Corporate governance and corporate finance during crisis periods

Veronique Vermoesen

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Veronique

Contents

Introduction

If ownership is separated from control, how do investors, the suppliers of finance, make sure that managers return some of the firm's profits to them? Management, the ones who are in control (i.e. the agents) in a firm, typically have residual control rights over how to allocate the funds from the investors (i.e. the principals). This creates conflicts of interests if agents use their discretion to extract private benefits instead of acting in the investors' interest (Jensen & Meckling 1976). Ideally, shareholders and managers sign complete contracts in which they specify exactly what the manager should do in all states of the world and how profit should be allocated. However, complete contracting is not feasible so that managers may use their residual control rights to expropriate shareholders (Shleifer & Vishny 1997). To better align interests and prevent managers from expropriating shareholders, shareholders can make use of a set of mechanisms through which they can protect themselves against expropriation by management. These mechanisms are called 'corporate governance' (e.g. Shleifer & Vishny 1997; La Porta *et al.* 2000).

In advanced market economies, many mechanisms are in place to better protect shareholders, both at the firm level and at the national level. Externally, at the national level, a strong financial system helps in protecting shareholder rights. A strong financial system comprises the following essential elements: respect of property rights, an accounting and disclosure system that promotes transparency, a legal system that enforces arm's length contracts cheaply and a regulatory system that protects shareholders, consumers, promotes competition and controls excessive risk taking (Rajan & Zingales 2003). Internally, at the firm level, board composition is probably the most important governance mechanism. It includes characteristics such as the degree of board independence, whether the function of CEO and chairman of the board are combined and directors compensation. Another internal governance

mechanism is debt. It reduces the agency costs of free cash flow by reducing the cash flow available for managers (Jensen 1986).

Today, in our advanced market economy, the subject of corporate governance is considered of high importance. Practices that are considered good corporate governance were formalized in national codes of conduct and in laws (e.g. Sarbanes-Oxley Act of 2002 in the US and the Principles of Corporate Governance of 1999/2004 of the OECD) and every year, numerous scientific papers on the subject are published among which some important ones are, for example, on the quality of financial reporting (e.g. Barton & Waymire 2004), on ownership structure (e.g. Lemmon & Lins 2003), on the composition of the board of directors (Yermack 1996; Ferris *et al.* 2003; Fich & Shivdasani 2006) and on performance-dependent pay (e.g. Jensen & Murphy 1990; Frydman & Saks 2010).

Although, one century ago, practitioners were aware of the need for better shareholder protection, in practice, it was weak. For example, disclosure requirements were rudimentary. The law only stipulated limited requirements relative to form or content. The law of July 22th 1913 and the modification on October 30th 1919 required that, in public limited companies, each year, executive directors had to draw up an inventory of all assets and liabilities, with an annex summarizing all loans to management and supervisory directors. Executive directors had to draw up a balance sheet and a profit and loss account, in which the necessary depreciation was accounted for. In practice those depreciations often fluctuated depending on economic conditions or on the preconceived profit (Velghe 1934). Balance sheets were made up of a scheme which distinguished only between fixed assets and realizable assets and between equity, bonds, mortgages, and other debt. Yearly, as long as legal reserves did not reach 10% of capital, 5% of profit needed to be assigned to legal reserves (art. 75). The profit and loss account did not have any legally defined format. Annually, the balance sheet, the income statement and a report on the firm's activities had to be deposited at the head office of the company after approval by the supervisory board ('les commissaires'), and it had to be sent to all nominal shareholders at least two weeks before the

general meeting (art. 76). The general meeting had to approve this report. The law included legal sanctions for false balance sheet or profit and loss accounts. Two weeks after the general meeting, the balance sheet and the profit and loss statement had to be publicly disclosed (art.78).

Investing in stocks must have been much more risky in light of the absence of corporate governance mechanisms that today are considered to be very important. Still, financial markets were well developed. For example, Belgium had one of the most developed financial markets in 1929 and its financial development was comparable to 1999 levels. Stock market capitalization over GDP was 1.31 in 1929, compared to 0.82 in 1999. In 1929, this ratio was only higher for Japan (1.20) and the UK.(1.38) (Rajan & Zingales 2003). If shareholder protection is key for the development of financial markets, then why did Belgium have such a developed financial system? Shareholders were less protected in the interwar period than they are today. Why did investors trust their money with managers if those investors face high risk to be expropriated?

Strong corporate governance helps in protecting shareholder rights and it is beneficial for the well-functioning of the economy (e.g. La Porta *et al.* 2000). It may even become more important during periods of serious market turmoil (e.g. Johnson *et al.* 2000; Mitton 2002; Lemmon & Lins 2003) as weak corporate governance is often considered an aggravating factor for the deteriorating economic situation and for firm losses (e.g. Francis *et al.* 2012). The first reason for this is that controlling shareholders have a stronger incentive to expropriate minority shareholders when firm performance decreases because their expected future return on investments drops. Similarly, managers too have an increased incentive to expropriate shareholders (Johnson *et al.* 2000). Second, investors may shift their capital away from firms with weak corporate governance towards firms with stronger corporate governance simply because the awareness for governance quality increases. During long periods of economic expansion, active interest in the quality of corporate governance diminishes as stakeholders of the firm become more concerned with the generation of wealth rather than with the quality of

governance mechanisms (Clarke 2004). However, when the economy slides into recession, corporate governance again becomes a point of attention (e.g. The Economist 2015). Third, firms with weak corporate governance have a higher cost of capital, lower operational efficiency, weaker firm performance (e.g. Bebchuk *et al.* 2009) and less flexibility in terms of external financing which becomes more valuable when the supply of credit decreases (Nguyen *et al.* 2015).

And yet, recent literature suggests that strong corporate governance could also harm firm value during crisis periods. Corporate governance mechanisms which protect shareholder rights in steady-state economic conditions, may fail to prove robust during crisis periods (e.g. van Essen *et al.* 2013). For example, mechanisms that try to reduce CEO power, may prevent management from taking quick action. In a crisis, more managerial discretion may be more important than board vigilance.

Studying a crisis is not only interesting form an economic point of view, also from a statistical point of view, it is interesting to use a crisis period. It allows us to better identify relations. Determining relations between firm characteristics and firm performance is generally problematic in financial research as they are interdependent. One possible solution to overcome this problem is by using a crisis. Firms are unable to anticipate an external economy-wide shock and are in general not able to readily respond because of the existence of transaction costs. Therefore, firm characteristics such as corporate governance mechanisms and capital structure are fixed in the short run. This allows us to more clearly identify the effect of those firm characteristics on firm value and to determine relations more clearly.

This thesis adds to our knowledge of the financial history of Belgium, which had one of the most developed capital markets before World War II (Rajan & Zingales 2003). For the empirical part of this dissertation, we use the database of the research center SCOB[1]

[1] A database that contains information on all firms listed on the Brussels Stock Exchange as of 1832 until today.

(StudieCentrum voor Onderneming en Beurs) from the University of Antwerp. This database contains all information on stocks and bonds listed on the Brussels Stock Exchange as of 1832 until today. This unique database has already been used to study, for example, capital structure and bank affiliation before World War I (Deloof & Van Overfelt 2008; Van Overfelt *et al.* 2009; Van Overfelt *et al.* 2010; Deloof *et al.* forthcoming) and to study business elite networks and structures of relations between banks/financial institutions, political elites, wealthy families and non-financial firms over the period 1858 to 1990 (Ghita *et al.* 2009). This thesis aims to contribute to this line of research by investigating corporate governance mechanisms of Belgian listed firms in the interwar period.

This dissertation not only contributes to our knowledge of the financial history of Belgium, but also to a growing body of empirical evidence on corporate governance mechanisms in a historical period in general (e.g. Bayer & Burhop 2009 on director compensation in Germany; Van Overfelt *et al.* 2009 on bankers on the board in selected Belgian industries; Graham *et al.* 2011 on board size in U.S. firms; Braggion & Moore 2013 on politicians on the board in firms quoted on the London Stock Exchange; Foreman-Peck & Hannah 2013 on firm size in the UK). Furthermore, this thesis also contributes to the body of literature that investigates the value of corporate governance mechanisms during a crisis (Johnson et al. 2000; Mitton 2002; Lemmon & Lins 2003; Baek et al. 2004; Barton & Waymire 2004; Graham et al. 2011; Nguyen et al. 2015).

In the first study, we investigate the composition of corporate boards, which includes both executive and supervisory directors. Policy makers and scientists acknowledge that boards are important in protecting shareholder rights, but research on how different board aspects affect firm performance is inconclusive. Moreover, its effect on firm performance may change during crisis periods as the optimal board composition in periods of economic growth may not be adapted to the challenges of a severe crisis. Therefore, we look at corporate board composition

during a crisis period, i.e. the Great Depression, when shareholder protection was weak and the deteriorating economic situation was highly demanding for directors. We study three board characteristics: (i) board size, (ii) board busyness and (iii) bankers on the board for a sample of 150 firms and 574 firm-year observations over the four-year period 1928-1931.

In this study, we empirically test two opposing theories. On the one hand, following the resource dependence theory (e.g. Pfeffer & Salancik 1978), having a large board with directors holding directorships in other firms and having bankers on the board provides connections with the outside world which allows the firm to better cope with uncertainty and to facilitate access to resources. This may be especially important during the interwar period when information asymmetry was high. On the other hand, directors holding several directorships may become overcommitted which negatively affects their advising and monitoring quality and, as a consequence, has a negative effect on firm performance (e.g. Fich & Shivdasani 2006). Overcommitted directors may be especially harmful during crisis situations when their monitoring and advising are most needed. Moreover, many directors on the board may give rise to coordination and communication problems (e.g. Jensen 1993) that also negatively affect firm performance.

The second study investigates directors' incentive pay, that is the bonus. Making compensation dependent on firm performance could help in aligning the interests of directors and shareholders. However, directors may also use it as a means to expropriate shareholders. Today, complex compensation contracts are composed in an attempt to align interests, but practitioners and scientists are inconclusive on how an effective compensation contract should look like. We add to this debate by studying performance related pay during the interwar period, in which directors possibly had more possibilities to expropriate shareholders because of weak legal shareholder protection.

Our sample consists of 1,556 firm-year observations for 214 firms over the ten-year period 1925-1934. To get a better idea of how profit was distributed and how performance-related pay was calculated, we first describe 2 randomly chosen firms from our sample in detail. We describe how bonuses were calculated and we test this empirically for all sample firms. To study potential shareholder expropriation via bonuses, we also examine the effect of the paid out bonus before the crisis on performance during the crisis. The idea is that firms with directors expropriating shareholders via excessive bonuses before the crisis, suffer greater losses during the crisis. Therefore, if we find a negative effect of bonus payments before the crisis on firm performance during the crisis, this provides evidence in favor of shareholder expropriation via excessive bonusses that results in higher firm losses.

In the third study, we focus on a different time period, namely the recent financial crisis of 2008-2009 and we study small and medium sized enterprises ('SMEs') instead of large listed firms. For SME's, the agency conflict between managers and shareholders is most often irrelevant as those shareholders and managers are very often the same person(s). Therefore, studying governance mechanisms, such as board composition and director compensation, that could reduce potential agency conflicts between those shareholders and managers, is rather irrelevant. Therefore, we focus on corporate *finance* in the this study.

Corporate finance focuses on financial decision making in firms and on how it affects firm value. It has become a broad field of study that builds upon early work from Lintner (1956) on dividend policy and on work from Modigliani and Miller (1958), Miller (1977) and Myers (1984) on capital structure. More recently, the field of study has extended to, among others, investment analysis, working capital management, mergers and acquisitions and risk management.

In this study, we focus on the maturity structure of long term debt, which is one specific aspect of a firm's capital structure that has received little academic attention so far. Recent

research suggests that the maturity structure of long term debt may affects corporate behavior (e.g. Almeida *et al.* 2012). We investigate how the availability of external finance affected investments of small and medium-sized enterprises (SMEs) during the recent Global Financial Crisis of 2008-2009. A reduction in the supply of bank credit must be especially harmful for privately owned SMEs because, in general, they more rely on bank debt than large listed firms. We use a sample of 2,354 firm-year observations for privately owned Belgian SMEs over the four-year period 2006-2009, which includes two pre-crisis years and two crisis years. We hypothesize that privately owned SMEs with a large proportion of long-term debt maturing at the start of the crisis had difficulties to renew their loans due to the negative credit supply shock, and hence could invest less than other SMEs. Furthermore, we hypothesize that the drop in investments is larger for ex ante financially constrained firms. Firms are likely to be financially constrained if they are small, if they do not pay out a dividend, if they have fewer liquid reserves and/or if they have a higher leverage. This paper was published in Small Business economics in 2013.

In the conclusion presented at the end of this doctoral dissertation, we review the main findings from the three empirical studies.

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Study 1

Did corporate boards matter during the Great Depression? Belgian evidence[2]

Abstract

We investigate how the composition of the board of directors was related to the value of listed Belgian firms in the 1928-1931 period, when investor protection was weak and firms were hit by the largest financial crisis of the 20th century. Before the crisis, we find evidence for the resource dependence theory. Firms typically had a large board, with directors holding multiple directorships in banks and other firms and this was positively associated with corporate value. Firms tried to reduce environmental uncertainty by enlarging their network. However, during the crisis, we find that this board composition is less suited to face a crisis. We find that the positive association between busy boards and firm value strongly decreased in the 1929-1931 period. We also find a negative but less pronounced crisis effect for board size and bankers on the board. These negative crisis effects seem to be partly driven by firm risk: riskier firms were more connected to the outside world via busier and larger boards and experience a larger drop in value.

Keywords: Busy boards, director interlocks, board size, bank affiliation, corporate value, Great Depression, Belgium

JEL classification: G21, G30, G34

[2] This paper is co-authored with Marc Deloof (Universiteit Antwerpen)

1 Introduction

Does corporate governance matter during a financial crisis? A number of studies have found that corporate governance practices significantly affected firm value during the East Asian Crisis in 1997-1998 (Johnson *et al.* 2000; Mitton 2002; Lemmon & Lins 2003; Baek *et al.* 2004) and the recent 2008-2009 financial crisis (Erkens *et al.* 2012; Nguyen *et al.* 2015). In this paper, we take a unique historical perspective by investigating the value of corporate governance in Belgium during the Great Depression. This was a period when investor protection was weak and firms were hit by the worst financial crisis of the twentieth century. Our focus is on the composition of corporate board, the most important internal corporate governance mechanism.

Does the composition of the board matter during a crisis? A large number of studies has investigated board composition and firm value in steady-state economic conditions (e.g. Jensen 1993; Petersen & Rajan 1994; Yermack 1996; Weinstein & Yafeh 1998; Ferris *et al.* 2003; Fich & Shivdasani 2006; Coles *et al.* 2008), but few have considered the value of board composition during crisis periods (Francis *et al.* 2012). During normal economic conditions, it is difficult to establish a link between board composition and firm value because firms chose their boards endogenously to maximize firm value (e.g. Boone *et al.* 2007; Linck *et al.* 2008). A crisis period, on the contrary, puts pressure on a board that is potentially not composed to face such an exceptional situation. Or, even if it is composed to deal with crisis situations, a crisis asks for the full potential of those directors, which might otherwise not be the case. One CEO puts it like this: "the board of directors becomes the center of authority, and must become active and effective in the case of almost disaster." (Mace 1986). Therefore, studying a crisis gives us the opportunity to more clearly identify the relationship between board composition and firm value. Moreover, firms were unable to anticipate the crisis by altering the composition or the size of their board. Therefore, by considering board characteristics in 1928 prior to the start of the

Great Depression, we ascertain that board characteristics are not driven by firm performance during the Great Depression.

Corporate boards both advise and monitor management but we will mainly focus on the advising task of directors rather than on their monitoring task as the latter was probably weak. Although we have no direct evidence on supervisory director's monitoring activities, indirect evidence shows that only supervisory directors were in charge of the monitoring and control of the executives, without any other internal or external body of control. Moreover, a legal framework for their monitoring activities was largely absent. Several contemporary authors describe the lack of independence of supervisory directors, which resulted in weak monitoring (Gilis 1929; Wauwermans 1933; Centre d'étude des Sociétés 1956).

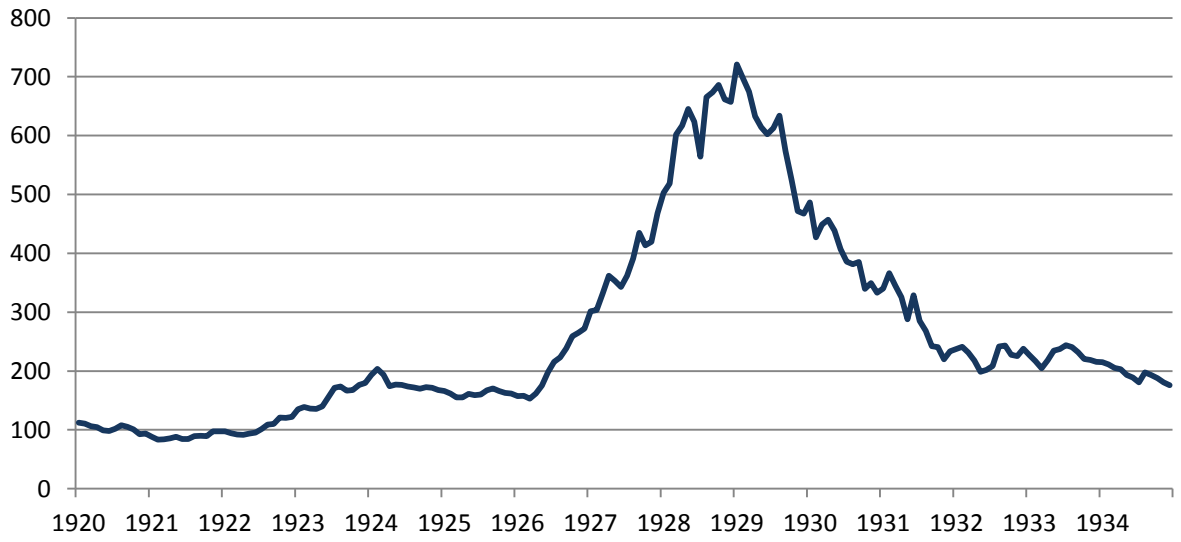
We consider three board characteristics in this paper. First, we study *board busyness*, i.e. the extent to which directors on the board held multiple directorships. *Busy directors* may enhance the quality of the board's advice because they may be a source of valuable experience and they may enlarge a firm's network (e.g. Miwa & Ramseyer 2000; Ferris *et al.* 2003). However, board busyness may also hinder the advising and monitoring quality because of time limitations if directors become overcommitted resulting in lower firm value (e.g. Loderer & Peyer 2002; Fich & Shivdasani 2006).

Second, we study *board size*, i.e. the number of directors on the board. As *board size* increases, communication and coordination problems (e.g. Lipton & Lorsch 1992) can result in less effective advising and monitoring and lower firm value (e.g. Yermack 1996; Eisenberg *et al.* 1998). However, a large board adds experience and knowledge to the board and reduces environmental uncertainty (e.g. Dalton *et al.* 1999). This may be beneficial for firm value especially when advising needs are large (e.g. Coles *et al.* 2008; Faleye *et al.* 2011).

Third, we study the presence of *bankers on the board*. *Bankers on the board* can provide important industry-specific financial expertise (e.g. Kroszner & Strahan 2001) and they can

mitigate information asymmetries between the bank and its client firm so that the availability of credit is increased and its cost reduced (e.g. Hoshi *et al.* 1990; Petersen & Rajan 1994; Weinstein & Yafeh 1998). However, a banker on the board can also abuse its private information to extract rents from the firm (e.g. Rajan 1992; Weinstein & Yafeh 1998; Agarwal & Elston 2001).

Figure 1
Cumulative stock return of Belgian firms on the Brussels Stock Exchange with December 1919 as basis (index value of 100).



Source: Own calculations based on SCOB database

Belgium, in this period, provides an interesting environment to study board composition. Despite weak investor protection, Belgium had an active stock market (Rajan & Zingales 2003) which was combined with a powerful banking industry (e.g. van der Valk 1932; Chlepner 1943; Durviaux 1947; Vanthemsche 1991; Rajan & Zingales 2003). It was dominated by a limited number of banks with close ties to the Belgian industry via director interlocks and equity stakes (e.g. Chlepner 1943). Moreover, The Great Depression had a strong negative effect on the value of Belgian firms. Figure 1 shows the cumulative stock returns of all firms listed on the Brussels

Stock Exchange in the period 1920–1936[3]. We set the index at 100 on December 31st 1919. It rose from 100 to 721 from December 1919 to January 1929, the culminating point of the rising market. After January 1929, stock prices started decreasing. From January 1929 to December 1934, the index fell from 721 to 176.

Using a sample of 150 large Belgian firms listed on the Brussels Stock Exchanged in 1928-1931, we find that Belgian firms in 1928 typically had a large board, with directors holding multiple directorships in banks and other firms. This was positively associated with corporate value. During the 1929-1931 period, the relationship between board busyness and firm value significantly weakens. We also find a negative but less pronounced crisis effect for board size and bankers on the board. If we take into account the impact of firm risk on the change in value during the crisis, the negative effect becomes less significant for busy boards and board size, both economically and statistically. This indicates that the negative relationship between board characteristics and firm value during the crisis is partly driven by risk: riskier firms are more connected to the outside world via busy boards and large boards and they experience a stronger drop in value during the 1929-1931 period. We also find that our results are mainly driven by the number of executive directors and their directorships (and much less by supervisory directors). These results provide evidence in favor of the resource dependence theory: large and busy boards allowed the firm to better connect with the outside world and in this way reduce environmental uncertainty. However, this board composition becomes less beneficial when facing a severe crisis.

Our paper provides a unique contribution to the literature by investigating the value of corporate boards during the most important crisis of the 20th century. It not only contributes to the body of literature that investigates the value of corporate governance mechanisms during a crisis (Johnson *et al.* 2000; Mitton 2002; Lemmon & Lins 2003; Baek *et al.* 2004; Barton &

[3] Indices are Laspeyres market cap weighted return indices (including dividend returns) calculated by linking monthly returns through a chain index. The weight of each firm's return is given by its relative market capitalization.

Waymire 2004; Graham *et al.* 2011; Nguyen *et al.* 2015), but also to a small but growing literature that investigates the value of corporate boards from a historical perspective (Van Overfelt *et al.* 2009; Campbell & Turner 2011; Graham *et al.* 2011; Braggion & Moore 2013; Foreman-Peck & Hannah 2013)

The remainder of the paper is organized as follows. Section 2 discusses the historical background of interwar Belgium with a description of its economy, corporate boards and banking industry. Section 3 reviews prior literature on seat accumulation by directors, the value of board size and bank affiliation and firm performance and we formulate hypotheses. The construction of the sample, the empirical model and the variables are discussed in section 4 and section 5 reports empirical findings. Our conclusions are presented in section 6.

2 Interwar Belgium

2.1 Economy

In Belgium, as in other European countries, the imperatives of war finance during WWI created unbalanced budgets and rocketing inflation rates (Chlepner 1943). In October 1926, Belgium rejoined the gold standard in a modified form: the gold exchange standard[4]. The Belgian franc was devaluated to one-seventh of its prewar value which resulted in a considerable undervaluation compared to the British pound and American dollar (Aldcroft 1997). This gave a strong boost to Belgian exports and the Belgian economy.

By 1929, the international financial and economic situation was deteriorating (e.g. Bernanke & James 1990). In Belgium, industry's rigidity and low productivity levels led to an economic downturn by the beginning of 1929. The market crash in the United States in October 1929 and the British abandonment of the gold exchange standard in September 1931 seriously aggravated the Belgian and international economic situation (Chlepner 1943). After the British

[4] Monetary authorities tied its currency to gold indirectly: they maintained a fixed exchange rate with a foreign currency that was convertible into gold at a stable rate of exchange. Those currencies were mostly the U.S. dollar or the British sterling.

abandonment, the Belgian government introduced a deflationary policy, but this policy failed because fiscal revenues were disappointing and government expenditures rose as unemployment compensation increased (Chlepner 1943; Buyst 2005). In March 1935 the government devaluated the Belgian franc by 28% after which the Belgian economy started to recover (Chlepner 1943; Baudhuin 1944).

2.2 Corporate boards

The board of directors ("conseil général") of Belgian firms had a dual structure with executive directors ("administrateurs") in the "conseil d'administration" and supervisory directors ("commissaries") in the "collège des commissaires". Executive and supervisory directors met each other only occasionally in the "conseil général".

The executive directors acted on behalf of and for the account of the company and were appointed by the articles of incorporation or by the general meeting of shareholders. Their responsibilities were confined by the company's articles of incorporation. A firm needed to have at least three executive directors and their mandate could not exceed six years. However, they were eligible for re-election and their mandate was revocable at all times (Wauwermans 1933).

Supervisory directors were charged with the supervision of the executive directors and had to approve the company's annual accounts. They were also appointed by the general meeting of shareholders. The number of supervisory directors was set by the general meeting of shareholders with a minimum of one and their mandate could not exceed six years but they were eligible for re-election (Wauwermans 1933).

Investor protection in Belgium significantly improved since the law of May 25th 1913 (following other European countries such as Britain, Germany and France). Conflicts of interests between shareholders and executive directors had to be reported and executive directors with conflicting interest were not allowed to attend board meetings (e.g. Gilis 1929;

Wauwermans 1933). Furthermore, names of all directors, both executive and supervisory directors, had to be made public and all directors were obliged to deposit shares of the firm ("cautionnement") to make sure that they would act according to the articles of incorporation and to the law (e.g. Wauwermans 1933).

Still, corporate governance was still in its infancy. For example, rules to impose board independence, which is today generally considered as a requirement for good corporate governance (e.g. Sarbanes-Oxley Act of 2002 in the US and the Principles of Corporate Governance of 1999/2004 of the OECD), were lacking: the law allowed supervisory directors to be employees of the firm and they were also allowed to be family members or other relatives of the executive directors of the firm (Wauwermans 1933; Centre d'étude des Sociétés 1956). As several studies have shown that board independence is positively related to the effectiveness of monitoring because of the independent directors' perceived objectivity (e.g. Adams & Ferreira 2007; Hwang & Kim 2009; Faleye *et al.* 2011), the lack of rules to enforce board independence may have hampered monitoring efficiency in the 1920s. This is confirmed by Gilis (1929), a contemporary accountant, who points to the fact that, *de facto*, the rules for supervisory directors were not complied with. He describes that supervisory directors mostly limited their monitoring activities to some random checks of the annual accounts.

2.3 Banking industry

As of the creation of Belgium in 1830, the Belgian banking sector was characterized by a close links with industrial firms via loans, equity stakes and shared directorships which strongly supported the economic development of Belgium before WWI (e.g. Chlepner 1943; Van Nieuwerburgh *et al.* 2006). After the war, banks were able to further enlarge their influence on industry thanks to the enormous demand for capital that was matched with an increasing supply. By the end of the 1920s, most Belgian banks had a portfolio of equity stakes in

industrial firms which allowed them to control a significant part of Belgian industry (e.g. van der Valk 1932).

Up until 1932 the Belgian banking industry did not experience severe adverse shocks and credit was still readily available. For example, loans and advances of Belgian banks to industry even increased from 2,158 million francs in 1927 to 3,206 in 1930 and decreased again to 2,533 in 1931 after which they further decreased sharply (Durviaux 1947). Moreover, during the period of high inflation preceding the stabilization of the Belgian franc in 1926, banks were forced to increase their equity, while many of their assets, mainly equity stakes, did not lose value. This created hidden reserves (Chlepner 1930; Durviaux 1947).

3 Board composition and corporate value

Firms compose their board in order to maximize firm value (e.g. Boone *et al.* 2007; Linck *et al.* 2008). This is problematic for the identification of the relationship between board composition and firm value, especially during normal economic periods. If, before the crisis, our results are plagued by endogeneity, we expect to find no relationship between board composition and firm value or a negative relationship if board composition diverts from its optimum when transaction costs to change board composition are significant (e.g. Coles *et al.* 2008). However, during the crisis, we expect boards to act outside their comfort zone and we expect to find clearer evidence on the relationship between board composition and firm value. The following three sections describe theories that could explain this relationship.

3.1 Busy boards

According to the resource dependence theory (e.g. Pfeffer 1972; Pfeffer & Salancik 1978; Boyd 1990), directors holding directorships at other firms provide connections with the outside world which allow the firm to cope with uncertainty and to facilitate access to trustable, timely and up-to-date information (Carpenter & Westphal 2001; Coles *et al.* 2012). Having multiple directorships might also proxy for reputational capital (e.g. Kaplan & Reishus 1990): higher

quality directors are more frequently asked to serve on other boards (Ferris *et al.* 2003; Coles *et al.* 2012). Coles et al. (2012) and Field et al. (2013) empirically show that busy directors positively relate to firm value when advising needs are high. However, Loderer and Peyer (2002) and Fich and Shivdasani (2006) find that directors with multiple board seats can become overcommitted, rendering them unable to effectively perform their monitoring duties or to advice management properly.

If our results are not driven by endogeneity, we can expect to find a positive relationship between board busyness and firm value: busy directors help the firm in accessing resources and they enlarge a firm's network which is especially valuable when information asymmetry is high.

