Personal Character and Firm Performance
The Economic Implications of Having Fraudulent Board Members

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Unique proprietary data on Swedish board members reveal that a non-trivial proportion of board members in Swedish listed firms have been convicted of crimes. In the light of the behavioral criminology literature, we hypothesize and find evidence supporting the argument that criminal convictions and other proven dishonest behavior impair the boards' ability to monitor and advice the firm's management. Specifically, we find that the greater the proportion of fraudulent board members, the lower is profitability and the higher are the volatility of earnings and cash flows. We also find that earnings of firms with more fraudulent board members are lower and less value-relevant. Finally, we find that board members exhibiting personal fraudulent behavior are more likely to be males than females. Our results suggest that individuals' behavioral aspects should be considered when appointing them to the board.

JEL Classification: M41, G10, G30, K42

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1. Introduction

Boards of directors have significant influence on corporate decisions, in particular by monitoring the decisions of senior executives (Larcker *et al*. 2007). As Fama and Jensen (1983) point out, corporate boards consist of individuals who collectively share their opinions and make decisions at board meetings. This raises the important question as to whether listed firms have a non-trivial number of dishonest or unethical individuals on the board and whether such board members influence the performance and risk-taking of the firm. If board members do not obey the rules and norms of society, how can shareholders expect them to abide by corporate governance and other rules, to monitor management activities, and ensure that the firm is managed in the best interests of its shareholders?

It is well established in behavioral research that criminal convictions, regardless of the nature or seriousness of the crime, are likely to reflect on an individual's negative behavioral attributes, for instance over-confidence, narcissism, hedonism, and sensation seeking (Jones and Kavanagh 1996; Blickle *et al.* 2006; and Iversen and Rundmo 2002). Moreover, these attributes are linked to individual economic decisions as documented, for example, by Grinblatt and Keloharju (2009). They show that convictions for violating even minor traffic laws explain investors' sensation seeking behavior in their stock market trading. Surprisingly, evidence on whether board members exhibit such behavior and whether it affects the board's ability to govern the firm is scarce. To the best of our knowledge, there are no published studies on the implications for corporate performance of having board members with criminal convictions or other similar norm-breaking behavior.

Our study examines whether and to what extent listed firms have board members who have been convicted of crimes or have exhibited other forms of dishonest behavior. In addition, we investigate the effect of having fraudulent board members on firms' performance, the propensity to take risks and the quality of financial reporting. Our analysis employs a unique and proprietary database on the criminal convictions of all board members serving on the boards of Swedish listed firms, obtained from the Swedish National Council for Crime Prevention.[1]

Our analysis shows that 20% of board members of Swedish listed firms have been convicted of crimes and, consequently, sentenced to pay a fine or to unconditional or conditional prison sentences (these and other related figures in this study do not include speeding, parking and similar minor infringements of traffic laws). This proportion, which is similar to that in the Swedish population as a whole, seems high because most would expect the board members of listed companies to be above the population average in terms of personal conduct due to their position in the firm's corporate governance system. Clearly, having been convicted of a crime reflects a person's undesirable personal characteristics, such as dishonesty and carelessness. We also examine the proportion of convicted board members in Swedish companies listed in the New York Stock Exchange and NASDAQ and found it to be similar to that of Swedish companies listed only in Stockholm (Sweden). While ideally we would need more data on US companies for a more meaningful comparison, this finding suggests that having board members convicted of a crime is a phenomenon not confined to Sweden, as foreign firms listed in US stock markets must follow US regulation and governance rules.

[1] Our dataset is more comprehensive than the official crime registers maintained by police authorities (which are also very difficult to access even for research purposes). Specifically, our database contains all criminal convictions in Sweden since 1974, regardless of the type of crime or whether these convictions have been expunged from the official crime records. In Sweden, minor crimes are expunged after five years and serious crimes after 10 years. Therefore, our database allows an examination of board members' personal attributes.

We also find that 20% of Swedish listed firms have at least one board member whose name has been entered in a public non-payment record and that 15% of the firms have at least one board member who serves as a board member in more than three other firms that had gone into bankruptcy. These figures remain fairly stable over the entire sample period from 1999 to 2007, indicating that tightened corporate governance practices following recent accounting scandals have not reduced the likelihood of fraudulent board members being appointed. Moreover, our results show that male board members are more likely than female board members to have been convicted of crimes. This is an interesting finding, given the recent focus of the corporate governance literature on the importance of gender diversity on boards.

An analysis of profitability reveals that the proportion of fraudulent board members is associated with lower firm profitability. This result is robust for the inclusion of firm fixed-effects in the regression models as controls for potential correlated omitted variables, and for using the Generalized Method of Moments (GMM) to control for potential endogeneity (as in Barton and Waymire 2004, and Ozkan 2001). Employing an instrumental variable approach combined with the GMM method shows that higher proportions of fraudulent board members cause firm performance to decline rather than vice versa. This result is consistent with the argument that board members convicted of (even seemingly minor) crimes have a negative influence on firm performance due to negative personal attributes. However, we find some evidence suggesting that board members' personal ownership interest in the firm mitigates the negative effect on corporate profitability of having fraudulent board members.

We also find that companies with more fraudulent board members exhibit higher earnings volatility, suggesting that these firms engage in more risky projects without being fully compensated for taking such risks. In addition, we find that the power of earnings in

explaining market-adjusted stock returns decreases with the proportion of fraudulent board members. Finally, we find that the proportion of fraudulent board members is positively associated with earnings management activities, measured in terms of discretionary accruals.

Taken together, our empirical results strongly support the conjecture that appointing individuals with past dishonest behavior to the board of directors may be more widespread than often believed, and that such appointments could have a serious negative effects on firms' performance and risk-taking (Pech and Slade 2007, and Jones *et al.* 2004). Our results support the view that, when developing new corporate governance measures, more emphasis should be placed on enhancing the quality of individuals serving within the corporate governance system, rather than on changing the governance system itself (Fischer *et al.* 2009).

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature on the role of boards of directors in the governance mechanisms of the firm and in cases of corporate fraud. Section 3 describes the Swedish system of justice and corporate governance practices relevant for our study. Section 4 describes the sample, data sources and variables. In Section 5, we report the results of our analysis. Section 6 provides concluding remarks.

2. Institutional Background

2.1. Board members lacking conventional morality

Prior studies suggest that several aspects of individuals' personal characteristics are related to their unethical or even criminal behavior. Typically, individuals showing hedonistic or over-confident behavior are more likely to commit crimes. For instance, Jones and Kavanagh (1996) show that individuals lacking conventional morality and being

effective manipulators of others exhibit significantly more unethical behavioral tendencies than other people. Blickle *et al.* (2006) argue that low behavioral self-control, high hedonism, high narcissism and high conscientiousness are positively related to the likelihood of committing business white collar crime.

