shareholders and the management results in rising costs of equity. Managers are generally interested in achieving their own financial targets. These targets are often measured in terms of sales maximization. This can conflict with the firm value, which is generally the most important for shareholders. In order for shareholders to control and maximize a firm's shareholder value, they must closely monitor the behaviour of the firm's management, but this brings extra costs. These extra costs are regarded as the agency cost of equity.

The relation between debt-holders and managers is a bit different, the debt-holders lend money to the managers at a particular interest rate. The interest rate is a premium for the risk associated with a firm default. Managers may try to transfer the value of the firm from the creditors to their shareholders, which would increase the probability of a firm default. Debt holders bear the costs to monitor and control the actions of the firm's senior management, which result in higher agency cost of debt (i.e. interest rates).

For firms, the effect of agency cost of debt and agency cost of equity will differ on the size of the firm. Small, closely held firms with limited ownership, will have lower agency cost of debt because the cost of control and monitoring the owners is reduced. (Ang, Cole & Lin, 2000).

2.1.3 Uncertainty

Standard economics predicts that the investment decision of firms is based on the net present value (NPV). The calculation of the NPV consist of two steps. First, the present expected value stream of profits that an investment will generate must be calculated. Second, the present value of the expected costs generated by the investments must be calculated. The differences between those two calculations, the NPV, should be higher than zero. If it is sufficiently higher than zero a firm should decide to invest. The issues of future market uncertainty conditions, such as inflation and discount rates, are adjusted with mathematical models and added to the calculation. The NPV method, however, may value threat uncertainty to simplistically or uses assumptions that do not hold in reality. The most critical issues which are not taken into account with NPV are the irreversibility of investments, the

timing of investments and the uncertainty of the future profits for the investments. These issues will be discussed by using the option approach model.

2.1.3.1 Irreversibility

The NPV rule is based on the assumption that investments are reversible, meaning that investments can be "undone" and the expenditures can be recovered if "somehow "the market conditions were not as favourable as expected. If according to standard economics, investments are irreversible, that investment is a "now or never" proposition. That means that if the investment is not performed at this moment in time, it cannot be done in the future. The theory of irreversibility is based on the work of Dixit & Pindyck (1994)

Most investments do not meet these assumptions. The irreversibility of investment and the option for firms to delay an investment, undermine standard economic theory. Although these factors are important for the investment decision of firms, investments are irreversible when they are firm-specific. Examples such as advertisement and marketing investment are ones that cannot be recovered. An investment which is industry specific are irreversible or at least partially irreversible. Firm-specific investment for industry-specific machinery is also an example of unrecoverable costs. If a firm wants to recover the expenditures of an investment in machinery it purchased, it must sell it to other firms in the specific industry. Assuming that the industry is reasonably competitive, and the equipment is not customized, the value of the machinery will be roughly the same, so there is not much gain from selling the machinery. If the firm is selling the machinery due to a shock and reduction in the demand, other firms in the industry will be facing the same shock, so they wouldn't be able to buy the equipment because they face the same market conditions. In this case, the investment is irreversible or partly irreversible when, if it has any value, it will be sold at a steeply discounted value. Even if the investment is not industry or firm-specific, the investment may be partly irreversible. For example, if the investment was a truck, an airplane or a car. If for any reason the firm wants to recover the expenditure of the investment buyers in the market for used trucks, airlines or cars do not know the "true" quality of the machinery. Therefore, the price offered by the buyers corresponds with the "average" quality of the trucks, airlines or cars in the market. As a result, since the sellers know the quality of their products (trucks, airplanes or cars) will be reluctant to sell them at a below-market price. This, in turn, results in a lower than average market quality and therefore lower prices. This is also referred to as "The market for lemons" (Akerlof, 1970) and has a consequence these investments are often partly irreversible. Investments can also become irreversible due to changing government regulations and institutional arrangements. For instance, capital controls could make it impossible for foreign firms to sell their assets and reallocate their funds or Institutional arrangements could result in higher cost of dismissing (firing works and staff) which make investments in new employees costly and the same can be true for hiring and training of new employees (Dixit & Pindyck, 1994).

Due to the fact that investments are mostly, irreversible firms might opt to delay their

investments in order to get added or better information. However, it is not always possible to delay investments. Some investments are necessary in situations where firms must react quickly based upon competition. Although it is for the most part always possible to delay investments, it is not always desirable. Delays result in risks, either from higher costs and the loss of competitive advantage. On the other hand, a firm can benefit from delaying an investment if it is able to receive new investment information which is beneficial for a firm. When risks are considered the benefits of delaying an investment are mostly recognized as higher costs.

The Option Approach of investments states that the investment opportunity of a firm is comparable with a financial option. In other words, the firm has the opportunity to invest and can decide whether to spend money now or in the future. Then in return for acting on the investment opportunity, the firm receives an asset with a particular value.

2.2 Country level influences

The external conditions that influence the future investment of a firm have more macroeconomic characteristics. The expectation of a firm determines, for a large part, whether or not a firm will invest. If a firm expects an increase in demand (sales), as a result of market economic expansion, it will decide the invest. A decrease in demand, due to an economic recession, will decrease the potential to invest. Furthermore, sales are an essential ingredient for firms to determine if they will invest. If sales increase or are projected to rise, then investments will increase, if sales decreases then investment are more than likely to decrease. The same reasoning is true for the profits of a firm. The determinants of investment are, to a large extent, influenced by macroeconomic indicators such as economic output and government policies. In this section, the effect of the financial system, economic output and government policies in a country related to the investment decision of a firm are discussed.

2.2.1 Market based versus bank based

External financing can be obtained through many different kinds of channels. These can be divided into market-based and bank-based financing. In Europe, most countries tend to be more bank-based economies, which indicates that most firms will use banks to get external financing, however, since the 1990's it has been recognized that the success of market-based economies has been an accelerator of economic growth and increasingly more countries are moving towards market-based economies. The differences in the performance and importance of both market-based and bank-based economies are described for firms reviewing their options when financing investments.

Figure 1, The financial system
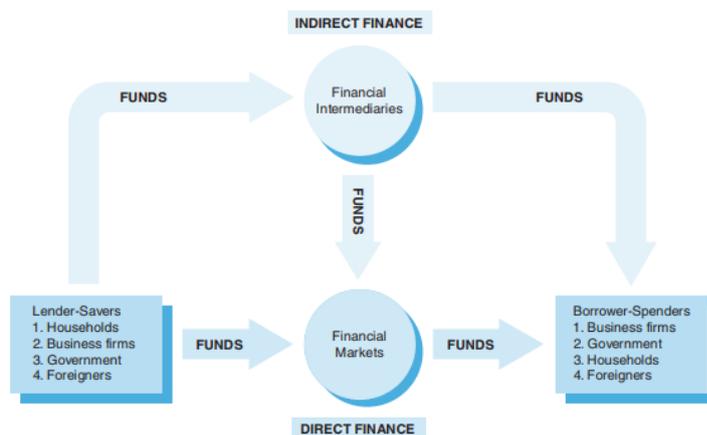
Mishkin & Serletis, 2011

The left side of figure 1 represents groups and entities that have saved money which can then be lent to the right side, which are groups and entities that need finance for investments. The vehicle by which the funds are transferred can either be directly (market-based), in which the funds are transferred through financial markets; financial markets are markets on which actors can issue and

trade securities, or groups can also obtain funds indirectly (bank based), in which financial intermediaries obtain funds from the savers and use these savings as loans to the spenders. Financial intermediaries are most commonly, banks, insurance companies, mutual funds, etc. (Levine, 2005)

A crisis affects both financing (debt) systems in different ways. The crisis is a result of an external shock that hits the firm's domestic market, the financial markets are becoming less liquid and market prices for firms decline. Bank-based systems are typically focused on long-term close client relations, which, in times of crisis, allows them to continue lending to the firms. Due to close bank and client firm relationships, banks have more inside and trusted information of the firm and therefore can better monitor the lending risk. On the other hand, market-based systems will generally suffer from such a crisis. Because those markets have weaker relations and less information, they are therefore less capable of distinguishing between profitable firms and non-profitable firms (Schmukler & Vesperoni, 2001).

This reasoning, however, changes when the last financial crisis of 2008 is taken into account. In the case of 2008, the financial crisis was more severe for bank-based economies than it was for market-based economies. In a bank-based economy, banks tend to overextend and misallocate credit (discount risk) in times of robust economic growth and in a deep crisis, banks ration and severely limit credit more than market-based economies (Pagano et al. 2014). The performance of a bank-based system during a crisis depends on the stability of the total financial system (public/government central and private banking). The stability can, however, be influenced by systematic risk. The systematic risk, as defined as the disruption in the flow of financial services, can result in the deterioration of the financial system and has negative longer term consequences for the real economy. Banks usually are very leveraged, because in times of economic growth the assets on the balance sheet rise and banks can get a higher return (interest) on their equity. In contrast, in a financial crisis the value of the balance sheet assets decreases, and banks must raise capital and decrease their balance sheets, in order to fulfil the mandatory liquidity (stress test) requirements (Bats & Houben, 2017). It can, therefore, be concluded that the nature of a crisis depends on how well a financial system handles such a crisis. The research presented here is focused on the last financial crisis where market-based systems seemed to have an advantage over bank-based systems when it came to functioning of both systems. This seemed to indicate that market-based economies recovered earlier from the crisis and investments recovered and increased earlier or showed less of a decrease, after the crisis.

2.2.2 Economic output
Growth in Gross Domestic Product (GDP) in most cases stimulates firms to invest. The firm's investment decision is based on the profitability of the investment and the future cash-flow, market share growth and increase in shareholder value it will generate. If the GDP of a country declines the profit and cash-flow will also decrease and therefore the firm will most often postpone the investment. Furthermore, a decline in GDP also indicates a decline in the general activity in an economy. It is an

indicator of a decline in demand, lower productivity growth or a sign of imperfections in the financial markets. Several theories are building upon the concept of the positive relationship between GDP and business investments (Keynes, 1936; Kalecki, 1937, demand driven decision), (Chenery, 1952, with the accelerator principle) and (Hall and Jorgenson, 1967; Jorgenson, 1971; Chirinko, 1993, with the Sales principle). These theories have a common thread and predict that an economic downturn leads to delaying the investment decision of firms.

The predicted or expected economic results are a critical determinant of the investment decision and a change in the greater economic output affects all related firms in their investment decision. Several studies have found that investments (positive or negative) are indeed correlated with the output of a country. In the United States (US) economic output is proven to be one of the main determinants to the extent that and the degree firms invest. (Griliches and Wallace, 1965; Bischoff, 1969; Jorgenson, 1971). In Europe, the same investment relationship was identified by Barkbu et al. (2015) and was found to be especially evident in Spain. It is important to note that, during the most recent crisis, the decline in economic output did not accurately forecast the decline in investments. The difference between the predicted investment decline and actual investment decline can be explained by (1) financial constraints, (2) high uncertainty and (3) corporate sector leverage.

2.2.3 Government
The investment decision is also influenced by individual country characteristics and more specifically by the policies and institutions in that country. The influence of a countries' government on the investment decisions is important in the sense that the political circumstances, social environment and government regulations, can have an impact on the investment decision. The political environment is critically important for a country and can increase investment risks when the political environment in a country change. If governments decide to change policy or institutions, this can hugely affect the investment decision for the firms. The situation when a government changes its policy or institutions is regarded as political risk (Busse & Hefeker, 2007).

The most direct and important change a government makes is to its system of taxation. The taxes in a country are an important factor for firms when considering investments. For instance, when taxes on capital are higher, the cost of capital also becomes higher (Summers et al., 1981; Auerbach and Hassett, 1992; Cummins, Hassett and Hubbard, 1996). One of the main determinants of an investment decision is whether the return on investments is higher than the cost of capital. Therefore, higher taxes can result in a decline in investments. Several studies have found a negative relationship between taxes and investments. A distinction needs to be made between corporate, personal income, consumption (sales) and property taxes. Unsurprisingly, corporate taxes are found to be most harmful to business investments (McBride, 2012; Arnold et al., 2011). However, tax rate considerations are more important for large firms than for smaller firms when it comes to the investment decision process. (Alam and Stafford, 1985). It is interesting to note that small firms might not even take tax rates into

account when they make their investment choices. (Bialowolski & Weziak-Bialowolska, 2014).

In addition to tax rates, a government can also indirectly affect the rate of return on investments. The rate of return can be greatly influenced by the proper and efficient operations of a countries institutions. The government can change these institutions in favour of a particular group or class of firms (Child and Yuan 1996; Nelson 2005), for example, domestic over international firms. Moreover, the specific regulations in a specific country are important for the overall investment strategy of a firm because it can directly influence the return on investments (Ozorio et al. 2013). For example, if a firm elects to invest in green energy and the government is subsidizing green energy, it will increase the companies rate of return for the subsidized investment. subsidized.

2.2.4 Uncertainty avoidance

In this section, the role of uncertainty avoidance with respect to financial constraints receives further elaboration. Uncertainty avoidance is one of the six cultural dimensions outlined by Hofstede (2001) and is to a large degree why people feel threatened by ambiguous or unknown situations. Hofstede (2001) developed the Hofstede index by doing a worldwide survey of the employees working at IBM.

A brief summary of the characteristics of a country that scores high on uncertainty avoidance is given for a better understanding of uncertainty avoidance. Before doing so, it must be mentioned that uncertainty avoidance must not be confused with risk avoidance. The latter is about an event which carries a degree of risk. The risk can be calculated by the probabilities the event occurs. While uncertainty does not carry a probability, it is about situations in which anything can happen but no one does know what is going to happen (Hofstede, 2001).