During the crisis, however, the functioning of a board becomes especially important and relying on directors' network may not be enough to deal with the crisis. Directors are supposed to act in crisis situations (Mace 1986), but to properly do so, a director needs to have sufficient time to analyze the company's situation before he or she is able to advise and support management (e.g. De Maere *et al.* 2014). Therefore, we hypothesize that busy directors/boards are negatively related to firm value during the crisis.

3.2 Board size

The resource dependence theory suggests that larger boards are associated with a higher corporate value. A larger board may have more knowledge and experience at its disposal and it may have a larger network and may therefore be better able to cope with various external uncertainties and secure external resources (e.g. Dalton et al. 1999; Coles et al. 2008; Graham et al. 2011). On the other hand, smaller boards can monitor management more effectively and therefore reduce agency costs (Jensen 1993; Yermack 1996; Eisenberg et al. 1998).

If our results are not driven by endogeneity, we hypothesize that, before the crisis, large boards are positively related to firm value because it enlarges a firm's network and facilitated access to resources, which is especially important when information asymmetry is high.

During a crisis, smaller boards may be more able to reach consensus and initiate strategic actions, while larger boards may more easily develop factions and coalitions that lead to group conflict, which may hinder the process of reaching consensus and taking action (e.g. Goodstein et al. 1994). Therefore, we hypothesize that, during the crisis, when rapid action is needed (e.g. Daily & Dalton 1994), a large board hinders rapid decision making and therefore negatively relates to firm value.

3.3 Bankers on the board

Having a banker on the board can have a positive impact on firm value (e.g. Van Overfelt *et al.* 2009). It can mitigate information asymmetries between the lending bank and the firm (e.g. Hoshi *et al.* 1990; Petersen & Rajan 1994; Weinstein & Yafeh 1998), it can reduce conflicts of interest between shareholders and debt holders (e.g. Diamond 1984) and bankers can provide valuable financial advice to management (e.g. Fohlin 1999). In Belgium, in order to safeguard the value of their loans and equity stakes, the banks exercised effective control on industrial firms via having a banker on the board of those firms (e.g. van der Valk 1932). For example, the Société Générale had bankers on the board of every firm in our sample in which the bank held an equity stake (own research in the Recueil Financier). We hypothesize that bankers acted as monitors of executives and that this positively related to firm value.

During a crisis, having a banker on the board may be positively associated with firm value because they can grant financial relief, extend credit and give financial expertise (e.g. Hoshi *et al.* 1990; Elsas & Krahnen 1998; Ferri *et al.* 2001; Francis *et al.* 2012). However, bankers on the board could also have a negative effect on firm value as it allows the bank to create an information monopoly so that banks can extract rents from the borrowing firm (e.g. Rajan

1992; Weinstein & Yafeh 1998; Agarwal & Elston 2001), they can hold up related firms or take actions to insulate themselves from trouble and shift the burden to other creditors (e.g. Kroszner & Strahan 2001). It is therefore a priori not clear how bankers on the board relate to firm value during the crisis.

4 Research design

4.1 Sample

Our study is based on a sample of non-financial Belgian firms listed on the Brussels stock exchange during the period 1928–1931. Except for the stock data, we hand-collected the data used for this research from the *Recueil Financier*, a financial annual containing firm-specific information on firms listed on the Brussels Stock Exchange, including accounting data and names and positions of the members of the boards of directors. Stock data were taken from a database constructed by the StudieCentrum voor Onderneming en Beurs (SCOB) at the University of Antwerp. This database contains information on all stocks listed on the Brussels Stock Exchange. Since most of the information needed for this study had to be hand-collected, we initially restricted our sample to the 220 largest firms based on market capitalization in 1928. For 185 firms we were able to find all the necessary information on the board of directors and financial statements in the Recueil Financier. To be included in the sample, a firm also had to be listed on the Brussels Stock Exchange in 1927 and 1928, to allow us to calculate beta coefficients (discussed further below). After excluding 20 financial firms, 11 firms with missing accounting data, one firm with insufficient stock return data, and three firms that had listed bonds but no listed stocks, our final sample consisted of 150 firms, for which we have an unbalanced panel of 574 firm–year observations for the four-year period 1928 to 1931. This sample is representative for the population of firms that we study. The market capitalization of our sample represents 96% of market capitalization of all Belgian firms listed on the Brussels Stock exchange, excluding financial firms and government owned firms.

4.2 Empirical model

We estimate a random effects model with the following specification[5]:

$\text{Ln(MTB)}_{i,t} = a + b$ (Crisis Year Dummies) $+ c$ Board $\text{measure}_i + d$ Board measure_i x (Crisis Year Dummies) $+ e$ (Firm $\text{Characteristics}_{i,t}$) $+ f$ (Industry Dummies_i)

The dependent variable is the natural log of the market-to-book ratio (MTB). Using MTB as a measure of firm value is consistent with related studies such as, for example, Fich and Shivdasani (2006), Yermack (1996), Coles et al. (2008), Field et al. (2013) and Ferris et al. (2003) and is indicative of good governance. This ratio is calculated as the market value of equity plus the book value of debt divided by the book value of total assets at the end of the fiscal year. We take the natural logarithm to reduce skewedness[6]. The advantage of a market based measure is that when a crisis occurs, it immediately incorporates the effect of the crisis on profit expectations. Accounting measures of profitability on the other hand are by nature backward looking, and accounting profits in Belgium were highly susceptible to manipulation (e.g. Van Overfelt *et al.* 2010).[7]

The main independent variables in our models are (1) three dummy variables equal to one for the crisis years 1929, 1930 and 1931 to take into account the effect of the crisis, (2) board variables measuring board busyness, board size and bankers on the board, and (3) the interaction between the crisis year dummies with our board measures, to investigate how the relation between corporate value as measured by MTB and board characteristics changed during the crisis years. Additionally we control for firm characteristics and industry effects.

[5] We do not use a fixed effects model because the board characteristic variables are defined only once so they would drop out of the regressions, and the Breusch-Pagan Lagrange multiplier test confirmed presence of random effects. The results of the random effect model are qualitatively the same as those of the OLS regressions.
[6] Skewedness drops from 12.7 to 1.4 after taking the natural logarithm.
[7] It would also be interesting to investigate how our corporate governance measures are related to firm survival. However the number of firms in our sample which go bankrupt is too small to draw any meaningful statistical conclusion: only three of the 150 firms in our sample were bankrupt by the end of 1931, and six firms were bankrupt by the end of 1935.

Board measures, firm characteristics and industry effects are further discussed in the next three subsections.

4.3 Board measures

We consider several measures of board busyness, board size and bankers on the board. Information on board busyness comes from the Recueil Financier and is measured in three different ways. First, following Ferris et al. (2003), we use *directorships per director* which is the total number of directorships held across all the directors of a board divided by board size. If there is a dispersion in the number of board seats held by the different directors of the same firm, the average number of directorships per director may not be a perfect measure. Therefore, following Fich and Shivdasani (2006), our second busyness measure is the *percentage of busy directors* on a firm's board. A director is busy if he/she holds three or more directorships. We use three directorships as the cut-off rate because the mean and median number of directorships per board in the sample is close to three, resulting in a roughly even split between busy and non-busy directors. It is also in line with prior work by Fich and Shivdasani (2006) and Ferris et al. (2003). Third, we use *ln(no. of external directorships+1)*, which is the natural logarithm of (the total number of external directorships held by all the directors of the board plus one). Board size is the total number of executive and supervisory directors.

To measure bank affiliation, we use interlocking directorships between firms and banks (e.g. Fohlin 1997, 1998; Becht & Ramírez 2003; Van Overfelt *et al.* 2009). A firm is assumed to be bank affiliated if it has a bank director on its board. We identify interlocking directorships by the names of the directors. If a director holds directorships with more than one bank, we attribute the largest of these banks (in terms of its industrial portfolio) to this director. We consider the directors of 41 banks based on a list of banks drawn up by Durviaux (1947) for 1930. We use different affiliation measures. First, *bank affiliated (0,1)* is a dummy equal to one if the firm has at least one bank director on its board, and zero otherwise. Second, firms in our

sample were often affiliated with more than one bank. Multiple bank affiliations may reduce the incentive of individual banks to monitor a firm or to grant credit to it because the costs are borne by just one bank, while the benefits are enjoyed by the other banks as well (e.g. Foglia *et al.* 1998). This may have a negative effect on firm value. Therefore, we include the *no. of affiliated banks*, which is the number of banks which have at least one director on a firm's board. Third, the *percentage of bank directors* is the number of bank directors on the board of a firm divided by the total number of directors of the firm.

Although we investigate the effect of corporate board structure on firm value during an external shock, firms may still react to the deteriorating economic conditions by adapting their board (e.g. Gilson 1990). They could, for example, appoint new busy directors so that the firm can take advantage of valuable reputation and experience to better cope with the crisis. In principle, this endogeneity issue is controlled for by defining board structure variables at the end of 1928, before the start of the crisis and by keeping the sample period relatively short. To ascertain ourselves that board composition does not change significantly during the period 1929-1931, we look at the evolution of board size and board busyness during our sample period. If a firm's performance would affect the number of directors in our sample, we should observe important changes in the number of directors over time. Therefore, we compare the names of directors in 1928 with the names in 1933 for 128 surviving firms[8]. We find a mean change in the board size of 0.54 and a median change of 0. Furthermore, 60% of the boards have no change or a change of only one director over this six year period. The correlation between performance and the change in the board size of directors is very small (-0.050) and is statistically insignificant. We also find that directorships per director decrease from 2.95 in 1928 to 2.73 in 1933. This change is not statistically significant (p-value is 0.164). The

[8] We do not have this information for 1931, which is the end of our sample period. Firms that drop out of the sample are firms that went bankrupt, merged or were taken over. Only three firms went bankrupt by the end of 1931.

percentage of busy directors decreases from 0.38 to 0.30. This decrease is statistically significant (p-value is 0.016) and is inconsistent with the idea that badly performing firms would attract busy directors or increase the number of external directorships to better cope with the crisis. Furthermore, there were no legal changes in corporate governance that could have affected the composition or the functioning of corporate boards during our sample period.

An important aspect of the functioning of the board is director independence. In our sample, this is most important for supervisory directors as they had to monitor the executive directors. And yet, we do not control for it since we do not know which directors are independent and which are not. No regulation on director independence existed at the time, even not for the only body of corporate control, the supervisory directors. Moreover, we found several sources describing the lack of independence of supervisory directors (see section 2.2).

Panel A of Table 1 reports descriptive statistics for the board measures. The average board size is 15.38. The average number of executive directors is 10.87 and the average number of supervisory directors is 4.51. By way of comparison, Foreman-Peck and Hannah (2013) found an average board size in the UK in 1911 of 9.6, Frydman and Hilt (2010) found an average board size of 12.43 for listed U.S. railroad companies for the period 1905-1923 and Graham et al. (2011) found an average board size of 10.97 for U.S. firms during the Great Depression. Table 1 also shows that boards tend to be busy: the average number of directorships per director is 2.95. This is in line with Fich and Shivdasani (2006) and Ferris et al. (2003) for contemporary US data, but the frequency of busy boards is high (38%) compared to other studies (e.g. Ferris *et al.* 2003). We find strong board connections between the firms in our sample and the banking industry: 87% of the firms in our sample have a bank director on their board and the median firm is affiliated with two banks. This is remarkable, since Van Overfelt et al. (2009) found that in 1905, only 36% of Belgian listed firms in capital-intensive industries had a bank director on their board.

Table 1
Descriptive statistics (period 1928-1931, 150 firms and 574 observations)

	Mean	Median	St. Dev.	25th percentile	75th percentile
Panel A: Board characteristics in 1928 (150 observations)					
Board size	15.38	14.00	6.35	11.00	19.00
No. of executive directors	10.87	10.00	5.20	7.00	14.00
No. of supervisory directors	4.51	4.00	1.82	3.00	5.00
Directorships per director	2.95	2.84	1.41	1.70	4.00
Percentage of busy directors	0.38	0.38	0.24	0.18	0.56
No. of external directorships	31.95	27.00	27.68	8.00	49.00
Bank affiliated (0,1)	0.87				
No. of affiliated banks	2.21	2.00	1.62	1.00	3.00
Percentage of bank directors	0.22	0.20	0.15	0.09	0.33
Panel B: Firm characteristics in 1928-1931 (574 observations)					
MTB	3.24	1.43	12.90	0.92	2.54
Size (in millions of Belgian franks)	200	100	310	53	200
Age	25.87	20.00	20.54	9	36
Debt ratio	0.37	0.34	0.19	0.23	0.48
Corporate diversification[a]	1.88	2.00	1.04	1.00	3.00
Beta[a]	0.62	0.56	0.37	0.34	0.80
Family firm (0,1)[a]	0.58				

Notes: *board size* is the number of board seats of a firm; *no. of executive directors* is the total number of directors at the board of a firm minus the number of supervisory directors; *no. of supervisory directors* is the number of supervisory directors at the board of a firm; *directorships per director* is the total number of directorships held across all the directors of a board divided by board size; *percentage of busy directors* is the percentage of busy directors on a firm's board (a director is defined as busy if he/she holds three or more directorships); *no. of external directorships* is the total number of directorships held across all the directors of a board minus board size; *bank affiliated* is a dummy equal to one if the firm has at least one bank director on its board, and zero otherwise; *no. of affiliated banks* is the number of banks with which a firm is affiliated; *percentage of bank directors* is the number of bank directors on the board of a firm divided by the total number of directors of that firm; *MTB* is the market value of equity divided by the book value of the equity at the end of the fiscal year; *size* is total assets; *age* is the number of years the firm has been listed; *debt ratio* is the book value of total debt divided by total assets; *corporate diversification* is the number of industries in which the firm is active; *beta* is the unlevered beta. First, levered beta is computed by regressing a firm's monthly stock return in the pre-crisis period on the corresponding market return obtained from SCOB. We require at least 24 months of return prior to January 1929 to compute beta and we use a maximum of 63 months' worth of data. Next, the unlevered beta is calculated with the Hamada equation; and *family firm (0,1)* is a dummy equal to one if its board has (i) at least two directors with the same name, (ii) at least two directors living at the same address, (iii) at least one director living at the address of the firm and (iv) at least one director that has the same name as the firm, and zero otherwise. Board variables, *corporate diversification*, *beta* and *family firm (0,1)* are defined at the start of 1929. *MTB, size, age and debt ratio* are defined every year of the four-year sample period 1928-1931.
[a] Based on 150 observations

4.4 Firm characteristics

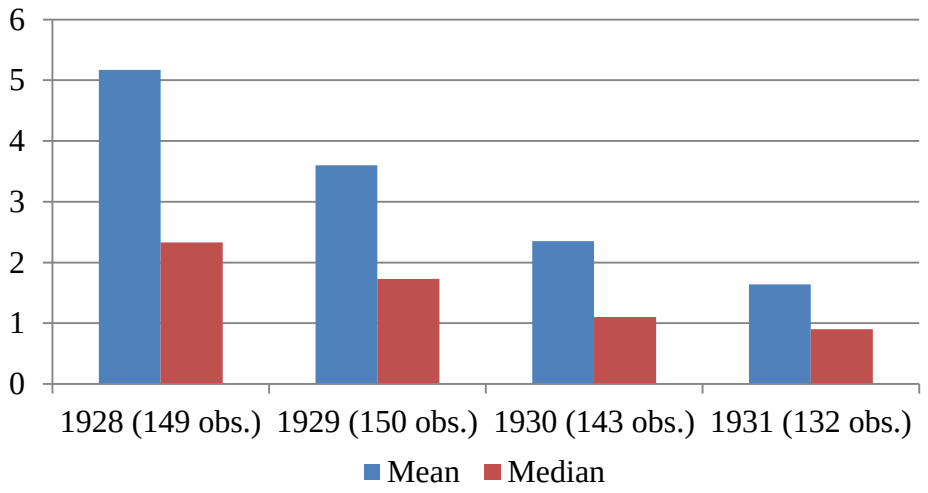
As potential determinants of MTB we consider the following firm characteristics: firm size, age, leverage, corporate diversification, beta and family ownership (e.g. Yermack 1996; Fich &

Shivdasani 2006; Coles *et al.* 2008). *Firm size* is measured by the natural logarithm of total assets at the beginning of the fiscal year. *Age* is the difference between the beginning of the year and the year the firm was first listed[9]. As a measure of *leverage*, we use the book value of total debt divided by the book value of total assets measured at the beginning of the fiscal year. We account for *corporate diversification* by including the number of business segments (e.g. Yermack 1996; Faleye *et al.* 2011; Francis *et al.* 2012). As risky firms generally have a high default risk and are therefore more vulnerable to external shocks (e.g. Baek *et al.* 2004), we include *beta*. We first compute beta by regressing a firm's monthly stock return in the pre-crisis period on the corresponding market return obtained from SCOB. We require at least 24 months of return prior to January 1929 to compute beta and we use a maximum of 63 months' worth of data. Since we compare firms across industries, we calculate *unlevered* beta, using the Hamada equation (Hamada 1972). Unfortunately, we have no ownership data, but we are able to calculate a proxy for *family ownership*. This proxy is a dummy that equals one if a firm has (i) at least two directors with the same name, (ii) at least two directors living at the same address, (iii) at least one director living at the address of the firm and (iv) at least one director that has the same name as the firm (Deman *et al.* 2015). We include this measure because family ownership may mitigate the classic agency problem between shareholders and managers and therefore positively affect firm value, especially in absence of strong monitoring (Yermack 1996; Fich & Shivdasani 2006). However, this effect may be offset by the costs of family directors if hired professionals are better directors than family founders or their heirs (Burkart *et al.* 2003).

[9] If a firm had different kinds of stock outstanding with a different period of listing, we use the age of the oldest stock.

Descriptive statistics on the firm characteristics are reported in panel B of Table 1. The firms in our sample tend to be mature firms: they have on average been listed for 26 years (median is 20 years). The average (median) debt ratio is 0.37 (0.34), which is substantially higher than the debt ratio's found by Deloof and Van Overfelt (2008) for capital intensive Belgian firms in 1905-1909. Figure 2 shows the mean and median values of the MTB in each of the four years. Not surprisingly, the effect of the crisis from 1928 to 1931 is very pronounced. The mean (median) MTB decreases from 5.17 (2.33) in 1928 to 1.64 (0.90) in 1931.

Figure 2
Market-to-book ratio 1928-1931



Source: Own calculations based on SCOB database and data from the Recueil Financier

4.1 Industry effects

To control for industry effects, we include seven industry dummies, a dummy for firms with their main activities abroad and a dummy for firms with mainly colonial activities. The industry classification is taken from the SCOB database and is based on the most important industry in which the firm is active. The industries were double-checked with a description of the firm's activities in the Recueil Financier.

Table 2
Board characteristics and firm connections across industries (mean figures)

	1	2	3	4	5	6	7	8	9
Industry	No of firms	Board size	Directorships per director	% busy directors	No. of external directorships	Bank affiliated (0,1)	No. of affiliated banks	% external directorships within industry	Connected firms within industry
Mining	23	13.70	2.97	30%	27.74	0.91	1.87	33%	20
Metal	17	14.95	2.74	33%	26.94	0.88	2.41	18%	15
Electricity	14	20.29	3.67	57%	54.64	1.00	2.93	27%	14
Stone	9	10.78	2.03	20%	12.56	0.78	1.67	19%	4
Tram/railways	9	17.78	2.98	43%	34.22	0.78	1.78	14%	8
Chemicals	8	14.13	2.15	25%	17.63	0.88	2.13	6%	4
Textile	5	10.80	1.48	16%	5.80	0.60	1.80	23%	3
Foreign	32	15.94	3.00	40%	34.88	0.88	2.34	36%	28
Colonial	23	16.39	3.79	55%	45.61	1.00	3.00	49%	21
Rest (*)	10	13.82	2.22	24%	17.82	0.55	1.00	39%	0

Notes: (*) The rest category includes firms from the following industries: automobile industry, catering, construction, food industry, other manufacturing, other utilities, shipping, weapon industry and wholesale

Table 2 describes board characteristics and connections between firms across industries. While firms in all industries tend to have large boards, busy boards and bank directors on the board in all industries, these characteristics are especially pronounced for firms in electricity, colonial firms and firms operating abroad. For example, 55% of the directors of colonial firms are "busy", i.e. they hold three or more directorships. All these firms are affiliated with at least one bank, and on average they are connected with three banks.

The last two columns show the number of firms connected with at least one firm operating in the same industry and the percentage of external directorships held in firms operating in the same industry. These figures show many interlocking directorships within an industry. For example, in the mining industry, 20 out of 23 firms in the sample are connected to other firms in the mining industry via interlocking directors. An explanation for the magnitude of these connections might be cartel formation. Heyman (1928), a former minister of industry, mentions the creation of international cartels. He provides a list of cartels known at the time with the countries involved. In the Recueil Financier, we found that 'Société anonyme Métallurgique de Prayon', a metallurgic firm from our sample, mentions restrictions of production because of international agreements ("entente international"). At the same time, firms are also strongly connected with firms in other industries. For example, of all the external directorships held by directors in the mining industry, only 33% is within the mining industry, other board seats are in other industries. Only four firms have no interlocking directors with other firms from our sample.

Table 3
Corporate value and busy boards

	(1)	(2)	(3)	(4)
Busy measure:		Directorships per director	Percentage of busy directors	ln(no. of external directorships+1)
1929	-0.195***	0.056	-0.009	0.153**
	(0.0000)	(0.3480)	(0.8521)	(0.0228)
1930	-0.524***	-0.322***	-0.345***	-0.205*
	(0.0000)	(0.0006)	(0.0000)	(0.0592)
1931	-0.721***	-0.512***	-0.534***	-0.435***
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Busy measure		0.149***	0.436	0.177***
		(0.0025)	(0.1976)	(0.0031)
Busy measure *1929		-0.085***	-0.491***	-0.115***
		(0.0000)	(0.0000)	(0.0000)
Busy measure *1930		-0.068**	-0.475***	-0.105***
		(0.0154)	(0.0046)	(0.0023)
Busy measure *1931		-0.071**	-0.503***	-0.094***
		(0.0160)	(0.0049)	(0.0094)
ln (Size)	-0.435***	-0.437***	-0.429***	-0.443***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.047	0.054	0.053	0.065
	(0.3655)	(0.3110)	(0.3545)	(0.2469)
Debt ratio	0.959***	0.902***	1.015***	0.939***
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Corporate diversification	-0.001	0.017	0.001	0.010
	(0.9857)	(0.7352)	(0.9898)	(0.8370)
Beta	0.172	0.074	0.194	0.105
	(0.3404)	(0.6852)	(0.3381)	(0.5891)
Family firm (0,1)	-0.080	-0.005	-0.070	-0.018
	(0.4332)	(0.9620)	(0.5419)	(0.8675)
Industry dummies	Yes	Yes	Yes	Yes
Observations	574	574	574	574
R^2	0.50	0.52	0.50	0.51

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. *1929*, *1930* and *1931* are year dummies; *directorships per director* is the total number of directorships held across all the directors of a board divided by board size; *percentage of busy directors* is the percentage of busy directors in a firm's board; *ln(no. of external directorships+1)* is the natural logarithm of the total number of directorships held across all the directors of a board minus board size plus one; all other variables are defined as before. Industry dummies are included. Intercept is included but not reported. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5 Results

5.1 Busy boards

Table 3 shows the regression results for our busy board measures. The natural log of the MTB is the dependent variable in all regressions. As a benchmark, in regression (1) we first look at the effect of the crisis on MTB without taking into account board characteristics. As expected, the results show a significant decrease of MTB in the crisis years 1929, 1930 and

1931. We find a statistically significant and negative coefficient for size (e.g. Van Overfelt 2009) and a statistically significant and positive coefficient for *debt ratio* (e.g. historical findings of Van Overfelt et al. (2009), Graham et al. (2011) and Foreman-Peck and Hannah (2013)). The debt ratio is a proxy for monitoring activity: firms relying more on external finance can be expected to be monitored more closely by debt holders. This monitoring activity may be especially valuable when other inside and outside monitoring is weak or absent.

In regressions (2), (3) and (4), we include the busy measures *directorships per director, percentage of busy directors* and *ln(no. of external directorships+1)*. We find that MTB is positively related to all three measures before the crisis. This relationship is statistically significant for *directorships per director* and for the *no. of external directorships* and is also economically significant. For example, one additional directorship per director is associated with a 16% increase in the MTB (=100*(exp(0.149)-1)). However, the market value associated with busy directors significantly decreased in the crisis years 1929, 1930 and 1931. For example, in 1929, one additional directorship per director is associated with an increase in MTB of only 6.6%. The results are similar for 1930 and 1931, and for other busy measures.

In table 3, we considered both executive and supervisory directors together although their tasks are very different and executive directors mostly meet without the supervisory directors. Therefore, our results could be driven by busy *executives* alone. In table 4, we only consider executive directors and, overall, we find the same results that are somewhat less statistically significant. This means that our results are mainly driven by *executive* directors.

Table 4
Corporate value and busy executive directors

	(5)	(6)	(7)
	Directorships per executive director	Percentage of busy executive directors	ln(no. of external executive directorships+1)
1929	-0.036	-0.083*	-0.051
	(0.4480)	(0.0802)	(0.2418)
1930	-0.416***	-0.422***	-0.427***
	(0.0000)	(0.0000)	(0.0000)
1931	-0.600***	-0.616***	-0.612***
	(0.0000)	(0.0000)	(0.0000)
Busy executive measure	0.008***	0.196	0.009***
	(0.0008)	(0.1701)	(0.0010)
Busy executive measure * 1929	-0.003***	-0.226***	-0.004***
	(0.0000)	(0.0031)	(0.0000)
Busy executive measure * 1930	-0.002	-0.207**	-0.002
	(0.1189)	(0.0286)	(0.1058)
Busy executive measure * 1931	-0.002*	-0.217**	-0.003*
	(0.0933)	(0.0346)	(0.0887)
ln (Size)	-0.466***	-0.429***	-0.462***
	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.072	0.052	0.066
	(0.1831)	(0.3370)	(0.2170)
Debt ratio	0.861***	0.983***	0.843***
	(0.0002)	(0.0000)	(0.0003)
Corporate diversification	0.018	0.000	0.022
	(0.7174)	(0.9979)	(0.6604)
Beta	0.022	0.181	0.009
	(0.9029)	(0.3308)	(0.9598)
Family firm (0,1)	0.015	-0.073	0.019
	(0.8847)	(0.4933)	(0.8560)
Industry dummies	Yes	Yes	Yes
Observations	574	574	574
R^2	0.54	0.50	0.53

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. *Directorships per executive director* is the total number of directorships held across all the executive directors of a board divided by the number of executive directors; *percentage of busy executive directors* is the percentage of busy executive directors on a firm's board (a director is defined as busy if he/she holds three or more directorships); ln(*no. of external executive directorships+1)* is the natural logarithm of (the total number of directorships held across all the executive directors of a board minus the number of executive directors +1); all other variables are defined as before. Intercept is included but not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5.3 Board size

Table 5 suggests that firm value is positively related to board size before the crisis: the board size coefficient is positive and statistically significant in regression (8). It is also economically significant. For example, a 10% increase in board size increases MTB with 4.6%.