Is it then possible that individuals possessing these personal characteristics are appointed to the boards of listed firms, and what are the implications for corporate performance of appointing such board members? In fact, studies suggest that it may be surprisingly common that such individuals are appointed as senior executives. For instance, Pech and Slade (2007) suggest that firms sometimes appoint and promote to top managerial positions individuals who may be incompetent, narcissistic and manipulative. They conclude that such individuals can be characterized as organizational sociopaths, and they are sometimes promoted repeatedly until they reach the highest levels of the organizational hierarchy. In addition, Jones *et al*. (2004) suggest that organizational cultures actually tolerate and favor manipulative, egotistical and self-centered managerial behavior. If the organizational cultures described in these studies are widespread among firms, finding fraudulent individuals on boards of directors may be quite common.

Interestingly, Daly (1989), Zahra *et al*. (2005) and Blickle *et al.* (2006) suggest that males engage in white-collar crimes more often than females. In addition, corporate governance studies show that a higher proportion of females on the board enhances the board's ability to monitor management. For instance, Adams and Ferreira (2009) show that US companies with more gender-diverse boards invest more effort in monitoring activities. These results indicate that appointing females as board members may result in more effective monitoring, because, compared to male board members, they are less likely to lack morality and exhibit other fraudulent behavior.

Although board decisions are based on collective opinion sharing and decision-making, the composition of the board, and particularly the personal characteristics of board members plays a significant role in the board's actions (Raheja 2005; Adams and Ferreira 2008; and Fischer *et al*. 2009). In essence, a board consists of individuals and the composition of the board plays a crucial role in its effectiveness as a governance mechanism (Fama, 1980; Fama and Jensen, 1983). Therefore, having low-moral and dishonest individuals on the board is likely to reduce a board's ability to effectively monitor and advise management. In particular, board members with lower ethical standards who fail to follow the standards and norms of society, would be expected to put less emphasis on corporate governance rules and principles that require board members to monitor and advise management.[2] These board members are more interested in enjoying their private benefits of being on the board such as monetary compensation and reputation rather than putting in the necessary effort. Studies even suggest that these personal characteristics may result in poor business decisions, because the individuals possessing these characteristics are not appointed to their positions because of their skills, but because they can manipulate those who promote them (e.g., Pech and Slade, 2007).

The literature discussed above implies a negative relation between the proportion of low-moral and fraudulent board members and the board's effectiveness in monitoring and advising management. Since the board's actions are based on collective decision-making, these board members can have a serious negative influence on the decisions made by the board, resulting in lower profitability and cash flows.

[2] Individuals' tendency to engage in fraudulent behavior may also be associated with the so-called free rider problem often discussed in the corporate governance literature. The free rider problem refers to those board members who do not contribute much to the board's work. This problem is more pervasive in large boards, where a single board member may play a relatively minor role in the joint decision-making. For instance, Jensen (1993), Yermarck (1996) and Larcker et al. (2007) find that small boards are more effective in their work.

2.2. Excess risk-taking and sensation seeking board members

While manipulative or sociopathic behavior are extreme examples of personal characteristics that may be associated with criminal convictions, a more common behavioral attribute that has been documented to be associated with criminal behavior is sensation seeking. Sensation seeking may be defined as an individual's tendency to take physical, social, legal and financial risks simply for the sake of the thrill (Zuckerman, 1994). Sensation seekers are relatively fearless and take risks because of the thrill resulting from risk-taking, not because of the expected utility resulting from actions that involve greater risk. Earlier studies argue that criminal convictions such as traffic offences resulting from bad driving behavior may be a good empirical measure of sensation seeking (e.g. Jonah 1997, and Iversen and Rundmo, 2002)). For instance, Grinblatt and Keloharju (2009) show that investors' sensation seeking, measured by the number of speeding tickets received, is positively related to the frequency with which they trade their stocks and negatively related to the returns of those investments. They argue that sensation seeking investors find trading entertaining *per se*, and, therefore, the mere act of trading rather than a buy and hold strategy creates a more varied and novel experience for these investors. Levenson (1990) argues that sensation seeking is associated with antisocial behavior.

Sensation seeking and in particular, its behavioral attributes, are relevant to our study. Board members who have exhibited fraudulent behavior (e.g., have been convicted of crimes) may be more predisposed to sensation seeking behavior. These sensation seekers may advise or even require management to take unwarranted operating and financial risks. For instance, they may advise management to implement over-risky business strategies or enter over-risky investment projects. Since sensation seeking refers to actions that involve high risk without anticipated appropriate compensation for bearing such risk, these decisions are likely to result in poorer performance and higher earnings/cash-flow volatility.

2.3. Do badly managed firms appoint fraudulent board members?

While the literature discussed so far implies that appointing fraudulent board members may cause weaker corporate performance, it is also possible that firms with weaker performance are more likely to appoint more fraudulent board members. First, these firms may not be able to appoint competent board members, as such individuals may be reluctant to serve on the boards of troubled firms due to higher litigation exposure and negative reputation effects. Second, management of badly managed and under-performing firms may deliberately prefer weaker boards so that they can keep their positions despite the poor performance. Both explanations raise serious doubts as to the board's ability to serve as an effective corporate governance mechanism. However, some evidence suggests that under-performing firms tend to appoint stronger, not weaker, boards. For instance, Bhagat and Black (2002) show that US firms respond to poor performance by increasing the proportion of independent board members, therefore increasing the quality of the board as a corporate governance mechanism.

3. The Swedish System of Justice and the Corporate Governance Code

3.1 Legal and corporate governance systems in Sweden

While the legal system in Sweden is based primarily on French and German civil codes, the importance of case law has increased over time. Hence, Sweden can be classified as somewhere between a civil and a common law regime (Strömholm, 1991). Despite the disparate origins of the legal system, the penal code in Sweden is quite similar to those of other western countries including the United States and the United Kingdom, although penalties for similar crimes are usually less severe in Sweden than in the US and the UK, capital punishment is not allowed and punitive damages are not imposed in civil cases

(Carlson 2009). Crime rates in Sweden are considered average among western countries (Dolmén 2001). Leuz *et al*. (2003) give the Swedish law enforcement system a grade of 10 on a scale from zero to 10, based on scores developed by La Porta *et al*. (1998).[3]

Being an EU Member State, the legal basis for corporate regulation in Sweden is the EU directives. In addition, listed companies in Sweden must comply with the Swedish Corporate Governance Code, which is in many ways similar to the corporate governance rules and practices followed in the United States. As in other western countries, the corporate governance system is made up of shareholders, who can exercise control over the firm through nomination committees and non-executive boards, executives in charge of operations, and external auditors (Unger 2006). Also, similar to other European countries, foreign ownership of Swedish listed firms is about a third (Dahlquist and Robertsson 2001). For the most part, these foreign investors are institutional US investors, who put pressure on firms to follow stricter governance practices as in the US. In addition, 24 Swedish firms were listed in the United States (New York Stock Exchange and NASDAQ) during our sample period in addition to their local listing in Sweden, which increases the level of scrutiny and hence the quality of corporate governance. Recent global integration of stock markets resulted in a merger between the Stockholm Stock Exchange (OMX) and NASDAQ forming the current OMX-NASDAQ as the major public securities market in Sweden. The association between OMX and NASDAQ also upgraded the quality of corporate governance practices to those in the United States.