The societal members in countries that score high on uncertainty avoidance are characterized by getting nervous and feel threatened in situations which are considered uncertain (unstructured, unclear and unpredictable). In order to avoid such situations and to cope with the unpredictability, these countries have strict codes of behaviour and beliefs (Merkin, 2006; Bae et al., 2012). In both, high and low uncertainty avoidance countries, individuals are prepared to take risk. The difference between the high and low uncertainty countries regarding risk is, that in low uncertainty countries risk taking includes unknown risk, and in high uncertainty avoidance countries risk taking includes only known risk (Hofstede, 2001). Another feature that characterizes high uncertainty avoidance countries is that of more fear of things foreign. Countries scoring high on uncertainty avoidance see things that are different as dangerous while countries scoring low on uncertainty avoidance are curious when things are different. (Hofstede, 2001). Consequently, firms within countries scoring high on uncertainty avoidance could behave differently from those within countries scoring low on uncertainty avoidance.

It has been identified that that firms within countries which have a high degree of uncertainty avoidance will not take the unknown risk. Managers of firms active in high uncertainty avoidance countries tend to lower the dividend payouts of financial and non-financial firms (Bae et al., 2012;

Zheng & Ashraf, 2014). Indicating that shareholders of these firms prefer a certain low payout of dividend instead of an uncertain high level of dividend. Further, the managers of these firms prefer to keep more cash instead of paying dividend in order to deal with the situation of financial distress (Zheng & Ashraf 2014). Gleason et al. (2000) argued that firms with lower levels of debt in their capital structure believe that debt leads to a higher probability of bankruptcy. In addition, higher degrees of conservatism in a country, which could be associated with uncertainty avoidance, results in lower corporate debt ratios (Chui et al., 2002).

Countries with high levels of uncertainty avoidance are more averse to debt and this could result in less investment because not all investment opportunities can be financed with internal credit. In a crisis, uncertainty avoidance can be of even more important because the output of firms will decrease and as a result, the availability of internal credit will decline. During a crisis, the circumstances are even more unknown, which makes firms even more debt adverse which results in a continuing and growing investment declines. Firms with a lower level of uncertainty avoidance could use debt financing during a crisis if the firm runs out of internal resources. Consequently, the investments reduction by firms in a country with low uncertainty avoidance will ease.

The counter issues also holds, when firms are less willing to obtain debt they subsequently need more internal funds for investments during times of economic growth. Since these firms feel threatened and at risk by unknown future events, it can cause them to increase its savings in the event of economic downturns. If an economic crisis starts a firm can use their savings (internal funds) to carry out investments. With a rise in uncertainty because of a crisis, firms will most likely postpone investments even when they have sufficient financial resources.

2.3 Firm size, internationalization and investments

In this section, the factors the size of a firm and the degree that they have international business interests are discussed. The potential relationship between uncertainty avoidance and the size of a firm along with uncertainty avoidance and the international nature of firms are discussed.

2.3.1.1 The size of firms and uncertainty avoidance

The size of a firm is affected by many different factors. The most important factors that affect the size of a firm are the development of the financial system in a country, its access to foreign markets and its overall size in relation to the economy.

The growth rate of a firm is negatively affected by the lack of available external funds. The lack of available external funds makes it difficult for firms to invest in the growth of the company. A better developed financial system results in easier access to credit. The effect of a financial developed system can either be negative or positive on the size of firms. A more developed financial system can result in an increase of startup or "newborn" firms, which will decrease the average size of firms in a country. On the other hand, it can result in the sustained growth by existing firms through superior access to external funds (Rajan & Zingales, 1998). Kumar et al. (1999) studied the effect of financial development on the size of firms and the empirical results indicated that the size of firms which are dependent on external finance is larger in countries which have higher developed financial markets. Furthermore, the size of the firm is affected by the size of the economy in which it is operating. Higher economic output of a country results in more demand and this results in higher growth rates for the firms which operate in those higher growth countries (Carrizosa, 2007). The positive connections between higher output and access to foreign markets both influence the size of a firm. When a firm has access to foreign markets the demand for its good and services increases because it is now active in multiple markets and the more open a country is in terms of trade, the more competition the firm will face, which more often than not increases the productivity of firms. As a result, the level of trade openness of a country can affect the size of firms (Carrizosa, 2007).

Uncertainty avoidance can affect the average size of firms in a country. Higher levels of uncertainty avoidance indicate that people in a country are less comfortable with uncertainty and the unknown. Risk taking is one essential part of growth for a firm. However, in countries with high levels of uncertainty avoidance firms are focusing on security and stability and are therefore less entrepreneurial (Hofstede, 1980). Swierczek & Ha (2003) studied the relationship between uncertainty avoidance and entrepreneurial orientation[2]. The results of the study indicate that uncertainty avoidance does negatively affect the risk-taking behaviour of firms but does not affect the pro-active and innovative attitudes of the firms. Besides the relationship between risk taking and uncertainty avoidance, a relationship between a low level of uncertainty avoidance and business growth and job creation was

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[2] Entrepreneurial orientation is about the tendency of a firm to be risk-taking, innovative and pro-active to fulfill its strategic objectives (Swierczek & Ha, 2003).

reported. This provides some minor evidence that uncertainty avoidance indeed can affect the firm size in a country because it does affect the growth and job creation of firms. The self-employment rates are higher in countries with high levels of uncertainty avoidance than in countries with low levels of uncertainty avoidance (Wildeman et al., 1999). It turned out that in countries with high levels of uncertainty avoidance, people tend to be more dissatisfied with working at a large firm (Hofstede, 2001). This result indicates that countries with higher levels of uncertainty avoidance would have smaller firms due to the high self-employment rate.

The growth of firms can be impeded by the unwillingness of obtaining long-term debt since the debt is matured before the growth options are exercised (Zheng et al., 2012). Combined with the finding that uncertainty avoidance negatively affects the debt ratios (Chui et al., 2002), this implies that uncertainty avoidance does affect the growth of firms negatively. Since growth opportunities are not fully utilized. Related to the aversion to long-term debt is that firms in countries with high levels of uncertainty avoidance tend to hold more cash to hedge against the future economic conditions that can change (Ramirez & Tadesse,2009). This hedging could affect the size of the firms negatively by not seizing the growth opportunities.

2.3.1.2 Foreign oriented firms and uncertainty avoidance

Besides the difference in the size of firms, which can influence the investment decisions, the level of internationalization of a firm can also influence the decision to invest. Internationalization is a broad concept in the business literature which unfortunately has no universal definition. One of the definitions of internationalization is the process by which firms get increasingly involved in the international markets (Susman, 2007). In this context, the focus of internationalization is on exports and foreign direct investments. The second definition that is commonly used focusses more on the behavioral aspects of the firm and states that: internationalization is a combination of (1) innovative, (2) pro-active and (3) risk seeking behavior that crossed country borders with the specific intention to create value for the firm (McDougall & Oviatt, 2000).

Taking these two definitions together it can be concluded that internationalized firms are firms that operate on the international markets by exporting or foreign direct investments which result in extra risk. To be able to respond to the international competition after markets become more globally integrated, all firms have to become more internationalized regardless of size, industry or country Becoming internationalized means entering new markets, which in turn gives a firm advantages to grow faster in sales and increase the profitability of a firm. Besides generating more growth and profit other factors such as the trade policies of a country, the lack of domestic demand, greater economies of scale and tax benefits can affect the decision of a firm to internationalize (Kubíčková et al., 2014). Internationalized firms during a crisis could also have a comparative advantage over domestically operating firms. Since internationalized firms are operating in different markets an asymmetric shock

in their home country can be better managed. If the sales demand in their home country decreases as a result of a crisis, internationalized firms are able to generate alternate substitute sales in the foreign markets. To become internationalized firms must overcome some additional barriers. The most important barriers that prevent firms from internationalization are: (1) unfamiliarity with doing foreign business, (2) inadequate or untrained personnel for doing business abroad, (3) the extra cost and risks doing business across the borders and (4) the lack of financial resources for overseas operations. (Cerrato & Piva, 2012). Since risk is one of the greatest barriers for firms to become internationalized, uncertainty avoidance can influence the decision of firms to enter the international market. De Jong et al. (2006) studied the relationship between the openness of a country and Hofstede's cultural dimensions. Openness is often referred to as the commodity and capital markets and the focus is therefore often on the balance of trade and these markets. However, in this study, the focus is on the restriction on these activities. The hypothesis is that higher levels of uncertainty avoidance do decrease the level of open trade. Higher levels of trade openness are increasing the level of exogenous risk, while higher levels of uncertainty avoidance lead to more need for security and familiarity. Empirical results support the hypothesis that uncertainty avoidance negatively affects the level of openness in a country. On the firm level, the same line of reasoning could be true. Higher levels of uncertainty avoidance are associated with more aversion to foreign influences as is shown by De Jong et al. (2006). Merkin (2006), noted that high uncertainty avoidance countries are more defensiveness when it comes to cross-national relationships. This makes people in these high uncertainty avoidance countries more resistant to embrace relationships with individuals from other cultures. Therefore, firms in countries with high levels of uncertainty avoidance are expected to be more reluctant to do international business.

2.3.2 Different firms and different investments

In this part, the differences between the firms of a fundamentally different nature are discussed. How each determinant of the investment decision affects different types of firms will most likely differ. First, we will examine the difference between small and medium firms, followed by differences between domestic-orientated companies and foreign-oriented companies.

2.3.1.1 Small versus large firms

Empirical evidence shows that financial constraints affect investments. In Belgium, France, Germany and the UK financial constraints have had significant negative impacts on investments (Bond et al., 2003). In the UK these effects were more profound than in the other countries, which could indicate that financial constraints are more present in the market-based system of the United Kingdom (UK) than the bank-based system of Belgium, Germany and France. In addition, in a study of the R&D investments in the high-tech sector in France, Japan and the US have similar results. In all countries, cash flow had a significant negative effect on R&D investments. Although, in the US this effect was stronger and more similar to the UK a market-based economy instead of a bank-based (Mairesse et al.,

1999).

The higher cash flow sensitivity in market-based economies is an investment problem for firms if they cannot obtain other sources of capital. In the Euro area, the supply of bank credit declined during the crisis. Usually, firms can opt for other non-bank financing options, such as corporate bond issuances when facing a decline in the bank credit supply. However, in the bank-based economies, which applies to the Euro area, issuing bonds is not a real option for firms and especially not during a crisis. Buca and Vermeulen (2017), studied how the investment of firms for small, medium and large firms in six European countries was influenced by the degree of bank-dependency. They found in general that bank-dependent firms faced a greater economic decline than non-bank-dependent firms. This effect was found for all firm sizes, but it was not specified on how the effect differs between the small, medium and large firms.

During a crisis, financial constraints can be even more of importance for firms. For US public firms, the investments dropped significantly during the subprime crisis. The drop in investments was even higher for firms with low cash reserves, high short-term debt and for firms active in industries that required most on external finance (Duchin et al., 2010). A survey of 1050 CFO's across the globe found that the more financially constrained firms cut more of their tech spending, employment and capital spending and used more cash. Furthermore, the financially constrained firms drew more heavily on lines of credits because they were afraid of less access to future funding and assets were sold to fund their operations. Another finding was that firms which could not get external finance had to bypass attractive investment opportunities as a result of the financial constraint (Campello et al., 2010).

When it comes to the size of a firm, for smaller firms financial factors are generally regarded as more important for their investment decisions. Smaller firms have limited access to capital markets and therefore they are more dependent on their internal funds and external bank credits. These funds could be from personal savings or borrowing from friend or relatives (Gill et al. 2012). In contrast, large firms which have better access to external funding and they use more formal methods, such as capital budgeting, to evaluate their investments. Large firms also have more opportunities to provide collateral for their investments, in contrast to smaller firms which have fewer assets available for collateral. As a result, small firms are expected to have a lower chance of obtaining credit because they have less capacity when it comes to providing collateral. It is noteworthy that the available empirical evidence is suggesting that cash flow-sensitivity is actually the greatest for the largest firms and lowest for the smallest firms and medium-sized firms have more liquidity constraints than either the smallest and largest firms (Kadapakkam et al., 1998).

Research on the size of the firm and the relation of the debt to equity ratios show mixed results. Some studies have relieved that larger firms having higher debt to equity ratios (Adiputra, 2016). This can imply that the access to credit for larger firms is less constrained and according to the pecking

order theory, debt is preferred above equity. Still, other studies have found that the size of a firm has a negative influence on the debt to equity ratio (Ramlall, 2009).

2.3.1.2 Domestic orientated versus foreign orientated

The impact of a crisis differs among firms and depends on many different factors. One of the factors that can most readily explain how severe the impact of a crisis may be on classes of firms, could actually be the type of firm. Internationalized firms can either be foreign-owned or locally-owned with subsidiaries abroad, or only locally owned firms that are not internationalized. Firms that only operate on the domestic market and without a foreign connection, are less productive and have in general a lower performance than firms with foreign connections (Helpman et al., 2004). The performance of multinationals and foreign owned firms during a crisis is less clear. On the one hand, multinationals and foreign owned firms, are found to increase investments after a crisis (Blalock et al., 2008). On the other hand, some rationalize and report that the multinationals and foreign owned firms move the production process to other countries or slow down the production process (Görg and Strobl, 2003; Lipsey, 2001; Alvarez and Görg, 2009).

   The differences between multinationals, firms with foreign connections and domestic firms, give reason to believe that their investment behaviour does in fact also differ. The main problem with the decline in investments is the lack of finance. If a firm has a lower level of indebtedness or if they are less dependent on external finance they are better able to cope with the major crisis (Braun and Larraín, 2005; Desai et al., 2004; Bricogne et al., 2012). This could also imply that they will not have to decrease their investments.