Table 5
Corporate value and board size

	(8)	(9)	(10)
Board size measure:	Ln(Board size)	ln(No. of executive directors)	ln(No. of supervisory directors)
1929	0.313*	0.140	-0.052
	(0.0508)	(0.2525)	(0.5862)
1930	-0.107	-0.198	-0.504***
	(0.6970)	(0.2813)	(0.0020)
1931	-0.319	-0.407**	-0.696***
	(0.2149)	(0.0183)	(0.0000)
Board size measure	0.464***	0.347***	0.254*
	(0.0012)	(0.0046)	(0.0651)
Board size measure * 1929	-0.190***	-0.147***	-0.096
	(0.0015)	(0.0050)	(0.1239)
Board size measure * 1930	-0.154	-0.141*	-0.008
	(0.1263)	(0.0719)	(0.9406)
Board size measure * 1931	-0.148	-0.136*	-0.011
	(0.1253)	(0.0693)	(0.9103)
ln (Size)	-0.463***	-0.452***	-0.457***
	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.075	0.076	0.040
	(0.1714)	(0.1734)	(0.4451)
Debt ratio	0.977***	1.006***	0.923***
	(0.0000)	(0.0000)	(0.0001)
Corporate diversification	-0.011	-0.011	-0.002
	(0.8296)	(0.8249)	(0.9739)
Beta	0.150	0.166	0.128
	(0.4011)	(0.3501)	(0.4896)
Family firm (0,1)	-0.065	-0.065	-0.081
	(0.5104)	(0.5090)	(0.4290)
Industry dummies	Yes	Yes	Yes
Observations	574	574	574
R^2	0.51	0.51	0.50

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. L*n(Board size)* is the natural logarithm of the number of a firm's board seats; *ln*(*no. of executive directors)* is the natural logarithm of the total number of directors at the board of a firm minus the number of supervisory directors; *ln*(*no. of supervisory directors)* is het number of supervisory directors at the board of a firm; all other variables are defined as before. Industry dummies are included. Intercept is included but not reported. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Corporate value and bank affiliation

	(11)	(12)	(13)
Bank affiliation measured by:	Bank affiliated (0,1)	No. of affiliated banks	Percentage of bank directors
1929	-0.082	-0.087*	-0.097**
	(0.2617)	(0.0507)	(0.0395)
1930	-0.470***	-0.453***	-0.453***
	(0.0016)	(0.0000)	(0.0000)
1931	-0.681***	-0.688***	-0.662***
	(0.0000)	(0.0000)	(0.0000)
Bank affiliation measure	0.035	0.066*	0.462
	(0.8164)	(0.0881)	(0.2240)
Bank affiliation measure * 1929	-0.131*	-0.049***	-0.446**
	(0.0978)	(0.0033)	(0.0176)
Bank affiliation measure * 1929	-0.064	-0.031	-0.320
	(0.6789)	(0.2536)	(0.2659)
Bank affiliation measure * 1929	-0.048	-0.014	-0.271
	(0.7248)	(0.6296)	(0.2988)
ln (Size)	-0.432***	-0.446***	-0.438***
	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.047	0.056	0.049
	(0.3603)	(0.3056)	(0.3509)
Debt ratio	0.960***	0.951***	0.951***
	(0.0001)	(0.0001)	(0.0000)
Corporate diversification	-0.001	0.001	-0.002
	(0.9814)	(0.9877)	(0.9677)
Beta	0.177	0.177	0.179
	(0.3335)	(0.3274)	(0.3221)
Family firm (0,1)	-0.082	-0.062	-0.069
	(0.4328)	(0.5436)	(0.5055)
Industry dummies	Yes	Yes	Yes
Observations	574	574	574
R^2	0.50	0.50	0.50

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. *Bank affiliated (0,1)* is a dummy that equals one if a firm has at least one banker on its board and zero otherwise; *no. of affiliated banks* is the number of banks of which the firm has a director on its board; *percentage of bank directors* is the number of bank directors on the board of a firm divided by the total number of directors of that firm; and all other variables are defined as before. Industry dummies are included. Intercept is included but not reported. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

The positive relationship significantly weakens in 1929. The coefficients for the interaction variables are also negative for 1930 and 1931, but they are not statistically significant. Since boards were composed of both executive and supervisory directors, our results may be driven by either executive or supervisory directors. To test this, we

differentiate between the *no. of executive directors* and the *no. of supervisory directors* in regressions (9) and (10). We find a positive coefficient in 1928 for the *no. of executive directors* and negative coefficients during the crisis. All are statistically significant. We find no crisis effect for the *no. of supervisory directors*. In sum, our results indicate a positive relationship between board size and firm value before the crisis and we find a negative crisis effect for executive directors.

5.4 Bank affiliation

In table 6, we investigate the relation between corporate value and bank affiliation using three measures of bank affiliation: *bank affiliated (0,1)* (regression (11)), *no. of affiliated banks* (regression (12)) and the *percentage of bank directors* on the board (regression (13)). *Bank affiliated (0,1)* and MTB are not statistically significantly related before the crisis (regression (11)). However, the coefficient of the interaction between bank affiliation and the 1929 dummy is significant and negative, which suggests that the decline in corporate value in 1929 was more pronounced for firms which had a bank director on their board. We also find negative coefficients for the interactions with the 1930 and 1931 dummies, but these are not statistically significant. In regression (12), we find a positive association between the number of affiliated banks and MTB which is statistically and economically significant: being affiliated with an additional bank is associated with a 6.8% increase in MTB (=100*(exp(0.066)-1)). The coefficient of the interaction between bank affiliation and the 1929 dummy is significant and negative which means that being affiliated with more banks puts extra pressure on firm value in 1929. The coefficient of the interaction variable with the 1930 and 1931 dummies is also negative but not statistically significant. We also find a negative and statistically significant coefficient for the percentage of bank directors on the board in 1929 (regression (13)). These results indicate that the perceived costs of bank affiliation in Belgium increased during the first year of the Great Depression.

Table 7
Corporate value and busy directors/board, board size and bankers on the board

	(19)	(20)	(21)	(22)
Busy measure:	Directorships per director	Percentage of busy directors	ln(no. of external directorships+1)	ln(no. of external directorships+1)
Bank affiliation measure:	No. of affiliated banks	Bank affiliated (0,1)	No. of affiliated banks	Bank affiliated (0,1)
Crisis	0.057	-0.012	-0.135	-0.190
	(0.7740)	(0.9525)	(0.4854)	(0.3526)
Busy measure	0.146***	0.513	0.134**	0.171**
	(0.0033)	(0.1415)	(0.0480)	(0.0160)
Busy measure * crisis	-0.069***	-0.475***	-0.114***	-0.126***
	(0.0013)	(0.0004)	(0.0003)	(0.0001)
ln (Board size)	0.542***	0.609***	0.384**	0.414**
	(0.0005)	(0.0003)	(0.0251)	(0.0174)
ln (Board size) * crisis	-0.103	-0.118	0.021	0.021
	(0.1986)	(0.1109)	(0.8099)	(0.8061)
No. of affiliated banks	-0.007	-0.218	0.005	-0.259
	(0.8667)	(0.1769)	(0.8964)	(0.1236)
No. of affiliated banks * crisis	0.005	0.110	0.009	0.124
	(0.8314)	(0.3509)	(0.7263)	(0.2989)
ln (Size)	-0.582***	-0.578***	-0.583***	-0.580***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.050	0.053	0.046	0.050
	(0.3186)	(0.3075)	(0.3699)	(0.3225)
Debt ratio	1.104***	1.209***	1.187***	1.174***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Corporate diversification	0.016	0.000	0.007	0.008
	(0.7586)	(0.9973)	(0.9009)	(0.8891)
Beta	0.057	0.163	0.148	0.127
	(0.7521)	(0.4188)	(0.4464)	(0.5105)
Family firm (0,1)	0.016	-0.045	-0.025	-0.023
	(0.8819)	(0.6880)	(0.8268)	(0.8345)
Industry dummies	Yes	Yes	Yes	Yes
Observations	574	574	574	574
R^2	0.47	0.46	0.46	0.46

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. All variables are defined as before. Intercept is included but not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

To see which of the board variables is the most important, in table 7 we include board busyness and board size measures and the number of affiliated banks in the same regression. Instead of three year dummies, we only consider one crisis dummy to avoid

multicollinearity[10]. The results for board busyness remain significant, and we also find an overall positive relation between board size and firm value before the crisis. However, the significant effect of the number of affiliated banks disappears. This indicates that the main positive effect is driven by board busyness and also by board size, while the negative crisis effect is determined by board busyness.

5.5 Board characteristics and firm risk

We have found that board busyness, board size and bankers on the board are negatively associated with firm performance during the crisis. However, it cannot be ruled out that an unobserved factor correlated with our board measures, affected firm performance during the crisis. Specifically, board busyness, board size and bankers on the board might be related to firm risk. The resource dependence theory proposes that corporate boards are a mechanism for reducing environmental uncertainty (Pfeffer 1972). Hillman and Dalziel (2003) argue that boards may not only provide resources, but may also "provide channels of communication and conduits of information between the firm and external organizations". Boards "provide the firm with timely and valuable information and serve to reduce the transaction costs of dealing with uncertainties in the environment" (Hillman & Dalziel 2003, p387). Therefore, the higher a firm's environmental uncertainty or risk, the more a firm may try to connect with the external environment by having a large board with busy directors and bank directors. Furthermore, firms with higher risk will typically suffer more during a crisis (e.g. Baek *et al.* 2004). The negative crisis effects of our board variables may therefore be driven by firm risk. Firms with a higher systematic risk enlarge their network by having a large board with busy directors and bank directors, and they are the ones that suffer most during the crisis because of their higher systematic risk. Consistent with this argument, we find a strong and statistically significant correlation between our board busyness measures

[10] As a robustness test, we included a dummy variable *crisis* which combines the three crisis years in our baseline results, instead of three crisis year dummies. These results are qualitatively the same.

and *beta*, which measures systematic risk (correlations between 0.42 to 0.53). Table 8 shows that, on average, beta differs strongly per industry. For example, mining industry has the lowest beta (0.30) and the chemicals industry, electricity, tram- and railways and colonial firms have highest beta's, respectively 1.12, 1.10, 1.10 and 1.21.

Table 8
Average beta per sector in 1929 (mean figures)

Industry	No. of firms	Beta
Mining	23	0.30
Metal	17	0.84
Electricity	14	1.10
Stone	9	0.29
Tram/railways	9	1.10
Chemicals	8	1.12
Textile	5	0.52
Foreign	32	0.65
Colonial	23	1.21
Rest (*)	10	0.79

Notes: (*) The rest category includes firms from the following industries: automobile industry, catering, construction, food industry, other manufacturing, other utilities, shipping, weapon industry and wholesale

Our baseline regressions include beta as a control variable, but this does not take into account that the effect of beta might change during a crisis. While beta generally tends to be positively related to stock returns, one would expect firms with a high beta to perform poorly during a crisis period, when the overall market performs poorly (e.g. Baek *et al.* 2004). To take into account the changing effect of beta during the crisis, we interact beta with the three crisis years. Results are shown in table 9.

Table 9
Corporate value, board characteristics and firm risk during the crisis

	(14)	(15)	(16)	(17)	(18)
		Directorships per director	ln (Board size)	Ln (No. of executive directors)	No. of affiliated banks
1929	0.064	0.174***	0.330**	0.219*	0.131***
	(0.1516)	(0.0018)	(0.0265)	(0.0690)	(0.0053)
1930	-0.100	-0.084	-0.043	-0.039	-0.082
	(0.1164)	(0.2875)	(0.8638)	(0.8206)	(0.2193)
1931	-0.318***	-0.278***	-0.228	-0.237	-0.324***
	(0.0000)	(0.0008)	(0.3358)	(0.1560)	(0.0000)
Beta	0.755***	0.629***	0.709***	0.723***	0.748***
	(0.0003)	(0.0049)	(0.0006)	(0.0004)	(0.0004)
Beta * 1929	-0.442***	-0.372***	-0.417***	-0.420***	-0.415***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Beta * 1930	-0.719***	-0.702***	-0.711***	-0.710***	-0.713***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Beta * 1931	-0.692***	-0.656***	-0.676***	-0.676***	-0.689***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Board measure		0.098*	0.339**	0.255**	0.049
		(0.0594)	(0.0216)	(0.0408)	(0.1898)
Board measure * 1929		-0.052***	-0.104*	-0.073	-0.037***
		(0.0035)	(0.0763)	(0.1712)	(0.0078)
Board measure * 1930		-0.008	-0.020	-0.027	-0.009
		(0.7531)	(0.8371)	(0.7259)	(0.7035)
Board measure * 1931		-0.020	-0.034	-0.037	0.003
		(0.4776)	(0.7044)	(0.6142)	(0.9107)
ln (Size)	-0.405***	-0.411***	-0.432***	-0.423***	-0.415***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.084*	0.085*	0.097*	0.099*	0.087*
	(0.0875)	(0.0802)	(0.0616)	(0.0584)	(0.0883)
Debt ratio	1.188***	1.094***	1.170***	1.191***	1.165***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Family firm (0,1)	-0.076	-0.016	-0.065	-0.065	-0.061
	(0.4500)	(0.8833)	(0.5087)	(0.5089)	(0.5447)
Corporate diversification	-0.001	0.015	-0.008	-0.009	0.001
	(0.9892)	(0.7693)	(0.8666)	(0.8527)	(0.9834)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Observations	574	574	574	574	574
R^2	0.52	0.54	0.53	0.53	0.52

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. All variables are defined as before. Intercept is included but not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Regression (18) shows a statistically and significant positive relation between beta and MTB before the crisis. However, this relation became negative during the crisis. This shows that the higher the systematic risk, measured by beta, the higher firm value losses are

during the crisis. When we add the board measures *directorships per director, board size, no. of executive directors* and *no. of affiliated banks* together with their interactions with the crisis years dummies in regressions (19), (20), (21) and (22), our results become less strong, both statistically and economically. During the crisis, the coefficients of the interaction variables of *directorships per director* and *ln(No. of executive directors)* in 1930 and 1931 (regression (19) and (21)), and the coefficient of *no. of affiliated banks* (regression (22)) before the crisis lose statistical significance. It seems that firms subject to more systematic risk had a more extended network reflected by busy boards and large boards and suffered more during the crisis.

5.6 Robustness checks

Accounting performance

As noted in section 4.2, we prefer to focus on MTB as a performance measure instead of accounting based measures because market prices immediately take into account the effects of the crisis, while accounting measures are by nature backward looking, reflecting the current profitability of assets in place. Accounting profits in Belgium were also highly susceptible to manipulation (Van Overfelt *et al.* 2010). As a robustness check we used *return on assets* (ROA), i.e. net income plus depreciation divided by total assets, as a measure of performance. Not surprisingly, we find no statistically significant relation between board composition and ROA. Regression results are reported in table 10.

Table 10
Corporate value, measured by ROA, and board composition

	(23)	(24)	(25)	(26)	(27)
		Directorships per director	ln (Board size)	ln(No. of executive directors)	No. of affiliated banks
1929	-0.001	-0.000	0.004	0.002	0.004
	(0.8743)	(0.9889)	(0.9304)	(0.9514)	(0.8167)
1930	-0.007	-0.024	-0.005	0.004	-0.002
	(0.3761)	(0.3087)	(0.9333)	(0.9065)	(0.9177)
1931	-0.035***	-0.068***	-0.116**	-0.077**	-0.051***
	(0.0000)	(0.0008)	(0.0358)	(0.0307)	(0.0013)
Board measure		-0.011	-0.011	-0.001	-0.004
		(0.2364)	(0.6370)	(0.9488)	(0.5613)
Board measure *1929		-0.000	-0.002	-0.001	-0.002
		(0.9415)	(0.9031)	(0.9058)	(0.6268)
Board measure *1930		0.005	-0.001	-0.005	-0.003
		(0.3745)	(0.9604)	(0.7036)	(0.6377)
Board measure *1931		0.011**	0.030	0.019	0.007
		(0.0431)	(0.1188)	(0.1910)	(0.1778)
ln (Size)	-0.044***	-0.044***	-0.044***	-0.044***	-0.043***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.018**	0.017**	0.016*	0.017**	0.017**
	(0.0247)	(0.0265)	(0.0510)	(0.0377)	(0.0364)
Debt ratio	0.129**	0.131**	0.124**	0.126**	0.123**
	(0.0115)	(0.0157)	(0.0161)	(0.0148)	(0.0179)
Corporate diversification	-0.003	-0.004	-0.002	-0.003	-0.003
	(0.7420)	(0.6328)	(0.7691)	(0.7444)	(0.7231)
Beta	-0.018	-0.010	-0.019	-0.018	-0.018
	(0.3348)	(0.6864)	(0.3261)	(0.3310)	(0.3502)
Family firm (0,1)	0.002	-0.003	0.002	0.002	0.001
	(0.8786)	(0.8445)	(0.9032)	(0.8783)	(0.9653)
Constant	0.851***	0.876***	0.889***	0.868***	0.842***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Observations	529	529	529	529	529
R^2	0.33	0.34	0.34	0.33	0.34

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is *return on assets* (ROA) and is net income plus depreciation divided by total assets at the end of the fiscal year. All variables are defined as before. Intercept is included but not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Stock return volatility as alternative risk measure

Table 11
Corporate value, board characteristics and firm risk during the crisis

	(28)	(29)	(30)	(31)	(32)
		Directorships per director	ln (Board size)	ln(No. of executive directors)	No. of affiliated banks
1929	0.027	0.170**	0.521***	0.374***	0.114*
	(0.6966)	(0.0204)	(0.0006)	(0.0008)	(0.0946)
1930	-0.076	0.027	0.481*	0.391*	0.008
	(0.4841)	(0.8128)	(0.0653)	(0.0561)	(0.9434)
1931	-0.316***	-0.240**	-0.006	-0.053	-0.316***
	(0.0001)	(0.0111)	(0.9786)	(0.7348)	(0.0005)
Volatility	1.888***	1.502***	1.845***	1.909***	1.794***
	(0.0020)	(0.0084)	(0.0010)	(0.0008)	(0.0021)
Volatility * 1929	-2.048***	-1.591***	-2.048***	-2.091***	-1.974***
	(0.0010)	(0.0074)	(0.0005)	(0.0004)	(0.0009)
Volatility * 1930	-4.893***	-4.532***	-4.983***	-5.112***	-4.936***
	(0.0007)	(0.0018)	(0.0006)	(0.0005)	(0.0006)
Volatility * 1931	-4.180***	-3.824***	-4.158***	-4.216***	-4.209***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Board measure		0.134***	0.426***	0.329***	0.054
		(0.0048)	(0.0035)	(0.0026)	(0.1796)
Board measure *1929		-0.065***	-0.185***	-0.150***	-0.043***
		(0.0002)	(0.0008)	(0.0003)	(0.0080)
Board measure *1930		-0.048*	-0.205**	-0.196***	-0.036
		(0.0602)	(0.0234)	(0.0043)	(0.1183)
Board measure *1931		-0.038	-0.115	-0.113*	0.001
		(0.1420)	(0.1552)	(0.0618)	(0.9548)
ln (Size)	-0.424***	-0.430***	-0.447***	-0.438***	-0.434***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ln (Age)	0.017	0.024	0.042	0.044	0.022
	(0.7565)	(0.6582)	(0.4739)	(0.4632)	(0.7036)
Debt ratio	0.793***	0.805***	0.823***	0.840***	0.766***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Corporate diversification	0.011	0.031	0.003	0.002	0.013
	(0.8293)	(0.5491)	(0.9511)	(0.9602)	(0.8028)
Family firm (0,1)	-0.087	-0.012	-0.075	-0.074	-0.073
	(0.3921)	(0.9090)	(0.4520)	(0.4526)	(0.4743)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Observations	574	574	574	574	574

Notes: this table displays the regression coefficients and robust p-values for random effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. *Volatility* is defined as the standard deviation of monthly stock returns over the previous year. All other variables are defined as before. Intercept is included but not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

To measure total firm risk instead of systematic risk, we include volatility instead of beta. *Volatility* is defined as the standard deviation of monthly stock returns over the previous year. We reproduce our baseline results with the new risk measure in table 11. The relation between risk and firm value qualitatively stays the same (regression (28)). The signs of the

board variables and their interaction variables stay the same, but statistical significance slightly changes. The coefficient of *directorships per director* in 1931 (regression (29)) and the one for *no. of affiliated banks* before the crisis (regression 32)) are not statistically significant anymore, but the coefficient of board size becomes now statistically significant in 1930 (regression (30)). The results for *no. of executive directors* (regression (31)) are statistically stronger.

Table 12
Corporate value and board composition - Firm fixed effects

	(33)	(34)	(35)	(36)
		Directorships per director	ln (Board size)	No. of affiliated banks
1929	-0.229***	0.051	0.150	-0.087
	(0.0000)	(0.5102)	(0.4571)	(0.1462)
1930	-0.688***	-0.508***	-0.481	-0.612***
	(0.0000)	(0.0001)	(0.1797)	(0.0000)
1931	-1.009***	-0.806***	-0.723*	-0.971***
	(0.0000)	(0.0000)	(0.0527)	(0.0000)
Board measure *1929		-0.096***	-0.144*	-0.066***
		(0.0000)	(0.0501)	(0.0001)
Board measure *1930		-0.063*	-0.080	-0.037
		(0.0568)	(0.5354)	(0.2119)
Board measure *1931		-0.071**	-0.110	-0.020
		(0.0404)	(0.4154)	(0.5279)
ln (Size)	-0.669***	-0.651***	-0.661***	-0.662***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ln (Age)	-0.019	-0.006	-0.006	-0.012
	(0.8731)	(0.9636)	(0.9598)	(0.9214)
Debt ratio	1.725***	1.776***	1.752***	1.694***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	576	576	576	576
R^2	0.758	0.765	0.759	0.762

Notes: this table displays the regression coefficients and robust p-values for fixed effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the natural logarithm of the MTB. All variables are defined as before. Intercept is included but not reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Fixed effects

To rule out that our results are driven by any omitted/unobserved effect such as firm culture, quality of the management and other governance mechanisms that do not change

during our sample period, we use a fixed effects model instead of a random effects model. Inevitably, the board variables *corporate diversification, beta, family firm (0,1),* and industry dummies drop out of the regression because they are defined only once. Results are reported in table 12. We find a negative relation between busy directors/boards and firm value for all crisis years (regression (34)) and we find a negative coefficient in 1929 for *board size* and *no. of affiliated banks* (regressions (35) and (36)). This confirms our baseline results.

To measure the balance of power between executive and supervisory directors, we include the ratio of executive directors to board size. On average 30% of the directors are supervisory directors. In the regressions, this variable is not statistically significant and does not change our baseline results qualitatively (unreported).

6 Conclusion

This study investigates the impact of corporate board structure on the value of Belgian firms in the period 1928-1931. In this period which was characterized by weak investor protection and high information asymmetries, firms had large, busy boards and were strongly connected with other firms and with banks. We find evidence in favor of the resource dependence theory. Board busyness, board size and bankers on the board were positively related to firm value before the crisis, but this positive effect tended to become smaller during the crisis in 1929-1931. It seems that these connections provided little protection during the crisis. Consistent with resource dependency theory which considers boards as provider of resources, our results suggest that board busyness, board size and bankers on the board are correlated with firm risk. When we take into account that the effect of firm risk on market value changed during the crisis, we find that the negative effect of our board characteristics on firm value become smaller, suggesting that our findings for board characteristics are partly driven by firm risk. High risk firms had a larger director network in order to cope with environmental uncertainties, but they suffered more during the crisis.

In this study we mainly focused on social capital of directors which includes their network, experience and knowledge and less on their role of monitors since their monitoring activities were probably limited. Still, the lack of strong internal monitoring might have been substituted by other forms of monitoring, such as monitoring by debt holders. The positive and statistically significant relation between leverage and firm value is indicative for this hypothesis. Furthermore, bankers were on the board of industrial firms (in which they held equity stakes or to which they granted credit) to monitor executives (e.g. van der Valk 1932). Moreover, director reputation might have served as a substitute for supervisory directors' monitoring. In a small world of business elites (Ghita, 2009), executives might be concerned about their reputation which prevents them from misusing shareholders' funds. Further research on these alternative governance mechanisms should shed more light on this hypothesis.

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Study 2

Performance related remuneration of directors before and during the Great Depression [11]

Abstract

We study director compensation and its relation with firm performance in the period 1925-1934, including the Great Depression. Performance-related compensation for directors was already well established among listed firms in Belgium. The calculation of their bonus was regulated by the articles of incorporation which meant that, in practice, directors' bonus was mainly tied to net income of the previous year. Other performance related pay did not exist. In spite of weak corporate governance and little accounting regulation, we find no evidence of shareholder expropriation via the allocation of excessive bonuses: first, we find that bonuses are related to performance and this pay-performance sensitivity decreases or even disappears during the crisis: less of profit is distributed as a bonus during the crisis and, second, we find that paying out high director bonuses before the crisis has no negative effect on firm performance during the crisis. If shareholders were being expropriated before the crisis via excessive director bonuses, we should observe a larger drop in firm performance for those firms during the crisis but we do not.

Keywords: Director compensation, corporate value, Interwar period, Belgium

JEL classification: G01, G34, G35, N84

[11] This paper is co-authored with Marc Deloof (Universiteit Antwerpen) and Armin Schwienbacher (Université Lille - SKEMA Business School).

1 Introduction

Conflicts of interest between managers and shareholders may result in the destruction of shareholder wealth if managers extract rents from the firm for their private benefit (e.g. Jensen & Meckling 1976). Academic studies have shown that the quality of the legal system plays an important role in protecting those shareholder rights (e.g. La Porta *et al.* 1997, 1998; La Porta *et al.* 1999; La Porta *et al.* 2000, 2002). For example, absence of good corporate governance legislation may lead to hidden rent extraction by executives and, as a result, to destruction of shareholder wealth (e.g. Core *et al.* 1999; Durnev & Kim 2005).

In this study, we focus on the ten-year period 1925-1934, which was characterized by weak corporate governance and legal shareholder protection (e.g. Tienrien 1933; Velghe 1934) combined with high information asymmetry. Curiously enough, this did not prevent stock markets from flourishing: before the Great Depression, Belgium had one of the largest stock markets in the world and its level of development was comparable to 1999 figures (e.g. Rajan & Zingales 2003).

One well-recognized way of protecting shareholder rights is aligning interests of executives and shareholders through appropriate incentive mechanisms such as making executive compensation dependent on firm performance (e.g. Jensen & Murphy 1990). Today, total performance related compensation includes a bonus that may depend on different performance measures, it may include option grants, retirement and severance pay,… (Goergen & Renneboog 2011). However, in 1925-1934, our sample period, we find that pay was already related to performance, but it consisted solely of a monetary bonus that was determined only by net income of the last accounting year, without long-term incentives.

Did these rudimentary compensation arrangements protect shareholder rights in the absence of strong legal protection? Were they an incentive mechanism to align interests of directors and shareholders or were directors able to expropriate shareholders via their

bonuses? Were the rules from the articles of incorporation to calculate bonuses honored or were they just hollow phrases?

In this study on compensation and performance, we take a slightly different approach than other research on executive compensation by considering not only executives' bonuses, but also supervisory directors' bonuses. It is clear that supervisory directors, who should protect the interest of shareholders by monitoring executives on behalf of the shareholders, are agents of shareholders too and therefore face the same principal-agent problem as shareholders and executives (e.g. Hermalin & Weisbach 1991; Theeravanich 2013). Therefore, performance related pay of both executive and supervisory directors needs to be studied jointly, which we do in this study. Moreover, articles of incorporation generally stipulated that both executive and supervisory directors got a percentage of net income, although the supervisory directors' bonus was usually smaller.

We do not only consider a period of normal economic activity, but we also include the Great Depression, which is interesting for two reasons. First, the severity of the agency problem between directors and shareholders may increase when director compensation is tied to decreasing firm performance during the Great Depression. As a result, directors might have an increased incentive to expropriate shareholders (e.g. Johnson *et al.* 2000; Mitton 2002; Lemmon & Lins 2003). Second, we try to account for the endogeneity that arises from the joint determination of director compensation and firm performance (e.g. Bayer & Burhop 2009).

To get a better understanding of how performance related pay was calculated, distributed and impacted by the crisis, we first analyze the cases 'Anciens Etablissements Louis De Naeyer' and 'Société anonyme Métallurgique de Prayon'. Articles of incorporation prescribe how much of net income of the last fiscal year had to be distributed as a bonus to directors. Before the crisis, the paid out bonus more or less matches the prescribed bonus. However,

during the crisis, we find a growing discrepancy between what was actually paid out (according to the profit distribution statement) and what should have been paid out based on stipulations in the articles of incorporation ('the theoretical bonus'). For these two cases, the ratio of paid out bonus to this 'theoretical bonus' is around one until 1931 and 1930 respectively which means that prescriptions in the articles of incorporating are honored. In 1933, the ratio dropped to zero and 0.75 respectively (for positive net incomes), which means that directors get less than what they should get according to the articles of incorporation. These two firms rather paid out dividends or kept profit in the firm as reserves than to pay out bonuses.

Next, we study pay-performance sensitivity using regression analyses. We find a positive relation between the bonus that is paid out (as reported in the profit distribution statement) and net income before the crisis that becomes less strong during the crisis. This is not surprising as the bonus should depend on net income as prescribed by the articles of incorporation. When we use the change in shareholder wealth as an alternative performance measure that has no formal relation with the paid out bonus, we find a negative effect of the crisis that offsets the positive relation before the crisis. Overall, we find a decrease or even disappearance of pay-performance sensitivity during the crisis which is mainly due to the negative leverage effect of a fixed dividend.

Too high or excessive bonuses are linked to bad corporate governance and to the existence of unresolved agency problems (Core *et al.* 1999) and may be related to a lack of constructive criticism and effective monitoring of directors toward executives (Jensen 1993). A famous example is the Enron debacle of 2001. Brick et al. (2006) refer to this phenomenon as "mutual back scratching" between directors and management that allows managers and/or directors to expropriate shareholders. Brick et al. (2006) and Core et al. (1999) provide

empirical evidence showing that excessive CEO and director compensation is associated with weaker future firm performance.

In order to detect any shareholder expropriation via bonus payments, we study the effect of bonuses paid out before the crisis on firm performance during the crisis. We expect that firms, in which shareholders were expropriated before the crisis by means of high bonuses, show a larger drop in firm value during the crisis. In this case, we should find a negative relation between the bonus before the crisis and firm performance during the crisis. However, this contradicts our findings. We find no relation or even a positive relation between the bonus before the crisis and performance during the crisis. These results are robust to a battery of robustness tests. Together, we find no evidence for shareholder expropriation via excessive bonuses, at least not to the extent that it negatively impacts future firm performance.

Our work relates to studies on pay-performance sensitivity from, for example, Jensen and Murphy (1990), Hall and Liebman (1998), Hartzell and Starks (2003), and Renneboog and Zhao (2011). Furthermore, it relates to studies that investigate pay-performance sensitivity in a historical context. Burhop (2004) studies executive compensation in German banks in the period 1854-1910 and Bayer and Burhop (2009) studied 46 German firms for the period 1870-1911. They find that monetary incentives were replaced by better corporate governance after a legal reform. Frydman and Saks (2010) study pay-performance sensitivity during the period 1936-2005. They find that the strength of the pay-performance sensitivity increased over the period 1936-2005. Furthermore, the second part of our work relates to research on the quality of corporate governance, (excessive) executive/director compensation and future firm performance. Core et al. (1999) and Brick et al. (2006) find that excessive compensation, related to weak corporate governance, has a negative effect on subsequent firm performance. Brick et al. (2006) study U.S. firms from 1992 to 2001 and Core et al. (1999) study U.S. firms in the three-year period 1982-1984.