Nonetheless, there are several differences between the Swedish and the US corporate governance system. First, many large Swedish firms have major owners, who often take an active role in governing the company, which is likely to increase the level of corporate

[3] Law enforcement is measured based on scores across three legal variables: the efficiency of the judicial system, an assessment of rule of law, and a corruption index. All three variables range from zero to ten.

governance. Second, Swedish firms have employee representatives on the boards, and these representatives have the same rights and responsibilities as other board members elected by the shareholders. Carlsson (2007) argues that employee representatives on boards are highly valued by other board members because of their knowledge of the company. Also, labor unions provide their board representatives with good formal training on board matters. Levinson (2000) shows that in a majority of Swedish firms, both board members and CEOs consider employee representatives on boards to be a positive and productive practice. Third, unlike in the US, the CEO of the firm may not be the chairman of the board. Finally, there seems to be a more marked distinction between the board of directors and executive management in Swedish companies. In particular, the Swedish Companies Act states that the board is responsible for the management, strategy and resource allocation, appointing the CEO and monitoring and evaluating his/her performance, but it is not involved in operational decisions.

3.2 Process of appointing board members

The Companies Act in Sweden requires a minimum of three directors on the board but stipulates no maximum. The board itself has no influence over its own size. The chairman of the board and the CEO may not be one and the same person. The Corporate Governance Code states that the majority of directors elected by the shareholders must be independent of the company and its top management. Typically, only the chief executive officer represents the executive management on the board, however, it is not uncommon to find Swedish listed firms without any member of the executive management on the board (Unger 2006). At least two of the directors who are independent of the company and its management must also be independent of the company's major shareholders.

Potential candidates for the board are identified and presented by a nomination committee, and later elected by the shareholders at the shareholders' meeting. The nomination committee proposes candidates for the position of chairman and other members of the board, as well as remuneration for each director. According to the Swedish Corporate Governance Code, nomination committees must have at least three members (including a chairman), providing the majority of these members are independent of the firm and its top management. At least one member of the nomination committee must be independent of the largest shareholder in terms of voting power, or any ownership group. Board members may be members of the nomination committee but may not constitute majority. A CEO cannot be a member of the nomination board. No board member may chair the nomination committee (Unger 2006).

While the process of appointing board members in Sweden is similar in many respects to that in the US, there are several differences that could make this process more stringent in Sweden than in the US. In particular, the nomination committee in Sweden is not part of the board, instead, it is made up of shareholders' representatives who review the performance of the board and nominate new candidates to the share-holders' meeting. Second, CEOs and other top executives are not involved in the process of appointing board members.

3.3 Appointing previously fraudulent board members to boards of directors

The main reason convicted individuals are appointed to boards is that these convictions are often not known to the nomination committee or shareholders. As in other western countries, information on criminal convictions in Sweden is typically maintained by the police, and may be used in screening candidates for certain positions or for licensing (for

example, government positions).[4] However, these official crime registers include only recent or convictions not yet expunged. Depending on the seriousness of the crime, convictions are always expunged from these databases after five to 10 years. However, for research purposes we were given unrestricted access to records of all criminal convictions in Sweden since 1974, regardless of whether these convictions have been expunged from official crime records. Since criminal convictions may reflect negative personal behavioral characteristics, these characteristics could negatively affect firm performance, regardless of when these crimes were actually committed.[5] Furthermore, searching for previous criminal convictions in the screening process for board membership may not be as common practice as many would expect.[6]

Having been convicted of a crime is a negative signal about a person's character.[7] However, many of these convictions are linked to crimes that are not viewed by many as impairing a person's ability to exercise sound business judgment or even a person's undesirable personal characteristics. For instance, a conviction for driving under the

[4] Reviewing an individual's criminal record is easier in Sweden than in the US. Specifically, criminal records in the US are maintained separately by the state and the federal governments. A person's record may be accessed by that person but not by the public. Also, policies and rules for accessing state-level records vary by state. Typically, criminal background checks are done for positions requiring contact with minors, for certain health services occupations, and employment with firms providing security services (Stoll and Bushway 2008). In Sweden there is a nation-wide crime register administered by the police. Each Swedish citizen may request, free of charge, a transcript of their own record. Hence, Swedish firms could easily require a criminal record check on candidates for board membership. In the US candidates could issue similar transcripts obtained from the FBI. However, our informal discussions with listed firms and head-hunters assisting firms in the recruitment process of board members indicate that this policy is uncommon in both Sweden and in the US. In the US obtaining FBI records would require fingerprinting, which most would try to avoid.

[5] We recognize that convictions for juvenile crimes may not necessarily indicate sustained criminal behavior. Therefore, we exclude crime convictions prior to the age of 18 from our empirical analyses. All the results remain similar even if we include these crimes in our sample.

[6] Informal discussions with Swedish leading head-hunting firms suggest that the selection process of board members is quicker, less formal and less costly than that of senior corporate executives. Usually, the names of potential board member candidates are put forward by the firm's nomination committee and the head-hunters rarely examine these candidates in depth. The head-hunters pointed out that an examination of criminal records is not part of the selection process, whereas criminal records and other past events play a crucial role in the selection of senior corporate executives.

[7] We searched the media and found four cases where board members' crime convictions became publicly known. In each case the board member had to resign his position. This anecdotal evidence suggests that being convicted of a crime is considered a negative personal attribute, and that this was not known to the appointing firm.

influence of alcohol may not be considered serious enough by the legislators or nomination committee to exclude a person from serving as a board member. However, the criminology literature reviewed in Section 2 suggests that criminal convictions, regardless of the nature or seriousness of the crime, could be indicative of an individual's negative behavioral attributes, such as over-confidence, hedonism, propensity to manipulate others, and sensation seeking. Furthermore, appointing individuals with these behavioral attributes to boards is likely to undermine the board's ability to monitor and advise management. If the firm's nomination committee and shareholders are unaware of the negative behavioral aspects of convicted candidates, these candidates may be appointed to the board.