         Firms with foreign connections generally have fewer financial constraints (Beck et al.,2006). Multinationals or firms with foreign connections have easier access to international sources of external finance (Sembenelli and Schiantarelli, 2000; Harrison and McMillan, 2003). This results in increased access to finance for those firms and they are less financially constrained. The same is true for government-owned firms that receive more support from the government due to preferential treatment (Harrison and McMillan, 2003; Laeven, 2003). Once again, the results are fewer financial constraints for government-owned firms and therefore better investment opportunities during a crisis. (Beck et al., 2006a).

2.4 Conclusion and hypothesis

All in all, the theory and empirical evidence is suggesting that larger firms face fewer finance constraints compared to small firms and that both sizes prefer internal finance. Furthermore, larger firms are better able to forecast the future economic environments which reduce the problem of irreversibility. The empirical evidence during a crisis supports that it is likely that internal financing decreases for both small and large firms. Multinationals and firms owned by foreign parent companies seem to have more access to financing and therefore are less constraint during a crisis. In addition to better access to credit, it is expected that uncertainty related to future economic environments is reduced for firms with higher international orientation. They can more easily move their operations to other markets which can make them less affected by a changing economic environment. Therefore, it can be expected that larger firms and foreign orientated firms invest more after a crisis. Uncertainty avoidance is expected to be related to both firm size and the degree of firms having ownerships ties with foreign firms

Since the theory predicts that firms in countries with higher levels of uncertainty avoidance are less entrepreneurial oriented, it can be stated that this leads to firms being more averse to long-term debt and to hold more cash to be able to hedge against a possible future economic shock. It can be expected that countries with higher levels of uncertainty avoidance have smaller firms. Therefore, the first hypothesis is:

> *H1: Uncertainty avoidance has a negative effect on the firm size*

The second hypothesis states that uncertainty avoidance negatively affects the level of internationalization of firms. This negative relation is expected due to the riskiness and costliness that expansion of operations to the international market has. Since higher levels of uncertainty avoidance are related to the disliking of unknown situations and having a lower tolerance about uncertain outcomes, it can be expected that firms that have been founded in a country with high levels of uncertainty avoidance are less likely to take the step towards the international market.

> *H2: Uncertainty avoidance negatively affects the level of internationalization of firms.*

The theory predicts that larger firms invest relatively more than smaller firms. For larger firms it is easier to obtain finance, they have generally more resources to gather information which decreases the effect of uncertainty that influences the decision to invest. Low levels of uncertainty avoidance are expected to increase the effect that firm size has on investments. The ability to obtain external finance and uncertainty on the expected return on investments are obstacles that reduce investments. The expectation is that firms in countries with lower levels of uncertainty are better in overcoming these obstacles. Low levels of uncertainty avoidance are related to having less resistance to the unknown and are therefore better in dealing with a changing environment.

Hypothesis three is:

> *H3: Investments of smaller firms decrease more than the investment of larger firms after a crisis and uncertainty avoidance affects this relationship negatively.*

The last hypothesis states that firms that are more foreign oriented, measured in terms of owning a foreign subsidiary or being owned by a foreign firm, increase the investments of firms. The empirical literature shows that firms with a foreign connection to other firms are better in obtaining finance. This could be a reason for an increase in investments of these firms. Furthermore, it is expected that low levels of uncertainty avoidance strengthen the relationship between investments and internationalized firms.

> *H4: Investments of domestic orientated firms decrease more than the investment of internationalized firms and uncertainty avoidance negatively affects this relationship.*

3. Method

3.1 Data

In figure 2, the hypotheses are graphically conceptualized. The hypotheses that state that uncertainty avoidance has an effect on the size of firms and the level of internationalization of firms is on the country level. To test these hypotheses, a dataset that consists of only country level variables is used. The hypotheses stating that uncertainty avoidance affects the investments of firms by interacting with firm size or internationalization is on the firm level. These hypotheses test the relationship between firm level variables, firm size, internationalized firms and investments. It does also include uncertainty avoidance which is on the country level measured. These hypotheses are tested by a dataset that included firm level data and country level data.

Figure 2. Conceptualization of the hypothesis

Hypothesis 1 and 2
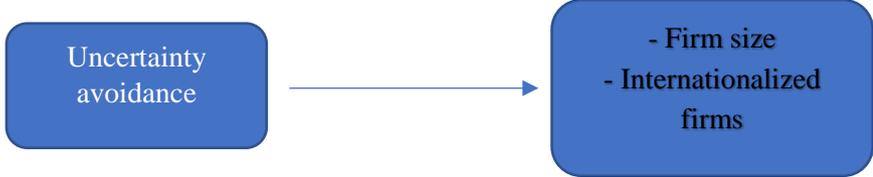
Hypothesis 3 and 4
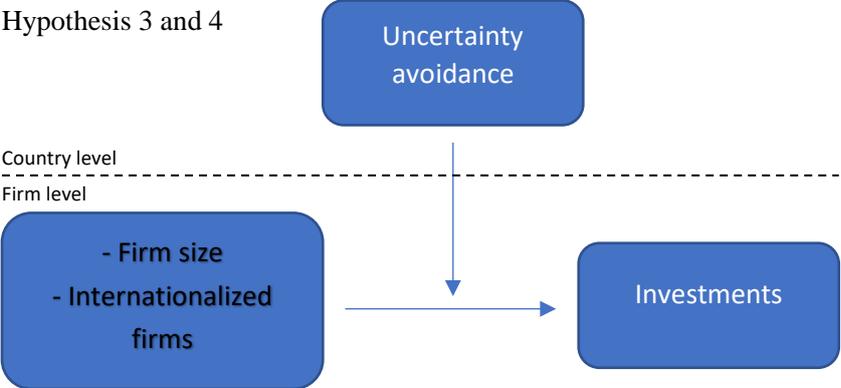
The dataset that exists of only country level data includes the number of firms that export and the number of firms that in every size category. The size category is made out of micro firms (<10 employees), small firms (between 10-49 employees), medium firms (between 50-249 employees) and large firms (>249 employees). The data is retrieved from the OECD and 34 countries have data on the number of exporting firms and 35 countries have data on the number of firms within each size category. The firms in this dataset are all operating in the manufacturing sector.

The second dataset consists of firm level data and is retrieved from Orbis. Firms are selected if they are located in countries that are a member of the OECD, have annual data on the number of employees and have ownership information in terms of ultimate global owner and subsidiaries. This results in

26002 firms within 31 countries.

The OECD countries are chosen because the last crisis hit most of these countries around the same time. This enables it to analyze the dynamics of investments, firm size and internationalized firms during a crisis. Furthermore, OECD countries are more or less equally developed as a country which excludes potentially other influences that can determine investments, firm size and internationalization.

3.2 Operationalization of the variables

Two different datasets are used to test the hypotheses. Therefore, the operationalization of the variables is discussed separately to make a clear distinction. First, the variables in the country level dataset are operationalized. Secondly, the variables in the firm level dataset are operationalized.

3.2.1 Country level dataset and the operationalization of the variables

In this section, the variables are operationalized that are used to test the effect of uncertainty avoidance on firm size and the level of internationalized firms. These variables are all measured on the country level.

Dependent variables

The dependent variables used to test the first hypothesis are the firm size and the level of internationalized firms. The firm size as a dependent variable is measured as the share of the firms in each size category in a country which is respectively micro, small, medium and large. The level of internationalized firms is measured as the share of firms that are involved in exporting activities.

Independent variable

The variable of main interest in this hypothesis is uncertainty avoidance. This measurement of uncertainty avoidance is retrieved from Hofstede's own site[3] and consists of the latest available data. The uncertainty avoidance index ranges from 8 to 112. The expected effect of uncertainty avoidance as has been stated in the hypothesis is that higher levels of uncertainty avoidance lead to relatively smaller firms and that firms are less internationalized. Higher levels of uncertainty avoidance are related to lower levels of entrepreneurial orientation and less job creation (Swierczek & Ha 2003). Uncertainty avoidance is also related to the unwillingness of firms to obtain long-term debt and firms hold more cash to hedge against future risk. This result in firms that do not optimally utilize their growth opportunities. Therefore it is expected that uncertainty avoidance negatively affects the firm size distribution in a country. The negative effect of uncertainty avoidance on the level of internationalized firms is expected because firms in countries with higher levels of uncertainty avoidance are expected to not taking the unknown risk of doing business abroad. Higher levels of

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[3] Website Hofstede https://geerthofstede.com/research-and-vsm/dimension-data-matrix/

uncertainty avoidance are related to avoiding unpredictable and unstructured situations and a more defensiveness attitude towards strangers (Merkin, 2006). Since the unfamiliarity of doing foreign business and the risk of doing business are important barriers for firms to become more internationalized. It is expected that uncertainty avoidance has a negative effect on the level of internationalization.

Control variables

The control variables that have been added to the analysis to control the other factors that can affect the size of firms in a country and the level of internationalized firms are: size of the economy, GDP per capita, financial development, trade openness, financial structure and labour productivity.

GDP per capita can affect the firm size distribution within a country due to the fact that higher levels of income give individuals less incentive to start their own business and the share of micro firms in a country is found to be negatively related to GDP per capita (Galindo et al., 2009).

The size of the market has been added as a control variable to test the effect of uncertainty avoidance on the level of internationalized firms. Smeets et al. (2010) have observed that the size of the market increases the probability that firms start exporting. To control for the size of the market GDP is used as control variable.

Financial development is important in explaining the size and number of firms exporting because a higher level of financial development results in better access to external finance (Rajan & Zingales, 1998). Having a lower cost of external finance results in less financial constraints for firms which enhances growth and increases the access to foreign markets since the opportunity costs of exporting decrease (Cerrato & Piva, 2012; Kumar et al., (1999). Financial development is measured as the ratio of domestic credit plus stock market capitalization to GDP (Rajan & Zingales, 1998)

Trade openness affects the average size due to the fact that firms in countries are more open to trade and therefore have more possibilities to extend their operations. This leads to more growth of the firm and therefore increases the average size of the firm in the particular country (Kapri, 2016; Rubini et al., 2012). The number of firms that export is positively affected by higher levels of trade openness. As higher levels of trade openness indicate that the cost of exporting is relatively lower compared to countries with low levels of trade openness leads to the consequence that more firms start to export due to the lower costs. (Bernard et al., 2006). Therefore, higher levels of trade openness positively affect the number of firms that export.

Financial structure has been added as a control variable to be able to test the relationship between uncertainty avoidance and firm size. A bank-based financial structure indicates that in a country banks are more often used to get external finance. Small firms rely more on banks in obtaining finance (Weinberg, 1994), a bank-based country, therefore, could increase the establishment of smaller firms. A negative relationship between the financial structure and the size of a firm is expected.

Labour productivity has been added to the regression to test the relationship between uncertainty

avoidance and the level of internationalized firms Since the level of internationalized firms is measured in the number of exporting firms, it can be expected that countries with a higher labour productivity have more exporting firms as a result of the ability to produce goods at a lower cost or produce higher quality goods (Srinivasan & Archana, 2011). Therefore, labour productivity is added as a control variable which is expected to positively influence the number of exporting firms. All the control variables are retrieved from the Worldbank.

The equations of hypothesis one and two that are tested are as follows:

1) $Firmsize_j = \beta_0 + \beta_1\ Uncertianty\ avoidance_j + \beta_2\ \text{GDP per capita}_j +$ $\beta_3\ \text{Financial development}_j + \beta_4\text{Trade openness}_j + \beta_5\text{Financial structure}_j + \epsilon$

2) $Level\ of\ internationalization = \beta_0 + \beta_1\ Uncertianty\ avoidance_j + \beta_2\ GDP_j +$ $\beta_3\ Financial\ development + \beta_4 Productivity_j + \beta_5 Trade\ openness_J + \epsilon$

3.2.2. Firm level dataset and the operationalization of the variables

In this section, the variables of the dataset on the firm level are operationalized. This dataset contains firm level data as well country level data. The dependent and independent variables are on the firm level even as the control variables profitability and debt ratio. The country level variables in this dataset are uncertainty avoidance, GDP growth, long-term interest rate, tax rates on profits and market uncertainty.

Dependent variables

The dependent variable to test the second and third hypothesis is *investments*. Investments are measured as the log of the difference in total tangible assets between years of observation. The tangible assets of a firm are the physical items which are used to generate revenue. The total tangible assets enfold the Property Plant and Equipment (PPE) and machinery, office furniture, buildings, cash, inventory, stock, bonds etc. The log of the difference in total tangible assets serves as a proxy for the increase or decrease of investments by firms. The total tangible assets have been used earlier as a proxy for investments by Laeven, Mcadam, & Popov and in Hsiao & Li (2012). They find that PPE is the best proxy for investments. Data limitations result in the fact that total tangible assets are used which capture PPE because the PPE of a firm is mostly only available for publicly listed companies.

Independent variables

Firm size is the independent variable of interest. Firm size is measured by the number of employees per firm. This measurement is one of the many used measurements in the literature. The reason why number of employees is chosen instead of profits or total assets is that these variables are more likely to be affected by a crisis than the number of employees. Employees cannot simply be fired as a result

of the crisis whereas profit will drop, and the amount of total assets can easily be lowered during a crisis.