The remainder of the paper is structured as follows. Section 2 gives the historical background of corporate boards and of bonuses. Section 3 discusses corporate governance, director compensation and firm performance and we formulate hypotheses. We elaborate on two case studies in section 4. The construction of the sample and the variables are discussed in section 5 and section 6 reports empirical findings. Section 7 concludes.

2 Historical background

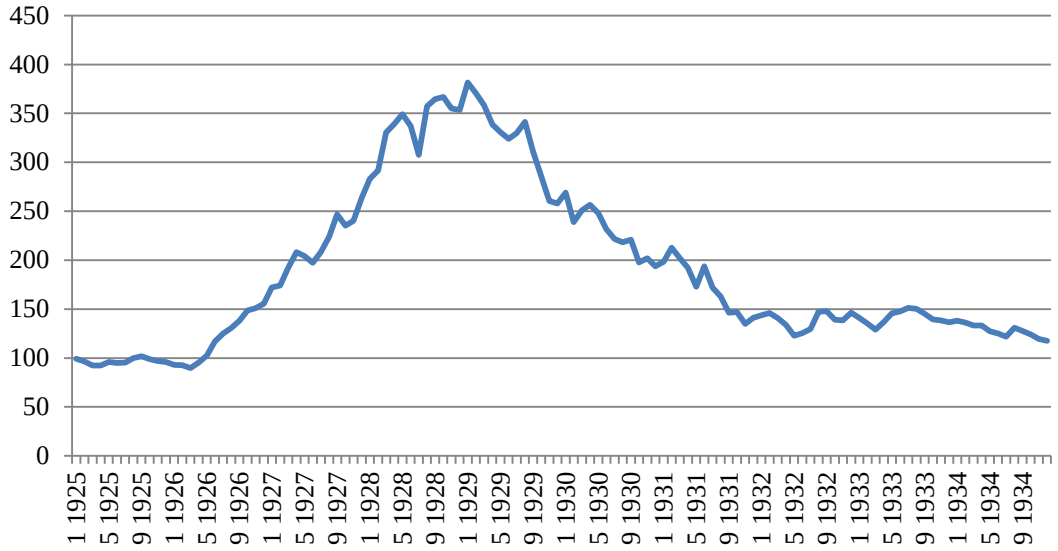
2.1 Economy

After recovery from world war one, the introduction of the gold exchange standard[12] and the simultaneous devaluation of the Belgian franc in October 1926, the Belgian economy started to flourish again. However, in 1929, the Great Depression hit most parts of the world and, outside the United States, Belgium was one of the countries with the most serious decline in economic activity (Aldcroft 1997). Figure 1 shows cumulative stock return of all Belgian firms listed on the Brussels Stock Exchange in the period 1925–1934[13]. We set the index at 100 on December 31st 1924. As of 1926, stock prices strongly increased until January 1929, the culminating point of the rising market. After January 1929, stock prices started to fall dramatically, together with output, income, employment, trade and prices (Aldcroft 1997). The year 1932 saw a bottoming out of the crisis and it took another three years before the Belgian economy started to recover, thanks to the abandonment of the gold exchange standard and another devaluation of the Belgian franc in 1935 (Chlepner 1943; Baudhuin 1944).

[12] Monetary authorities tied its currency to gold indirectly: they maintained a fixed exchange rate with a foreign currency that was convertible into gold at a stable rate of exchange. Those currencies were mostly the U.S. dollar or the British sterling.

[13] Indices are Laspeyres market cap weighted return indices calculated by linking monthly returns through a chain index. The weight of each firm's return is given by its relative market capitalization.

Figure 1
Cumulative stock return of Belgian firms on the Brussels Stock Exchange, with January 1925 as basis (index value of 100).



Source: Own calculations based on SCOB database

2.2 Corporate boards and corporate governance

In this period, the functioning and composition of the board was regulated by the law on commercial enterprises ("Lois sur les sociétiés commerciales") that was last updated by the law of July 29th 1926. This law stipulated that the board of directors ("conseil général") of Belgian firms had a dual structure, consisting of executive board members ("administrateurs", together forming the "conseil d'administration") and supervisory board members ("commissaires", together forming the "collège des commissaires"). Executive and supervisory directors met each other only occasionally in the "conseil général" and this was not obliged by law (Wauwermans 1927; Gilis 1929).

The executive board members, acted on behalf of and for the account of the company, they were appointed by the articles of incorporation or by the general meeting of shareholders and their responsibilities were limited by the company's articles of incorporation. The minimum number of executive board members was legally set at three, but there was no legal maximum and their mandate could not exceed six years. However, they were eligible for re-

election (unless the articles of incorporation stipulated differently) and their mandate was revocable at any time (art 53-56).

Supervisory board members were in charge of the supervision of the executive board members and had to approve the company's annual accounts. They were appointed by the general meeting of shareholders. The number of supervisory board members was set by the general meeting of shareholders with a minimum of one and their mandate could not exceed six years but they were eligible for re-election and their mandate was revocable at all times (art 64).

Names of all board members, both executive and supervisory, had to be made public and all board members were obliged to deposit shares of the firm ("cautionnement") (art. 57- 59 and 69) to make sure that directors would act according to the articles of incorporation and to the law. The number of shares to deposit was set by the articles of incorporation or, when this information was missing, it was set by the general shareholder meeting. It was allowed to deposit other shareholders' shares. This means that directors were not obliged by law to be owners of the deposited shares. Furthermore, conflicts of interest between the firm and an executive director had to be reported to the other executive directors, and the director with conflicting interest was not allowed to attend meetings in which this particular issue was dealt with (Wauwermans 1927; Gilis 1929).

Daily management and representation of the firm were delegated to a management committee that was composed of managers ("directeur") of which some held a board seat ("administrateur-directeur"). The details on their appointment, responsibilities and discharge were set by the articles of incorporation (art 63). Only the names of the managers with a board seat had to be published (e.g. Wauwermans 1927; Gilis 1929), although some firms also reported the names of the other members of this committee.

Although a first step toward good corporate governance had been taken with the laws of May 25th 1913, October 30th 1919 and July 14th and 29th 1926 (following other European countries such as Great Britain, Germany and France), corporate governance was still in its infancy. For example, rules to impose board independency[14], which is today considered to be a requirement for good corporate governance (e.g. the Sarbanes-Oxley Act of 2002 in the US and the Principles of Corporate Governance of 1999/2004 of the OECD), were lacking: employees, family members or other relatives of a firm's executive directors were legally allowed to become supervisory board members of that same firm (Wauwermans 1927 p257; Velghe 1934). Furthermore, whatever the subject of the vote, both supervisory and executive directors were allowed to vote in the general meeting of shareholders (art. 64). This means that executives were allowed to participate in the appointment of supervisory directors (Wauwermans 1927; Velghe 1934). Often, a firm's bookkeeper was appointed as supervisory director (Velghe 1934, p10). Moreover, being supervisory director could be seen as a preparation for becoming an executive director. In this case, it was important for them to stand well with the executive directors (Vaes 1929, p73; Velghe 1934, p9). All this indicates that supervisory directors were not necessarily independent. As a result, this raises questions about their monitoring responsibility. Gilis (1929) and Velghe (1934), a contemporary accountant and member of the Chamber of Deputies respectively, describe that supervisory board members mostly limited their monitoring activities to some random checks of the annual accounts and that supervision in general was very weak. Important steps to improve corporate governance would only be taken in 1934-1935, as a response to the crisis.

2.3 Bonuses

Whether executive directors were paid and whether this was a fixed salary or a profit share, a bonus ("tantième"), was stipulated in the articles of incorporation or could be

[14] A board is considered to be independent if it has a majority of independent directors. A director is considered to be independent if he/she has neither financial nor family ties to the firm.

delegated to the general meeting of shareholders (art 53). Most often, executive directors received a profit share (Gilis 1929).

The compensation of supervisory directors was set by the general meeting but could also be fixed by the articles of incorporation (art 64). In practice, their bonus calculation was similar to that of the executive directors which was mostly dependent on net income of the firm. Articles of incorporation stipulated how much of net income had to be distributed to supervisory directors or, if a guideline was absent, they stipulated that the general meeting of shareholders had to decide upon their profit share.

In the period under consideration, stock option grants did not exist and we have no evidence of specific performance-related compensation arrangements for individual directors. Firms were free to choose their remuneration policy for directors: a fixed salary, a bonus that depends on performance or no remuneration at all. If directors received a bonus, this bonus was generally different between the two classes of directors, executive and supervisory directors, but not within one class. Moreover, individual directors could earn an extra salary by taking up extra responsibilities or by being member of the executive committee charged with daily management. This salary was included in the general costs ("frais généraux"). Unlike the profit share, this pay was not mentioned separately in the firm's annual accounts (Velghe 1934). As we have no information on fixed salaries for directors, this means that we do not necessarily know an executive director's total pay. Still, it seems reasonable to assume that this does not significantly affects our results, as directors were, in general, paid out a bonus rather than a fixed salary (Gilis 1929)[15].

Articles of incorporation stipulated how profits should be distributed. First, as long as legal reserves did not attain 10% of shareholder funds, at least 5% of net income had to be

[15] As far as we know, no information is available on directors' salary. We went through documentation of several firms in the state archives of Belgium, but we found no information on fixed salaries for directors at all.

assigned to legal reserves (art. 75). Second, a dividend was typically paid out based on shareholder funds. From the remainder, the directors' bonus, was calculated.

Firms were free to distribute net income as they pleased, as long as they took legal reserve requirements into account. Here are four examples of profit distributions from firms in our sample. Information comes from the annual accounts of 1928 in the Recueil Financier, in which the profit distribution from the articles of incorporation is published.

- 'Compagnie Internationale des Wagons Lits et des Grands Express Européens', a company in the railways industry: 10% to legal reserves, a dividend of 5% of preferred shareholder funds ("Actions privilégiées") to preferred shareholders and a dividend of 5% of the ordinary shareholder funds ("Actions ordinaires") for ordinary shareholders. Of what was left, 7,5% to the executive directors and the remainder to the shareholders.
- 'Société Industrielle de la Cellulose (S.I.D.A.C)', a company in the chemicals industry: 5% to legal reserves, a dividend of 8% of shareholder funds to shareholders and, of the remainder: 15% to executive and supervisory directors together. The remainder had to be distributed as a dividend.
- 'Charbonnages de Beeringen', a mining company: 5% to legal reserves, a dividend of 5% of shareholder funds to shareholders and on the remainder: 12% to the executive directors and 6% at the disposal of the executive directors. The remainder was at the disposal of the general meeting of shareholders.
- 'Phenix-Works', a metal company: 5% to legal reserves, a first dividend of 12,50fr per share to shareholders and on the remainder: 10% to executive directors and for the supervisory directors: one third of the bonus of an executive director, the remainder to the shareholders or to the reserves.

Part of net income could also be distributed to employees and management or an extra profit share could be assigned to the CEO or to the president of the board. Executive and supervisory directors' bonus could also be expressed as a percentage per director or the supervisory directors' bonus was delegated to the general meeting by the following expression: 'compensations of supervisory directors to be fixed by the general meeting'.

The guidelines on profit distribution in the articles of incorporation could change over time. We found anecdotal evidence of executive directors proposing in their annual report ("Rapport du conseil d'administration") to change the profit distribution[16]. The final decision was made by shareholders during the general shareholder meeting.

3 Corporate governance, director compensation and firm performance

Agency theory describes conflicts of interest between (executive) directors and shareholders. These arise when their interests divert and directors (the agents) maximize their own wealth at the expense of shareholder's (the principal) wealth. To incentivize directors to act according to wealth maximization of shareholders, it could be argued that it is appropriate that director compensation is tied to shareholder wealth since that is the objective of shareholders.

Most empirical studies have repeatedly confirmed the existence of a pay-performance link. The seminal contribution of Jensen and Murphy (1990) shows a weak relationship between performance and CEO pay. They find that each $1.000 change in shareholder wealth corresponds to an average increase in total CEO wealth of about $3.25 in the period 1974-1986. They suggest that the relationship might have been stronger before World War II.

[16] "… Tenant compte de cette progression de nos bénéfices, nous vous proposons, Messieurs, de porter le dividende de 18 à 20p.c.,…" from the report of the 'conseil d'administration' at the general meeting of shareholders of March 15th 1929 from the 'Banque Générale Belge'. "Le conseil (d'administration) a décidé la création d'un fonds de prévision et réserve spécial qui est doté d'une somme de …" from a newspaper article of June 16th 1928 concerning 'Emailleries et Tôleries Réunies'.

Other empirical studies evidence changes in pay-performance sensitivity over time. For example, Hall and Liebman (1998) find a sharp increase in pay-performance sensitivity for CEO's in the late 1990s. This finding is confirmed by Frydman and Saks (2010) who study the relationship for top executives over the long run from 1936 to 2005. The pay-performance sensitivity was about the same from the mid-1950s to the mid-1980s (with a small dip in the 1970s) and then strengthened from the mid-1980 to 2005, possibly because of an overall change in firm size, a transformation from firm-specific to general managerial skills or because of the increased ability of executives to extract rents from the firm (Frydman & Saks 2010).

The pay-performance link does not only change over time, it is also sensitive to changes in regulation. For example, Perry and Zenner (2001) found an increase in CEO pay of $7 to $25 for a $1.000 change in shareholder value following a regulatory intervention that affected compensation disclosure and tax deductibility of nonperformance related compensation. Bayer and Burhop (2009) studied 46 German listed firms in the period 1870-1911. They found that the pay-performance sensitivity of executives decreases after a legal reform that ameliorated corporate governance. They argue that at least the part of the bonus that is eliminated by the reform most likely served as incentive pay.

Few studies have examined the pay-performance link in a historical context. Burhop (2004) and Bayer and Burhop (2009) study pay-performance sensitivity in ancient Germany and they find that executive's pay is dependent on performance. Burhop (2004) examines the principal-agent problem for nineteenth-century shareholders. He finds that performance related pay was not generally established yet. The average profit share of 65 banks that paid out a bonus (out of 70 banks) was 7.7% and 1.2% for 7 bonus paying railway companies out of 20 railway companies. Bayer and Burhop (2009) found a decrease in pay-performance sensitivity after a legal reform that ameliorated corporate governance (see above).

We examine whether directors' bonuses were dependent on firm performance and whether the crisis had an effect on this relationship. Since net income is the basis for the bonus calculation (according to articles of incorporation) we expect a positive link between net income and bonuses. We also expect a decrease of this pay-performance during the crisis. The reasoning is the following: in general, a part of profits first goes to legal reserves (see examples below in section 4). Then, a first, fixed part of the dividend is distributed among shareholders. This acts as a negative leverage on equity that strongly lowers the remainder income to distribute among directors if net income decreases. Our second performance measure is the change in shareholder wealth (e.g. Jensen & Murphy 1990; Bayer & Burhop 2009). Unlike net income, this measure is not related to the bonus in a mechanical way so that the relation between the paid out bonus and this performance measure could be different. If shareholders are expropriated by directors, we may well observe no decrease or even an increase in pay-performance sensitivity during the crisis as directors would try to minimize bonus loss. Else we expect to find a decrease.

The mechanical relationship between the bonus and net income makes it more difficult for directors to expropriate shareholders via their bonus payment. However, shareholder expropriation is not impossible because directors may still extract rents from the firm for their own benefit via other channels. For example, the lack of strict accounting and disclosure regulation gave managers the opportunity to adapt net income to the desired bonus. Burns and Kedia (2006) find that manipulation of accounting numbers (misreporting) is associated with performance-based compensation. Bergstresser and Philippon (2006) show that highly incentivized CEOs are "guilty of higher levels of earnings manipulation". Misreporting may be especially relevant in our sample period as external control on annual accounts was absent. Supervisory directors were responsible for internal control, but they were probably not independent and their monitoring activities were most probably limited (see above).

To find out whether bonuses served as incentive mechanism or whether they were a means to expropriate shareholders, we also study the effect of the bonus before the crisis on performance during the crisis. The idea is that firms with weak corporate governance structures have greater agency problems that give rise to greater director compensation. This may especially apply in our setting: a period of weak shareholder protection and high information asymmetry. Empirical evidence shows that firms with weaker corporate governance perform worse (Core *et al.* 1999; Brick *et al.* 2006). Therefore, if shareholders are being expropriated by means of excessive bonuses, those firms should have a larger drop in firm value during the crisis than firms that do not (or less) pay excessive bonuses. However, if bonuses are a substitute for good corporate governance which means that they serve as an incentive for executives to maximize shareholder value (e.g. Bayer & Burhop 2009), higher bonuses may not be excessive, but the result of an efficient market-based process that depends on characteristics such as human capital of directors and of the board in general, cyclical shifts in demand for director services,… In this case, our analysis should show no effect or a positive effect on firm performance during the crisis.

4 Two case studies

4.1 Anciens Etablissements Louis De Naeyer

We randomly selected two firms from our sample to study in more detail. The first one is 'Anciens Etablissements Louis De Naeyer' that was founded in 1862 as a limited partnership. It has been dissolved twice: in 1881 and in 1905 and was reestablished in July 1907 as limited liability company. It went public in November 1907. The company produced paper and machinery such as heaters and refrigerators in factories in different parts of Belgium (Willebroek and Geraardsbergen) and France (Prouvy). It is a large firm with a market capitalization of 74.539.200fr in January 1925. During our sample period, the firm also invested in factories in Italy and England.

In 1925, the firm's board consisted of 12 directors. The size of the board remains unchanged during the sample period. The president, Robert Peeters, stayed in place during our 10-year sample period. It was his only mandate. Furthermore, the board consisted of six executive directors and five supervisory directors. As of 1927, the two managers on the board ("administrateur-directeur"), Aristide Petsalys and Alexandre van Langenhove, became CEO ("administrateur délégué")[17]. They stayed in place for the rest of our sample period. Simultaneously with their appointment, the number of ordinary executive directors decreased from six to four. Furthermore, only one executive director was replaced (Albert Carton de Wiart replaced Madam Maurice Fourvel-Peeters) in 1928. The supervisory directors were replaced more frequently: one in 1927, one in 1928, one in 1931 and two in 1932. We have no information of why directors were replaced or left the board.

Net income was distributed as follows: 5% to reserves and a first dividend of 5% of preferred equity to preferred shareholders; the rest is distributed as follows: 10% to the executive directors and of what is left 15% to preferred shareholders and 85% to ordinary shareholders.

Some yearly key figures are tabulated in table 1, panel A. It is clear that the firm suffered from the worldwide crisis. After a period of systematic net income increase, net income stayed constant in 1930 and dropped as of 1931[18]. In the Recueil Financier, we found that the firm suffered from lower prices and less demand due to heavy competition from countries that had left the gold standard and devaluated their currencies.

[17] It is rare, in our sample, for a firm to have two CEO's.
[18] Year end is end of April.

Table 1
Evolution of net income, bonuses and dividends for 'Anciens Etablissements Louis De Naeyer' (Panel A) and 'Société anonyme Métallurgique de Prayon' (Panel B).

Panel A: Anciens Etablissements Louis De Naeyer							
jaar	Net income	Actual bonus	Theoretical bonus	Excess bonus	Dividend	=bonus/dividend	= Bonus/net income
1925	7,411,830	604,124	552,791	1.09	6,351,567	10%	8%
1926	10,582,850	905,371	905,371	1.00	9,145,050	10%	9%
1927	14,465,608	1,274,233	1,274,233	1.00	12,440,214	10%	9%
1928	14,855,700	1,385,570	1,334,238	1.04	12,440,520	11%	9%
1929	18,745,850	1,723,253	1,723,253	1.00	16,012,516	11%	9%
1930	18,815,755	1,730,243	1,730,243	1.00	16,809,153	10%	9%
1931	11,808,072	1,001,839	1,029,475	0.97	10,472,243	10%	8%
1932	4,086,047	223,873	257,272	0.87	1,513,325	15%	5%
1933	1,925,174	0	41185	0	1513325	0%	0%
1934	(881,729)	0	0	0	0	n/a	n/a
Panel B: Société anonyme Métallurgique de Prayon							
jaar	Net income	Actual bonus	Theoretical bonus	Excess bonus	Dividend	=bonus/dividend	= Bonus/net income
1925	4,026,525	1,043,287	1,032,804	1.01	2,975,000	35%	26%
1926	4,363,209	1,092,054	1,008,050	1.08	3,260,000	33%	25%
1927	3,979,426	906,401	915,942	0.99	2,934,000	31%	23%
1928	6,513,709	1,503,290	957,393	1.57	5,000,000	30%	23%
1929	6,836,479	996,401	1,009,037	0.99	5,807,692	17%	15%
1930	4,334,532	596,089	608,725	0.98	3,083,333	19%	14%
1931	1,697,016	69,269	186,723	0.37	1,358,974	5%	4%
1932	1,809,894	147,477	204,783	0.72	1,369,393	11%	8%
1933	2,063,295	184,140	245,327	0.75	1,369,393	13%	9%
1934	2,015,086	141,749	237,614	0.60	1,369,393	10%	7%

The *actual bonus* is the bonus that is paid out. This figure comes from the annual accounts. The *theoretical bonus* is the bonus that is calculated based on stipulations in the articles of incorporation. *Excess bonus* is the actual bonus divided by the theoretical bonus.

Furthermore, although articles of incorporation stipulated how profit should be divided, net income was often distributed differently, creating an 'excess bonus'. This excess bonus is calculated as follows:

paid out bonus as reported in the yearly accounts /

theoretic bonus according to the distribution from the articles of incorporation

For 'Anciens Etablissements Louis De Naeyer', the actual paid out bonus is close to the theoretical one (excess bonus equals one), except for 1932 and 1933 (table 1, panel A). In 1932, the firm transfers net profit to the next year and in 1933, the firm pays out a dividend instead of paying out a bonus. Therefore, the excess bonus is less than one in 1932 and 1933. In 1934, there is no profit to be distributed.

4.2 Société anonyme Métallurgique de Prayon

Our second case concerns 'Société anonyme Métallurgique de Prayon'. This firm was founded in 1882 as a limited liability company and was active in the metal industry. Its main activity was the production of zinc and sulfuric acid. The firm went public in 1888. Its market capitalization amounted to 38.785.000fr in January 1925. In 1928, a new factory came into operation (Prayon 2015) and the firm increased its capital by issuing new shares.

Board size decreased from 11 in 1925 to 10 in 1926 and 1927 and nine as of 1928. Board composition was relatively stable. In 1926, one of the three supervisory directors was replaced. Untill 1928, Franz Philippson was chairman of the board and Jules Delruelle was CEO. Thereafter, Jules Delruelle became chairman ánd CEO. Emile Renault was the only ordinary manager with a board seat. The number of executive directors decreased as board size decreased. Only once an executive director is replaced.

The profit distribution changed when capital was increased in 1928. Before 1928, profit distribution was as follows: 5% to reserves, but if reserves made up at least 10% of capital, no contributions needed to be made to legal reserves. Next, shareholders got a dividend of 5fr per share. Those shares had no nominal value. If profit was not enough to pay the dividend, the dividend could also come from a special provision fund. Furthermore, each executive director got 3% of what was left and the supervisory directors got a third of the executive directors' bonus. In 1928, capital was increased and profit distribution changed. Shareholders with the (new) preferred shares got 7% of net income and the shareholders of shares without nominal value still got 5fr per share. Of what was left, the chairman got 3%, the vice-chairman or the delegated executive director got 3% too, executive directors each got 2% and each supervisory director got 2/3%. The rest was attributed to reserves, provisions, special depreciations etc. and paid out to shareholders.

Table 1, panel B, shows the evolution of profits, bonuses and dividends. Profit sharply increases in 1928, after a new factory came into operation (Prayon 2015) and then sharply decreased again as of 1930 due to the worldwide crisis. In 1929, the firm and its competitors set up an "entente international", a cartel to limit production. However, the cartel had limited success: prices kept on decreasing during the crisis. The agreement ended at the end of 1934.

Until 1930, the actual paid out bonus was in line with the theoretical bonus with 1928, the year of the capital increase, as exception. As of 1931, the actual paid out bonus is lower than the theoretical one. Unfortunately, we did not find any information on why the actual paid out bonus is different from the theoretical bonus.

These two cases show a strong link between net income and bonus before the crisis. We can predict almost perfectly the bonus that is paid out if we know net income. This changes as the crisis deepens in 1931 and 1932 and following years. Bonuses decrease as firms rather pay out dividends or keep profits in the firm. In these two cases, pay-performance sensitivity with net income decreases during the crisis.

5 Sample and variables

To construct our database, we selected the 200 largest listed non-financial firms in 1925 and in 1935 according to their market capitalization on the Brussels stock exchange in those years. This selection procedure is similar to the one of Frydman and Saks (2010). Our initial dataset covers a total of 278 firms for the period 1925-1935. This yields an unbalanced panel as firms enter and drop out of the sample over time. Among these firms, 112 appear both in 1925 and 1934 (although not necessarily in every other year in the sample[19]). Our sample period covers a pre-crisis and a crisis period. The year 1935 is the first year of recovery

[19] It is possible that we do not have data for one/some year(s) if accounting data is missing, if the fiscal year is longer or shorter than 12 months,…

(based on literature and on our data of holding period returns, return-on-assets (ROA) and bonuses). Because one year of recovery is little informative, we leave 1935 out of the sample.

The accounting and director data were collected from the Recueil Financier, a financial annual containing firm-specific information, including financial statements and names and positions of the members of the boards of directors. Observations dropped out because the profit and loss statement was missing or because we found no information on profit distribution, although firms were legally obliged to report the profit and loss statement and distribution of profits (art. 78). We also left out firms that reported results after profit distribution. In these cases, we had no full information on their profit distribution and we were unable to reconstruct the profit distribution from the balance sheet. For the board data, we limited data collection to three data points: 1925, 1928 and 1933. That is because board composition is highly correlated in the short run. For example, the correlation between the board size in 1925 and 1928 is 92%. The correlation between board size in 1928 and 1933 is 97%. We used the data of 1925 for firm observations in 1925, 1926 and 1927. We used data from 1928 for observations in 1928, 1929, 1930 and 1931 and we used data from 1933 for observations in 1932, 1933 and 1934. If an observation in one of these years was missing for a firm, we took the consecutive year, if available. Furthermore, we excluded firms which had a fiscal year of more or less than 12 months and we excluded firms with a growth rate of more than 100% to exclude mergers or any other major restructuring and we left out government owned firms.

We added stock data from a database constructed at the University of Antwerp by the Studie Centrum voor Onderneming en Beurs (SCOB), which contains data on all stocks listed on the Brussels Stock Exchange. These stock data were hand-collected by the SCOB and double-checked from various sources, including the official quotation list and firm correspondence with the exchange. After excluding firms with missing stock data and other

missing financial statement data, our final sample consists of an unbalanced panel of 1.556 firm–year observations for 214 firms for the ten-year period 1925-1934.

Table 2
Descriptive statistics

	N	mean	median	St. dev.	min	P25	P75	max
Bonus	1556	600,689	205,183	1,035,075	0	0	696,440	6,063,817
Bonus per director	1556	47,396	17,883	90,642	0	0	56,707	986,058
Net income	1556	6,867,551	3,218,613	1.20e+07	-1.23e+07	876,520	7,533,992	6.74e+07
Δ shareholder wealth	1377	7,799,014	-696,660	2.36e+08	-9.69e+08	-1.64e+07	1.77e+07	1.51e+09
Holding period return	1556	0.063	-0.024	0.451	-0.604	-0.216	0.227	2.335
Board size[c]	481	13.65	12	6.59	5	9	16	43
% busy directors[c]	481	0.600	0.625	0.246	0	0.417	0.8	1
Leverage	1556	0.424	0.396	0.216	0.047	0.266	0.554	0.941
Size	1556	3.74e+08	6.20e+07	1.79e+09	6,055,774	3.21e+07	1.51e+08	2.50e+10
MTB	1556	2.037	1.323	2.394	0.103	0.739	2.322	17.291
Stock return volatility	1556	0.092	0.080	0.050	0.014	0.057	0.113	0.285

Notes: *bonus* is the total bonus paid out to all executive and supervisory directors. The bonus is paid out in t+1 and comes from the balance sheet at the end of fiscal year t; *bonus per director* is the bonus from the balance sheet at the end of year t divided by the number of board members; *net income* is the profit of year t; *Δ shareholder wealth* is the change in shareholder wealth and is defined as the firm market value at the end of the previous year (t-1) * holding period return in fiscal year t; *holding period return* is the yearly holding period return on firm level at the end of the fiscal year, dividend payments and stock splits taken into account (if a firm had different kinds of shares outstanding, we calculated yearly return as a weighted average based on market capitalization of the shares); *Board size* is the number of board seats of a firm; *% busy directors* is the percentage of busy directors on a firm's board (a director is defined as busy if he/she holds three or more directorships); *Leverage* is the book value of total debt divided by total assets at the end of fiscal year t; *size* is the total assets at the end of fiscal year t; *MTB* is the market-to-book value of equity and is defined as the market value of equity divided by the book value of equity at the end of fiscal year t; *Stock return volatility* is the standard deviation of monthly stock returns over the year t.