4. Data and Variables

4.1. Data sources

Our sample includes all companies listed on the Swedish stock market for the period 1999-2007 and monitored by Finansinspektionen (The Swedish Financial Supervisory Authority), i.e. the Swedish securities regulator. Table 1 includes information on our sample and on the effects of data restriction on the number of firms. Most of the analysis in this study is conducted using 382 firms, but analyses involving operating cash flows and accruals are conducted using only 334 industrial firms.

(Table 1 about here)

The identities of board members in all listed Swedish companies were obtained from *Finansinspektionen*. We measure tendency for fraudulent behavior by using data from three different sources: criminal convictions, entries in the public non-payment records and involvement in multiple corporate bankruptcies. While having been convicted of a crime is clearly an indication of fraudulent behavior, entries in the non-payment records or being a board member of several other bankrupt firms could result from reasons other than non-

ethical or fraudulent behavior. Nevertheless, they have implications for the board member's credibility as a participant in a main corporate governance mechanism. For instance, a board member with serious personal financial problems resulting in entries in the non-payment record may not be considered a credible and responsible source of good judgment in monitoring and advising management. Similarly, being a board member of several other bankrupt firms could be an indication of a board member's poor judgment or lack of advisory skills. Despite their potential limitations, these three items taken together should reflect a board member's potential fraudulent behavior. We therefore consider these three events – criminal convictions, entries in the non-payment record and being a board member of bankrupt firms – as indications of fraudulent behavior.

Data on board members' criminal convictions are taken from *Brå* (The Swedish National Council for Crime Prevention), a council within the Swedish judicial system formed by the Swedish government.[8] Our dataset from *Brå* contains information on criminal activity for all Swedish citizens as of 1974. More specifically, it contains information about individuals who have been found guilty by a court of law or received summary punishments by prosecutors.[9] The information on which the register is based is collected from all Swedish courts and prosecution authorities. For each board member registered, this dataset includes details of the crime and the punishment (the length of unconditional prison sentences, suspended sentences and monetary fines) and the details of the crime (for each crime an exact reference to the law or laws violated is given). The data base does not, however, contain information on minor offences like speeding, parking and violations of local bylaws

[8] The purpose of *Brå* (www.bra.se) is to reduce crime and improve levels of safety in Sweden by producing data and disseminating knowledge on crime and crime prevention work. The Council also produces Sweden's official crime statistics, evaluates reforms, conducts research and provides support to local crime prevention agencies.

[9] A criminal investigation does not always lead to a prosecution and trial, even though there is sufficient evidence to prove that the crime has indeed been committed. If the suspect confesses to the crime and it is clear what the punishment will be, the prosecutor may pronounce a so-called order of summary punishment (Source: Swedish Prosecution Authority, www.aklagare.se).

for which the punishment is an on-the-spot fine. Hence, the database does not contain information about negligible crimes committed. We deleted all crimes committed by board members before their 18th birthdays, as crimes committed prior to age 18 may not be good predictors of overall criminal behavior. Appendix 1 shows the list of the most commonly violated laws. The list includes serious crimes against the Penal Code such as theft and crimes against life and health. As described above, speeding, parking and similar minor violations of traffic laws are not included in our sample.

Data on board members' involvement in bankruptcy and records of nonpayment are from UC, Sweden's leading business and credit information agency. According to Swedish law (SFS 2005:559), UC is not allowed to store information on individuals' involvement in bankruptcy for more than five years. Since data on bankruptcy were collected at the beginning of 2009, we managed to obtain bankruptcy involvement data going back to 31 December 2004. Information on non-payment is stored for only three years (SFS 1973:1173). Our data on non-payment was collected on 30 October 2008, so the first observation is from 30 October 2005.

Finally, data on board members' stockholdings were taken from Euroclear Sweden, which maintains an electronic database on the ownership of all Swedish stocks. For each investor, the dataset includes ownership records of all stocks owned at the end of July and December of each year (as data are recorded at six-month intervals). Data on board members' other wealth (real estate, mutual funds, bank holdings and investments in debt securities) were obtained from the Swedish tax authorities and are reported on an annual basis. Finally, accounting and market data for Swedish listed firms were obtained from Thomson's Datastream. If the firm was missing from Thomson's Datastream, we retrieved data from Bureau van Dijk global database, accessed via Wharton Research Data Services (WRDS), and the Six Trust database.

4.2. Variable definitions

To capture the effect of fraudulent behavior on the board of directors we construct three variables based on the proportion of fraudulent board members. First, $CRIME_{it}$ is the ratio of board members convicted of crimes to the total number of board members for firm *i* at fiscal year-end *t*. Second, $PAYMENT_{it}$ is the number of board members having a non-payment record divided by the total number of board members for firm *i* at fiscal year-end *t*. Third, $BANKRUPTCY_{it}$ is the number of firm *i*'s board members who have served on at least three boards of other bankrupt firms divided by firm *i*'s total number of board members at fiscal year-end *t*. Finally, $FRAUD_{it}$ is the sum of the variables $CRIME_{it}$, $PAYMENT_{it}$ and $BANKRUPTCY_{it}$. This variable is a composite measure containing all the information regarding a board member's potential fraudulent behavior.[10]

We include board members' criminal convictions and non-payment records in $FRAUD_{it}$ because both measures clearly reflect a person's tendency for unethical or antisocial behavior. In particular, it is well established in the criminology literature that one of the best predictor of future criminal acts is a history of criminal behavior (Gendreau *et al*. 1996). Moreover, Shu *et al*. (2009) show that people perpetrating unethical behavior tend to persist in this, justifying it through moral disengagement. These individuals also exhibit motivated forgetting of information that might otherwise limit their dishonesty.

We include board members' involvement in multiple bankruptcies in $FRAUD_{it}$ because bankruptcies are often caused by excessive risk-taking, which is more typical for individuals with fraudulent behavior, as discussed in Section 2. Also, while certain board members specialize in "turning around" distressed firms, serving on multiple boards of companies that

[10] Some boards include members who have been convicted of crimes, have an entry in the non-payment record and have been involved in a bankruptcy. Consequently, $FRAUD_{it}$ may be greater than one. In these cases, we have truncated the value of the variable $FRAUD_{it}$ to one. We also estimate all our models without this truncation and also by deleting these observations with similar results.

go bankrupt could raise serious doubts about an individual's ability to monitor and advise management. We nevertheless recognize the problematic nature of bankruptcy history as an indicator of fraudulent behavior and conduct robustness checks by excluding board members' bankruptcy involvement from $FRAUD_{it}$. These results are similar to those reported here.