Internationalized firms are measured by information about the firms' ownership. The ownership information is retrieved form Orbis and includes information about the ultimate owner of the firm and if a firm owns a foreign subsidiary. The measurement is a dummy that takes the value of: (1) foreign ownership and foreign subsidiary, (2) foreign ownership, (3) foreign subsidiary or (4) domestically owned. This measurement is taken as a proxy for the level of internationalization of firms since there is limited data on the export activities of non-listed firms. Foreign owned firms are found to export more than domestically owned firms (Wakasugi et al, 2008) and a foreign subsidiary is a substitute for exports to serve a foreign market (Conconi et al., 2016). The interest of this study is to analyze the relationship between internationalization and investments. Therefore, it is decided to use the ownership information as a proxy for internationalization.

<u>*Interaction variable*</u>

Uncertainty avoidance is measured by the Hofstede index in the dataset for hypothesis one. The interaction effect of uncertainty in firm size and level of internationalization is expected to be negative. The interaction terms indicate that the effects of firm size and the level of internalization on depends on uncertainty avoidance. A negative interaction effect indicates that the effect of firm size and internationalized firms on investments is larger if uncertainty avoidance is lower. This negative effect of uncertainty avoidance on the relationship between firm size and investments is expected because uncertainty avoidance result is more postponing of investments and the use of less external finance which reduces investments. Uncertainty avoidance is expected to affect the relationship between internationalized firms and investments negatively. Higher levels of uncertainty avoidance are related to more resistance to unknown risk and unpredictable situations. This is expected lower the effect of on the relationship between internationalization and investments.

<u>*Control variables*</u>

Firm level variables

Profitability is one of the control variables on the firm level. An increase in profitability increases the available internal funds for firms which increases the possibility to invest. The literature predicted that higher levels of profitability are positively related to investments(Pacheco, 2017). Profitability is taken into account to control for this. Profitability should have a positive relationship with investments. Profitability is measured by the earnings before tax divided by the total assets of a firm (Li et al., 2011). The second control variable on the firm level is the debt ratio of firms. This is measured by the total liabilities divided by the total assets (Li et al., 2011). The debt level has a positive relationship

with investments, higher debt levels indicate that the firm has more resources for investments (Pacheco, 2017)

Country level variables

GDP growth is taken as a control variable to control for differences in output growth. The growth of output is associated with more demand in an economy. An increase in the demand in an economy leads to an increase in the willingness of firms to invest and therefore an increase in investments can be expected. GDP growth has been added to control for the differences in growth between the countries.

Long-term interest affects the investment since it determines the return on investment. Lower long-term interest rates are associated with more investments. Controlling for the long-term interest is necessary since the long-term interest differs between countries.

Higher taxes on profits lowers the investments by firms as the expected return on investments decreases (McBride, 2012; Arnold et al., 2011). The tax rates on profits differ between the countries in the sample and therefore this variable is added as a control variable.

Finally, market uncertainty has been added as a control variable to the analysis. Market uncertainty also results in lower expected returns on investments by firms. The higher the market uncertainty, the more likely it will be that firms will delay their investments (Bialowolski & Weziak-bialowolska, 2014). Therefore, a higher market uncertainty is expected to lower investments. The market uncertainty is added to the analysis to control for the differences in market uncertainty between countries. The control variables are retrieved from the Worldbank database.

The equations for hypothesis three and four that are tested are as follows:

3) $INV_{ij} = \beta_0 + \beta_1\, Firm\, size_{ij} + \beta_2\, Profitability_{ij} + \beta_3\, Debt\, ratio_{ij} + \beta_4\, GDP growth_j + \beta_5\, Long\, term\, interest\, rate_j + \beta_6 Taxes_j + \beta_7\, Market\, uncertainty_j + \beta_8\, Uncertainty\, avoidance_j + \beta_9\, Uncertainty\, avoidance_j * Firm\, size_{ij} + \epsilon$

4) $INV_{ij} = \beta_0 + \beta_1\, Foreign_{ij} + \beta_2\, Profitability_{ij} + \beta_3\, Debt\, ratio_{ij} + \beta_4\, GDP growth_j + \beta_5\, Long\, term\, interest\, rate_j + \beta_6 Taxes_j + \beta_7\, Market\, uncertainty_j + \beta_8\, Uncertainty\, avoidance_j + \beta_9\, Uncertainty\, avoidance_j * Foreign_{ij} + \epsilon$

3.3 Analysis

3.3.1 Analysis for testing uncertainty avoidance on the country level

The first step is to take the average of all the variables over the period 2005-2015. This makes it possible to perform a cross-sectional regression analysis. Uncertainty avoidance is a constant variable that does not change over time. Taking the averages of the other variables allows for determining the average effect uncertainty avoidance has on the firm size distribution and the level of internationalization of firms in a country. Furthermore, taking the averages of the period 2005-2105 makes the data obtained less affected by the country specific shock. Table 1 presents the summary statistics of the country level dataset that is used to analyze the first and second hypothesis. In total 37 countries are included in the dataset of which 35 countries have data on the size distribution of firms and 34 countries have data on the share of exporting firms.

Table 1 Summary statistics country level dataset

Variable	Obs	Mean	Std.Dev.	Min	Max
Micro firms as share of total firms (%)	35	76.5	9.82	55.19	94.93
Small firms as share of total firms (%)	35	16.52	7.13	4	33.77
Medium firms as share of total firms (%)	35	4.64	2.1	.9	9.59
Large firms as share of total firms (%)	35	1.02	.57	.17	3.16
Average size of firms (Employees)	33	16.56	8.88	3.94	40.18
Exporting firms as share of total firms (%)	34	20.09	9.14	1.23	40.85
Uncertainty avoidance	37	68.86	21.53	23	112
GDP per capita (1.000$)	37	37.68	27.68	6.79	131.19
Financial development	37	154.55	82.14	44.66	369.5
Trade openness (%)	37	104.82	63.93	25.09	337.6
Financial structure	37	.81	.62	-.41	2.56
Productivity (1.000$)	37	76.03	31.74	30.99	209.22
Countries: 37					

To test the first hypothesis, equation (1) is regressed four times. In each regression the dependent variable change. The first time the dependent variable is micro firms as a share of the total number firms in a country followed by small firms, medium firms and large firms as a share of the total number of firms in a country. The second hypothesis is tested with the number of exporting firms as a share of the total number of firms as a dependent variable.

3.3.2 Analysis for testing uncertainty avoidance on the firm level

The dataset contains missing values for the long-term interest rate for Estonia and Luxembourg and missing values for the market uncertainty for Iceland. These missing values are replaced by the mean of the values of the other countries for the particular variable. A dummy is added to the model that takes the value of 1 of the particular variable is missing and a value of 0 if the variable is not missing. This is known as the dummy variable adjustment method (Allison, 2001).

To test the third and fourth hypothesis a multilevel model is performed. The multilevel model is used when variables are clustered in other variables. In this thesis uncertainty avoidance is a variable that is measured on the country level whereas investments, firm size and the level of internationalization are variables on the firm level. Therefore, a multilevel approach is the appropriate model to test the effect of variables of different levels. The advantage of a multilevel is that it allows the relationship between investments and respectively firm size and level of internationalization to vary among countries (Farla, 2014). The control variables profitability and debt ratio are firm level variables. While GDP growth, Tax rate on profits, market uncertainty and long-term interest rate are variables measured on the country level. The dataset covers the period 2005-2015 but for the analysis, the average of the whole period, the period before the crisis (2006-2007), the period during the crisis (2008-2012) and the last sample consist of the average after the crisis (2013-2015). In doing so, it allows the main effect of firm size and level of internationalization to be seen over the whole period and if the effect of firm size and level of internationalization change between the periods.

To construct the interaction variable the independent variables (Firm size and level of internationalization) and uncertainty avoidance are multiplied. To construct the interaction term the first thing that must be done is to center the variables. Centering the variables of the interaction variable results in low intercorrelation with the other independent variables, thus a lower collinearity. This reduces the multicollinearity of variables where uncentered variables included in the interaction variables results in high multicollinearity (Robinson & Schumacker, 2009).

To test the relationship between firm size and investments and how uncertainty avoidance affects this relationship the analysis is performed in two steps. In the first step, firm size and the control variables are added to the analysis. This is done to test the relationship between firm size and investments. In the second step, the interaction variable between firm size and uncertainty avoidance is added to the model. The second step reveals if uncertainty avoidance affects the relationship between firm size and investments. These two steps are also performed to test the relationship between internationalized firms and investments and the effect of uncertainty avoidance on this relationship.

In Table 2, the summary statistics of the variables are presented. The mean of the number of employees is 2225, caused by the inclusion of a few very large companies with more than hundred

thousand employees. Furthermore, the mean of uncertainty avoidance is 68 which is approximately the half of the total range of uncertainty avoidance. Lastly, the number of firms are shown by their ownership dummy. Most firms are domestically owned followed by firms with a foreign subsidiary, foreign owned firms and firms that are both foreign owned and own a foreign subsidiary.

Table 2 Summary statistics firm level dataset

Variable	Obs	Mean	Std.Dev.	Min	Max
Firm Level					
Investments (log)	26002	-0.013	0.206	-1.801	1.592
Employees	26002	2225	19573	0	2120000
Foreign:					
- Both owner and subsidiary	1,126				
- Owner	2,141				
- Subsidiary	7,847				
- Domestically owned	14,888				
Debt ratio	26002	1.557	0.461	0.926	44.93
Profitability	26002	9.933	0.137	5.340	12.528
Country Level					
GDP growth annual (%)	31	1.156	.874	-1.952	4.73
Total tax rate on profits (%)	31	18.825	5.983	3.847	30.6
Market uncertainty (%)	31	3.817	3.844	-7.658	15.151
Long term interest rate (%)	31	4.08	.942	1.929	8.642
Uncertainty avoidance	31	68.05	22.73	23	112

4. Results

This chapter discusses the results of the four hypotheses. The results of hypothesis one and two are discussed in the first section. The results of hypothesis three and four are discussed in section two. Besides of discussing the results, the assumptions of the particular regression analysis are discussed as well.

4.1.1 Assumptions cross-sectional analysis

Before the analysis is performed the assumptions that apply to a cross-sectional analysis are checked. The first assumption is that the variables are normally distributed (Wooldridge, 2012). The variables are regarded normally distributed when the skewness/kurtosis test is insignificant. The variables that are not normally distributed are GDP, GDP per capita, trade openness, the share of large firms. These variables are transformed to logarithms, resulting in a normal distribution (Wooldridge, 2012). Second, the assumption of multicollinearity is tested. The variance inflation factor is used (VIF), a value on the VIF higher than 10 indicates that multicollinearity is a problem. In the appendix, the tables that include the output of the VIF are presented. The output in the VIF table shows that none of the variables exceeds the value of 10 which indicates that multicollinearity is not present. The last assumption that is tested is homoscedasticity, the Breusch-Pagan test is used to test if heteroscedasticity is present (Wooldridge, 2012). The Breusch-Pagan test is insignificant meaning that the alternative hypothesis is rejected, and the assumption of homoscedasticity is assumed. Lastly, the outliers and influential cases are removed from the sample if the model fit improved.

4.1.2 Results firm size distribution and uncertainty avoidance

In this section, the results of the first analysis are discussed. The first analysis tested the effect of uncertainty avoidance on the firm size distribution in countries. In column 1, the results of uncertainty avoidance on the share of micro firms in a country are presented. Uncertainty avoidance does significantly affect the micro share in a country. A 10-point higher score on the uncertainty avoidance index results in an increase of 1.16 per cent point in the share of micro share firms in a country. This indicates that countries that have higher levels of uncertainty avoidance have a higher share of micro firms. Columns 2-4 show that uncertainty avoidance negatively affects the share of small, medium and large firms in a country. The effect of uncertainty avoidance is significant for the share of small and large firms. Higher levels of uncertainty avoidance do decrease the share of small and large firms.

It can be observed that uncertainty avoidance does affect the firm size distribution in a country negatively. High levels of uncertainty avoidance do increase the share of micro firms and decrease the share of small and large firms. There is a tradeoff between the share of micro firms and the shares of the other categories. Due to the shares of the respective size categories are together one a SURE regression analysis is performed. The results are presented in the appendix and are similar to the cross-

sectional analysis. Overall, the results indicate that countries with a higher level of uncertainty avoidance have relatively smaller firms than countries with lower levels of uncertainty avoidance.

In column 5, the robustness of the results is tested by analyzing the effect of uncertainty avoidance on the average size of firms in a country. The average size of firms in a country is obtained by dividing the total numbers of firms by the total employees measured and is transformed to a logarithm. The results show that uncertainty avoidance is negatively affecting the average size of firms. Meaning that a 10-point higher score on uncertainty avoidance decreases the average size of firms in a country by 0.12%.

Table 3 Regression results with firm size as the dependent variable

Variable	(1) Micro *Coef. (SE)*	(2) Small *Coef. (SE)*	(3) Medium *Coef. (SE)*	(4) Large *Coef. (SE)*	(5) Average firm size *Coef. (SE)*
Uncertainty avoidance	0.116[*] (0.066)	-0.095[*] (0.0540)	-0.023 (0.017)	-0.008[*] (0.005)	-0.012[***] (0.004)
Control variables					
GDP per capita	3.661 (2.963)	-3.291 (2.255)	-1.199 (0.733)	-0.021 (0.194)	-0.388[**] (0.183)
Financial development	-0.096[***] (0.028)	0.076[***] (0.0213)	0.021[***] (0.007)	0.002 (0.002)	0.002 (0.002)
Trade openness	-6.802[**] (2.821)	-0.464 (2.625)	1.804[**] (0.710)	0.623[***] (0.200)	-0.124 (0.193)
Financial structure	-3.977 (2.552)	5.167[**] (1.964)	0.838 (0.640)	0.210 (0.166)	-0.135 (0.157)
Observations	*32*	*32*	*33*	*33*	*30*
adj. R^2	*0.44*	*0.41*	*0.32*	*0.34*	*0.29*

Standard errors in parentheses
[*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$, [****] $p < 0.001$

The effect of the control variables are quite in line with the expectations discussed in chapter three. Financial development, representing the ease to obtain finance for firms has a negative effect on the number of micro sized firms in a country and a positive effect on the share of small and medium firms in a country. The reason that financial development does not affect the share of large firms in a country is probably that large firms are less financially constrained and initially do not face difficulties in obtaining finance. Trade openness does affect the share of micro firms in a country negatively whereas it positively affects the share of medium and large firms in a country. Indicating that trade openness harms the share of micro firms in a country due to the increased competition. Lastly, the financial structure of a country positively affects the share of small firms in a country. This indicates that if banks are more dominant in the financial system of a country that the share of small firms is therefore higher.