[c] Data of 3 years: 1925, 1928 en 1933

Table 2 shows descriptive statistics. We use two bonus measures. *Bonus* is the total yearly bonus paid by a firm to all directors as reported in the profit distribution which comes from the annual accounts. The average firm pays out a bonus of 600,689fr to its directors. Our second bonus measure is *bonus per director* and is calculated by dividing *bonus* by the number of directors on the board. We find an average bonus per director of 47,396fr. This is comparable to findings of Bayer and Burhop (2009). They find that 4.6% of net income is

distributed among executives, while we find that 8.7% of net income is distributed amongst executive ánd supervisory directors.

We only have one aggregate bonus figure from the profit distribution for most firms without differentiation between the bonus of executive directors and supervisory directors[20]. Although differentiating between the two would be informative, considering both executive and supervisory directors together in this study is also logical because supervisory directors are compensated in the same way as executive directors are. That is, in general, supervisory directors also get a profit share that is set by the articles of incorporation (which is usually lower than the executives' profit share). Furthermore supervisory directors and executive directors are both subject to conflicts of interests with shareholders.

We use different performance measures. First, we use *net income* which comes from the annual accounts. It is the income to be distributed. We use this measure because it is used to calculate bonuses according to the articles of incorporation. Next, we have two market-based performance measures which are not mechanically linked to the bonus. The first is *change in shareholder wealth.* This variable is defined as the market value of the firm at the end of the previous fiscal year (t-1) multiplied with the holding period return in fiscal year t (Jensen & Murphy 1990). The second market-based performance measure is *holding period return.* This is the yearly holding period return on firm level at the end of the fiscal year, dividend payments and stock splits taken into account (Core et al. 1999). If a firm had different kinds of stocks outstanding, we calculated yearly return as a weighted average based on market capitalization of the stocks. Next, we use different board variables. *Board size* is the number of directors on the board and *% busy directors* is the percentage of busy directors on a firm's board. A busy director is a director that holds at least three directorships (e.g. Fich & Shivdasani 2006). Finally, we include the control variables *leverage*, *size*, *MTB* and *stock*

[20] We only have separated information for 30 firm-year observations for 11 firms.

return volatility. *Leverage* is the book value of total debt divided by total assets at the end of the fiscal year t, *size* is total assets at the end of the fiscal year t, *MTB* is the market-to-book value of equity and is defined as the market value of equity divided by the book value of equity at the end of fiscal year t. *Stock return volatility* is the standard deviation of monthly stock returns over the year (Conyon & He 2011). All variables are defined yearly, except for the board variables that are only defined in 1925, 1928 and 1933 (see above).

We are able to compare the directors' bonuses with wages of contemporary workers. For example, an educated worker of 'Ateliers de construction électriques de Charleroi' earned 3.895fr per hour[21] in 1925 (Scholliers 1979). If we assume that workers worked 48 hours per week for 52 weeks[22], this means that their yearly salary is 9,722fr (=3.895*48*52) in 1925. The paid out bonus to directors in 1925 was 266,126fr amongst 19 board members, or on average 14,007fr per director.

The average pay per hour for an educated worker of 'Compagnie Générale de Gaz et d'électricité' (Gazelec), a firm active in the gaz and electricity industry, was 3.10fr in 1925. The average pay per hour for a non-educated worker was 2.38fr. If we make the same assumptions as above, we find an average annual pay for educated workers of 7,738fr and 5,940fr for non-educated workers. In 1925, the paid out bonus is 187,222fr amongst 19 board members. This means an average bonus of 9,854fr.

Table 3 shows the number of observations and the number of firms per industry. Most firms (35) were active in the mining industry, followed by the metal and electricity industry (28). Of all firms, 27 firms come from the finance industry. Table 4 shows the number of years that firms are present in our sample. For example, 95 firms are present in our sample every year.

[21] This pay includes a profit share of about 36%.

[22] The law of June 14th 1921, on social legislation, limited the working day to eight hours per day and 48 hours per week (except exceptions) (Goethem & Leën 1938). Concerning holidays, many firms already had the custom to give paid leave to its employees, but it was only with the law of July 8th 1936 that firms were obliged to give its employees paid leave of six days per year (Goethem & Leën 1938).

Table 3
Number of observations and firms per industry

Industry	# observations	# firms
Mining	263	35
Metal	221	28
Textile	196	25
Catering	13	2
Stone	124	17
Train	105	15
Electricity	218	28
Food	81	10
Chemicals	109	17
Shipping	3	1
Wholesale	32	4
Manufacturing	29	4
Finance	152	27
Real Estate	10	1
Total	**1556**	**214**

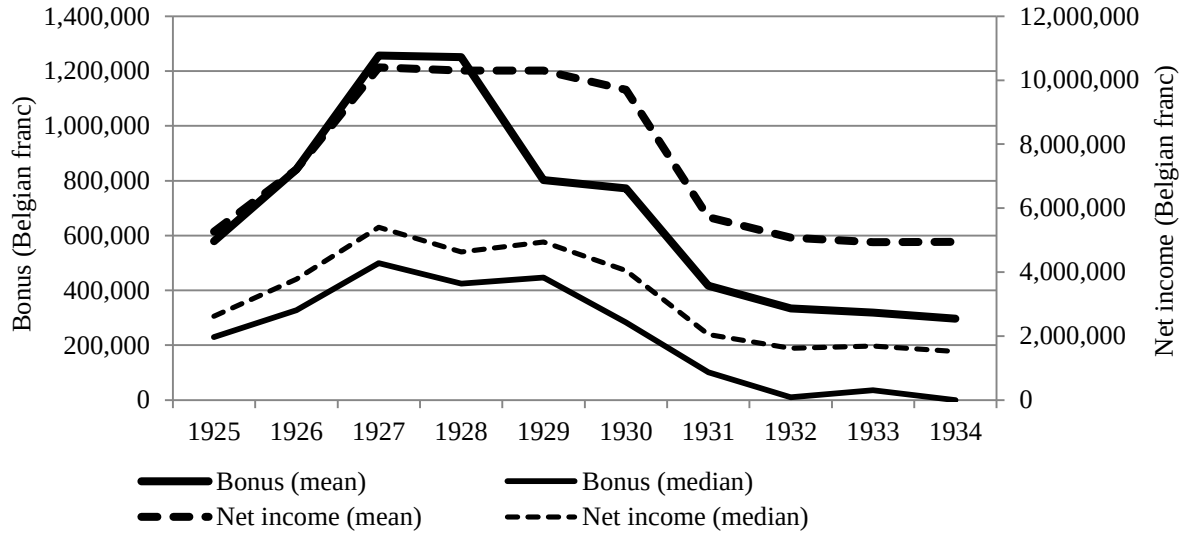
Table 4
Number of years that firms are present in the sample.

No. of years in the sample	No. of firms
1	5
2	11
3	31
4	10
5	7
6	13
7	21
8	3
9	18
10	95
Total	**214**

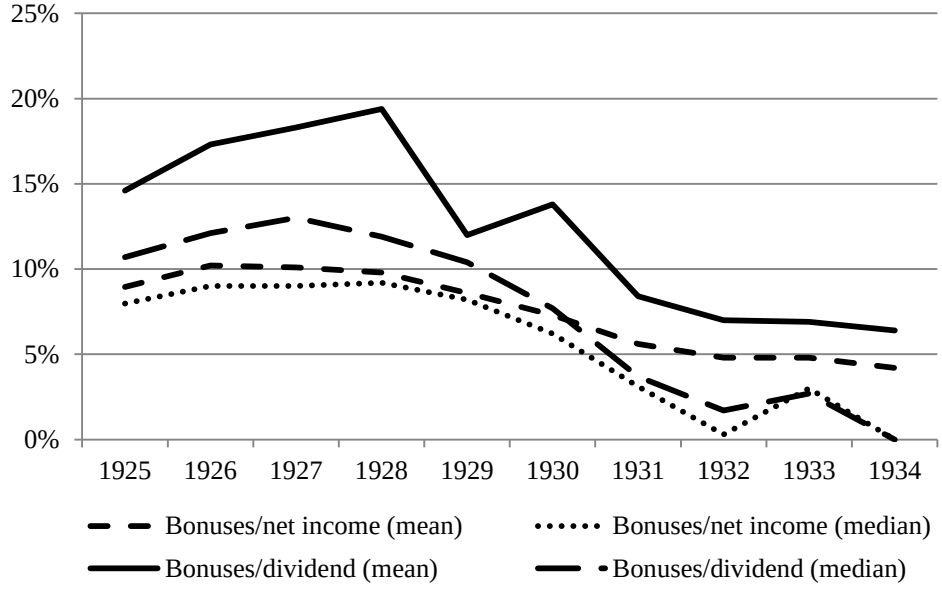
Figure 2 shows the evolution of bonuses and net income over time to better understand the impact of the crisis. The average bonus increases from 578,979fr in 1925 to 1,250,395fr in 1928 after which it plummets to 296,803fr in 1934. The bonus as a percentage of profit decreases strongly from 9.8% in 1928 to 4.2% in 1934. Panel B shows a decrease of the ratio bonus/net income during the crisis and it also shows that bonuses decrease more than dividends do.

Figure 2
Evolution of bonuses, net income, bonuses/net income and bonuses/dividends of the sample firms during the sample period.

Panel A Bonuses and net income (in Belgian franc)



Panel B Bonuses/net income and bonuses/dividends (in %)



6 Pay-performance sensitivity

We first estimate a random-effects tobit model with the following specification[23]:

[23] A fixed-effects tobit model is inappropriate for our model as board characteristic variables are defined only three times, so many observations would drop out of the regressions. When we use OLS regressions and random-effects regressions, the results are qualitatively the same for the performance measure 'net income' and are statistically weaker for 'change in shareholder wealth'. These results are reported in appendix A.1 and A.2.

Bonus $\text{measure}_{i,t}$ = a + b Performance $\text{measure}_{i,t}$ + c Performance $\text{measure}_{i,t}$ x Crisis Dummies + d Crisis Dummy + e (Firm $\text{Characteristics}_{i,t}$) + f (Board $\text{characteristics}_{i,t}$) + g (Industry Dummies_{i})

Our first bonus measure is the *bonus* as reported in the profit distribution. If we use this bonus figure, board size may affect the bonus as the bonus may depend on the number of directors[24]. To avoid any potential board size effect, we divide the bonus by board size. This gives us a proxy for the individual director's bonus.

Articles of incorporation prescribe that bonuses are a percentage of net income. Therefore, we expect to find a strong and positive link between bonus and *net income,* our accounting performance measure in our baseline pay-performance sensitivity analyses (Bayer & Burhop 2009). *Change in shareholder wealth*, the measure that is often used for pay-performance sensitivity research, is our market-based performance measure. As a formal link between the bonus and this measure is missing (unlike with net income), this pay-performance sensitivity is more difficult to predict. We expect it to at least be less strong.

The pay-performance sensitivity is captured by the performance measure and the interaction between the crisis dummy and the performance measure. This crisis dummy is one during the crisis years 1929-1934 and zero before the crisis, from 1925 to 1928.

Following previous research, we also control for firm complexity and risk. Director compensation might be positively related to the difficulty of the directors' tasks and this is related to firm complexity and risk. Therefore, firm complexity could play an important role in determining the level of director compensation (e.g. Brick *et al.* 2006). To measure firm complexity, we include the variables *leverage, firm size* and the *market-to-book ratio* (MTB). We expect that larger firms with more debt and more growth opportunities are more complex and therefore pay out higher bonuses (e.g. Hartzell & Starks 2003; Renneboog & Zhao 2011).

[24] Bonus calculation may either depend on only profit or may also depend on the number of board members. (See examples of profit distribution above.)

MTB is our measure for a firm's growth opportunities (e.g. Hartzell & Starks 2003). We also include *stock return volatility* as a measure for risk (e.g. Conyon & He 2011; Renneboog & Zhao 2011).

Literature has pointed out that corporate governance quality helps in explaining variations in executive compensation: as corporate boards are an important corporate governance mechanism, inefficient board structures may lead to excessive compensation (e.g. Bayer & Burhop 2009; Frydman & Saks 2010). Therefore, we also include the board characteristics *board size* and the *% busy directors* in our baseline regressions.

We include industry dummies to control for bonus similarities within industries, but also to control for differences in magnitude in which industries are affected by the crisis.

Table 5
Pearson correlations

		1	2	3	4	5	6	7	8	9	10	11
1	Bonus											
2	Bonus per director	**0.84**	1									
3	Net income	**0.75**	**0.47**	1								
4	Δ shareholder wealth[a]	**0.16**	**0.12**	**0.10**	1							
5	Holding period return	**0.19**	**0.18**	**0.19**	**0.50**	1						
6	Leverage	**0.20**	**0.12**	**0.21**	**0.19**	**0.16**	1					
7	Size	**0.27**	**0.06**	**0.54**	**0.01**	0.01	**0.30**	1				
8	MTB	**0.22**	**0.22**	**0.20**	**0.39**	**0.36**	**0.33**	-0.01	1			
9	Stock return volatility	**-0.11**	**-0.11**	**-0.11**	**0.12**	**0.14**	0.01	0.02	-0.01	1		
10	Board size[b]	**0.27**	**-0.08**	**0.46**	-0.01	-0.01	**0.15**	**0.37**	-0.04	0.02	1	
11	% busy directors[b]	**0.12**	0.01	**0.19**	**0.06**	0.05	-0.02	**0.14**	**0.05**	-0.01	**0.32**	1

This table shows Pearson correlation coefficients. All variables are defined as before. **Bold** denotes significance at the 5% level.
[a] Based on 1377 variables.
[b] Based on 481 variables.

Correlations

Table 5 shows Pearson correlation coefficients. The bonus is highly positively correlated with net income (0.75) and less with change in shareholder wealth (0.16) and holding period return (0.19). This is logical as the bonus calculation is based on net income and not on

market related performance measures. Board size and bonus are positively correlated (0.27). The strength of the correlation is moderate as the bonus is often set as a percentage of net income so larger boards do not always get higher bonuses ceteris paribus (see above).

Table 6
Pay-performance sensitivity

	(1)	(2)	(3)	(4)	(5)	(6)
Bonus measure	Bonus	Bonus per director	Bonus	Bonus per director	Bonus	Bonus per director
Net income	0.080***	0.006***	0.078***	0.005***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Net income * crisis	-0.015***	-0.001***	-0.015***	-0.001***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Δ shareholder wealth					0.00077***	0.000025**
					(0.000)	(0.050)
Δ shareholder wealth * crisis					-0.00095***	-0.000024
					(0.000)	(0.277)
Crisis	-11,769	-7,694**	30,930	-675	-210,245***	-21,748***
	(0.722)	(0.022)	(0.421)	(0.863)	(0.000)	(0.000)
Leverage			317,314***	45,694***	218,120	42,914***
			(0.008)	(0.000)	(0.218)	(0.008)
Ln(Size)			22,191	5,811*	258,311***	21,414***
			(0.492)	(0.095)	(0.000)	(0.000)
MTB			15,677*	2,210**	105,434***	8,707***
			(0.094)	(0.021)	(0.000)	(0.000)
Stock return volatility			-637,809**	-86,096***	-2241404***	-190,943***
			(0.033)	(0.004)	(0.000)	(0.000)
Board size			-829.142	-3,322***	23,614***	-1,827**
			(0.888)	(0.000)	(0.005)	(0.021)
% busy directors			233,165*	35,722***	396,064**	48,625***
			(0.061)	(0.008)	(0.024)	(0.003)
Constant	-122,663	-31,722***	-868,396	-129,349**	-4895428***	-390,516***
	(0.232)	(0.010)	(0.138)	(0.044)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,556	1,556	1,556	1,556	1,377	1,377
Nr firms	214	214	214	214	211	211

Notes: this table displays the regression coefficients and p-values for random-effects tobit regressions. The dependent variable is the total paid out bonus in regressions (1), (3) and (5). In regressions (2), (4) and (6), the dependent variable is the paid out bonus divided by board size. *Crisis* is a dummy that equals one for observations from the six-year period 1929-1934 and zero for observations from the four-year period 1925-1928; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Regression results

Table 6 shows regression results. In regression (1), *bonus* is the dependent variable. We find a positive and statistically significant relation between net income and bonus before the

crisis. Before the crisis, an increase in net income of 100fr is associated with an increase in bonus payment of 8fr on board level. The crisis has a mitigating effect on the pay-performance relationship: an increase in net income of 100fr is now associated with an increase in the bonus of 6.5fr on board level. In regression (2), *bonus per director* is our dependent variable. Per 100fr increase in net income, an average director gets an additional bonus of 0.6fr before the crisis. This is much lower than figures of Bayer and Burhop (2009). For the period 1870-1883, they find an additional bonus payment of 4,6 Marks per executive per 100 Marks increase in excess profits[25]. During the crisis, pay-performance sensitivity decreases. In regressions (3) and (4), we introduce control variables. The relation between the bonus and net income qualitatively stays the same. The control variables *leverage* and *MTB* are positively related to the bonus. For example, in regression (3), a one percent increase in leverage means an increase in the total paid out bonus of 3,173.14. This is in line with the expectation that more complex firms, measured by *leverage* and *MTB*, pay out higher bonuses. *Stock return volatility* is negatively related to net income, which is in contradiction with expectations, but in line with results of Renneboog and Zhao (2011). As a consequence, bonuses in those firms will be lower. Furthermore, *% busy directors* is positively related to bonuses, which is also in line with literature (e.g. Brick *et al.* 2006; Renneboog & Zhao 2011). In regression (5), we use an alternative performance measure which is not formally used to calculate bonuses. We find that an increase in shareholder wealth of 1000fr is associated with a higher bonus of 0.77fr at firm level and we find a negative coefficient during the crisis that is statistically significant. The same result holds if we consider the bonus of an average director instead of the bonus at firm's level in regression (6). In regression (4), (5) and (6), we find a positive and statistically significant relation between bonus and *size*, as expected. The coefficient of *board size* is negative and statistically

[25] The profit measure is defined differently. Excess profit is the accounting profit less the fixed dividend of 4-6% of the paid-up share capital.

significant in regressions (4) and (6), but positive and statistically significant in regression (5).

It may well be that pay-performance sensitivity changes during the crisis as the crisis deepens. To test this hypothesis, we divide the crisis into two sub-periods. The first group includes the three-year period 1929-1931 and the second group includes the second three-year period 1932-1934. Regression results are shown in table 7. Regression (7) is similar to regression (1) from table 7 except that, now, we have two crisis dummies instead of one. We find a positive relation between the bonus and net income before the crisis and a negative relation between the paid out bonus and net income in both sub-periods during the crisis with a more negative coefficient in the second stage of the crisis. These coefficients are statistically significant. Results are similar if we use the bonus per average director as dependent variable (regression (8)). If we use *Δ shareholder wealth*, we again find a positive relation with bonus before the crisis, but only a statistically significant and negative effect in the first phase of the crisis. We find no relation between *Δ shareholder wealth* and the bonus of an average director during the crisis in regression (10). Overall, we find evidence that pay depended on performance and that this pay-performance sensitivity decreased during the crisis. We find no important differences between the two sub-periods.

Table 7
Pay-performance sensitivity with two sub-periods during the crisis

	(7)	(8)	(9)	(10)
Bonus measure	Bonus	Bonus per director	Bonus	Bonus per director
Net income	0.078***	0.005***		
	(0.000)	(0.000)		
Net income * 1929-1931	-0.010***	-0.001***		
	(0.000)	(0.000)		
Net income * 1932-1934	-0.028***	-0.002***		
	(0.000)	(0.000)		
Δ shareholder wealth			0.0008***	0.000025**
			(0.000)	(0.047)
Δ shareholder wealth * 1929-1931			-0.0015***	-0.00025
			(0.000)	(0.340)
Δ shareholder wealth * 1932-1934			-0.0003	-0.000
			(0.195)	(0.923)
1929-1931	18,081	1,160	-146,097***	-14,908***
	(0.666)	(0.786)	(0.007)	(0.002)
1932-1934	22,465	-4,335	-338,274***	-33,686***
	(0.606)	(0.330)	(0.000)	(0.000)
Leverage	255,013**	39,581***	79,673	30,595*
	(0.033)	(0.002)	(0.652)	(0.058)
Ln(Size)	24,214	5,974*	250,407***	21,289***
	(0.447)	(0.085)	(0.000)	(0.000)
MTB	13,444	1,949**	94,172***	7,831***
	(0.148)	(0.043)	(0.000)	(0.000)
Stock return volatility	-767,534***	-91,316***	-2177550***	-184,106***
	(0.010)	(0.002)	(0.000)	(0.000)
Board size	3,123	-3,028***	24,968***	-1,583**
	(0.595)	(0.000)	(0.003)	(0.045)
% busy directors	215,408*	32,340**	286,784	38,944**
	(0.081)	(0.015)	(0.100)	(0.017)
Constant	-841,257	-125,821**	-4588286***	-374,527***
	(0.146)	(0.049)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes
Observations	1,556	1,556	1,377	1,377
Nr firms	214	214	211	211

Notes: this table displays the regression coefficients and p-values for random-effects tobit regressions. The dependent variable is the total paid out bonus in regressions (7) and (9). In regressions (8) and (10), the dependent variable is the paid out bonus divided by board size. *1929-1931* is a dummy that equals one for observations from the three-year period 1929-1931 and zero otherwise; *1932-1934* is a dummy that equals one for observations from the three-year period 1932-1934 and zero otherwise; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

We further consider the possibility of a chairman also being CEO (CEO duality). Typically, this duality is expected to increase the CEO's bonus because he has additional tasks and combining these two functions may increase agency problems and give him more

power to negotiate a higher bonus. Moreover, CEO duality may not only affect a CEO's bonus but may affect the bonus of all board members. Brick et al. (2006) found that if the CEO is also chairman, directors receive larger total compensation. Therefore, we may expect a positive relation between CEO duality and director bonuses. In our sample, the function of CEO and chairman are combined in 20 firms. Furthermore, we consider the percentage of supervisory directors on the board. The reason for this is that supervisory directors generally get a lower bonus than executive directors so we might expect that boards with a higher percentage of supervisory directors pay out a lower bonus. On average, 30% of board members are supervisory directors. Appendix A.3 shows regression results including *% supervisory directors* and the dummy *Chairman is CEO*. We did not include these two variables in the baseline regressions as they are not statistically significant, they reduce our sample size and do not impact our other results.

Sometimes, reported bonuses also include provisions, reserves, payments to employees or management. Unfortunately, in these cases, we do not know the exact bonus figure because of a lack of detail in the annual accounts. In those cases we only have an aggregate figure that includes the bonus, reserves, payment to employees etc. Nevertheless, we used this noisy bonus figure in the reported regressions because we otherwise lose 115 observations. As a robustness check, we only take firms into account for which we know the 'pure' bonus without any added reserves, provisions, payment to employees etc. If we exclude these firms from the sample, the average bonus decreases from 600,689fr to 490,782fr. Regression results are included in appendix A.4.

7 Bonus before the crisis and firm performance during the crisis

On the one hand, if corporate governance is weak and board composition is inefficient, agency problems may give directors an increased incentive to expropriate shareholders via excessive bonuses (e.g. Core *et al.* 1999). Furthermore, appointing directors to the board

based on cronyism rather than expertise may prevent them from "rocking the boat" (e.g. Brick *et al.* 2006) if necessary. Even if compensation is related to accounting performance, still directors may artificially increase their bonus by misreporting accounting figures (Burns & Kedia 2006). This may be especially relevant in our sample period as external control mechanisms were non-existent. Only supervisory directors were in charge of control of annual accounts, but they were not necessarily independent and their monitoring activities were most probably limited (see above). As a consequence, excessive bonuses resulting from bad corporate governance and inefficient boards, should have a negative effect on firm performance. If this is true, we should find a larger drop in firm value during the crisis for firms that pay high bonuses than for firms that did not, before the crisis. The advantage of studying a crisis is that the consequences of excess bonuses may become especially harmful for firm value during a period of substantial value losses.

On the other hand, if bonuses are a substitute for good corporate governance which means that they serve as an incentive for executives to maximize firm value (e.g. Bayer & Burhop 2009), higher bonuses are not excessive, but are the result of an efficient market-based process that depends on characteristics such as human capital, cyclical shifts in the demand for director services,… In this case, we should find no effect or a positive effect on firm performance during the crisis.

Results

In our baseline test, we examine the effect of the bonus in 1928 on performance in 1929. We use the following OLS regression:

$$\text{Holding period return}_i = a + b \ln(\text{Bonus/net income}_i) + c\,(\text{Firm Characteristics}_i) + d\,(\text{Board characteristics}_i) + e\,(\text{Industry Dummies}_i)$$

As dependent variable, we use holding period return (Core *et al.* 1999). Our bonus measure is *ln(Bonus/Net income)*[26]. We divide the bonus by net income as the bonus is highly correlated with net income and we want to avoid measuring net income instead of the bonus. We add the same control variables as before: *leverage*, *firms size*, *MTB*, *stock return volatility*, *board size* and *% busy directors*. *Firm size* is expected to positively relate to holding period return during the crisis: larger firms experience smaller losses during the crisis (e.g. Mitton 2002; Barton & Waymire 2004, p104). *Leverage* may be negatively related to holding period return during crisis periods (e.g. Mitton 2002; Lemmon & Lins 2003; Francis *et al.* 2012) but, as a proxy for monitoring activity, it could also be positively related to firm value (e.g. historical findings of Van Overfelt et al. (2009), Graham et al. (2011) and Foreman-Peck and Hannah (2013)). Next, we expect that firms with more investment opportunities experience smaller value losses during the crisis, therefore, we include *MTB* (e.g. Lemmon & Lins 2003; Francis *et al.* 2012). Furthermore, more risky firms are generally more vulnerable to external shocks. Therefore we expect a negative coefficient for *stock return volatility*. (e.g. Lemmon & Lins 2003; Baek *et al.* 2004; Francis *et al.* 2012). We chose to use *stock return volatility* instead of beta as a measure for firm risk to be consistent with similar research of Core et al. (Core *et al.* 1999) and Brick et al. (Brick *et al.* 2006). Finally, we expect to find a positive coefficient for our board variables *board size* and *% busy directors* (Deloof & Vermoesen Unpublished).

[26] We do not lose negative values by using the natural logarithm since no firms in the sample pay out a bonus if net income is negative. Furthermore, if net income is zero (which would give an error when using it as denominator in the fraction), we set *Bonus/Net income* equal to zero. In order not to lose any zero's, we add one to *Bonus/Net income* before taking the natural logarithm.

Table 8

Bonus before the crisis and firm performance during the crisis

	(11)	(12)	(13)	(14)	(15)	(16)
Holding period return defined in:	1929	1929	1930	1930	1929	1929-1931
Ln(Bonus/Net income) defined in:	1928	1926-1928	1928	1926-1928	1927	1928
Ln(Bonus/Net income)	0.256	0.009	0.463*	0.039	-0.125	0.237
	(0.639)	(0.830)	(0.073)	(0.254)	(0.826)	(0.683)
Leverage	0.095	-0.144	0.014	0.034	0.290	0.014
	(0.705)	(0.45()	(0.891)	(0.794)	(0.271)	(0.947)
Ln(Size)	-0.115*	-0.077**	-0.057***	-0.063***	-0.129***	-0.102**
	(0.056)	(0.019)	(0.002)	(0.006)	(0.001)	(0.012)
MTB	-0.013	-0.006	-0.016***	-0.016***	-0.011	-0.033***
	(0.34()	(0.506)	(0.005)	(0.009)	(0.562)	(0.000)
Stock return volatility	0.260	-0.668	-0.407	-0.390	0.323	-1.495**
	(0.820)	(0.257)	(0.272)	(0.399)	(0.851)	(0.037)
Board size	0.001	0.000	0.004	0.003	-0.003	0.003
	(0.902)	(0.990)	(0.279)	(0.413)	(0.625)	(0.633)
% busy directors	-0.099	-0.178	0.181**	0.182*	-0.079	0.106
	(0.486)	(0.221)	(0.025)	(0.060)	(0.632)	(0.462)
Constant	2.043**	1.701***	0.732**	0.981**	2.263***	1.656**
	(0.020)	(0.001)	(0.030)	(0.015)	(0.000)	(0.016)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135	118	138	122	121	128

Notes: this table displays the regression coefficients and robust p-values for OLS regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the holding period return defined in different years; *ln(Bonus/Net income)* is the natural logarithm of the paid out bonus divided by net income plus one; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8 shows regression results. Regression (11) shows that *ln(Bonus/Net income)* in 1928 is not related to firm performance in 1929. *Firm size* has a statistically significantly negative effect on holding period return. All other control variables are statistically insignificant. To avoid the influence of any unique event in the distribution of profit in 1928, we use an average bonus measure over the last three years preceding the crisis (if available, else we still use the one-year period or a two-year period measure) in regression (12). We again find no association between this bonus measure and holding period return in 1929. In regression (13), we look at the effect of our bonus measure *ln(Bonus/Net income)* on holding period return in 1930. In this way, we can identify potential lagged effects. We find a positive and statistically significant relation between *ln(Bonus/Net income)* and holding period return. In this regression *MTB* is statistically significantly and negatively associated with firm

performance. In regression (14), we measure the association between our average bonus measure and performance in 1930, but we find no statistically significant relation between the bonus payment and holding period return. The same holds for regression (15), in which we define the bonus in 1927 and firm performance in 1929. In regression (16), we consider the holding period return over three years, 1929, 1930 and 1931 but it does not change our results. In sum, we mainly find a positive relation between our bonus measure and following firm performance but the coefficients are mostly statistically insignificant. This suggests that shareholders were not expropriated via excessive bonuses before the crisis, at least not to the extent that it negatively impacted firm value during the first years of the crisis.