We also include ten corporate governance variables frequently used in the literature (each variable is measured for firm *i* at fiscal year *t*). $MALE_{it}$ is the ratio of male board members to total board members; $BUSY_{it}$ is the number of board members serving on three or more boards of listed Swedish firms divided by total board members; $CEODUAL_{it}$ is a dummy variable that obtains the value of "1" if the CEO is also a member of the board, and otherwise "0"; $BOARDSIZE_{it}$ is the logarithm of the total number of board members; $MAINOWNER_{it}$ is a dummy variable that obtains the value of "1" if there is at least one controlling shareholder (that is owns 10% or more of the firm's equity) in the firm, and otherwise "0"; $EMPLOYEE_{it}$ is the proportion of employee representatives on the board; AGE_{it} is the average age of the board members; $LISTING_{it}$ is a dummy variable that obtains the value of "1" if the firm is also listed in the United States (NYSE, NASDAQ or AMEX), and otherwise "0"; $INSIDER_{it}$ denotes the proportion of board members who hold other positions in the firm in addition to being on the board (non-independent board members). Finally, we use data on board members' total personal wealth to compute the proportion of total personal wealth invested in the firm. Specifically, we define $OWNER_{it}$ as the average market value of the board members' holdings in firm *i* at year *t* divided by the average value of their total wealth at year *t* (the market value of holdings in all insider and outsider stocks and the value of other wealth).

Firm performance is measured using the following variables: (i) net income divided by market value of equity at the beginning of the year (EP_{it}); (ii) operating cash flows (CF_{it}),

measured as net income minus total accruals divided by average total assets for firm *i* at fiscal year-end *t*; (iii) return on assets (ROA_{it}), measured as firm *i*'s earnings before interest and taxes divided by lagged total asset at fiscal year-end *t*; and (iv) return on equity (ROE_{it}), measured as firm *i*'s net income divided by lagged shareholders' equity at fiscal year-end *t.* These measures yield qualitatively similar results, and we tabulate only those results for EP_{it} and CF_{it}. Total accruals ($TOTACCRUALS_{it}$) needed to calculate CF_{it} are measured as:

$$TOTACCRUALS_{it} = \Delta Inventory_{it} + \Delta \mathrm{Re}\, cievables_{it} + \Delta Other\ current\ assets_{it} - \Delta Payables_{it} - \Delta Other\ current\ liabilities_{it} - Depreciation_{it}.$$

We also use stock market returns in our empirical analysis. For each firm/year we compute annual stock returns from January to December. To adjust for market movements, we subtract the return on the Swedish market portfolio to obtain annual market-adjusted returns for each firm/year, denoted as $MRET_{it}$.

4.3. Descriptive Statistics

Table 2, Panel A, presents summary statistics on board members who have been convicted of crimes. As Table 2 shows, the proportion of convicted board members in Swedish listed companies is surprisingly high. From a total of 4,046 board members in our sample, 819 (20.2%) had been convicted and sentenced to pay fines, while 82 (2.0%) were sentenced to unconditional and conditional prison terms.[11] Panel A, Table 2 also shows that the numbers of convictions are greater than the numbers of convicted board members. For comparison, nearly 24% of the population has been convicted of crimes of all sorts (Svensson 2000).

[11] The number of board members who have been sentenced either to pay a fine or to unconditional or conditional prison sentences is slightly smaller than the sum of these numbers reported in Table 2. This difference is also due to the fact that some board members have been convicted of more than one crime, and received different sentences (fine vs. imprisonment) for different crimes.

The results in Panel A also show that about 95% of monetary fines and 99% of prison sentences are handed down to male board members, while only 84% of board members in our sample are males. These results suggest that appointing male board members is more likely to increase the proportion of fraudulent board members. Earlier studies suggest that greater proportion of female board members raises the level of corporate governance because more balanced gender distribution increases the diversity of board opinion. Our results suggest that another reason for these prior findings could be related to less fraudulent behavior and consequently lower agency costs, rather than diversity in opinion. Our findings on fraudulent behavior being more common for males than females are consistent with those reported in studies on individuals' overall criminal behavior of individuals (Blicke *et al*. 2006).

We also collect data on board members with entries in a non-payment record and board members who served on the boards of at least three other bankrupt companies. Having an entry on the non-payment record indicates that a board member has failed to meet his/her financial obligations. Regarding seats on the boards of other bankrupt companies, we consider only board memberships of private (non-listed) companies during the sample period. We identify 101 cases of board members with an entry in the non-payment record (92 males and 9 females), and 68 cases (67 makes and 1 female) of board members serving on the board of at least three other bankrupt companies. As in the case of criminal convictions, male board members are more likely to fail to meet their financial obligations and serve on other bankrupt companies than female board members.

Panel B of Table 2 reports summary statistics on the fraud variables. The mean (median) proportion of convicted board members ($CRIME_{it}$) is 26.2% (22.2%). This variable ranges from 0 to 1, indicating that some sample firms have no convicted board members, while some have appointed only convicted members. The mean (median) proportion of

fraudulent board members ($FRAUD_{it}$), represented here by the sum of $CRIME_{it}$, $BANKRUPTCY_{it}$ and $PAYMENT_{it}$ is 32.0% (28.6%).[12] This variable ranges from zero to one with a reasonable degree of dispersion, suggesting that having fraudulent, even convicted, board members is pervasive among Swedish listed firms. We also present summary statistics for a sub-sample of non-financial firms (1,767 observations), financial firms (250 observations, and Swedish firms listed in the US (59 observations). The proportion of fraudulent board members is higher in financial institutions than in non-financial firms (35.3% versus 31.5%, significant at the 0.05 level). Also, Swedish firms listed in the US exhibit a proportion of fraudulent board members similar to that in the entire sample.

(Table 2 about here)

Earlier studies argue that the general level of corporate governance has improved following recent accounting and other corporate scandals (Linck *et al*. 2008, and Burkes 2009).[13] These scandals prompted actions by regulators to tighten the Swedish corporate governance code and corporations to adopt voluntary measures designed to improve their corporate governance.

This behavior raises the question of whether the proportion of fraudulent board members has decreased over time. If firms and their equity holders have become more cautious when appointing board members, the proportion of fraudulent board members may have decreased. Such a change would, however, require that the nominees for boards have voluntarily begun to disclose their criminal records, because the legislation in Sweden does not require them to disclose such information.