Taken these results it can be stated that uncertainty avoidance does have a negative effect on the firm size distribution in a country. Uncertainty avoidance negatively affects the firm size distribution in

terms of size classes as well the average size of firms in a country. Therefore, the hypothesis stating that uncertainty avoidance has a negative effect on the firm size in a country is accepted.

4.1.3 Results level of internationalization and uncertainty avoidance

In this section, the results of the analysis that tested the relationship between uncertainty avoidance and the level of internationalized firms are discussed. In Table 4, these results are presented, in column 6, the results show that uncertainty avoidance does not significantly affect the share of exporting firms. This indicates that uncertainty avoidance has no effect on the level of internationalization of firms. The sign of uncertainty avoidance indicates that uncertainty avoidance has a negative effect on the share of exporting firms. This effect is, however, not significant which means that no conclusions can be drawn regarding the effect uncertainty avoidance has on the share of exporting firms. In column 7, the results of the analysis in which exports as share of GDP as the dependent variable is presented. This analysis is performed to test whether the results of the analysis presented in column 6 are robust. Uncertainty avoidance remains insignificant indicating that higher levels of uncertainty avoidance do not decrease the exports as share of GDP.

The control variables GDP and financial development and labour productivity are significant. A higher level of GDP does decrease the share of firms that export in a country. This contradicts with the expectations and indicates that firm within larger countries (GDP) do export relatively less than firms within smaller countries. A reason for this could be that firms within smaller countries use exports as a tool to increase their markets. The effect of financial development is positive and significant in the first analysis which is in line with the expectations. This means that firms in countries with a higher level of financial development export more. The costs of operating on international markets are due to the higher level of financial development less of an obstacle for firms. In the second analysis, financial development changes in sign. This could be caused by the fact that the total exports of a country can be harmed if more firms have access to the international market. A large proportion of the total exports is performed by just a small fraction of firms in a country. If more firms decide to export it could lower the total exports of a country as these firms could compete against each other.

The results of model 6 and 7, indicate that there is no significant relationship between uncertainty avoidance and the level of internationalization of firms. Therefore, the hypothesis stating that uncertainty avoidance does negatively affect the level of internationalization of firms is rejected.

Table 4 Regression results with the level of internationalization as the dependent variable

Variable	(6) Exporting firms Coef. (SE)	(7) Export (% of GDP) Coef. (SE)
Uncertainty avoidance	-0.027 (0.063)	-0.005 (0.003)
Control variables		
GDP	-3.019** (1.365)	-0.229**** (0.044)
Financial development	0.073** (0.027)	-0.003** (0.001)
Productivity	3.141 (5.068)	0.941**** (0.211)
Trade openness	0.642 (4.028)	
Observations	*30*	*33*
adj. R²	*0.42*	*0.63*

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

4.2.1 Assumptions multilevel analysis

The multilevel model is an extension of a normal regression model. Therefore, the assumptions that are tested in the previous section are now tested as well for the multilevel model. The first assumption that is tested is the assumption of normality. Again, this assumption is tested by using the skewness and kurtosis statistic. The variables are regarded normally distributed when the skewness and the kurtosis statistic is insignificant. The variables that are used in the regression are all significant which indicates that they are not normally distributed. Using histograms shows that transforming debt ratio, profitability and employees in logarithms results in a normal distribution. The variables investments, debt ratio, profitability and employees contain values (zero and negative values) that turn into a missing value when they are transformed to logarithms. To solve this, the minimal value of each variable plus one is added to each observation. The other variables are not normally distributed and transforming them does not improve the distribution of these variables. So the assumption of normality is violated. However, violating the assumption of normality is not a serious problem with large data samples (Wooldridge, 2012). The Breusch-Pagan test has shown that heteroscedasticity is present in the model. To control for this the multilevel analysis is performed with the robust function of Stata. By analyzing the VIF values it can be concluded that multicollinearity is not present in the model. The output of this test, presented in the appendix, shows that the VIF values are below 10. Another issue is that the intra class correlation of the multilevel model is quite high. Indicating that much of the variation in the model is caused by including the different groups, countries in this case. The intra class correlation is around 50% meaning that 50% of the variance in investments is caused by the different countries.

4.2.2 Results firm size and investments and the role of uncertainty avoidance

This section discusses the results of the third hypothesis stated that uncertainty avoidance has an interaction effect with firm size on investments. In table 5, the results of the multilevel model are presented. This table presents the models that include the average data over the period 2005-2015, the period before the crisis, during the crisis and after the crisis.

Column 11 shows the results of the model for the whole period in which the interaction variable is excluded. In this model, firm size has a positive significant effect on the investments of firms. Indicating that larger firms do invest more over the whole period. Further, profitability is the only control variable that shows a significant result on the investments. All the other control variables are insignificant. In column 12 the interaction variable of firm size and uncertainty avoidance is added to the model. The interaction between uncertainty avoidance and firm size is insignificant in the model with the whole period. The coefficient is 0,000 meaning that over the whole period the effect of firm size on investments does not depend on the level of uncertainty avoidance in a country. In other

words, uncertainty avoidance does not moderate the effect of firm size on investments. Looking at the results of the different periods, this changes.

In the period before the crisis, the size of firms does not significantly affect investments. Meaning that before the crisis, the investments of firms are not affected by the size of these firms. The interaction term between firm size and uncertainty avoidance is significant before the crisis. The significance of the interaction between firm size and uncertainty avoidance indicate that the effect of firm size on investments differs on the level of uncertainty avoidance in a country. The positive sign of the interaction indicates that larger firms do invest more in countries with higher levels of uncertainty avoidance. Though the effect of firm size on its own on investments is not significant, such a statement can therefore not be made.

During the crisis, the effect of firm size on investments becomes significant. An increase of 10 per cent point in firm size results in an increase of 0.091 per cent point in investments. Before a crisis, no difference between firms that differ in size and their investments is observed. During the crisis, larger firms do invest more than smaller firms do. The moderating effect of uncertainty avoidance on the relationship between firm size and investments is absent during the crisis. Meaning that the level of uncertainty avoidance in a country does not strengthen or weaken the relationship between the size of firms and investments.

After the crisis, the size of firms also has a significant positive effect on investments. The coefficient is larger indicating that the effect of firm size after the crisis is larger on investments than during the crisis. The interaction effect of uncertainty avoidance and firm size is negatively significant. Meaning that the effect of firm size on investments is weakened when the level of uncertainty avoidance is higher. This indicates, that after the crisis larger firms invest more but that higher levels of uncertainty avoidance diminish this effect. So, uncertainty avoidance affects the investment decision of firms.

Only the control variables profitability, GDP growth and market uncertainty show some significant results. Profitability and GDP growth show the expected signs in the models when significant. An increase in both profitability and GDP growth results in an increase in the investments of firms. Market uncertainty, on the other hand, has a positive effect on investments in the period before the crisis which contradicts the expectations. One possible explanation is that before the crisis the market uncertainty already increased, since the problems that had underlain the beginning of the crisis were already noticed by some. Firms could have ignored these problems until the actual crisis started. The start of the crisis could have been the actual reason that the investments of firms decreased.

These results show that firms size is positively affecting the level of investments in all periods, except before the crisis. Indicating that during and after a crisis larger firms are better able to deal with the deteriorated conditions they operate in. Such conditions are less access to finance, lower demand and

increased uncertainty. The effect of firm size on investments after the crisis is weakened if the level of uncertainty avoidance is higher. This is in line with hypothesis three that stated that larger firms do invest more after a crisis and that uncertainty avoidance does negatively affect this relationship. Therefore, the third hypothesis stating that larger firms invest more after a crisis and uncertainty avoidance has a negative impact on this relationship is accepted.

Table 5 Regression results multilevel with investments as the dependent variable and firm size as independent

Variable	(8) invest	(9) invest	(10) invest before	(11) invest before	(12) invest during	(13) invest during	(14) invest after	(15) invest after
	Coef. (SE)	*Coef. (SE)*	*Coef. (SE)*	*Coef. (SE)*	*Coef. (SE)*	*Coef. (SE)*	*Coef. (SE)*	*Coef. (SE)*
Firm size	0.074**	0.074**	0.050	0.056	0.091**	0.090**	0.537****	0.514****
	(0.033)	(0.033)	(0.072)	(0.061)	(0.045)	(0.039)	(0.135)	(0.084)
Control variables firm level								
Debt ratio	0.120	0.119	1.693	1.653	-0.259*	-0.246*	-0.874*	-0.811
	(0.221)	(0.213)	(1.101)	(1.054)	(0.139)	(0.138)	(0.507)	(0.498)
Profitability	10.467**	10.479**	12.467**	13.435**	14.670***	14.408***	-0.189	-0.687
	(4.683)	(4.786)	(5.059)	(5.413)	(5.272)	(5.373)	(6.810)	(6.358)
Control variable country level								
GDP growth annual change%	1.754	1.792	0.030	-0.018	0.081**	0.089**	6.286**	6.291**
	(1.518)	(1.487)	(0.095)	(0.103)	(0.035)	(0.041)	(3.046)	(3.032)
Tax rate	-0.024	0.005	0.004	0.001	-0.004	-0.003	1.072	1.046
	(0.096)	(0.095)	(0.013)	(0.013)	(0.012)	(0.011)	(0.685)	(0.680)
Market uncertainty	-0.068	-0.057	0.027*	0.033*	-0.003	-0.003	-0.883*	-0.866
	(0.168)	(0.169)		(0.018)		(0.011)		(0.532)
Long term interest rate	-0.753	-0.966	0.286	0.615	-0.054	-0.117	7.939	8.064
	(1.238)	(1.137)	(0.371)	(0.449)	(0.132)	(0.153)	(7.268)	(7.176)
Uncertainty avoidance		0.032		-0.006		0.002		0.076
		(0.028)		(0.007)		(0.005)		(0.151)
Interaction								
Firm size*uncertainty avoidance		0.000		0.005*		-0.001		-0.012***
		(0.002)		(0.003)		(0.002)		(0.005)
Dummy for missings								
Interest rate	-2.754	-2.365	1.403****	1.351****	-0.117	-0.058	-1.793	-1.564
	(2.147)	(2.023)	(0.406)	(0.387)	(0.150)	(0.246)	(12.625)	(12.868)
Market uncertainty	-1.292	-0.335	-1.970****	-2.187****	-0.136	-0.062	-8.590	-7.836
	(2.819)	(2.532)	(0.294)	(0.349)	(0.144)	(0.183)	(9.431)	(10.488)
observations	26002	26002	26002	26002	26002	26002	26002	26002

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

4.2.3. Results Foreign ownership and investments and the role of uncertainty avoidance

In table 6, the results of the multilevel analysis of the fourth hypothesis are presented. This hypothesis states that internationalized firms invest more after a crisis and uncertainty avoidance does negatively affect this relationship. Column 16 and 17, show the results of the model covering the whole period. The results indicate that domestically owned firms without a foreign subsidiary invest more than foreign owned firms. Firms that are domestically owned and have a foreign subsidiary invest more than only domestically owned firms. The interaction effect of uncertainty avoidance with ownership does not significantly affect the relationship between ownership and investments. Meaning that the level of uncertainty avoidance in a country does not affect the relationship between internationalized firms and investments.

In the period before the crisis, the results change compared to the whole period. Firms that are both foreign owned and have a foreign subsidiary do not significantly invest less than domestic firms. Foreign owned firms do invest less before the crisis than domestically owned firms do. The interaction effect between uncertainty avoidance and foreign owned firms is positive and significant. Meaning that foreign firms invest relative less than domestically owned firms but with higher levels of uncertainty this effect is weaker. The other interaction effects are not significant meaning that uncertainty avoidance does not affect the relationship of the other ownership structures of firms. Firms that own foreign subsidiaries do invest, even as in the whole period, more than the other firms.

During the crisis, only the firms that do have a foreign subsidiary invest significantly more than domestically owned firms in the model without the interaction variable. These results change if the interaction variable is added to the model. By adding the interaction term, the firms that are both foreign owned and have a foreign subsidiary invest significantly more than domestically owned. The interaction term is negatively significant for firms that have a foreign owner and a foreign subsidiary. So, uncertainty avoidance does weaken the effect which means that higher levels of uncertainty avoidance relatively lower the investments of the foreign owned firms that own a foreign subsidiary. During the crisis, more internationalized firms do invest relatively more than domestically owned firms except for firms that only have a foreign owner.

This changes after the crisis, domestically owned firms do invest significantly more than foreign owned firms with a foreign subsidiary and foreign owned firms. Between domestically owned firms and firms owning a foreign subsidiary, no significant difference is observed after the crisis in the level of investments. Uncertainty avoidance does have a positive effect on the investments of foreign owned firms with a foreign subsidiary. The investments of these firms are higher when the level of uncertainty avoidance is higher in a country. So, foreign owned firms with a foreign subsidiary invest relatively more if the level of uncertainty avoidance is higher.