Following Brick et al. (2006), we also used excess holding period returns derived from a one-factor market model, but we found no statistically significant relationship between the bonus measure and this performance measure. We neither found a relationship between our bonus measure and *Δ shareholder wealth.* Regression results with these two alternative performance measures are reported in appendix A.5.

As an alternative bonus measures, we use *excess bonus*, that is the actual paid out bonus divided by the bonus that should be paid out according to articles of incorporation. Results were qualitatively the same as before and are reported in appendix A.6.

Overall, our results suggest that shareholders were at least not problematically expropriated via the distribution of bonuses although the institutional setting allowed directors to do so as corporate governance was weak and monitoring was probably limited.

8 Conclusion

We know very little about directors' compensation in historical periods when investor protection and corporate governance were weak. Did they receive performance related pay and if so, how was it calculated? Was it calculated objectively or was it determined based on bargaining power of individuals? Did it serve as incentive mechanism or was it mainly

subject to abuse and used to extract rents of the firm? We provide evidence that helps to answer these questions.

We find that the profit distribution was regulated by the articles of incorporation and that firms enjoyed a lot of discretionary power in setting this profit distribution. Furthermore, we found no individual compensation contracts. We also find that the actual paid out bonus is not always the same as what it should be according the articles of incorporation. We also find that bonuses were indeed related to accounting performance and only weakly related to market-based performance and that this relation weakens or even disappears during the crisis. Furthermore, we find that the bonus *before* the crisis is positively related or not related with performance *during* the crisis.

The results of this study suggest that shareholders were not expropriated via excessive bonuses, at least not in significant proportions that affected firm value. Yet, shareholders may have been expropriated via several other channels that we did not take into account in this study. To further increase our understanding about corporate governance practices in a period with little legal shareholder protection, it would be interesting to consider other possible channels of shareholder expropriation or other informal mechanisms to protect shareholders such as directors' reputation, leverage and dividends.

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Study 3

Long-Term Debt Maturity and Financing Constraints of SMEs during the Global Financial Crisis[27]

Abstract

We use the recent financial crisis to investigate financing constraints of private small and medium-sized enterprises (SMEs) in Belgium. We hypothesize that SMEs with a large proportion of long-term debt maturing at the start of the crisis had difficulties to renew their loans due to the negative credit supply shock, and hence could invest less. We find a substantial variation in the maturity structure of long-term debt. Firms which at the start of the crisis had a larger part of their long-term debt maturing within the next year, experienced a significantly larger drop in investments in 2009. This effect is driven by firms which are ex ante more likely to be financially constrained. Consistent with a causal effect of a credit supply shock to corporate investments, we find no effect in "placebo" periods without a negative credit supply shock.

Keywords: Privately held SMEs – financing constraints - long-term debt maturity - Global Financial Crisis - Belgium

JEL classification: G01, G31, G32

[27] This paper is co-authored with Marc Deloof (Universiteit Antwerpen) and Eddy Laveren (Universiteit Antwerpen).

1 Introduction

In a theoretical world with perfect capital markets, a firm will always be able to obtain the necessary funds at a fair price (Modigliani & Miller 1958). However, the real world is 'imperfect', and some of these 'imperfections', such as adverse selection, moral hazard and agency conflicts, may restrict access to external finance (e.g. Jaffee & Russell 1976; Jensen & Meckling 1976; Stiglitz & Weiss 1981; Myers & Majluf 1984; Holmstrom & Tirole 1997). As a result, corporate investment decisions may be constrained by the availability of external finance. Privately held SMEs are more likely to be affected by financing constraints than large, listed firms, since adverse selection, moral hazard and credit rationing problems tend to be more pronounced for private SMEs than for large, listed firms (Stiglitz & Weiss 1981; Berger & Udell 1998; Hyytinen & Väänänen 2006; e.g. Beck *et al.* 2008).

In this study, we investigate how the availability of external finance affected investments by privately held SMEs in Belgium during the recent Global Financial Crisis. The advantage of focusing on this crisis is that it allows us to separate the effect of financing constraints on investments from the effect of investment opportunities. This is because the financial crisis constituted an exogenous credit supply shock for Belgian SMEs: it originally was not caused by a weakening of firm business fundamentals in Belgium but by the subprime mortgage crisis which started in the United States. The bank lending survey of the European Central Bank (ECB)[28] confirms that the financial crisis substantially reduced the provision of credit by banks to SMEs in the Euro area (which includes Belgium). According to this survey, the costs related to the capital position of banks, the ability of the banks to access market financing and the liquidity position of the banks were important factors contributing to the tightening of credit standards. Furthermore, in a survey on the access to finance of SMEs in

[28] This survey is addressed to senior loan officers of a representative sample of euro area banks and is conducted four times a year. Detailed information on the survey and its results are available at: http://www.ecb.int/stats/money/surveys/lend/html/index.en.html.

the Euro area[29] which was conducted in the summer of 2009 by the ECB and the European Commission, 17.4% of SMEs named access to finance as the most pressing problem they faced. 43% of the SMEs applying for a bank loan also reported a deterioration in the availability of bank loans in the first half of 2009, while only 10% reported an improvement.

While other studies have investigated the effect of an exogenous credit supply shock on investments by large, listed firms (e.g. Peek & Rosengren 2000; Khwaja & Mian 2008; Almeida *et al.* 2009; Duchin *et al.* 2010; Lemmon & Roberts 2010; Chava & Purnanandam 2011), to the best of our knowledge we are the first to use this approach for investigating financing constraints of SMEs. This is remarkable: since privately held SME tend to have financing patterns which are very different from those of large listed firms (e.g. Beck *et al.* 2008), an exogenous credit supply shock such as the financial crisis may affect SMEs and large firms in different ways. Because SMEs are more vulnerable to information problems, they will be more bank dependent than large firms which can rely more on market finance. A reduction in the availability of bank finance is therefore likely to have a bigger impact on SMEs than on large firms. However, the ECB bank lending survey indicates that the crisis had a bigger impact on the provision of bank loans to large firms than bank loans to SMEs. In the first quarter of 2008 a net percentage of 54% of banks reported a tightening of the credit standards they applied for loans and credit lines to large firms because of the situation on the financial markets, while only a net percentage of 34% of banks reported a tightening of credit standards for SMEs[30]. It is therefore a priori not clear to what extent the Global Financial Crisis has reduced access to finance more for SMEs than for large firms.

Following Almeida et al. (2009) who investigate large listed firms in the United States, we hypothesize that privately owned SMEs with a large proportion of long-term debt maturing at

[29] Detailed information on the survey and its results are available at: http://www.ecb.int/stats/money/surveys/sme/html/index.en.html.

[30] The net percentage of tightening of credit standards is the percentage of banks of banks reporting a tightening minus the percentage of banks who reported they eased credit standards. See http://www.ecb.int/stats/money/surveys/lend/html/index.en.html for a further discussion of this issue.

the start of the crisis had difficulties to renew their loans due to the negative credit supply shock, and hence could invest less than other SMEs. Furthermore, we expect that this effect is stronger for SMEs which are ex ante more likely to be financially constrained: smaller SMEs and SMEs that pay no dividend, have fewer liquid reserves and/or have a higher leverage (Fazzari et al. 1988; Duchin et al. 2010). We investigate SME investments during the period 2006-2009, which includes 2 pre-crisis years (2006 and 2007) and 2 crisis years (2008 and 2009). We find a statistically and economically significant decline in investments in 2009, which is stronger for SMEs that had to renew a larger proportion of their long-term debt in 2008. We also find that this effect is driven by firms which are more likely to be financially constrained. To ascertain that our results are caused by a negative credit supply shock and not by unobservable firm characteristics, we consider three placebo periods in which there was no credit supply shock: 1998-2001, 1999-2002 and 2003-2006. For these placebo periods we expect *not* to find an effect of the long-term debt maturity structure on investments. This is indeed what we find, confirming the causal relationship of our findings for the period 2006-2009. To further check the robustness of our results we run a battery of additional tests. We consider the proportion of long-term debt maturing within the next year at the start of each crisis year rather than at the start of 2008, long-term debt maturing within the next year divided by total assets instead of total long-term debt, and we also include firms with little or no long-term debt which are otherwise left out of our sample. Furthermore we consider new investments in tangible fixed assets rather than new investments in all fixed assets, we extend our sample to 4 pre-crisis years rather than 2 pre-crisis years, and we measure long-term debt maturity at the start of 2007 rather than at the start of 2008. All the robustness tests confirm our basic findings.

Our study contributes to the literature in several ways. We are not aware of any other study that investigates the impact of a negative credit supply shock on financing constraints of

SMEs. Studying SMEs is important, since SMEs worldwide are a key driver for economic growth, innovation and employment. In Belgium, they account for 99.8% of the total number of firms, 66.9% of total employment, and 57.7% of total value added[31] (European Commission 2009). The role of SMEs in Belgium is representative of the role of SMEs in other European countries: European SMEs account for 99.8% of all firms, for 67.4% of total employment and for 57.9% of total value added in Europe (European Commission 2009). Furthermore, studying SMEs in Belgium allows us to use a unique database with detailed accounting data of all privately owned Belgium SMEs and it allows us to study a creditor-oriented financial system rather than a market-oriented financial system such as in the United States or the United Kingdom.

Our study also contributes to the finance literature by shedding light on the long-term debt maturity structure of SMEs. As Almeida et al. (2009) note, the maturity structure of long-term debt is an understudied topic in finance. Ideally, firms should have a well-diversified maturity structure of long-term debt, so that the refinancing or repayment of long-term debt is spread over time. However, consistent with results of Almeida et al. (2009) for large listed firms in the United States, we find a wide variation in long-term debt maturity across the SMEs in our sample. Furthermore, we find that long-term debt maturity affects access to external finance for SMEs.

The remainder of the paper is organized as follows. In the next section, we briefly discuss the Belgian banking sector and review the origins of the recent financial crisis. In section three, we discuss the literature on the effect of financial factors on corporate investments and the literature on financing patterns of SMEs. Sample and variables are discussed in section four. In section five, we discuss empirical design and results and we also take into account the

[31] Data refer to the non-financial business economy (NACE C-I, K) and represent estimates for 2008.

influence of ex ante financing constraints and we run the same regressions during placebo periods to further check causality of our results. We draw conclusions in the last section.

2 The Belgian banking sector and the Global Financial Crisis

At the start of the Global Financial Crisis, the Belgian banking sector was dominated by three banks: Fortis, KBC and Dexia. Based on the total book value of all 110 active banks in Belgium, in 2007 Fortis had a market share of 43%, KBC of 17%, and Dexia of 15% (Febelfin 2008). These three banks which provided nearly 70% of total outstanding credit in Belgium were strongly affected by the Global Financial Crisis. By April 2008, combined they had to write down 2.4 billion Euro of their equity capital due to the credit crisis (TNL/Belga 2008). This led to speculations about the solvency and liquidity of Belgian financial institutions. Corporate credit supply started to slow down and credit conditions were tightened in the second and third quarter of 2008 (Nationale Bank van België 2009; Kenniscentrum voor Financiering van KMO 2009). After the collapse of Lehman Brothers in September 2008, Fortis had to be bailed out by the Belgian, Luxemburg and Dutch governments: the Belgian entity of Fortis was sold by the Belgian government (which was by then owner of Fortis in Belgium) to the French bank BNP Paribas (Mooijman 2008), the Dutch government became the sole owner of the Dutch entity of Fortis and the Luxembourg government got 49,9% of the shares of Fortis Bank Luxembourg. Dexia had to be bailed out by the Belgian, Luxembourg and French government, and KBC was bailed out by the Belgian government (Dendooven 2008). The return on equity (ROE) of the Belgian banking sector dropped from +6.79% in 2007 to -33.69% in 2008 and the average profit margin decreased from 0.25% in 2007 to -1.31% in 2008 (Febelfin 2008, 2009).

3 The effect of financing constraints on SME investments

Several studies have investigated the effect of financing constraints on corporate investments of listed firms. Establishing a causal link between financing constraints and investments is challenging because measures of the availability of finance are often correlated with available investment opportunities. Different methodologies have been used to separate the effects of the availability of finance and investment opportunities on investments. Two important papers in this field are Fazzari et al. (1988), which were the first to incorporated ex ante measures of external financing constraints in the q-model of investment, and Whited (1992), who uses the Euler equation methodology to identify the role of financing constraints in the investment process. A number of authors have considered an exogenous change in the supply of external credit to study the effect of financial factors on corporate behavior. For example, Peek and Rosengren (2000) use the Japanese banking crisis in the early 1990s to study the impact of an exogenous loan supply shock to the real economy in the United States through the Japanese bank penetration in the United States real estate market. Chava and Purnanandam (2011) study the credit contraction in the US in 1998 that originated in Russia. Lemmon and Roberts (2010) consider regulatory changes as an exogenous negative shock to the supply of below-investment-grade credit after 1989 for listed firms in the United States. Sufi (2009) uses the introduction of syndicated bank loan ratings in 1995 to study financial and investment policies. Khwaja and Mian (2008) investigate a credit supply shock caused by unexpected nuclear tests in Pakistan in 1998.

Recently, some studies have focused on financing constraints during the Global Financial Crisis to study the effect on investments. Campello et al. (2010) investigate the effects of the crisis on employment and capital spending by surveying CFO's of listed firms in the United States, Europe and Asia. Duchin et al. (2010) and Almeida et al. (2009) focus on the impact of the crisis on investments of listed firms in the United States. Duchin et al. use cash holdings

and short-term debt to identify firms that are more or less affected by the crisis. They find that investments of firms with low cash reserves or high short-term debt decline more during the crisis than firms with high cash reserves and low short-term debt. Almeida et al. (2009) consider long-term debt maturing in the short run as a measure of financing constraints and find that the decline in investments is larger for firms that need to refinance a large proportion of their long-term debt at the onset of the crisis.

To the best of our knowledge, no study has yet considered the effect of an exogenous credit supply shock on investments of privately owned SMEs, although it has been found that the financing patterns of SMEs tend to be very different from those of large firms. Information asymmetries are generally higher for SMEs as they have less information disclosure requirements. Therefore, problems of adverse selection, moral hazard and credit rationing are more pronounced for SMEs than for large firms (Berger & Udell 1998; Hyytinen & Väänänen 2006; e.g. Beck *et al.* 2008). As a result, SMEs use less external finance than large firms, and they rely more on bank credit than large firms because they are typically unable to access public capital markets. SMEs are therefore more likely to be financially constrained than large firms because they have fewer finance options. Consistent with this hypothesis, Hadlock and Pierce (2010) find that firm size is a good predictor of financing constraints. Based on a study of 48 countries worldwide, Beck et al. (2008) find that small firms are less able to expand external financing as they become more financially constrained than large firms. Audretsch and Elston (1997) and Khwaja and Mian (2008) find that liquidity constraints are greater for smaller firms in Germany and Pakistan, respectively.

Since Almeida et al. (2009) and Duchin et al. (2010) find evidence that the Global Financial Crisis substantially constrained the finance of investments by large firms, we expect that this crisis also led to a reduction of investments by financially constrained SMEs. Following Almeida et al., we hypothesize that SMEs with a large proportion of long-term debt

maturing at the start of the crisis had difficulties to renew their loans due to the negative credit supply shock, and hence could invest less than other firms. Additionally, we expect that this effect is stronger for firms which are ex ante more likely to be financially constrained: smaller SMEs and SMEs that pay no dividend, have less liquid reserves and/or have a higher leverage (e.g. Duchin *et al.* 2010).

The advantage of focusing on the maturity of long-term debt is that this measure of financing constraints is unlikely to be correlated with investment opportunities or any other factors which may affect investment decisions during a financial crisis. As Almeida et al. note, the long-term debt maturity is plausibly exogenous because the decisions affecting the maturity of a firm's long-term debt were made several years prior to the crisis. By additionally considering ex ante measures of financing constraints we further minimize the risk that we are picking up any other effect than financing constraints. Long-term debt maturity may even be a better measure of financing constraints during a credit supply shock for SMEs than for large firms, for at least two reasons. Firstly, long-term debt is a more important source of financing for SMEs than for large firms. In Belgium, the average long-term debt to total assets ratio of non-financial firms was 23.54% for SMEs and 16.23% for large firms at the end of 2007[32]. For the sample of this study the mean long-term debt ratio in 2007 is 25.03%, while Duchin et al. (2010) find a mean ratio of 16.9% for their sample of large US firms. Secondly, while large firms typically have their long-term debt spread over a large number of individual loans, SMEs tend to have only a handful of long-term loans. This makes it more difficult for an SME to spread the maturity dates, and may actually make the fact that it has to renew a large part of its long-term debt during a crisis more a case of bad luck than of bad management[33].

[32] Own calculations based on the Belfirst database used for this study (see section 4.1 for more information). Firms in financial and public sectors are excluded.

[33] We thank an anonymous reviewer for this insight.

We have already noted in the introduction that it cannot be ruled out that the impact of the crisis on the availability of external finance was smaller for SMEs than for large firms. The ECB bank survey suggest that banks in the Euro zone tightened their credit standards in the wake of the crisis more for large firms than for SMEs. A likely explanation is that banks found it harder themselves to obtain market finance for the provision of loans to large firms, which are larger than loans to SMEs. Since large firms are also directly more dependent on market finance than SMEs, the large firms may have suffered more from a reduction in the availability of finance.

4 Sample and variables

4.1 Sample

The data used for this study come from the Belfirst database of Bureau Van Dijk. This database contains the financial statements of all Belgian and Luxembourg firms, both listed firms and privately held firms. We select privately held Belgian firms with non-consolidated statements and we exclude financial firms, not-for-profit organizations, and governmental enterprises[34] defined as firms with US SIC codes in the interval 6000-6999 and the interval 8000-9999. In Belgium, small firms can choose to deposit their financial statements in an abbreviated format[35]. We exclude firms that use the abbreviated format because these firms are not obliged to report turnover, which is one of our control variables. We also exclude firms with a negative equity[36] and firms for which the financial year is different from the calendar year. This is important as we want to measure the effect of the crisis in the same way for all firms. Following Almeida et al. (2009) and Duchin et al. (2010), firms for which total

[34] Managers of not-for-profit organizations and governmental enterprises may be influenced by government regulation and may have less discretion concerning investments (Smith 1986).

[35] A firm has to deposit the complete format if it has more than 100 employees or if it satisfies at least two of the following criteria: number of employees (yearly average) of at least 50, turnover (value-added tax excluded) of at least 7.300.000 Euro and total assets of at least 3.650.000 Euro (article 15 from 'Wetboek van Vennootschappen')

[36] Firms with negative equity which have continuous reported losses are likely to be financially distressed. While this will significantly impact their access to external finance, it is not the focus of our study.

assets double in one of the years of the sample period are excluded to exclude mergers or other significant restructurings.

We use the European definition to select SMEs. This definition is based on three criteria (European Commission 2003). First, the headcount (Annual Work Unit, AWU) must be less than 250. Second, the annual turnover may not exceed 50 million Euro *or* the annual balance sheet total may not exceed 43 million Euro. Third, firms must be independent. More specifically, firms may not have a shareholder with an equity stake of at least 25% (except for equity stakes of families, employees or directors) (European Commission 2003). We also exclude micro enterprises from our sample, i.e. firms which employ fewer than 10 persons and whose annual turnover or annual balance sheet total does not exceed two million Euro. Most of these firms fall out of our sample anyway because they typically submit their financial accounts in the abbreviated format. Finally, following Almeida et al. (2009) we exclude firm-year observations in which their debt maturing beyond one year represents less than 5% of total assets, to exclude possible "bad" firms that are obliged to rely on short-term debt. This reduces the sample from 1432 firms to 643 firms. Of the 789 firms left out, 489 firms had no long-term debt at all. Our final sample consists of 2,354 yearly observations in the four year period 2006-2009.

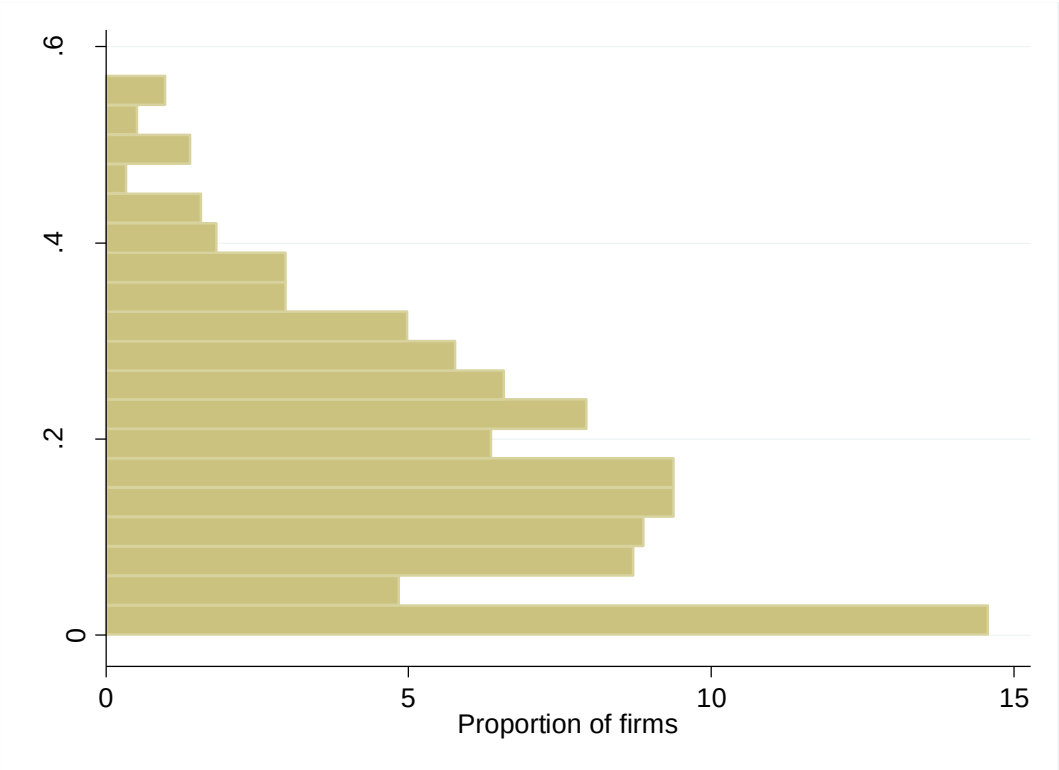
4.2 Variables

The dependent variable in our analysis is yearly investments in intangible, tangible and financial fixed assets divided by total assets. To test our hypothesis that a credit supply shock has an influence on investments that depends on financial contracting, we consider the variable "% LT debt < 1 year", which is the proportion of long-term debt at the start of 2008 (i.e. at the onset of the Global Financial Crisis) that matures within the next year. This measure is based on all financial long-term debt, which constitutes primarily of bank debt: 66% of all financial long-term debt of the firms in our sample is bank debt. We examine

whether firms with more long-term debt maturing at the onset of the crisis invested less than firms that did not have to refinance a large proportion of their long-term debt (Almeida *et al.* 2009).

Following Almeida et al. (2009), we prefer to use long-term debt maturing within the next year rather than short-term debt as our identification variable because the choice between short- versus long-term debt is correlated with firm characteristics such as size, credit rating and growth opportunities, and can therefore not be considered exogenous (e.g. Barclay & Smith 1995; Guedes & Opler 1996; Berger *et al.* 2005; Ortiz-Molina & Penas 2008). Heyman et al. (2008) also find for privately held Belgian firms that firm size and credit risk are positively correlated with short-term debt.

Figure 1: Long-term debt at the start of 2008 that matures within the next year



This figure shows the proportion of firms in our sample with respect to the proportion of long-term debt outstanding at the start of 2008 that matures within the next year.

In order for the maturing long-term debt to be a useful variable, there needs to be substantial variation in debt maturity across firms. It is plausible that firms generally diversify their long-term debt so that a similar proportion of long-term debt matures in every year (Almeida et al. 2009). If this would be the case, we would not be able to distinguish between firms that have a large proportion and firms that have a small proportion of long-term debt maturing within the next year. All firms would have a similar proportion of their long-term debt maturing in each year. However, Almeida et al. (2009) and Greenwood et al. (2010) do find a considerable diversity in debt maturity in the United States. Figure 1 shows the distribution of firms in our sample according to the proportion of long-term debt at the start of 2008 that matures within the next year. The figure makes clear that there is a considerable variation in the maturity structure of long-term debt: the proportion of long-term debt maturing within the next year ranges between 0% and 57%.

In the regressions, we also include cash flow and turnover in year t and in year t-1, scaled by total assets, and year dummies. Cash flow is defined as operating income before depreciation and amortization. Tobin's Q cannot be included since the firms in our sample are not listed. All these variables are winsorized at the 1st and the 99th percentiles to reduce the influence of outliers.

We also consider four proxies for ex ante financing constraints of SMEs at the start of the crisis in 2008: size measured by total assets, a dummy equal to one if the firm pays a dividend and zero otherwise, liquidity measured by liquid reserves over total assets and leverage measured by total financial debt over total assets. All four proxies are measured at the start of the crisis (i.e. the start of 2008).

Table 1
Descriptive statistics

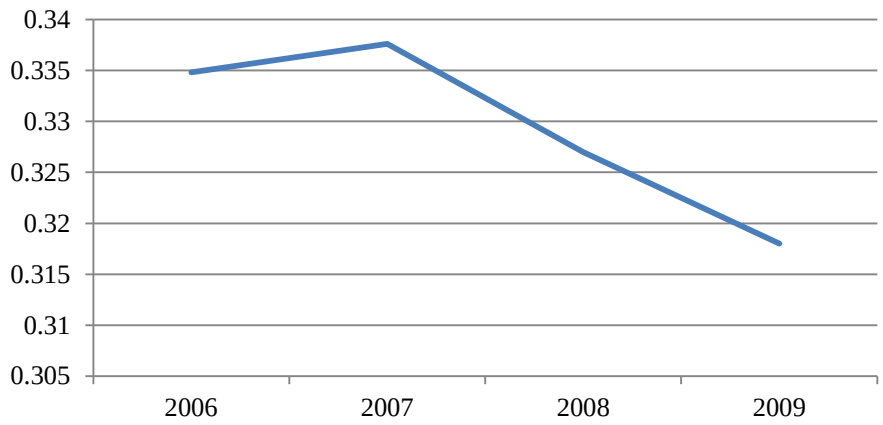
Variable	Obs	Mean	Median	St Dev	Min	Max
Investments/assets	2354	0.079	0.051	0.082	0	0.509
% LT debt < 1 year (*)	643	0.176	0.160	0.129	0	0.566
LT debt < 1 year/assets (*)	643	0.040	0.028	0.036	0	0.170
Cash flow/assets	2354	0.091	0.107	0.253	-1.900	0.506
Turnover/assets	2354	1.867	1.699	1.213	0.071	6.741
Turnover/assets t-1	2354	1.882	1.718	1.213	0.071	6.741
Size (*)	643	23.1 mio	8.8 mio	49.0 mio	2.2 mio	470.0 mio
Dividend payout (*)	643	0.235				
Liquidity (*)	643	0.055	0.035	0.064	0.000	0.495
Leverage (*)	643	0.338	0.317	0.174	0.0585	0.761

Investments/assets is capital expenditures in intangible, tangible and financial fixed assets over total assets. *% LT debt < 1 year* is the proportion of long-term debt outstanding at the start of 2008 that matures within the next year. *LT debt < 1 year/assets* is long-term debt outstanding at the start of 2008 that matures within the next year over total assets. *Cash flow/assets* is operating income before depreciation and amortization over total assets. *Turnover/assets* is turnover over total assets. *Size* is measured by total assets. *Dividend payout* is a dummy that equals one if a firm pays out a dividend and zero otherwise. *Liquidity* is cash holdings over total assets and *leverage* is total debt over total assets. The variables with (*) are measured at the start of 2008.

Table 1 shows summary statistics. The average yearly investment in fixed assets for the full period is 7.9% of total assets. This is in line with findings of Heyman et al. (2008) for Belgian SMEs in the period 1996-2000. They find a yearly average investment rate of 7.6% for a sample of 1,132 privately owned SMEs. In 2009, the average investment of the firms in our sample was 6.5% of total assets, which is comparable to the overall investment rate of Belgian SMEs. For all Belgian SMEs in the industries included in our sample, investments were on average 6% of total assets in 2009 (own calculations based on the Belfirst database). This suggests that the investment policy of the SMEs in our sample is representative for the overall investment policy of Belgian SMEs in the period considered. Table 1 also shows that on average 18% of long-term debt outstanding at the start of 2008 matured in the next year. Interestingly, Almeida et al. (2009) find that only 8% of their sample firms have more than 20% of their long-term debt expiring within the next year. They consider large firms which typically will have their long-term debt spread over a large number of individual loans, while

the SMEs in our sample typically will have only a handful long-term loans. As noted in section 3, this makes it more difficult for the SMEs to spread the maturity dates of their loans. Table 1 also reports descriptive statistics on our measures of financing constraints at the start of the crisis. 24% of the firms in our sample paid a dividend, 5% of total assets were cash holdings, and the average leverage ratio was 34%. Figure 2 shows the negative evolution of leverage during the crisis. Leverage decreases from 34% in 2007 to 32% in 2009.