Figure 1 shows the proportion of firms having at least one convicted board member each year. We cannot identify any systematic decrease in the proportion of convicted board

[12] As described earlier, some board members have been convicted of crimes, have an entry in the non-payment record and have been involved in a bankruptcy. Therefore, the sum of $CRIME_{it}$, $BANKRUPTCY_{it}$ and $PAYMENT_{it}$ is slightly greater than $FRAUD_{it}$.

[13] Skandia and Trustor are two Swedish examples of financial scandals during the 1990s.

members, suggesting that tightened corporate governance practices have not reduced the likelihood of fraudulent board members being appointed. Most likely this result indicates that firms are perhaps unaware of the convictions of nominated board members. Alternatively, firms may be aware of the fraudulent background of their board member candidates, but they have chosen to appoint these individuals either to avoid stringent monitoring or due to their other skills. Although the latter explanation is implausible as it downplays the shareholders' role in appointing board members, both explanations lead to weak monitoring of the firm management.

(Figure 1 about here)

Appointing fraudulent board members is pervasive across different types of companies. Table 3 presents average proportions of fraudulent board members ($FRAUD_{it}$) in double-sorted portfolios based on the size ($SIZE_{it}$), financial leverage ($LEVERAGE_{it}$) and growth opportunities (market-to-book ratios, PB_{it}). These results show that the proportion of fraudulent board members is similar across firms with different levels of financial leverage and market-to-book ratios. Only firm size emerges as a variable that is correlated with the proportion of fraudulent board members, i.e. small firms tend to have larger proportions of fraudulent board members. Hence, we control for size in our empirical analysis.

(Table 3 about here)

Table 4 reports summary statistics on the variables used in the empirical analyses. As Panel A shows, the mean proportion of male board members is 86.8% and about 17% of board members have three or more other board memberships. Forty percent of CEOs are also members of the board, while average board size is about eight members. About 15% of board members are employee representatives and the average age of the board is 53 years. Finally, 14% of board members' total wealth is invested in the stock of their firm.

Panel B of Table 4 presents summary statistics for several firm-specific performance and other measures.[14] Over the sample period, the firms in our sample generated, on average, negative return on assets (ROA_{it}). However, the median is 3.7%, suggesting that the distribution of ROA_{it} is skewed to the left. Also, mean return on equity (*ROE*) is negative, but the median is 10.1% over the sample period. Similarly, the median of earnings divided by beginning of period share price (EP_{it}) is 0.042, suggesting a median P/E ratio of 24. Operating cash flows are on average 2.2% of total assets (median = 6.9%).

On average, 19% of total assets are financed by interest-bearing debt, as reflected by the mean of $LEVERAGE_{it}$. The absolute value of total accruals is, on average, 8.1% of total assets. The average size of our sample firm is one billion Swedish crowns (about $150 million), smaller than a typical listed company in the US. Finally, market-adjusted stock return is on average 3% over the sample period, but the median is -2.3%.

(Table 4 about here)

Table 5 presents Pearson's (upper diagonal) and Spearman's (lower diagonal) correlations coefficients between our main variables including those between the variables measuring the proportion of fraudulent board members. The results show that the variables measuring the fraction of fraudulent board members are positively correlated, suggesting that firms that appoint convicted board members are more likely to appoint members with non-payment entries or members who have been involved in bankruptcies.

Moreover, the variables that measure the share of fraudulent board members ($FRAUD_{it}$, $CRIME_{it}$, $BANKRUPTCY_{it}$, and $PAYMENT_{it}$) are significantly negatively correlated with firm profitability (EP_{it}). This finding supports the view that board members' personal fraudulent behavior is associated with a lower level of corporate governance and consequently lower levels of performance. In addition, all variables measuring the share of

[14] Distributions of EP_{it}, CF_{it} and $MRET_{it}$ are truncated by deleting 1% of the observations on each side.

fraudulent board members are positively correlated with the proportion of male board members (Erhardt and Werbel 2003) and negatively correlated with employee representatives and firm size.

(Table 5 about here)

5. Empirical results

5.1. Determinants of the proportion of fraudulent board members

To identify the determinants of the proportion of fraudulent board members ($FRAUD_{it}$) we estimate the following OLS regression model:

$$FRAUD_{it} = \alpha_0 + \sum_{s=1998}^{2007} \alpha_s YEAR_s + \sum_{i=1}^{I} \alpha_i FIRM_i + \beta_1 MALE_{it} + \beta_2 CEODUAL_{it} + \beta_3 MAINOWNER_{it} + \beta_4 EMPLOYEE_{it} + \beta_5 AGE_{it} + \beta_6 LISTING_{it} + \beta_7 BUSY_{it} + \beta_8 INSIDER_{it} + \beta_9 LEVERAGE_{it} + \beta_{10} SIZE_{it} + \varepsilon_{it} \quad (1)$$

We include in Equation (1) variables that are expected to affect the likelihood of appointing fraudulent board members. Specifically, we include $MALE_{it}$ (the proportion of male board members) in the model because prior studies have shown that males are more likely than females to be involved in frauds (e.g. Zahra *et al*., 2005; Blickle *et al.*, 2006). We also include variables that capture the quality of the board and its independence. These variables include $CEODUAL_{it}$ (a dummy variable that obtains the value of "1" if the firm's CEO is also a member of the board, and otherwise "0"); $MAINOWNER_{it}$ (a dummy variable that obtains the value of "1" if there is at least one shareholder that owns 10% or more of the firm's equity, and otherwise "0"); $EMPLOYEE_{it}$ (proportion of employee representatives on the board); and AGE_{it} (board members average age). In addition, we include $LISTING_{it}$ (a dummy variable that obtains the value of "1" if the firm is also listed in the United States,

and otherwise "0") as a control for business complexity and regulatory environment. The model also includes $BUSY_{it}$ (the proportion of board members with three or more board memberships in other non-listed Swedish firms) because "professional" board members serving on several other boards are more likely to be screened by other firms as a part of the processes of selecting board members. $INSIDER_{it}$ (the proportion of board members who hold other positions in the firm) is included in the model because individuals who hold other positions in the firm are probably evaluated more thoroughly before being appointed to their positions. Hence, these board members are less likely to have been involved in fraudulent behavior. $LEVERAGE_{it}$ (interest-bearing debt divided by total assets) is included in the model because firms with more leverage are likely to be under stricter control by lenders, which may reduce the likelihood of fraudulent board members being appointed. On the other hand, firms with a larger proportion of fraudulent board members are more likely to engage in risky projects and borrow more. The sign of the coefficient on $LEVERAGE_{it}$ thus depends largely on the direction of causality. Finally, $SIZE_{it}$ (the natural logarithm of total assets) is included in the model because larger firms are more visible to the public and corporate governance decisions, such as appointing board members, may be under greater public scrutiny, hence reducing the likelihood of fraudulent board members being appointed.