These results indicate that foreign ownership, owning a foreign subsidiary or have both results in differences between investments compared to domestically owned firms. The difference in investments changes between the periods. Firms that have a foreign subsidiary invest in all the periods except after the crisis more than the other firms. Uncertainty avoidance does, however, not have an effect on firms with foreign subsidiaries. It does have an effect on the foreign owned firms before the crisis and the foreign owned firms with a foreign subsidiary during and after the crisis. An increase in the level of uncertainty avoidance results in relatively less investments of the foreign owned firms with a foreign subsidiary during the crisis. The effect of uncertainty avoidance changes in sign in the period after the crisis, meaning that foreign owned firms with a foreign subsidiary invest relatively more when the level of uncertainty avoidance is higher. This contradicts the hypothesis that uncertainty avoidance has a negative effect on the relationship between internationalization and investments. The results show that higher levels of uncertainty avoidance results in more investments by foreign owned firms with a foreign subsidiary after the crisis.

Another important issue is that the hypothesis stated that the internationalization of firms has a positive effect on the level of investments after the crisis. This effect is found to be negative since domestically owned firms invest more than the foreign owned firms with and without a foreign subsidiary after the crisis. While no significant differences are found in investments between domestically owned firms and firms with a foreign subsidiary in the period after the crisis. The hypothesis that states that internationalized firms invest more after a crisis and that uncertainty avoidance has a negative effect on this relationship has to be rejected.

Table 6 Regression results multilevel with investments as dependent variable and the level of internationalization as independent

Variable	(16) Invest Coef. (SE)	(17) Invest Coef. (SE)	(18) Invest before Coef. (SE)	(19) Invest before Coef. (SE)	(20) Invest during Coef. (SE)	(21) Invest during Coef. (SE)	(22) Invest after Coef. (SE)	(23) Invest after Coef. (SE)
Internationalization (ref= Domestically owned firms)								
- Both subsidiary and owner foreign	-0.133[*]	-0.132[*]	-0.089	-0.086	0.168	0.156[*]	-0.606[***]	-0.588[****]
	(0.074)	(0.072)	(0.098)	(0.100)	(0.138)	(0.095)	(0.209)	(0.153)
- Owner	-0.294[****]	-0.274[****]	-0.272[***]	-0.219[***]	-0.119	-0.130	-0.579[***]	-0.546[****]
	(0.078)	(0.078)	(0.085)	(0.073)	(0.122)	(0.097)	(0.176)	(0.123)
- Subsidiary	0.119[***]	0.119[***]	0.256[***]	0.254[***]	0.115[**]	0.115[**]	0.045	0.047
	(0.040)	(0.039)	(0.087)	(0.085)	(0.057)	(0.052)	(0.126)	(0.099)
Control variables firm level								
Debt ratio	0.320	0.320	1.834	1.843	-0.082	-0.075	-0.035	-0.044
	(0.264)	(0.261)	(1.208)	(1.199)	(0.117)	(0.117)	(0.587)	(0.592)
Profitability	12.107[**]	12.060[**]	13.009[**]	12.964[**]	16.377[***]	16.354[***]	3.441	3.405
	(4.864)	(4.857)	(5.727)	(5.717)	(5.192)	(5.200)	(7.947)	(7.973)
Control variables country level								
GDP growth annual change%	1.529	1.517	0.040	0.038	0.091[**]	0.095[**]	6.236[**]	6.246[**]
	(1.359)	(1.293)	(0.090)	(0.087)	(0.038)	(0.040)	(3.111)	(3.110)
Tax rate	-0.017	0.013	0.004	0.002	0.004	0.004	1.096	1.101
	(0.081)	(0.078)	(0.012)	(0.012)	(0.009)	(0.010)	(0.701)	(0.701)
Market uncertainty	-0.087	-0.080	0.024[*]	0.025[*]	-0.001	0.000	-0.912[*]	-0.912[*]
	(0.174)	(0.174)	(0.013)	(0.013)	(0.010)	(0.009)	(0.546)	(0.546)
Long term interest rate	-1.293	-1.556[*]	0.250	0.163	-0.110	-0.129	6.360	6.298
	(0.956)	(0.830)	(0.346)	(0.371)	(0.135)	(0.143)	(7.258)	(7.265)
Uncertainty avoidance (host country)		0.027		-0.003		0.003		0.060
		(0.023)		(0.006)		(0.005)		(0.151)
Interaction Foreign * UA (host country)								
(ref= Domestically owned firms)								
- Both subsidiary and owner foreign		-0.001		0.000		-0.008[*]		0.011[*]
		(0.003)		(0.004)		(0.005)		(0.007)
- Owner		0.004		0.010[***]		-0.003		0.008
		(0.004)		(0.003)		(0.005)		(0.006)
- Subsidiary		0.001		-0.002		-0.002		0.007
		(0.002)		(0.003)		(0.003)		(0.009)
Dummy missing variable								
Interest rate	-2.476	-2.045	1.329[****]	1.323[****]	-0.202	-0.188	-1.645	-1.442
	(1.854)	(1.693)	(0.310)	(0.297)	(0.157)	(0.183)	(11.663)	(11.897)
Market uncertainty	-0.646	0.328	-2.056[****]	-2.074[****]	0.006	0.054	-6.354	-5.130
	(2.318)	(1.950)	(0.242)	(0.284)	(0.106)	(0.170)	(9.403)	(10.621)
observations	**26002**	**26002**	**26002**	**26002**	**26002**	**26002**	**26002**	**26002**

Standard errors in parentheses [*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$, [****] $p < 0.001$

5. Conclusion

This thesis has attempted to provide a deeper understanding of how the mechanics of the negative relationship between uncertainty avoidance and private investments. The starting point of this thesis was the suggestion that uncertainty avoidance may have an effect on both the firm size and the level of internationalization of firms in countries. In addition, firms that are more internationalized and are relatively larger should exhibit a smaller decrease in investments during a crisis.

This thesis first tested the direct relationship between uncertainty avoidance on the one hand and firm size and level of internationalization on the other. A negative effect between uncertainty avoidance the firm size has been observed. This means that countries with higher levels of uncertainty avoidance have more micro size firms relative to the medium, small and large firms. This thesis has not found a relationship between uncertainty avoidance and the level of internationalization of firms. This indicates that uncertainty avoidance has no direct effect on the level of internationalization of firms. This contrasted with the expectation and a possible explanation is provided in the discussion.

By only studying the direct effect of uncertainty avoidance on firm size and level of internationalization the findings of Inklaar & Yang (2012) are not further clarified. Therefore, this thesis has performed a second analysis in which is examined if uncertainty avoidance affects the relation of firm size and level of internationalization on investments.

Firm size does positively affect the investments in all periods expect before the crisis. After the crisis, uncertainty avoidance negatively affects the relationship between firm size and investments. Meaning that larger firms invest more but if located in countries with higher levels of uncertainty avoidance this effect is smaller. In short, it can be concluded that higher levels of uncertainty avoidance weaken the effect of firm size on investments.

The relation between the level of internationalization and investments of firms differs between the periods. Expected was that internationalized firms invest more than domestically oriented firms. Uncertainty avoidance was expected to weaken this relationship. The findings of this thesis are that domestically oriented firms invest more than internationalized firms. This contradicts the hypothesis and this is further elaborated in the discussion. The effect of uncertainty avoidance on this relationship is found to be negative during the crisis while it is positive before and after the crisis. Indicating that during the crisis, the deteriorated economic conditions is

Taking everything into account, this thesis has found that uncertainty avoidance negatively affects the relation between firm size and investments after a crisis. In addition, uncertainty avoidance affect the firm size distribution of a country negatively. This is one reason for the lower private investments after a crisis in countries with high levels of uncertainty avoidance. The relationship of internationalized firms and investments is less clear, uncertainty avoidance negatively affected this relationship during

the crisis but positively before and after the crisis. Meaning that internationalized firms invest less than domestically oriented firms in a country with higher levels of uncertainty avoidance. No evidence was found that uncertainty avoidance affect the level of internationalization in a country.

6. Discussion

The interaction between uncertainty avoidance and the level of internationalization was significant before and after the crisis but it has the unexpected sign. This means that high levels of uncertainty avoidance positively affect the relationship between internationalized firms on investments. A possible reason could be that firms owned by foreigners, owning a foreign subsidiary or firm that have both, are more entrepreneurial oriented. Since these foreign oriented firms already bear the risk to operate on the international market it indicates that the managers of these firms are willing to take risks. These managers accept and deal more easily with the uncertainty embedded in operating on the international market (De Clercq et al., 2005). Therefore, these managers could differ in respect of entrepreneurial orientation to managers of domestically owned firms. Meaning that high entrepreneurial orientation does decrease the effect of uncertainty avoidance or that managers with high entrepreneurial orientation do not suffer from the level of uncertainty avoidance of their country.
Besides that foreign owners are more likely to have a higher level of entrepreneurial orientation, they also could have a different levels of uncertainty avoidance than the host county has. This could cause that a foreign owned firm that, for instance, operates in a country with a relatively high level of uncertainty avoidance, invest relatively more in this country than it does in a country with relatively low level of uncertainty avoidance. Due to the fact that the foreign owner comes from a country with low levels of uncertainty avoidance. This could indicate that the proxy to measure internationalization is not able to correctly estimate the effect of uncertainty avoidance on the relationship between internationalization and investments. Since the level of uncertainty avoidance of the host country is used in the models

Another finding of this thesis that contradicts the hypothesis was that firms owned by a foreigner and owning a subsidiary invest less than domestically owned firms and firms with a foreign subsidiary. This could be caused by the fact that a foreign owner cuts the firm's losses earlier than domestically owned firms and therefore the decision to stop investments is made. In line with this, Bernard & Sjoholm (2003) found that firms that are owned by a foreigner have a significantly higher chance of closing down operations than domestically owned firms.

This thesis faces several limitations that could have an influence on the outcomes of the analysis. The first limitation of this study and the most important one is the lack of a good dataset to test the effect of uncertainty avoidance on respectively firm size and level of internationalization. The problems that did arise in constructing a dataset with small firms is that data availability caused a huge constraint.

Smaller firms have often limited data, and this resulted in the fact that most variables are included as a proxy or constructed on basis of the balance sheet.

The constraints in data also lead to limitations of the dependent and independent variables. The dependent variable, investments, measured as the logarithm of the difference between tangible assets between two years. This measure of investments does not take into account investments in intangible goods. Due to the rapid technological development, investments in intangible goods are more and more important and contributes to economic growth (Barnes & McClure, 2009). Although, hardly any firm has data on the intangible assets in the Orbis database, leaving room for further research including intangible investments as well. The limitations of the independent variables are that the level of internationalization is measured as a dummy that includes if firms are domestically owned, foreign owned, have a foreign subsidiary or have both. As already suggested this proxy probably does not correctly estimate the effect of uncertainty avoidance on the relationship between internationalization and investments. A better measure would have been the ratio of export sales to sales. This better indicates the level of internationalization of firms and allowing for better estimating the effect of uncertainty avoidance on the relationship between internationalized firms and investments.

Besides the limitations of data availability, the multilevel model and the results of the model also face some limitations. The high intra class correlation indicates that the multilevel is not a perfect fit to the data. This could partly be caused by the lack of normality of the variables and the relatively low number of countries included in the model. Therefore, the results of this thesis are not generalizable, nonetheless, it could give an indication for further research.

Lastly, some variables that could affect the investment decision of firms are omitted from the model. This immediately opens possibilities for future research. Variables that could have affected investments as well are for example the industry in which the firm is operating, some industries require more investments than others. Furthermore, including firms age could affect investments, older firms could either have no need for investments or are due to their experience better capable of dealing with a crisis. On the country level, especially factors that affect corporate governance could affect a firm's investments decision. For instance, adding the world governance index could have controlled for the differences between countries in corporate governance.

For future research, it is important that a dataset is developed that includes rich data on firm level indicators that could affect investments. The Worldbank group has developed the Worldbank enterprise survey which included useful information about constraints and obstacles firms facing regarding investments. Although, this survey is especially focused on developing countries. Therefore, important in future research into the relation of culture, uncertainty avoidance, and investments it is important that a more sufficient dataset on firm level investments is developed.

Besides, a more complete dataset on firm level investments must be developed, interesting subjects for further research could be including other control variables to the analysis and include more countries in the sample. The relation between uncertainty avoidance and ownership structure could be an interesting topic for future research. Since it was expected that uncertainty avoidance has a negative interaction effect with foreign oriented firms, but the opposite was true. The dynamics of this relation could be subject to further research.

Literature

Adiputra, I. G. (2016). The Effect of Internal and External Factors on the Value of a Firm Through its Investment Opportunities on the Stock Exchange of the Southeast Asian Countries. *International Business Management*, *10*(4), 370-376.

Alam, K. F., & Stafford, L. W. T. (1985). Tax incentives and investment policy: A survey report on the United Kingdom manufacturing industry. *Managerial and Decision Economics*, *6*(1), 27-32.

Allison, P. D. (2001). *Missing data* (Vol. 136). Sage publications.

Alvarez, R., & Görg, H. (2007). Multinationals as stabilizers?: economic crisis and plant employment growth.

Ang, J. S., Cole, R. A., & Lin, J. W. (2000). Agency costs and ownership structure. *the Journal of Finance*, *55*(1), 81-106.

Antony, J., Kumar, M., & Madu, C. N. (2005). Six sigma in small-and medium-sized UK manufacturing enterprises: Some empirical observations. *International Journal of Quality & Reliability Management*, *22*(8), 860-874.