Figure 2
Evolution of leverage over the sample period



This figure shows the evolution of leverage over the sample period.

Table 2 shows the industry distribution of the firms in our sample. The largest part (36%) of our sample consists of wholesale and retail trading firms. There is also a substantial number of firms in mining and construction (16%), transportation, communications, electric, gas and sanitary services (15%), light manufacturing (15%) and heavy manufacturing (9%).

Table 3 reports Pearson correlation coefficients between the variables included in the analysis. This table shows that firms which invest more tend to generate higher cash flows, hold less cash, have a higher leverage and are less likely to pay a dividend. They also tend to have more long-term debt maturing within the next year. The proportion of long-term debt

maturing within the next year is negatively related to size and leverage, but it is not significantly related to liquidity.

Table 2
Industry distribution of sample firms (based on one digit US SIC codes)

		No. of firms	Percentage of firms
0	Agriculture, forestry, fishing	8	1.2%
1	Mining and construction	100	15.6%
2	Light manufacturing	95	14.8%
3	Heavy manufacturing	60	9.3%
4	Transportation, Communications, electric, gas and sanitary services	99	15.4%
5	Wholesale/Retail trade	232	36.1%
7	Services	49	7.6%
	Total	**643**	**100%**

Table 3
Correlation table (n=2354)

Variables		1	2	3	4	5	6	7	8	9	10
1	Investments/assets	1									
2	% LT debt < 1 year	0.163*	1								
3	LT debt < 1 year/ assets	0.329*	0.711*	1							
4	Cash flow/assets	0.187*	0.237*	0.218*	1						
5	Turnover t/assets	-0.082*	0.183*	-0.038*	-0.004*	1					
6	Turnover t-1/assets	-0.016*	0.171*	-0.051*	-0.019*	0.949*	1				
7	Size	0.023	-0.250*	-0.161*	-0.013	-0.336*	-0.334*	1			
8	Dividend payout	-0.039*	0.024*	-0.012	0.105*	-0.058*	-0.060*	0.114*	1		
9	Liquidity	-0.072*	-0.005	-0.086*	0.043*	0.133*	0.137*	-0.066*	0.044*	1	
10	Leverage	0.164*	-0.207*	0.198*	-0.102*	-0.293*	-0.289*	0.197*	-0.035*	-0.326*	1

This table shows Pearson correlation coefficients. All variables are defined as before.* denotes significance at the 5% level.

Table 4
Investments and long-term debt maturity

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Basis	Basis	Basis	Basis	Extended	Extended
2007	0.002	0.002	0.002	0.001	0.004	0.004
	(0.611)	(0.594)	(0.593)	(0.779)	(0.036)**	(0.035)**
2008	-0.005	-0.007	-0.002	-0.011	0.005	0.008
	(0.193)	(0.203)	(0.703)	(0.075)*	(0.028)**	(0.001)***
2009	-0.027	-0.015	-0.011	-0.017	-0.008	0.001
	(0.000)***	(0.020)**	(0.057)*	(0.015)**	(0.001)***	(0.624)
2008 * % LT debt < 1 year		0.015		0.027		
		(0.561)		(0.349)		
2009 * % LT debt < 1 year		-0.065				
		(0.033)**				
2008 * LT debt < 1 year/assets			-0.074			-0.153
			(0.436)			(0.031)**
2009 * LT debt < 1 year/assets			-0.391			-0.416
			(0.002)***			(0.000)***
2009 * % LT debt < 1year 2009				-0.060		
				(0.067)*		
Cash flow/assets	0.049	0.046	0.045	0.049	0.036	0.034
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Turnover/assets	-0.043	-0.043	-0.041	-0.047	-0.024	-0.023
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Turnover/assets t-1	0.050	0.051	0.051	0.055	0.022	0.023
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Observations	2354	2354	2354	2148	5194	5194
R-squared	0.112	0.117	0.122	0.127	0.048	0.059

This table presents fixed effects regression results for the period 2006-2009. The dependent variable is investments/assets; 2007, 2008 and 2009 are year dummies; *LT debt < 1 year/assets* is long-term debt outstanding at the start of 2008 that matures within the next year over total assets; *% LT debt < 1year 2009* is the proportion of long-term debt outstanding at the start of 2009 that matures within the next year. All other variables are defined as before. P-values (in brackets) are heteroskedasticity-consistent and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5 Results

5.1 Crisis investments and long-term debt maturity

Table 4 shows regression results for the relation between investments and long-term debt maturity in the period 2006-2009. In all regressions, the dependent variable is the level of investments in fixed assets scaled by total assets. We use the fixed effects model, which controls for all time-invariant differences between the firms in our sample[37]. Standard errors are heteroskedasticity-consistent and clustered at the firm level. We include the ratio of cash flow to assets, turnover in year t and turnover in year t-1 divided by assets and year dummies

[37] We used the Hausman test to determine whether to use fixed effects or random effects model.

as control variables. R^2 is low compared to Duchin et al. (2010), but comparable to other studies such as Lemmon and Roberts (2010). First, we investigate whether the SMEs in our sample reduced their investments in 2008 and/or in 2009. Regression (1) shows that while investments were not significantly lower in 2008 compared to the two previous years, in 2009 there was a statistically significant decrease in investments over total assets of 2.7%, ceteris paribus. All control variables are significant at the 1% level. As expected cash flow and turnover in year t-1 have a positive influence on investments but remarkably turnover in year t has a negative effect. A tentative explanation for this result is that the coefficient of turnover in year t picks up a negative effect of operating costs, i.e. the difference between turnover and cash flow, on investments.

Next, we investigate whether the investments of SMEs during the financial crisis depended on debt maturity. In regression (2), we add an interaction term between the 2008 and 2009 year dummies and the proportion of long-term debt at the start of 2008 maturing within the next year. For 2009, the interaction term is negative and statistically significant at the 5% level, which suggests that the decrease in investments in 2009 was larger for firms with more long-term debt maturing in the next year. While investments to total assets of firms without long-term debt maturing within one year decreased by 1.5% in 2009, the investments to total assets ratio of the typical firm in our sample with respect to long-term debt maturing within the year, decreased by an additional -0.065 * 16% = approx. 1%. This reduction in the investments/assets ratio is economically significant, when compared to the median (mean) investment/assets ratio for our sample of 5.1% (7.9%). The finding that long-term debt maturity affected investments in 2009 but not in 2008 is consistent with the fact that the crisis affected global Belgian investments only from 2009 onwards: while gross fixed capital formation by all Belgian enterprises in 2008 still increased by 3.4% , in 2009 it decreased by

7.5%[38].

The results for our long-term debt maturity measure may be biased because this measure depends on the total level of long-term debt in the denominator: the proportion of long-term debt maturing within the next year will be less relevant for firms with lower levels of long-term debt than for firms with high levels of long-term debt. Therefore in regression (3) we relate long-term debt maturing in the next year to total assets instead of total long term debt. Again we find a substantial negative effect of long-term debt maturity on investments in 2009, which is now statistically significant at the 1% level.

So far we have considered long-term debt maturity structure at the start of 2008, i.e. before the crisis affected Belgian banks, in order to make sure that long-term maturity structure is exogenous to the crisis. A disadvantage of this approach is that the interaction terms for 2008 and 2009 do not capture the same effect. The interaction term for 2008 measures whether long-term debt maturing in 2008 has an effect upon investments in the same year, while the interaction term for 2009 measures whether long-term debt maturing in 2008 has a *delayed* effect upon investments in the next year. Therefore in regression 4 we interact the 2009 year dummy with long-term debt maturing in 2009 instead of 2008. Again we find a significantly negative coefficient for the 2009 interaction term.

Following Almeida et al. (2009), we have restricted the sample to firms for which debt maturing beyond one year represents at least 5% of total assets. The purpose of this restriction is to ensure that the results do not come from a comparison between high-quality firms that can issue long-term debt and low-quality firms that are not able to do so. However, as noted in section 4.1 this restriction reduces the number of firms in our sample by more than half, and many of the firms left out may actually not be finance constrained at all. In order to check

[38] Percentages on gross capital formation reported in the annual reports of the National Bank of Belgium, available at http://www.nbb.be/pub/06_00_00_00_00/06_02_00_00_00/06_02_06_00_00/06_02_06_2001.htm?l=en.

how this restriction affects our results, we re-estimated the base regressions for a sample which also includes firms with little or no debt maturing in more than one year. Since many of these firms have only a small amount of long-term debt, we relate long-term debt maturing in the next year to total assets rather than to long-term debt, as we did in regression (3). The results of regression (5) confirm those of regression (1), and the results of regression (6) are even stronger than our base results: if we take into account all firms, long-term debt maturing in 2008 not only significantly reduces investments in 2009 but also already in 2008.

Table 5
Ex ante financing constraints

	Basis sample (643 obs.)		Other firms (789 obs.)	
	Mean	Median	Mean	Median
Size	23.1 mio	8.8 mio	16.3 mio***	7.3 mio
Dividend payout	0.235		0.306***	
Liquidity	0.055	0.035	0.100***	0.057
Leverage	0.338	0.317	0.081***	0.010

All variables are defined as before and are measured at the start of 2008. *** indicates significance at the 1% level, based on a t-test.

A problem with interpreting the (LT debt<1/assets) coefficient as a measure of financing constraints in regression model (6), is that this interpretation rests on the assumption that firms with little or no long-term debt are less financially constrained. Indeed, the (LT debt<1/assets) variable is equal to: (% LT-debt <1 year) x (LT-debt/assets). Therefore, the coefficient of (LT debt< 1/assets) in regression (6) simultaneously tests whether firms with a higher proportion of long-term debt maturing within the year (% LT-debt <1 year) *and* firms with a higher proportion of long-term debt over total assets (LT-debt/assets) are more financially constrained. While we do hypothesize that long-term debt maturity (as measured by % LT-debt <1 year) increased financing constraints during the crisis, there is no theoretical (or empirical) base for assuming that SMEs were less financially constrained if they had little

or no long-term debt outstanding (as measured by LT-debt/assets). It could even be argued that firms without LT-debt are *more* financially constrained because they are not able to obtain such debt[39]. Table 5 compares ex ante financing constraints measures at the start of 2008 between the firms in the basis sample and the firms added in the extended sample, i.e. firms with little or no long-term debt at the start of the crisis. Firms with little or no long-term debt were more likely to pay a dividend, held more cash, and had a lower leverage. This indicates lower financing constraints, but these firms also tended to be significantly smaller, which points to higher financing constraints. It cannot be ruled out that firms in our sample with little or no long-term debt pursued conservative financing policies for reasons unrelated to financing constraints. Since the focus of this paper is on the effect of long-term debt maturity (% LT-debt <1 year) anyway, in the remainder of the paper we will consider the basis sample of firms with a substantial amount of long-term debt outstanding.

[39] See Heyman et al. (2008) for an analysis of the determinants of the debt ratio and debt maturity for a sample of Belgian SMEs.

Table 6
Investments, LT-debt maturity, firm size and dividend payout

Sample:	Size < median	Size ≥ median	Size < median	Size ≥ median	No dividend	Dividend	No dividend	Dividend
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2007	0.005	-0.002	0.006	-0.002	0.001	0.004	0.001	0.004
	(0.265)	(0.736)	(0.236)	(0.736)	(0.793)	(0.608)	(0.774)	(0.604)
2008	-0.001	-0.010	-0.002	-0.011	-0.006	-0.002	-0.009	-0.003
	(0.916)	(0.066)*	(0.764)	(0.206)	(0.171)	(0.788)	(0.162)	(0.813)
2009	-0.028	-0.028	-0.006	-0.025	-0.027	-0.026	-0.016	-0.014
	(0.000)***	(0.000)***	(0.537)	(0.003)***	(0.000)***	(0.003)***	(0.036)**	(0.335)
2008 * % LT debt < 1 year			0.013	0.006			0.019	0.007
			(0.686)	(0.903)			(0.518)	(0.916)
2009 * % LT debt < 1 year			-0.101	-0.019			-0.064	-0.065
			(0.019)**	(0.656)			(0.069)*	(0.277)
Cash flow/assets	0.052	-0.037	0.046	-0.036	0.043	0.100	0.040	0.098
	(0.000)***	(0.491)	(0.000)***	(0.498)	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Turnover/assets	-0.047	-0.034	-0.046	-0.034	-0.042	-0.046	-0.041	-0.046
	(0.000)***	(0.006)***	(0.000)***	(0.006)***	(0.000)***	(0.005)***	(0.000)***	(0.004)***
Turnover/assets t-1	0.045	0.060	0.044	0.060	0.053	0.043	0.053	0.045
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.009)***	(0.000)***	(0.006)***
Observations	1164	1190	1164	1190	1786	568	1786	568
R-squared	0.148	0.088	0.159	0.089	0.121	0.094	0.126	0.098

This table presents fixed effects regression results for the period 2006-2009. The dependent variable is investments/assets. All variables are defined as before. P-values (in brackets) are heteroskedasticity-consistent and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5.1 Crisis investments and ex ante financing constraints

We next consider the effect of ex ante financing constraints. The literature provides evidence that fluctuations in the supply of external finance will have a more pronounced effect on firms that are ex ante more financially constrained (e.g. Duchin *et al.* 2010). As a first measure of ex ante financing constraints, we use firm size. We calculate the median value of total assets measured at the start of 2008 to distinguish between smaller and larger SMEs. The smaller SMEs are a priori expected to be more financially constrained than the larger SMEs (e.g. Duchin *et al.* 2010)[40]. Table 6 reports the results. Regressions (7) and (8) show that investments of both smaller and larger SMEs decrease in 2009. However, if we take into account long-term debt maturity in regressions (9) and (10), we find that long-term debt maturity only affects investments of the smaller SMEs, which are more likely to be financially constrained than the larger SMEs. Thus, the effect of long-term debt maturity seems to be conditional upon being financially constrained.

As a second measure of financing constraints we consider dividend payouts, since financially constrained firms are expected to pay less or no dividends (e.g. Fazzari *et al.* 1988; Duchin *et al.* 2010). We distinguish between firms that pay a dividend and firms that do not pay a dividend at the start of the crisis (e.g. Rommens *et al.* forthcoming). Out of the 643 firms in our sample, only 151 firms paid a dividend. Regressions (11) and (12) from table 6 show that both dividend payers and non-payers decreased their investments in 2009. However, if we take into account long-term debt maturity in regression (13) and (14), only investments of the non-payers depend on long-term debt maturity.

In Table 7 we additionally consider firm liquidity and leverage at the start of the crisis as measures of financing constraints. We expect that long-term debt maturity is more likely to

[40] Young firms also tend to be more financially constrained than older firms (Hadlock & Pierce 2010). However, since most of the firms in our sample are fairly mature firms, age is not a useful measure for financing constraints in this research.

matter for investments if the firm has low (below median) liquidity and/or high (above median) leverage. First, we find that firms with low liquidity (regressions (15) and (16)) and high leverage (regressions (19) and (20)) already significantly reduced their investments in 2008, while the high liquidity/low leverage firms did not have a significantly lower investment rate as compared to 2006 (i.e. the base year in our sample). All firms significantly reduce their investments in 2009, but the reduction seem to have been stronger for firms with low liquidity and/or high leverage. When we consider long-term debt maturity, the hypothesis of financing constraints due to a negative credit supply shock is again confirmed. We find that a higher proportion of long-term debt maturing in 2008 significantly reduces investments of firms with low liquidity (regression (17)) and high leverage (regression (22)), while it does not significantly affect investments of firms with high liquidity (regression (18)) and low leverage (regression (21)).

Table 7
Investments, LT-debt maturity, liquidity and leverage

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Sample:	Liquidity < median	Liquidity ≥ median	Liquidity < median	Liquidity ≥ median	Leverage < median	Leverage ≥ median	Leverage < median	Leverage ≥ median
2007	-0.003	0.007	-0.003	0.007	0.004	-0.000	0.004	0.000
	(0.571)	(0.149)	(0.604)	(0.145)	(0.319)	(0.974)	(0.315)	(0.995)
2008	-0.014	0.004	-0.010	-0.003	0.004	-0.014	-0.003	-0.011
	(0.010)***	(0.493)	(0.180)	(0.728)	(0.402)	(0.008)***	(0.750)	(0.130)
2009	-0.038	-0.017	-0.020	-0.009	-0.015	-0.039	-0.007	-0.023
	(0.000)***	(0.003)***	(0.042)**	(0.349)	(0.005)***	(0.000)***	(0.442)	(0.024)**
2008 * % LT debt < 1 year			-0.016	0.035			0.036	-0.017
			(0.612)	(0.373)			(0.363)	(0.615)
2009 * % LT debt < 1 year			-0.106	-0.042			-0.040	-0.097
			(0.028)**	(0.280)			(0.216)	(0.079)*
Cash flow/assets	0.056	0.043	0.050	0.041	0.067	0.071	0.065	0.065
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Turnover/assets	-0.042	-0.042	-0.042	-0.041	-0.040	-0.046	-0.039	-0.047
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Turnover/assets$_{t-1}$	0.055	0.045	0.057	0.045	0.035	0.065	0.035	0.067
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Observations	1152	1202	1152	1202	1194	1160	1194	1160
R-squared	0.138	0.095	0.146	0.099	0.093	0.164	0.097	0.169

This table presents fixed effects regression results for the period 2006-2009. The dependent variable is investments/assets. All variables are defined as before. P-values (in brackets) are heteroskedasticity-consistent and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Investments and long-term debt maturity during placebo periods

	(23)	(24)	(25)	(26)	(27)	(28)
Placebo period:	1998-2001	1998-2001	1999-2002	1999-2002	2003-2006	2003-2006
Year t:	2000	2000	2001	2001	2005	2005
Year t-1	-0.012	-0.012	-0.014	-0.014	0.007	0.007
	(0.133)	(0.133)	(0.051)*	(0.050)**	(0.069)*	(0.071)*
Year t	-0.028	-0.030	-0.012	-0.020	-0.004	-0.006
	(0.001)***	(0.007)***	(0.112)	(0.085)*	(0.382)	(0.353)
Year t+1	-0.029	-0.025	-0.025	-0.017	-0.008	-0.013
	(0.001)***	(0.069)*	(0.002)***	(0.172)	(0.029)**	(0.038)**
Year t * % LT debt < 1 year		0.009		0.038		0.012
		(0.845)		(0.315)		(0.667)
Year t+1 * % LT debt < 1 year		-0.019		-0.040		0.023
		(0.730)		(0.334)		(0.375)
Cash flow/assets	0.013	0.013	0.053	0.050	0.035	0.036
	(0.752)	(0.748)	(0.001)***	(0.001)***	(0.000)***	(0.000)***
Turnover/assets	-0.046	-0.046	-0.033	-0.033	-0.056	-0.056
	(0.001)***	(0.001)***	(0.002)***	(0.001)***	(0.000)***	(0.000)***
Turnover/assets lagged	0.054	0.054	0.040	0.040	0.053	0.053
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Observations	824	824	1723	1723	2534	2534
R-squared	0.112	0.113	0.075	0.084	0.107	0.108

This table presents fixed effects regression results for three different placebo periods. The dependent variable is investments/assets. *Year t-1*, *year t* and *year t+1* are year dummies, with year t given in the second row of each column. All other variables are defined as before. P-values (in brackets) are heteroskedasticity-consistent and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5.2 Placebo periods

Our results show a relationship between a negative credit supply shock and a decline in investments during the crisis of 2008-2009 that is conditional upon the firms' long-term debt maturity structure. To confirm that our results are not due to unobserved firm characteristics but rather to a causal relationship, we run the same regressions as before, but in periods without a negative credit supply shock. Following Duchin et al. (2010), we do *not* expect to find any effect of maturity structure on investments for the placebo periods. To replicate our baseline tests, we consider three placebo periods: 1998-2001, 1999-2002 and 2003-2006. The period 1998-2001 incorporates the end of the dot.com boom in 2000, which constitutes a negative demand shock. The decrease in investments following this shock should not be conditional upon the portion of maturing debt at the start of the crisis as credit was still readily available.

The period 1999-2002 is interesting to compare to the period 2006-2009, because the pattern of gross fixed capital formation by Belgian enterprises is similar for both periods. In the 1999-2002 period gross fixed capital formation by Belgian enterprises increased by 2.9% in the first placebo crisis year 2001 but decreased by 3.8% in the second placebo crisis year 2002, while in the 2006-2009 period, gross fixed capital formation increased by 3.8% in 2008 and decreased by 7.5% in 2009. To further exclude unobserved firm characteristics from our baseline results, we also use the period 2003-2006 without any crises. In the absence of a refinance constraint, the maturity structure of long-term debt should again be irrelevant for investments. We use the same specifications and the same variables as before. Table 8 shows the results. We find no statistically significant effect of long-term debt maturity on corporate investments during any of the placebo periods. This finding is consistent with our previous results that long-term debt maturity affected investments in 2009 because of an external credit supply shock.

5.3 Robustness checks

We did a number of additional tests to check the robustness of our results. We used the proportion of long-term debt that matures within the next year at the start of 2007 instead of 2008, to further ascertain that our results are not driven by an endogenous effect of the financial crisis on the long-term debt maturity structure. Indeed, it could be argued that because the financial crisis already started in the US in 2007, this may have affected long-term debt maturity structure of Belgian SMEs at the start of 2008. Regression results are reported in regression (29) in the appendix B.1. We find a positive and statistically significantly positive coefficient of the effect of the maturity structure on investments in 2008, but it again turns negative in 2009. We also considered capital expenditures in tangible fixed assets rather than capital expenditures in all fixed assets as a measure of investments. This result is reported in the appendix B.1 in regression (30). As an additional robustness check, we enlarged our pre-crisis period with two years, considering four pre-crisis years 2004-2007. The regression results can

be found in regression (31) of the appendix B.1. The results of the robustness checks are qualitatively the same as before.

6 Conclusions

The Global Financial Crisis induced a negative credit supply shock which led to a significant reduction in investments by large firms in the United States (Almeida et al. 2009; Duchin et al. 2010). This raises the question how this crisis affected investments of SMEs, which are worldwide a key driver for economic growth, innovation and employment. While SMEs are more likely to be financially constrained than large firms, the bank lending surveys of the ECB indicate that the Global Financial Crisis had a bigger impact on the access to external finance for large European firms than for European SMEs. It is therefore possible that the credit supply effect of the crisis did not matter very much for the investments of SMEs. In this study, we find a statistically and economically significant decrease in investments of Belgian SMEs in 2009. Our results suggest that this decrease is to a large extent caused by a reduction in the supply of credit which was induced by the Global Financial Crisis. SMEs invested significantly less when they had a larger proportion of long-term debt that needed to be renewed in the short run. Furthermore, the effect of the long-term debt maturity structure only mattered for SMEs which were more likely to be financially constrained: smaller firms, firms which did not pay a dividend, highly leveraged firms and firms with low liquidity. Consistent with the hypothesis that there is a causal effect of a credit supply shock on corporate investments, we find no effect of long-term debt maturity in periods without a negative credit supply shock.

Our findings confirm that the supply of credit significantly affects corporate behavior of privately held SMEs. A negative credit supply shock such as the Global Financial Crisis seriously hampers the ability of SMEs to finance new investments, because it reduces their access to external (bank) finance. Our findings also highlight the role of long-term debt

maturity in the financing of SMEs, a topic which so far has been largely neglected in the SME literature and in the finance literature. Many firms do not have a diversified long-term debt maturity structure. The results of this study show that while this may not matter in 'normal' economic times, it may severely restrict their ability to finance value creating investments when there is a negative credit supply shock.

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Conclusion

In the past, researchers have typically focused on steady-state economic conditions to study corporate governance and corporate finance. Most often, crisis periods are left out of the analysis because it could affect results. Yet, it is during a crisis period that a firm's corporate governance becomes most important and that ill-considered past financial decisions may increase firm losses.

Concerning corporate governance, it is only recently that scientific interest is raised on how the well-established corporate governance mechanisms influence firm performance in crisis periods. This research shows that the efficacy of corporate governance mechanisms may be subject to contextual circumstances (e.g. van Essen *et al.* 2013). We add to this literature by studying corporate governance in a historical period that includes the most severe crisis of the 20th century, i.e. the Great Depression, in which there were few legally enforced corporate governance laws so that legal shareholder protection was weak. We also add to the literature of corporate finance by considering implications of capital structure on corporate behavior during the recent financial crisis.

In our first study, we investigate the impact of board composition on firm performance during the Great Depression. To this end, we focus on board size, busy boards, busy directors and bankers on the board. We use a sample of 150 publically traded firms at the Brussels Stock Exchange over the four-year period 1928-1931. We have 574 firm-year observations. We find that in 1928, boards of directors were large, that a relatively large portion of directors was busy, meaning that they had at least 2 other board seats in other firms, and that firms very often had a banker on the board. Firms were to a high extend connected to the outside environment through shared directorships with other industrial firms and with banks. Using regression analysis, we find a positive relation between board busyness, board size,

bankers on the board and firm performance before the crisis, in 1928. This positive relationship becomes less strong or even disappears during the crisis.

In a next step, we focus on the effect of risk. We find that the negative crisis effect is partly driven by risk. More risky firms loose most value during the crisis and they are more connected to the outside environment by having a larger board, having more busy directors and by having at least one banker on their board. We still find a negative crisis effect, but it is only statistically significant in 1929. We find no negative crisis effect in 1930 and 1931.

Overall, these findings suggest that firms were well connected with the outside environment and that the positive relation between board characteristics and firm value becomes less strong during the crisis. This study shows that optimal board composition may be conditional upon economic conditions. During a crisis, firms not only need a network, but they also need committed directors that have enough time and are able to take quick decisions to cope with the crisis.

The findings from this study suggest that optimal board composition is not only conditional upon economic conditions, but may also be conditional upon the institutional setting. Today, boards need to be independent and small because this is believed to improve directors' monitoring efficiency. In our sample period, monitoring was probably of much less importance, so that the optimal composition of a board may have been different. Our results suggest that, in a period of high information asymmetry and economic prosperity, a strong network was more important than having effective monitors. However, during a crisis period, having a strong network seems not enough to cope with a crisis.

A first limitation of this study is that we have almost no records of annual shareholder meetings and director meetings, which could further clarify the value and the role of the board of directors in this period. Even if they are available (which some are in national archives), they mainly show what decisions were made without giving any insight into the

actual functioning of the board or into the added value of individual board members. If this data comes available, it would greatly increase our understanding of the functioning of boards in the interwar period. A second limitation of this study is the absence of ownership data which is an important determinant of the agency conflict between shareholders and managers. In general, the incentive of the CEO and other management to expropriate shareholders is decreasing in the level of managers' proportional firm ownership (e.g. Lemmon & Lins 2003). In this study, we try to account for the influence of ownership structure by creating a proxy for family ownership. It has no statistically significant effect on our results.

In the second study, we examine incentive compensation of directors, i.e. the bonus. This bonus may be used by directors to expropriate shareholders or it may be used by shareholders to incentivize directors by making it dependent on performance. Using a sample of 1,556 firm-year observations for 214 Belgian firms listed at the Brussels Stock Exchange over the 10-year period 1925-1934, we find that incentive compensation was rudimentary: formally, it solely depended on net income of the previous fiscal year following stipulations from the articles of incorporation regarding the distribution of profits. This is confirmed by our empirical results. Regression analysis shows a strong link between the bonus and net income before the crisis. During the crisis, pay-performance sensitivity with net income decreases. One reason for this is that, in general, part of the dividend is a fixed percentage of equity, so that it works as a negative leverage for the bonus. Moreover, firms rather paid out dividends or kept profits in the firm than to pay out a bonus. We also use a market-based performance measure that is not mechanically connected to the bonus, which is 'change in shareholder wealth'. We also find a positive relation between the bonus and 'change in shareholder wealth' before the crisis, but the relation disappears during the crisis.

In the second part of the regression analysis, we find that the paid out bonus scaled to net income before the crisis has no impact or a positive impact on performance during the crisis,

measured by holding period return, change in shareholder wealth and excess holding return. This contradicts the hypothesis of shareholder expropriation via bonuses, at least not that it negatively affected firm value during the crisis. This is an interesting result in light of the ongoing debate on effective remuneration packages for directors and executives. It seems that this rudimentary bonus that was set by the articles of incorporation without any possibility for individual bargaining by directors, did quite well in preventing shareholder expropriation via these bonuses.