Equation (1) includes year and firm fixed-effects to control for potential omitted variables.[15] For comparison, we also report results with industry instead of firm fixed-effects. Moreover, we report results using average coefficients and corresponding *t*-statistics from cross-sectional annual regressions as in Fama and MacBeth (1973). All *t*-values in the pooled regression are based on heteroskedasticity-adjusted standard errors. Also, we take into account firm-level clustering in standard errors as in Petersen (2009). Specifically, we

[15] We also estimated Equation (1) using Maximum Likelihood estimation method with random firm-specific intercepts (β_{0i}) rather than using firm-specific dummy variables. The results from these regressions were materially similar to those reported in the paper.

allow both a firm and time effect in the panel data and address the time effect parametrically by including yearly dummies and then estimate standard errors clustered on the firm dimension.[16]

The results of estimating Equation (1), which are reported in Table 6, show that the only variable that systematically explains the proportion of fraudulent board members ($FRAUD_{it}$) is the proportion of male board members ($MALE_{it}$). This result supports earlier findings on males being more likely to be involved in fraudulent activities (e.g., Zahra *et al*., 2005; Blickle *et al.*, 2006).

The coefficients on $MAINOWNER_{it}$ (the existence of a controlling shareholder) are positive, suggesting that firms with controlling shareholders are more likely to appoint fraudulent board members. The coefficients on $EMPLOYEE_{it}$ (proportion of employee representatives) are negative, suggesting that firms with more employee involvement are less likely to appoint fraudulent board members. Firms whose board members are, on average, older (AGE_{it}) are less likely to appoint fraudulent board members. The proportion of board members who hold other board memberships ($BUSY_{it}$) has a negative rather than positive effect on the proportion of fraudulent board members. However, these results do not hold when firm fixed-effects are included in the model.

Focusing on the Fama-MacBeth model, we find a positive coefficient on $LISTING_{it}$, suggesting that Swedish companies listed in the US are more likely to appoint fraudulent board members. We also find that the degree of leverage is positively associated with the proportion of fraudulent board members. However, these results are obtained only in the Fama-MacBeth analysis, perhaps because these variables are stable over time.

(Table 6 about here)

[16] We apply this methodology in all pooled regressions throughout the paper.

5.2. Fraudulent board members and the performance of the firm

We expect profits to increase with the effectiveness of the board in monitoring and advising the firm. As fraudulent board members are expected to be less engaged in monitoring and advising the firm, and promote unwarranted risk-taking, we expect a negative relation between the proportion of fraudulent board members and the profitability of the firm. Initially, we divide the sample into quartile portfolios according to the proportion of fraudulent board members ($FRAUD_{it}$). Table 7 presents the results for equal-sized portfolios (Panel A) and variable-sized portfolios (Panel B). As shown in Panel A, earnings deflated by lagged share price (EP_{it}) decline as we move from a quartile portfolio with fewer fraudulent members to a quartile portfolio with more fraudulent members (the difference between the high and low portfolios is significant at the 0.01 level). Similarly, operating cash flows (CF_{it}) decrease with the proportion of fraudulent board members (the difference between the high and low portfolios is significant at the 0.01 level). These results, which are corroborated by analyzing variable-sized portfolios (Panel B), are consistent with the argument that boards with higher proportions of fraudulent board members are less effective in monitoring the firm, resulting in lower earnings and cash flows.

Companies with larger proportions of fraudulent board members tend to be smaller, suggesting that these firms may be less visible to regulators and to the shareholders who appoint board members. Also, the absolute value of total accruals is significantly higher for companies with larger proportions of fraudulent board members, consistent with the argument that these companies produce lower quality financial statements. Similar results appear in Panel B, when, instead of equal-sized portfolios, we use variable-sized portfolios.

We also examined the volatility of income and operating cash flows and found them to increase with the proportion of fraudulent board members. This result is consistent with the argument that fraudulent behavior is associated with taking unwarranted risks (sensation

seeking). In particular, companies with more fraudulent board members take risks without being properly compensated in terms of expected earnings and cash flows. Finally, we could not identify an association between the proportion of fraudulent board members and stock returns.

(Table 7 about here)

Next, we estimate the relation between the proportion of fraudulent board members and corporate profitability measures after controlling for other corporate governance variables. We expect a negative relation between the proportion of fraudulent board members and the profitability of the firm. We also expect that the governance problem arising from appointing fraudulent board members may be mitigated if these board members collectively own the equity of the firm. In such a case, they have an incentive to exert more effort in monitoring and advising management. We therefore expect that the classical solution to the principal-agent problem, i.e. the alignment of the agent's interests with those of the principal through equity ownership (Jensen 1993), applies here. The empirical research provides some evidence that board members with significant equity ownership in the firm are indeed more effective monitors. In particular, Bhagat and Black (2002) report that independent board members who hold significant stock positions add value to the firm, while other independent board members do not. In addition, Bhagat and Bolton (2008) find that the stock ownership of board members increases the firm's operating performance. Therefore, we expect that although fraudulent board members generally have weaker incentives to monitor the firm, their monitoring incentives increase with their economic stake in the firm. We test these predictions by estimating the following OLS model:

$$PROF_{it} = \alpha_0 + \sum_{s=1998}^{2007} \alpha_s YEAR_s + \sum_{i=1}^{I} \alpha_i FIRM_i + \beta_1 FRAUD_{it} + \beta_2 FRAUD_{it} \times OWNER_{it} + \beta_3 OWNER_{it} + \beta_4 MALE_{it} + \beta_5 BUSY_{it} + \beta_6 CEODUAL_{it} + \beta_7 BOARDSIZE_{it} + \beta_8 MAINOWNER_{it} + \beta_9 EMPLOYEE_{it} + \beta_{10} AGE_{it} + \beta_{11} LISTING_{it} + \beta_{12} INSIDER_{it} + \beta_{13} LEVERAGE_{it} + \beta_{14} SIZE_{it} + \varepsilon_{it} \quad (2)$$

Dependent variables measuring firm profitability in Equation (2) are earnings per share divided by lagged share price (EP_{it}), and operating cash flows (CF_{it}). The main explanatory variables in Equation (2) are $FRAUD_{it}$ (the proportion of fraudulent board members) and $FRAUD_{it} \times OWNER_{it}$ (the interaction variable between the proportion of fraudulent board members and their ownership interest in the firm).[17] All other variables are as described in Equation (1). Heteroskedasticity-adjusted standard errors are used to calculate *t*-values, and the firm-level clustering in standard errors is taken into account as described in Equation (1) and in Petersen (2009).