Arnold, J., Brys, B., Heady C. , Johansson, A., Schwellnus, C., and Vartia, L. (2011), "Tax Policy For Economic Recovery and Growth", 121 Economic Journal F59-F80.

Audretsch, D. B., & Elston, J. A. (2002). Does firm size matter? Evidence on the impact of liquidity constraints on firm investment behavior in Germany. *International Journal of Industrial Organization*, *20*(1).

Auerbach, A. J., & Hassett, K. (1992). Tax policy and business fixed investment in the United States. *Journal of Public Economics*, *47*(2), 141-170.

Bae, S. C., Chang, K., & Kang, E. (2012). Culture, corporate governance, and dividend policy: international evidence. *Journal of Financial Research*, *35*(2), 289-316.

Barkbu, M. B., Berkmen, P., Lukyantsau, P., Saksonovs, M. S., & Schoelermann, H. (2015). *Investment in the Euro Area: Why Has It Been Weak?* (No. 15-32). International Monetary Fund.

Barnes, P., & McClure, A. (2009). *Investments in Intangible Assets and Australia's Productivity Growth* (No. 0901). Productivity Commission, Government of Australia.

Bats, J., & Houben, A. (2017). *Bank-based versus market-based financing: implications for systemic risk*. Netherlands Central Bank, Research Department.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2005). SMEs, growth, and poverty. *NBER Working Paper*, *11224*.

Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2006). The influence of financial and legal institutions on firm size. *Journal of Banking & Finance*, *30*(11), 2995-3015.

Beck, T., Demirgüç-Kunt, A., Laeven, L., & Maksimovic, V. (2006a). The determinants of financing obstacles. *Journal of International Money and Finance*, *25*(6), 932-952.

Bernard, A. B., Jensen, J. B., & Schott, P. K. (2006). Trade costs, firms and productivity. *Journal of monetary Economics*, *53*(5), 917-937.

Bernard, A. B., & Sjoholm, F. (2003). *Foreign owners and plant survival* (No. w10039). National Bureau of Economic Research.

Bialowolski, P., & Weziak-Bialowolska, D. (2014). External factors affecting investment decisions of companies. *Economics*, *8*(11), 0_1.

Bischoff, C. W. (1969). Hypothesis testing and the demand for capital goods. *The Review of Economics and Statistics*, 354-368.

Blalock, G., Gertler, P. J., & Levine, D. I. (2008). Financial constraints on investment in an emerging market crisis. *Journal of Monetary Economics*, *55*(3), 568-591.

Bloom, N., 2009. The impact of uncertainty shocks. Econometrica 77 (3), 623–685.

Bloom, N., Bond, S., van Reenen, J., 2007. Uncertainty and investment dynamics. The Review of Economic Studies 74, 391–415.

Bond, S., Elston, J. A., Mairesse, J., & Mulkay, B. (2003). Financial factors and investment in Belgium, France, Germany, and the United Kingdom: A comparison using company panel data. *Review of economics and statistics*, *85*(1), 153-165.

Braun, M., & Larrain, B. (2005). Finance and the business cycle: international, inter-industry evidence. *The Journal of Finance*, *60*(3), 1097-1128.

Bricongne, J. C., Fontagné, L., Gaulier, G., Taglioni, D., & Vicard, V. (2012). Firms and the global crisis: French exports in the turmoil. *Journal of international Economics*, *87*(1), 134-146.

Bruno, B., D'Onofrio, A., & Marino, I. (2017). Financial frictions and corporate investment in bad times. Who cut back most?.

Buca, A., & Vermeulen, P. (2017). Corporate investment and bank-dependent borrowers during the recent financial crisis. *Journal of Banking & Finance*, *78*, 164-180.

Burger, A., Damijan, J. P., Kostevc, Č., & Rojec, M. (2017). Determinants of firm performance and growth during economic recession: The case of Central and Eastern European countries. *Economic Systems*, *41*(4), 569-590.

Busse, M., & Hefeker, C. (2007). Political risk, institutions and foreign direct investment. *European journal of political economy*, *23*(2), 397-415.

Campello, M., Graham, J. R., & Harvey, C. R. (2010). The real effects of financial constraints: Evidence from a financial crisis. *Journal of financial Economics*, *97*(3), 470-487.

Carrizosa, M. T. (2007). *Firm growth, persistence and multiplicity of equilibria: an analysis of Spanish manufacturing and service industries* (Doctoral dissertation, Universitat Rovira i Virgili).

Carruth, Alan, Dickerson, Andy, Henley, Andrew, 2000. What do we know about investment under uncertainty? Journal of Economic Surveys 14 (2), 119–153

Cerrato, D., & Piva, M. (2012). The internationalization of small and medium-sized enterprises: the effect of family management, human capital and foreign ownership. *Journal of Management & Governance*, *16*(4), 617-644.

Child, J., & Yuan, L. (1996). Institutional constraints on economic reform: The case of investment decisions in China. *Organization science*, *7*(1), 60-77.

Chui, A. C., Lloyd, A. E., & Kwok, C. C. (2002). The determination of capital structure: is national culture a missing piece to the puzzle?. *Journal of international business studies*, *33*(1), 99-127.

Ciubotariu, M. S. (2013). The role of small and medium enterprises in the modern economy and the importance of IFRS application for SMEs. *The USV Annals of Economics and Public Administration*, *13*(1 (17)), 201-210.

Conconi, P., Sapir, A., & Zanardi, M. (2016). The internationalization process of firms: From exports to FDI. *Journal of International Economics*, *99*, 16-30.

Conefrey, T., & Gerald, J. D. F. (2011). The macro-economic impact of changing the rate of corporation tax. *Economic Modelling*, *28*(3), 991-999.

Cummins, J. G., Hassett, K. A., & Hubbard, R. G. (1995). *Tax reforms and investment: A cross-country comparison* (No. w5232). National Bureau of Economic Research.

De Clercq, D., Sapienza, H. J., & Crijns, H. (2005). The internationalization of small and medium-sized firms. *Small business economics*, *24*(4), 409-419.

De Jong, E., Smeets, R., & Smits, J. (2006). Culture and openness. *Social Indicators Research*, *78*(1), 111-136.

De Kok, J., Vroonhof, P., Verhoeven, W., Timmermans, N., Kwaak, T., Snijders, J., & Westhof, F. (2011). Do SMEs create more and better jobs. *Report prepared by EIM for the European Commission DG Enterprise and industry, Brussels, European Commission*.

Desai, M. A., Foley, C. F., & Forbes, K. J. (2004). *Financial constraints and growth: multinational and local firm responses to currency crises* (No. w10545). National Bureau of Economic Research.

De Socio, A., & Russo, P. F. (2016). *The debt of Italian non-financial firms: an international comparison* (No. 308). Bank of Italy, Economic Research and International Relations Area.

Devereux, M., & Schiantarelli, F. (1990). Investment, financial factors, and cash flow: Evidence from UK panel data. In *Asymmetric information, corporate finance, and investment* (pp. 279-306). University of Chicago Press.

Dixit, A. K., & Pindyck, R. S. (1994). *Investment under uncertainty*. Princeton university press.

Duchin, R., Ozbas, O., & Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics*, *97*(3), 418-435.

Ergungor, O. E. (2004). Market-vs. bank-based financial systems: Do rights and regulations really matter?. *Journal of Banking & Finance*, *28*(12), 2869-2887.

Farla, K. (2014). Determinants of firms' investment behaviour: a multilevel approach. *Applied economics*, *46*(34), 4231-4241.

Fazzari, S. M., Hubbard, R. G., Petersen, B. C., Blinder, A. S., & Poterba, J. M. (1988). Financing Constraints and Corporate Investment; Comments and Discussion. *Brookings Papers on Economic Activity*, (1), 141.

Fuss, C., Vermeulen, P. (2004). Firm´s investment decisions in response to demand and price uncertainty. European Central Bank, Working Paper Series, No 347

Galindo, M. Á., Guzmán, J., & Ribeiro, D. (2009). Entrepreneurship and Business. A Regional Perspective. *Revista de Economía Mundial*, *21*, 293-295.

Gill, A. S., Sharma, S. P., & Mathur, N. (2012). The Impact of Debt Policy on the Investment Decision of Small Business Owners in India. *International Research Journal of Finance and Economics*, (97).

Gleason, K. C., Mathur, L. K., & Mathur, I. (2000). The interrelationship between culture, capital structure, and performance: evidence from European retailers. *Journal of business research*, *50*(2), 185-191.

Görg, H., & Strobl, E. (2003). 'Footloose' multinationals?. *The Manchester School*, *71*(1), 1-19.

Gregory, G., Harvie, C., & Lee, H. (2002). Korean SMEs in the Wake of the Financial Crisis: Strategies, Constraints, and Performance in a Global Economy. *Economic Papers: A Journal of Applied Economics and Policy*, *21*(3).

Griliches, Z., & Wallace, N. (1965). The determinants of investment revisited. *International Economic Review*, *6*(3), 311-329.

Hall, R. E., & Jorgenson, D. W. (1969). Tax policy and investment behavior: Reply and further results. *The American Economic Review*, *59*(3), 388-401.

Harrison, A. E., & McMillan, M. S. (2003). Does direct foreign investment affect domestic credit constraints?. *Journal of international economics*, *61*(1), 73-100.

Helpman, E., Melitz, M. J., & Yeaple, S. R. (2004). Export versus FDI with heterogeneous firms. *American economic review*, *94*(1), 300-316.

Heshmati, A., Johansson, D., & Bjuggren, C. M. (2010). Effective corporate tax rates and the size distribution of firms. *Journal of Industry, Competition and Trade*, *10*(3-4), 297-317.

Hoffman, K., Parejo, M., Bessant, J., & Perren, L. (1998). Small firms, R&D, technology and innovation in the UK: a literature review. *Technovation*, *18*(1), 39-55.

Hofstede, G. (1980), Culture's Consequence: International Differences in Work-Related Values, Sage, Newbury Park, CA

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications.

Hsiao, P., & Li, D. (2012). What is a good investment measure? *Investment Management and Financial Innovations.*, *9*(1).

Hüttel, S., Mußhoff, O., & Odening, M. (2010). Investment reluctance: irreversibility or imperfect capital markets?. *European Review of Agricultural Economics*, *37*(1), 51-76.

Inklaar, R., & Yang, J. (2012). The impact of financial crises and tolerance for uncertainty. *Journal of Development Economics*, *97*(2).

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Jorgenson, D. W. (1971). Econometric studies of investment behavior: A survey. *Journal of Economic literature*, *9*(4), 1111-1147.

Kadapakkam, P. R., Kumar, P. C., & Riddick, L. A. (1998). The impact of cash flows and firm size on investment: The international evidence. *Journal of banking & Finance*, *22*(3), 293-320.

Kapri, K. (2016). Productivity, firm size and trade liberalization in a partner country: Evidence from Korean firm-level data. *International Review of Economics & Finance*, *45*, 572-583.

Kaufmann, S., Valderrama, T. (2008). Bank lending in Germany and the U.K.: are there differences between a bank-based and a market-based country?. International Journal of Finance and Economics, 13 (3), pp. 266- 279

Kräussl, R., Lehnert, T., & Stefanova, D. (2016). The European sovereign debt crisis: What have we learned?. *Journal of Empirical Finance*, *38*(PA), 363-373.

Kubíčková, L., Votoupalová, M., & Toulová, M. (2014). Key motives for internationalization process of small and medium–sized enterprises. *Procedia Economics and Finance*, *12*, 319-328.

Kumar, K. B., Rajan, R. G., & Zingales, L. (1999). *What determines firm size?* (No. w7208). National Bureau of Economic Research.

Laeven, L. (2003). Does financial liberalization reduce financing constraints?. *Financial Management*, 5-34.

Laeven, L., Mcadam, P., & Popov, A. (n.d.). Credit Shocks, Employment Protection, and Growth: Firm-level Evidence from Spain.

Lensink, R., Bo, H., & Sterken, E. (2001). *Investment, capital market imperfections, and uncertainty: Theory and empirical results*. Edward Elgar Publishing.

Li, K., Griffin, D., Yue, H., & Zhao, L. (2011). National culture and capital structure decisions: Evidence from foreign joint ventures in China. *Journal of International Business Studies*, *42*(4), 477-503.

Lipsey, R. E. (2001). *Foreign direct investors in three financial crises* (No. w8084). National Bureau of Economic Research.

Loungani, P., & Rush, M. (1995). The effect of changes in reserve requirements on investment and GNP. *Journal of Money, Credit and Banking*, *27*(2), 511-526.

Love, J. H., & Roper, S. (2015). SME innovation, exporting and growth: A review of existing evidence. *International small business journal*, *33*(1), 28-48.

Mairesse, J., Hall, B., Branstetter, L., & Crepon, B. (1999). Does cash flow cause investment and R&D? An exploration using panel data for French, Japanese, and United States scientific firms. *Innovation, industry evolution, and employment*, 129-56.

McBride, W. (2012), "What Is the Evidence on Taxes and Growth?", Tax Foundation Special Report No. 207, December 18.

McDougall, P. P., & Oviatt, B. M. (2000). International entrepreneurship: the intersection of two research paths. *Academy of management Journal*, *43*(5), 902-906.

Memili, E., Fang, H., Chrisman, J. J., & De Massis, A. (2015). The impact of small-and medium-sized family firms on economic growth. *Small Business Economics*, *45*(4), 771-785.

Mendes, S., Serrasqueiro, Z., & Nunes, P. M. (2014). Investment determinants of young and old Portuguese SMEs: A quantile approach. *BRQ Business Research Quarterly*, *17*(4), 279-291.