To reduce agency conflicts between managers and shareholders, it is believed that boards should be small and independent and that directors' pay should be dependent on performance. Today, complex remuneration contracts that are tied to different performance measures should ensure rational managerial decision making. Almost one century ago, we do not find small and independent boards nor complex remuneration contracts and yet it seems that shareholders were able to reasonably cope with agency problems. Else why would the capital market of the 1920s in Belgium have been so active and important? Shareholders must have entrusted their money with the managers. This made us search for other, informal mechanism that could reduce agency conflicts between management and shareholders. For example, leverage can serve as a substitute for legal corporate governance mechanisms. If a firm is highly levered, we can expect closer monitoring by debt holders and this should positively relate to firm value. Indeed, we find that leverage is statistically significantly and positively related to firm value. From historical sources, we also learned that bank directors had a seat on the board of industrial firms to monitor that firm's management. For example, the Société Générale, the largest bank at the time, had at least one board seat in the board of the industrial firms in our sample in which it held an equity stake. Furthermore, Ghita et al. (2009) show that before World War I, Belgium was characterized by a strong concentration of power. In such a setting, directors' reputation may have been a disciplining factor that prevents

management to (excessively) expropriate shareholders. Finally, dividends may have played a role in the protection of shareholder rights too because they reduce the free cash flow that is available to managers and as a results reduce the possibilities of managers to expropriate shareholders (Campbell & Turner 2011). Future research is needed to further increase our understanding of whether and how these mechanisms helped shareholders to cope with agency conflicts in an environment of weak legal shareholder protection.

In the third study of this doctoral dissertation, we examine corporate finance rather than corporate governance. Furthermore, we focus on the recent Global Financial Crisis instead of the Great Depression. We use a sample of 2,354 firm-year observations of privately held small- and medium sized enterprises (SMEs) for the four-year period 2006-2009 which includes two pre-crisis years, 2006 and 2007, and two crisis years, 2008 and 2009. SMEs are more vulnerable to information problems and therefore are more bank dependent than large firms, which can rely more on market finance. A negative credit supply shock, such as the recent crisis, reduced the availability of bank finance and may therefore have had a bigger impact on SMEs than on large firms.

We find a substantial variation in the maturity structure of long-term debt, which is necessary for our analysis. Furthermore, we find that investments drop during the crisis and that this drop is more pronounced for firms with a high portion of long-term debt maturing within the year. We also find that the effect is stronger for ex ante financially constrained firms: smaller SMEs and SMEs that pay no dividend, have fewer liquid reserves, and/or have higher leverage. These results are robust to several alternative empirical tests. Overall, these results show that, following a decrease in the availability of credit, the maturity structure of long term debt can have an influence on firm behavior. These findings suggest that SMEs would benefit from an optimal spread of the maturity structure of their long term debt to anticipate sudden decreases in the availability of credit.

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Appendix A – Study 2

Appendix A.1

Pay-performance sensitivity with OLS regressions

	(17)	(18)	(19)	(20)	(21)	(22)
Bonus measure	Bonus	Bonus per director	Bonus	Bonus per director	Bonus	Bonus per director
Net income	0.079***	0.005***	0.078***	0.005***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Net income * crisis	-0.021*	-0.002**	-0.021*	-0.002**		
	(0.074)	(0.020)	(0.071)	(0.029)		
Δ shareholder wealth					0.001	0.000
					(0.169)	(0.885)
Δ shareholder wealth * crisis					-0.001*	-0.000
					(0.079)	(0.997)
Crisis	-44,488	-11,702**	-3,706	-4,94	-335,332***	-34,52***
	(0.523)	(0.050)	(0.963)	(0.473)	(0.000)	(0.000)
Leverage			218,410	9,716	-314,955	-25,095
			(0.119)	(0.492)	(0.139)	(0.130)
Ln(Size)			5,953	4,865	321,971***	29,027***
			(0.825)	(0.126)	(0.000)	(0.000)
MTB			10,718	2,826*	103,490***	9,858***
			(0.403)	(0.072)	(0.000)	(0.000)
Stock return volatility			-904,196***	-108,180***	-3263896***	-252,402***
			(0.003)	(0.002)	(0.000)	(0.000)
Board size			-4,314	-4,268***	11,216	-3,385***
			(0.587)	(0.000)	(0.306)	(0.000)
% busy directors			117,813	12,340	106,293	6,979
			(0.395)	(0.496)	(0.571)	(0.742)
Constant	-42,884	-13,204	-248,749	-41,807	-5284395***	-423,620***
	(0.696)	(0.205)	(0.565)	(0.413)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,556	1,556	1,556	1,556	1,377	1,377

Notes: this table displays the regression coefficients and robust p-values for OLS regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the total paid out bonus in regressions (17), (19) and (21). In regressions (18), (20) and (22), the dependent variable is the paid out bonus divided by board size.; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix A.2

Pay-performance sensitivity with random-effects regressions

	(23)	(24)	(25)	(26)	(27)	(28)
Bonus measure	Bonus	Bonus per director	Bonus	Bonus per director	Bonus	Bonus per director
Net income	0.080***	0.006***	0.078***	0.005***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Net income * crisis	-0.015	-0.001*	-0.015	-0.001*		
	(0.222)	(0.065)	(0.212)	(0.085)		
Δ shareholder wealth					0.001	0.000
					(0.209)	(0.386)
Δ shareholder wealth * crisis					-0.001*	-0.000
					(0.085)	(0.370)
Crisis	-12,260	-7,733*	31,002	-670	-203,816***	-21,416***
	(0.850)	(0.075)	(0.631)	(0.896)	(0.001)	(0.004)
Leverage			317,043**	45,762***	247,646	45,017**
			(0.027)	(0.007)	(0.249)	(0.035)
Ln(Size)			21,446	5,814	254,568***	21,292***
			(0.660)	(0.189)	(0.000)	(0.000)
MTB			15,611	2,209*	105,975***	8,702***
			(0.173)	(0.095)	(0.000)	(0.000)
Stock return volatility			-635,133**	-85,177**	-2208321***	-189,393***
			(0.028)	(0.011)	(0.000)	(0.000)
Board size			-962.416	-3,321***	24,403**	-1,765**
			(0.893)	(0.000)	(0.032)	(0.012)
% busy directors			231,465	35,759*	416,167*	50,051*
			(0.127)	(0.089)	(0.091)	(0.074)
Constant	-120,254	-31,482**	-848,653	-129,597*	-4876168***	-392,146***
	(0.374)	(0.028)	(0.286)	(0.080)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,556	1,556	1,556	1,556	1,377	1,377

Notes: this table displays the regression coefficients and robust p-values for random-effects regressions. The results are based on clustered standard errors at the firm level. The dependent variable is the total paid out bonus in regressions (23), (25) and (27). In regressions (24), (26) and (28), the dependent variable is the paid out bonus divided by board size.; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix A.3

Pay-performance sensitivity including '*% supervisory directors*' and '*Chairman is CEO*'

	(29)	(30)	(31)	(32)	(33)	(34)
Bonus measure	Bonus	Bonus per director	Bonus	Bonus per director	Bonus	Bonus per director
Net income	0.080***	0.006***	0.078***	0.005***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Net income * crisis	-0.015***	-0.001***	-0.015***	-0.001***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Δ shareholder wealth					0.00077***	0.000024*
					(0.000)	(0.053)
Δ shareholder wealth * crisis					-0.00094***	-0.000023
					(0.000)	(0.291)
Crisis	-11,769	-7,694**	31,903	-674.733	-208,923***	-21,742***
	(0.722)	(0.022)	(0.415)	(0.865)	(0.000)	(0.000)
Leverage			322,834***	45,956***	192,742	40,741**
			(0.008)	(0.000)	(0.281)	(0.012)
Ln(Size)			27,617	6,372*	267,191***	22,156***
			(0.400)	(0.072)	(0.000)	(0.000)
MTB			17,478*	2,367.**	110,402***	9,101***
			(0.068)	(0.016)	(0.000)	(0.000)
Stock return volatility			-608,896**	-83,682***	-2238793***	-189,844***
			(0.045)	(0.006)	(0.000)	(0.000)
Board size			-1,546	-3,386***	21,702**	-1,957**
			(0.799)	(0.000)	(0.011)	(0.016)
% busy directors			228,507*	35,061***	401,775**	48,597***
			(0.070)	(0.010)	(0.023)	(0.003)
% supervisory directors			-69,067	-7,749	-201,301	-16,387
			(0.813)	(0.803)	(0.629)	(0.672)
Chairman is CEO			-28,165	-1,972	-169,421	-10,873
			(0.757)	(0.836)	(0.179)	(0.346)
Constant	-122,663	-31,722***	-950,619	-138,073**	-4950384***	-396,524***
	(0.232)	(0.010)	(0.115)	(0.037)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,556	1,556	1,539	1,539	1,362	1,362
Nr firms	214	214	213	213	210	210

Notes: this table displays the regression coefficients and p-values for random-effects tobit regressions. The dependent variable is the total paid out bonus in regressions (29), (31) and (33). In regressions (30), (32) and (34), the dependent variable is the paid out bonus divided by board size. *% supervisory directors* is the number of supervisory directors divided by board size; *Chairman is CEO* is a dummy that equals one if the chairman of the board is also CEO and zero otherwise; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix A.4

Pay-performance sensitivity without firms that include reserves, provisions,… in their bonus figure

	(35)	(36)	(37)	(38)	(39)	(40)
Bonus measure	Bonus	Bonus per director	Bonus	Bonus per director	Bonus	Bonus per director
Net income	0.069***	0.004***	0.066***	0.004***		
	(0.000)	(0.000)	(0.000)	(0.000)		
Net income * crisis	-0.010***	-0.001***	-0.010***	-0.001***		
	(0.000)	(0.000)	(0.000)	(0.001)		
Δ shareholder wealth					0.00065***	0.000015
					(0.000)	(0.139)
Δ shareholder wealth * crisis					-0.00057***	-0.000003
					(0.006)	(0.847)
Crisis	-10,171	-7,865***	-571	-4,053	-168,292***	-18,338***
	(0.694)	(0.002)	(0.985)	(0.163)	(0.000)	(0.000)
Leverage			142,339	23,122***	-59,031	6,368
			(0.127)	(0.009)	(0.671)	(0.566)
Ln(Size)			57,112**	7,312***	262,328***	20,744***
			(0.026)	(0.002)	(0.000)	(0.000)
MTB			19,407***	2,283***	93,111***	7,162***
			(0.008)	(0.001)	(0.000)	(0.000)
Stock return volatility			-415,826*	-56,521*	-1798491***	-141,041***
			(0.073)	(0.012)	(0.000)	(0.000)
Board size			522	-2,778***	25,405***	-1,380***
			(0.909)	(0.000)	(0.000)	(0.005)
% busy directors			29,977	7,225	36,923	3,082
			(0.759)	(0.429)	(0.784)	(0.772)
Constant	-79,677	-18,404**	-1291611***	-124,820***	-4693978***	-337,265***
	(0.310)	(0.014)	(0.005)	(0.004)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,441	1,441	1,441	1,441	1,275	1,275
Nr firms	208	208	208	208	204	204

Notes: this table displays the regression coefficients and p-values for random-effects tobit regressions. The dependent variable is the total paid out bonus in regressions (35), (37) and (39). In regressions (36), (38) and (40), the dependent variable is the paid out bonus divided by board size. All variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix A.5

Bonus before the crisis and firm performance during the crisis with performance measures *Δ shareholder wealth* and *Excess holding return.*

	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)
Performance measure:			Δ shareholder wealth					Excess holding return		
Performance measure in:	1929	1929	1930	1930	1929	1929	1929	1930	1930	1929
Ln(Bonus/Net income) measure in:	1928	1926-1928	1928	1926-1928	1927	1928	1926-1928	1928	1926-1928	1927
Ln(Bonus/Net income)	54074827	-6668999	7070787	16630724	-1.698e+08	0.171	0.003	0.508*	0.034	0.241
	(0.7346)	(0.6984)	(0.9635)	(0.3525)	(0.3716)	(0.7302)	(0.9412)	(0.0776)	(0.3629)	(0.6651)
Leverage	-1.081e+08	-1.282e+08	19797930	6201352	30261791[a]	-0.199	-0.404	-0.271	-0.319*	-0.066[a]
	(0.1203)	(0.1062)	(0.7872)	(0.9418)	(0.6712)	(0.4724)	(0.1214)	(0.1208)	(0.0746)	(0.8001)
Ln(Size)	-8.504e+07***	-8.057e+07***	-1.166e+08***	-1.132e+08***	-1.092e+08***[a]	-0.134**	-0.089***	-0.051**	-0.054**	-0.131***[a]
	(0.0001)	(0.0006)	(0.0000)	(0.0000)	(0.0000)	(0.0130)	(0.0100)	(0.0147)	(0.0235)	(0.0006)
MTB	-9141886***	-8269417**	-2.347e+07***	-2.198e+07***	-1.162e+07**[a]	-0.001	0.003	-0.003	-0.002	0.005[a]
	(0.0055)	(0.0189)	(0.0000)	(0.0005)	(0.0235)	(0.9223)	(0.7424)	(0.6412)	(0.7844)	(0.7497)
Stock return volatility	-1.958e+08	-3.278e+08	-1.872e+08	-3.775e+08	-1.211e+08[a]	0.598	-0.509	0.069	-0.151	0.932[a]
	(0.4564)	(0.3015)	(0.4581)	(0.2167)	(0.5886)	(0.5619)	(0.4200)	(0.8461)	(0.7171)	(0.5743)
Board size	-3259378	-3786652	-4729769	-5974322*	-1762119[a]	0.000	-0.001	0.004	0.002	-0.003[a]
	(0.3547)	(0.3578)	(0.1602)	(0.0906)	(0.5885)	(0.9612)	(0.8321)	(0.3017)	(0.7308)	(0.6947)
% busy directors	49148114	90657562	42005938	96607465	87654163[a]	-0.196	-0.214	0.298***	0.368***	-0.027[a]
	(0.4479)	(0.1816)	(0.5036)	(0.1620)	(0.2784)	(0.1693)	(0.1196)	(0.0045)	(0.0014)	(0.8579)
Constant	1.547e+09***	1.481e+09***	2.132e+09***	2.128e+09***	1.837e+09***[a]	2.680***	2.233***	0.825*	1.058**	2.146***
	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0017)	(0.0001)	(0.0557)	(0.0115)	(0.0006)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	135	118	137	121	119	107	96	109	99	102
Nr firms	0.654	0.647	0.717	0.727	0.675	0.285	0.360	0.352	0.364	0.280

Notes: this table displays the regression coefficients and robust p-values for OLS regressions. The results are based on clustered standard errors at the firm level. In regression (41) to (45), the dependent variable is the change in shareholder wealth. In regressions (46) to (50) the dependent variable is excess holding return, derived from a one-factor market model; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

[a]1927 figures

Appendix A.6

Bonus before the crisis and firm performance during the crisis with *excess bonus* as alternative bonus measure

	(51)	(52)	(53)	(54)	(55)	(56)
Holding period return defined in:	1929	1929	1930	1930	1929	1929-1931
Ln(Excess bonus) defined in:	1928	1926-1928	1928	1926-1928	1927	1928
Ln(Excess bonus)	0.045	-0.043	-0.022	0.068	0.039	0.023
	(0.6631)	(0.7343)	(0.6432)	(0.1182)	(0.8550)	(0.7453)
Schuldgraad	0.029	-0.003	-0.008	0.005	0.226	0.038
	(0.8982)	(0.9892)	(0.9442)	(0.9673)	(0.4922)	(0.8582)
Ln(Size)	-0.121**	-0.113**	-0.054***	-0.061***	-0.128***	-0.106**
	(0.0363)	(0.0443)	(0.0067)	(0.0017)	(0.0012)	(0.0116)
MTB	-0.011	-0.011	-0.014**	-0.016***	-0.009	-0.034***
	(0.3494)	(0.3604)	(0.0193)	(0.0062)	(0.6706)	(0.0004)
Stock return volatility	0.107	0.008	-0.631*	-0.507	0.742	-1.447**
	(0.9194)	(0.9938)	(0.0827)	(0.1727)	(0.6900)	(0.0426)
Board size	0.001	0.000	0.002	0.003	-0.002	0.004
	(0.8102)	(0.9518)	(0.5106)	(0.3465)	(0.7660)	(0.4453)
% busy directors	-0.118	-0.110	0.187**	0.180**	-0.134	0.069
	(0.3957)	(0.4286)	(0.0156)	(0.0191)	(0.4526)	(0.6332)
Constant	2.231***	2.190***	0.797**	0.845**	2.245***	1.690**
	(0.0087)	(0.0080)	(0.0296)	(0.0174)	(0.0010)	(0.0185)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	132	133	134	135	106	124
Nr firms	0.245	0.245	0.369	0.369	0.285	0.463

Notes: this table displays the regression coefficients and p-values for random-effects tobit regressions. The dependent variable is the total paid out bonus in regressions (51), (53) and (55). In regressions (52), (54) and (56), the dependent variable is the paid out bonus divided by board size. *Ln(Excess bonus)* is the natural logarithm of the actual paid out bonus divided by the bonus that should be paid out according to articles of incorporation +1; all other variables are defined as before. Industry dummies are included. Here ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix B – Study 3

B.1
Robustness checks

	(29)	(30)	(31)
Dependent variable:	Investments/ assets	Investments tangible assets/assets	Investments/ assets
2005			-0.003
			(0.475)
2006			-0.006
			(0.153)
2007	-0.004	0.002	-0.005
	(0.226)	(0.605)	(0.319)
2008	-0.012**	-0.006	-0.015**
	(0.037)	(0.272)	(0.025)
2009	-0.011*	-0.012*	-0.026***
	(0.056)	(0.062)	(0.000)
2008 * % LT debt < 1 year 2007	0.042*		
	(0.087)		
2009 * % LT debt < 1 year 2007	-0.071***		
	(0.004)		
2008 * % LT debt < 1 year		0.015	0.015
		(0.510)	(0.581)
2009 * % LT debt < 1 year		-0.070**	-0.052**
		(0.016)	(0.049)
Cash flow	0.045***	0.043***	0.045***
	(0.000)	(0.000)	(0.000)
Turnover t	-0.042***	-0.037***	-0.054***
	(0.000)	(0.000)	(0.000)
Turnover t-1	0.047***	0.046***	0.057***
	(0.000)	(0.000)	(0.000)
Constant	0.069***	0.055***	0.082***
	(0.000)	(0.000)	(0.000)
Observations	2,397	2,354	3,304
R^2	0.113	0.109	0.131

This table presents fixed effects regression results for three different robustness checks. In regressions (29) and (31), the dependent variable is investments divided by total assets. In regression (30), the dependent variable is investments in *tangible* assets divided by total assets. *% LT debt < 1 year 2007* is the proportion of long-term debt outstanding at the start of *2007* that matures within the next year; *2005* and *2006* are year dummies. All other variables are defined as before. P-values (in brackets) are heteroskedasticity-consistent and clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Nederlandstalige samenvatting

Dit proefschrift bestaat uit drie delen. De eerste twee delen behandelen twee aspecten van deugdelijk bestuur. Deugdelijk bestuur is een verzamelterm voor mechanismen die de belangenconflicten tussen managers en aandeelhouders proberen te beperken in bedrijven waar de aandeelhouders de controle van hun bedrijf toevertrouwd hebben aan managers. Dit kan gebeuren op verschillende manieren waarvan er in dit proefschrift 2 besproken worden, namelijk de samenstelling van de raad van bestuur en de bonussen van bestuurders.

We bestuderen de waarde van deze 2 mechanismen van deugdelijk bestuur tijdens het interbellum in België. Daar zijn verschillende redenen voor. Ten eerste is het interessant om naar het effect van een crisis te kijken, in dit geval "The Great Depression" die begon in 1929. Verschillende wetenschappelijk artikels hebben getoond dat deugdelijk bestuur nog belangrijker is tijdens crisis periodes dan tijdens stabiele economische periodes. Recent onderzoek veralgemeent deze bevindingen door bewijs te leveren dat de waarde van mechanismen van deugdelijk bestuur niet noodzakelijkerwijs belangrijker is tijdens een crisis, maar ook gewoon anders kan zijn, omdat de noden tijdens een crisis ook anders zijn.

Ten tweede is België een interessant land om te bestuderen tijdens het interbellum omdat de beurs van Brussel toen zeer actief en groot was in vergelijking met andere beurzen in die periode, omdat ook de banksector zeer sterk ontwikkeld was en omdat er aan de Universiteit Antwerpen een schat aan historische markt- en bedrijfsgegevens ter beschikking is. Verder werd België ook zwaar getroffen door de "Great Depression".

Ten derde is het interbellum een interessante periode om te bestuderen omdat aandeelhouders veel minder goed beschermd waren door de wet dan nu het geval is. Er was bijvoorbeeld veel minder regelgeving omtrent het openbaar maken van de jaarrekening. Dit verhoogde het risico voor aandeelhouders om te investeren in een onderneming die

gecontroleerd wordt door managers. En toch, ondanks dit schijnbaar hoge risico, kende België tijdens het interbellum een zeer actieve en belangrijke kapitaalmarkt. Wil dit dan zeggen dat de huidige mechanismen van deugdelijk bestuur optimaal aangepast waren om de belangen van aandeelhouders toen te beschermen of dat er andere mechanismen bestonden? Was de raad van bestuur, een van de belangrijkste interne mechanismen van deugdelijk bestuur vandaag, samengesteld om aandeelhouders toen te beschermen? Deden bonussen dienst als motivatie voor managers om in het belang van aandeelhouders te handelen? Dit proefschrift probeert een beter inzicht te geven in de mechanismen van deugdelijk bestuur die aandeelhouders toen ter beschikking hadden.

De eerste studie in dit proefschrift richt zich op de samenstelling van de raad van bestuur en meer bepaald op de grootte van de raad van bestuur, het aantal bestuursposten van bestuurders en op de aanwezigheid van bankiers in raden van bestuur. Een grote raad van bestuur met bestuurders die nog vele andere mandaten hebben en met minstens één bankier kan voordelig zijn voor een bedrijf indien dit het netwerk van het bedrijf vergroot en dit netwerk voordelig en snel toegang geeft tot allerlei grondstoffen, diensten en informatie. Deze samenstelling kan echter ook nadelig zijn indien dit de slagkracht van de raad van bestuur verkleint door onderlinge communicatieproblemen of doordat bestuurders niet voldoende tijd hebben voor het bedrijf wegens te veel andere verplichtingen. Eén of meerdere bankiers in een raad van bestuur kan enerzijds positief zijn indien het bedrijf een beroep kan doen op de financiële expertise van de bankier of indien dit de toegang tot krediet aan een voordelige prijs bevordert. Anderzijds kan een bank ook misbruik maken van haar bevoorrechte informatie, zeker wanneer het bedrijf in financiële moeilijkheden verkeert.

Uit dit onderzoek blijkt dat raden van bestuur groot waren, dat bestuurders ook vele andere mandaten hadden en dat er zeer vaak een bankier in de raad van bestuur zetelde. Verder vinden we dat dit positief gerelateerd is met de bedrijfswaarde voor de crisis en dat die

positieve relatie zwakker wordt tijdens de crisis. We vinden ook dat meer risicovolle ondernemingen grotere raden van bestuur hebben met bestuurders met meerdere mandaten en dat die bedrijven zeer vaak een bankier in hun raad van bestuur hebben. Het zijn ook die bedrijven die de meeste waarde verliezen tijdens de crisis. Het resultaat uit deze studie wordt dus deels verklaard doordat risicovollere bedrijven sterker verbonden zijn met hun omgeving en zij ook het meeste waarde verliezen tijdens de crisis. Als we rekening houden met dit effect, dan vinden we nog steeds een positieve relatie tussen bedrijfswaarde en de grootte van een raad van bestuur, het aantal mandaten van bestuurders en de aanwezigheid van een bankier in de raad van bestuur. Die positieve relatie wordt zwakker in 1929, het begin van de crisis.

De tweede studie gaat dieper in op de bonussen van bestuurders. Bonussen kunnen enerzijds een manier zijn om belangenconflicten te vermijden als een bonus afhankelijk wordt gemaakt van de prestatie van een onderneming (en afhankelijk wordt gemaakt van de waarde die gecreëerd wordt voor aandeelhouders). Anderzijds kan het voor managers een manier zijn om waarde te ontvreemden van aandeelhouders. Dit zou zelfs zeer problematisch kunnen geweest zijn in een omgeving met weinig regelgeving, zoals de jaren 1920 en 1930.

Tijdens het interbellum in België, werd de grootte van een bonus bepaald door de statuten van een onderneming. Daarin stond hoe de winst moest verdeeld worden en dus ook hoe de bonus voor bestuurders moest berekend worden. Wij onderzoeken of dit overeenstemt met de werkelijkheid. We beschrijven hiervoor eerst 2 cases. Vóór de crisis, tussen 1925 en 1928, blijkt de bonus sterk afhankelijk te zijn van de prestatie van de onderneming maar tijdens de crisis, van 1929 tot 1934, blijkt dat die relatie verzwakt. Aan de hand van regressieanalyse vinden we dat de bonus afhankelijk is van de boekhoudkundige winst, maar dat die relatie zwakker wordt tijdens de crisis. Dit komt onder meer doordat bedrijven een deel van het dividend uitkeerden als vast percentage van het eigen vermogen, onafhankelijk van de gerealiseerde winst. Als de winst daalt en dit stuk van het dividend blijft constant, dan is er

minder winst over voor de uitkering van de bonussen. Verder verkiezen bedrijven ook meermaals om de winst tijdens de crisis te reserveren in plaats van die uit te keren aan bestuurders in de vorm van bonussen. De relatie tussen de bonus en een kapitaalmarkt-gerelateerde prestatie maatstaf is gelijkaardig, maar zwakker.

In het tweede deel van de tweede studie, gaan we na of bonussen een manier zijn voor bestuurders om waarde te ontvreemden van de onderneming en dus van aandeelhouders (expropriatie van aandeelhouders). Het is mogelijk dat managers waarde onttrekken aan de onderneming via te hoge bonussen. Indien dit het geval is, dan verwachten wij een negatieve relatie tussen de grootte van de bonus voor de crisis en de ondernemingsprestatie tijdens de crisis. Dit is niet wat wij vinden en levert dus geen bewijs voor het misbruik van bonussen.

Tijdens het onderzoek van de eerste studie in dit proefschrift is gebleken dat, met grote waarschijnlijkheid, de controletaak van bestuurders eerder beperkt was. Bestuurders die belast werden met de boekhoudkundige controle waren waarschijnlijk niet onafhankelijk en voerden eerder geringe controles uit. Resultaten uit het tweede onderzoek van dit proefschrift suggereren dat de bonus enkel afhankelijk was van de netto winst van het voorgaande boekjaar, zonder verdere gesofisticeerde berekeningen, en, ook al week de werkelijke bonus regelmatig of van wat eigenlijk wettelijk verplicht was, toch vinden wij geen bewijzen voor zwaar en systematisch machtsmisbruik door bestuurders via die bonussen. Kan het dan zijn dat formele mechanismen van deugdelijk bestuur, zoals een onafhankelijke raad van bestuur, in deze periode vervangen werden door andere, informele methoden? Wij hebben verschillende suggesties voor verder onderzoek. Ten eerste kan schuld helpen in het bestrijden van belangenconflicten omdat schuldeisers een natuurlijke stimulans zullen hebben om controle uit te oefenen over bestuurders. Ten tweede, bankiers zetelden in raden van bestuur om toezicht uit te oefenen. Zo vonden we voor de Société Générale, de grootste bank in die tijd, dat zij bankiers had in de raad van bestuur van alle bedrijven in onze steekproef waarvan zij aandelen bezat.

Ten derde, kunnen ook dividenden een rol spelen in de bescherming van aandeelhoudersbelangen. Hoe hoger de dividenden, hoe minder fondsen beschikbaar voor het management en de bestuurders om dit in het nadeel van aandeelhouders te gebruiken. Tenslotte werd België voor WOI gekenmerkt door een sterke machtsconcentratie. De reputatie van bestuurders kan in zo een omgeving ook een factor geweest zijn die het bestuur verhinderde om waarde te ontvreemden van aandeelhouders. Verder onderzoek moet hierover meer duidelijkheid scheppen.

De derde studie van dit proefschrift focust op kleine en middelgrote ondernemingen (KMO's) tijdens de recente crisis. Bij deze ondernemingen is er vaak geen scheiding tussen aandeelhouders en management, maar zijn dit dezelfde personen. Hier speelt dus geen belangenconflict. In deze studie focussen we daarom op bedrijfsfinanciering in de plaats van op deugdelijk bestuur. Meer specifiek bestuderen we de lange termijn schuld die binnen het jaar vervalt. We verwachten dat een negatieve schok in het kredietaanbod van banken, zoals tijdens de recente financiële crisis het geval was, een impact zal hebben op het gedrag van ondernemingen, en in het bijzonder op het gedrag van KMO's aangezien zij vooral beroep doen op bankkrediet.

We vinden dat er substantiële verschillen zijn in de structuur van lange termijnschuld. Dit wil zeggen dat bedrijven hun aflossingslast niet (voldoende) spreiden doorheen de tijd. Verder vinden we dat investeringen dalen tijdens de crisis en dat die daling groter is voor ondernemingen die in 2008, het begin van de crisis, een groot deel van hun lange termijnschulden moesten terugbetalen. Vervolgens blijkt dit effect enkel te spelen voor bedrijven die ex ante al financieel beperkt waren. Dit zijn bedrijven die eerder klein zijn, eerder veel schulden hebben, geen dividenden uitbetalen of weinig liquide zijn. De resultaten van deze studie suggereren dat het voordelig kan zijn voor KMO's om de afbetaling van hun lange termijn schuld beter te spreiden in de tijd.