Merkin, R. S. (2006). Uncertainty avoidance and facework: A test of the Hofstede model. *International Journal of intercultural relations*, *30*(2), 213-228.

Mishkin, F., & Serletis, A. (2011). *The economics of money, banking and financial markets* (4th Canadian ed. ed.). Toronto: Pearson Addison Wesley.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American economic review*, *48*(3), 261-297.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, *13*(2), 187-221.

Nelson, R. R., (2005). *Technology, institutions, and economic growth*. Harvard University Press.

Ninh, L. K., Hermes, N., & Lanjouw, G. (2003). Irreversible Investment and Uncertainty: An Empirical Study of Rice Mills in the Mekong River Delta, Vietnam.

Obstfeld, M. (1992). *Risk-taking, global diversification, and growth* (No. w4093). National bureau of economic research.

Ozorio, L. D. M., Bastian-Pinto, C. D. L., Baidya, T. K. N., & Brandão, L. E. T. (2013). Investment decision in integrated steel plants under uncertainty. *International Review of Financial Analysis*, *27*(C), 55-64.

Pacheco, L. (2017). Investment determinants at the firm-level: the case of Portuguese industrial SMEs. *International Journal of Business Science & Applied Management*, *12*(2).

Pagano, M., Langfield, S., Acharya, V. V., Boot, A., Brunnermeier, M., Buch, C., Hellwig, M., Sapir, A. & van den Burg, I. , (2014), Is Europe Overbanked?, No 4, Report of the Advisory Scientific Committee, European Systemic Risk Board.

Pearce II, J. A., & Michael, S. C. (1997). Marketing strategies that make entrepreneurial firms recession-resistant. *Journal of business venturing*, *12*(4), 301-314.

Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of school psychology*, *48*(1), 85-112.

Rajan, R. G., & Zingales, L. (1998). Financial Dependence and Growth. *American Economic Review*, 559-586.

Ramirez, A., & Tadesse, S. (2009). Corporate cash holdings, uncertainty avoidance, and the multinationality of firms. *International Business Review*, *18*(4), 387-403.

Ramlall, I. (2009). Determinants of capital structure among non-quoted Mauritian firms under specificity of leverage: Looking for a modified pecking order theory. *International Research Journal of Finance and Economics*, *31*(31), 83-92.

Robinson, C., & Schumacker, R. E. (2009). Interaction effects: centering, variance inflation factor, and interpretation issues. *Multiple Linear Regression Viewpoints*, *35*(1), 6-11.

Rubini, L., Desmet, K., Piguillem, F., & Crespo, A. (2012). Breaking down the barriers to firm growth in Europe. *The fourth EFIGE policy report. Bruegel Blueprint Series, Brussels Google Scholar*.

Schiantarelli, F., & Sembenelli, A. (2000). Form of ownership and financial constraints: Panel data evidence from flow of funds and investment equations. *Empirica*, *27*(2), 175-192.

Schmukler, S., & Vesperoni, E. (2001). Firms' financing choices in bank-based and market-based economies. *Financial structure and economic growth: A cross-country comparison of banks, markets, and development*, 347.

Shama, A. (1993). Marketing strategies during recession: A comparison of small and large firms. *Journal of small business management*, *31*(3), 62.

Smeets, R., Creusen, H., Lejour, A., & Kox, H. (2010). Export margins and export barriers: Uncovering market entry costs of exporters in the Netherlands. *CPB Document*, *208*(1).

Srinivasan, T. N., & Archana, V. (2011). Determinants of Export Decision of Indian Firms: A Primary Data Analysis. *Journal of Quantitative Economics*, *9*(2), 6-35.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American economic review*, *71*(3), 393-410.

Summers, L. H., Bosworth, B. P., Tobin, J., & White, P. M. (1981). Taxation and corporate investment: A q-theory approach. *Brookings Papers on Economic Activity*, *1981*(1), 67-140.

Susman, G. I. (Ed.). (2007). *Small and medium-sized enterprises and the global economy*. Edward Elgar Publishing.

Svaleryd, H., & Vlachos, J. (2005). Financial markets, the pattern of industrial specialization and comparative advantage: Evidence from OECD countries. *European Economic Review*.

Swierczek, F. W., & Ha, T. T. (2003). Entrepreneurial orientation, uncertainty avoidance and firm performance: an analysis of Thai and Vietnamese SMEs. *The International Journal of Entrepreneurship and Innovation*, *4*(1), 46-58.

Van den Heuvel, R., (2015). The impact of uncertainty avoidance on investment: A comparison of the recent crises in Ireland and Spain. *Radboud University*.

Wakasugi, R., Todo, Y., Sato, H., Nishioka, S., Matsuura, T., Ito, B., & Tanaka, A. (2008). *The Internationalization of Japanese Firms: New findings based on firm-level data (Japanese)*. Research Institute of Economy, Trade and Industry (RIETI).

Weinberg, J. A. (1994). Firm Size, Finance, and Investment. *Federal Reserve Bank of Richmond Economic Quarterly*, *80*(1), 19.

Wennekers, S., Thurik, R., van Stel, A., & Noorderhaven, N. (2007). Uncertainty avoidance and the rate of business ownership across 21 OECD countries, 1976–2004. *Journal of Evolutionary economics*, *17*(2), 133-160.

Wooldridge, J. M. (2012). Introductory Econometrics: A Modern Approach. Cengage Learning.

Zheng, C., & Ashraf, B. N. (2014). National culture and dividend policy: International evidence from banking. *Journal of Behavioral and Experimental Finance*, *3*, 22-40.

Zheng, X., El Ghoul, S., Guedhami, O., & Kwok, C. C. (2012). National culture and corporate debt maturity. *Journal of Banking & Finance*, *36*(2), 468-488.

Appendix

1. Assumptions hypothesis one

Multicollinearity

Figure 3 VIF table hypothesis one

Variable	VIF	1/VIF
Financial development	3.13	0.319777
GDP per capita	2.75	0.364143
Financial structure	1.63	0.611755
Trade openness	1.28	0.779233
Uncertainty avoidance	1.42	0.704041
Mean VIF	2.04	

2. Relation uncertainty avoidance and size

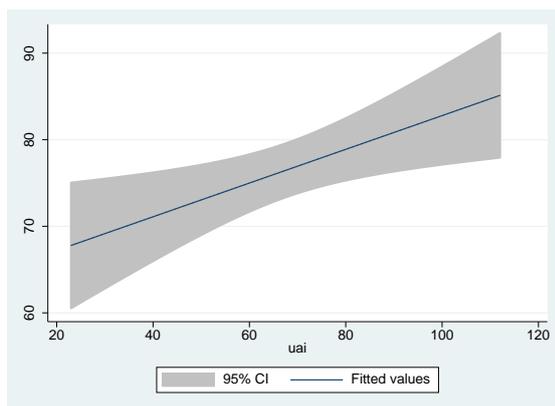*Figure 4 micro size and uncertainty avoidance*

Figure 5 small size and uncertainty avoidance
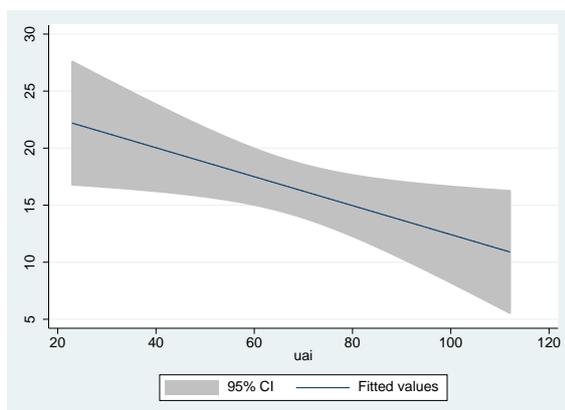
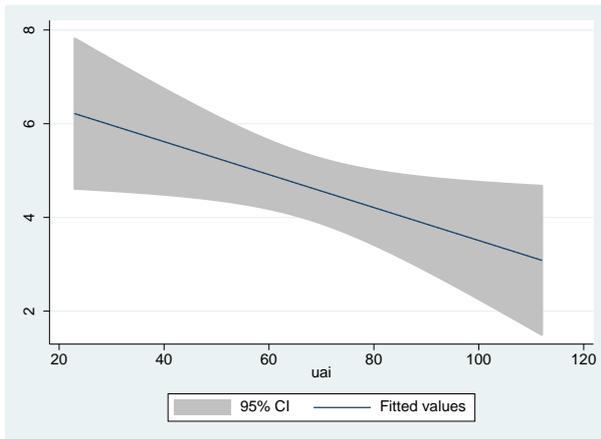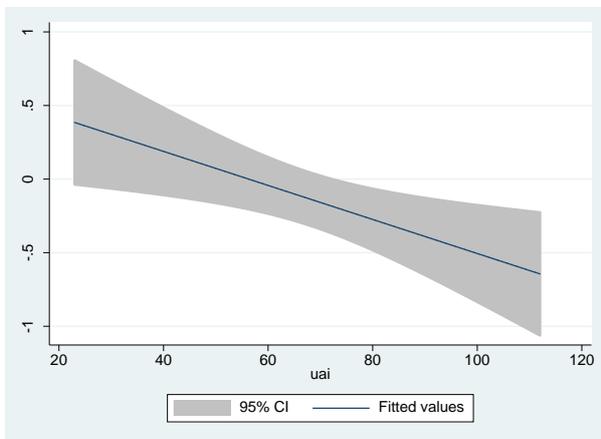*Figure 6 Medium size and uncertainty avoidance*

Figure 7 Large size and uncertainty avoidance

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3. SURE analysis hypothesis one

Table 7 SURE regression output

	() microshare	() Smallshare	Mediumshare	Largeshare
GDP per capita	1.451	-2.713	-1.134	-0.124
	(3.374)	(2.360)	(0.713)	(0.193)
Financial development	-0.051*	0.056***	0.015**	0.0017
	(0.031)	(0.021)	(0.006)	(0.002)
Trade openness	-1.887	-0.880	1.269*	0.331*
	(3.091)	(2.162)	(0.653)	(0.177)
Financial structure	-2.999	2.839	0.359	0.107
	(2.882)	(2.015)	(0.609)	(0.165)
Uncertainty avoidance	0.138*	-0.084	-0.026	-0.0104**
	(0.079)	(0.055)	(0.017)	(0.005)
_cons	71.20**	42.84*	9.732	-0.002
	(32.36)	(22.63)	(6.835)	(1.855)
N	35			
adj. R^2				

Standard errors in parentheses
$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$, $^{****}\ p < 0.001$

4. Assumptions hypothesis two

Figure 8 VIF table hypothesis two

Variable	VIF	1/VIF
Trade openness	3.58	0.279601
GDP	3.44	0.290334
Productivity	2.36	0.424241
Financial development	2.19	0.455956
Uncertainty avoidance	1.44	0.694706
Mean VIF	2.60	

5. Robustness test hypothesis two

Figure 9 Robustness hypothesis two

Variable	Export (% of GDP) *Coef. (SE)*	Export (% of GDP) *Coef. (SE)*
Uncertainty avoidance		-0.00486 (0.00305)
Control variables		
GDP	-0.241**** (0.0444)	-0.229**** (0.0439)
Financial development	-0.00236* (0.00120)	-0.00323** (0.00129)
Productivity	0.950**** (0.216)	0.941**** (0.211)
Trade openness		
Observations	*33*	*33*
adj. R²	*0.6131*	*0.6326*

6. Assumptions multilevel analysis

Figure 10 VIF table hypothesis three

Variable	VIF	1/VIF
Uncertainty	3.96	0.252520
Long term interest rate	3.03	0.330576
GDP growth	2.61	0.383140
Tax rates on profits	1.78	0.562281
Uncertainty avoidance	1.67	0.597713
Firm size	1.52	0.656200
Interaction	1.26	0.791049
Profitability	1.06	0.943425
Debt ratio	1.10	0.911081
Mean VIF	1.82	

Figure 11 VIF table hypothesis four

Variable	VIF	1/VIF
Foreign (ref= None)	1.03	0.968305
- Both subsidiary and owner foreign	1.05	0.951108
- Owner	1.12	0.890039
- Subsidiary	1.14	0.875439
Debt ratio	1.07	0.933161
Profitability	1.03	0.974965
GDP growth	2.62	0.382348
Tax rate on profit	1.66	0.603648
Market uncertainty	3.96	0.252829
Long term interest rate	2.70	0.370751
Uncertainty avoidance	2.43	0.411538
Interaction foreign UA		
- Both subsidiary and owner foreign	1.10	0.911834
- Owner	1.25	0.798395
- Subsidiary	1.61	0.619581
Mean VIF	1.65	

Figure 12 Matrix correlation table hypothesis three and four

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Investments	1.000									
(2) foreign oriented	-0.012	1.000								
(3) Firm size	0.144	-0.325	1.000							
(4) Total Debt	0.082	-0.120	0.246	1.000						
(5) Profitability	0.134	-0.105	0.245	0.120	1.000					
(6) GDP growth	0.026	-0.066	0.117	-0.089	0.185	1.000				
(7) Tax rate on profit	0.043	0.083	-0.292	0.034	-0.206	-0.510	1.000			
(8) Market uncertainty	0.044	-0.137	0.390	-0.002	0.181	0.602	-0.469	1.000		
(9) Long term interest rate	-0.059	0.077	-0.394	-0.026	-0.062	-0.180	0.131	-0.714	1.000	
(10) Uncertainty avoidance	-0.018	0.083	-0.250	-0.091	-0.250	-0.420	0.573	-0.339	0.031	1.000