We include in Equation (2) the same control variables as in Equation (1), because these variables are correlated with $FRAUD_{it}$ and thus could correct potential measurement error in this variable. In addition, several of these variables have been found to affect firm performance. $MALE_{it}$ is included in the equation because prior studies find that gender diversity affects firm performance, although different studies report different signs for the effect. For instance, Erhardt and Werbel (2003) find a positive relationship between gender diversity and performance, whereas Adams and Ferreira (2009) find a negative effect. $BUSY_{it}$ is included in the model because earlier studies find that firms in which a majority of outside board members hold several directorships in other firms exhibit weaker profitability (Fich and Shivdasani 2006). $CEODUAL_{it}$, $BOARDSIZE_{it}$, AGE_{it} and $INSIDER_{it}$ are included

[17] We also estimate Equation (2) by replacing $FRAUD_{it}$ with a dummy variable taking a value of one, if fraudulent board members have a majority in the board (i.e. $FRAUD > 0.5$), and zero otherwise. Results from these regressions are similar and statistically more significant than those based on the continuous $FRAUD_{it}$ variable.

because they reflect the quality and degree of board independence, which may be associated with firm performance (e.g. Drymiotes 2007; Coles *et al*. 2008, Larcker *et al*. 2007). $EMPLOYEE_{it}$ is included in the model because Swedish firms are less likely to appoint fraudulent board members, as shown earlier. $LISTING_{it}$ is included in the model because foreign listing could result in higher levels of corporate governance. Equation (2) also controls for leverage and firm size, as these firm characteristics may be related to performance. Finally, we include in Equation (2) year and firm fixed-effects to control for potential omitted variables.[18]

Table 8 reports the results of estimating Equation (2) with and without fixed-effects. The results show that the coefficients on $FRAUD_{it}$, proportion of fraudulent board members, are negative, as expected, and significantly different from zero at the 0.10 level or better. The results in Table 8 suggest that firms with relatively more fraudulent board members are less profitable. These results support the view that the corporate governance mechanisms are weaker in firms with relatively more fraudulent members, leading to less effective boards.

The coefficients on the interaction variable $FRAUD_{it} \times OWNER_{it}$ are positive, as expected, and significant at the 0.10 level or better in three of the four models reported. These results suggest that while the proportion of fraudulent board members is negatively related to firm profitability, board members' personal ownership interest in the firm mitigates this effect. These results support the view that the governance problem arising from board members' fraudulent behavior is mitigated if board members own a major stake in the firm's equity. In addition, these results are consistent with those reported by Bhagat and Black (2002) and Bhagat and Bolton (2008) who report that the board members' stock ownership increases firm performance.

[18] As in Equation (1), we estimate Equation (2) using Maximum Likelihood estimation method with random firm-specific intercepts (β_{0i}) instead of firm-specific dummy variables. Results remain materially unchanged.

Regarding the other explanatory variables, we find positive coefficients on $EMPLOYEE_{it}$ (significant at the 0.10 level or better in three of the four models) suggesting that the proportion of employee representatives on the board has a positive performance on performance. We also find that leverage is negatively associated with profitability, as expected, and that firm size is positively associated with profitability.

(Table 8 about here)

The results in Table 8 may be driven by serial correlation in the independent variables. We therefore estimate Equation (2) using one observation per firm.[19] In particular, for each variable, we compute the mean variable over the entire sample period and include these means in Equation (2). The results (not tabulated) confirm the negative association between firm performance and the proportion of fraudulent board members. Specifically, the coefficients on $FRAUD_i$ are negative (-0.14, and -0.14) and significant at the 0.01 level. These results support the view that appointing more fraudulent board members impairs firm performance.

5.3. Instrumental Variable Estimations

The results in Table 8 suggest that corporate performance is negatively associated with the proportion of fraudulent board members. However, these results are consistent with two alternative directions of causality: (i) appointing fraudulent board members causes profits to decline; or (ii) companies with weaker performance tend to appoint more fraudulent board members. As discussed in Section 2.3, both effects indicate a weaker level of corporate governance. Nevertheless, we next explore the direction of causality in detail. Specifically, we base our inference on a vector autoregressive system – VAR(1) – with serially

[19] We also estimate Equation (2) using the Fama-MacBeth method. The coefficients on $FRAUD_{ij}$ are negative and significant at the 0.01 level, as in Table 8. The coefficient on the interaction variable $FRAUD_{ij} \times OWNER_{ij}$ is insignificant, likely due to lack of power resulting from having 9 annual observations.

independent innovations, that takes account of both directions of the relationship. Specifically, we use instrumental variables and the GMM method, which has become popular in accounting and finance research in analyzing dynamic panel data like ours (Barton and Waymire 2004, and Ozkan 2001). As described the econometrics literature (for instance, Greene 2008), this methodology takes into account the reverse causality in endogenous variables, the potential effect of omitted variables, and the possibility of heteroskedastic error terms.

We estimate Equation (3) using GMM. The derivation of Equation (3) is explained in Appendix 2.

$$PROF_{it} = \alpha_0 + \alpha_{1t} + \alpha_{2i} + \gamma_1 FRAUD^*_{it} + \phi PROF_{it-1} + \beta_1 MALE_{it} + \beta_2 BUSY_{it} + \beta_3 CEODUAL_{it} + \beta_4 BOARDSIZE_{it} + \beta_5 MAINOWNER_{it} + \beta_6 EMPLOYEE_{it} + \beta_7 AGE_{it} + \beta_8 LISTING_{it} + \beta_9 INSIDER_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} SIZE_{it} + \varepsilon_{it} \quad (3)$$

In this analysis, $FRAUD^*_{it}$ is a dummy variable, which obtains the value of "1" if $FRAUD_{it}$ is above 0.5, and otherwise zero. This definition is motivated by the potential non-linearity of the effects of $FRAUD_{it}$ (fraudulent members dominate the board). All control variables are as described earlier.[20] The inclusion of the lagged firm performance ($PROF_{it-1}$) in Equation (3) is motivated by the VAR structure. At the same time, it takes into account the potential autocorrelation in firm performance, allowing past values of $FRAUD_{it}$ to affect $PROF_{it}$. Finally, α_{1t} and α_{2i} are random year and firm intercepts, respectively.

A key element in this analysis is to identify instruments for the endogenous variables ($FRAUD_{it}$ and $PROF_{it}$) in Equation (3). One approach is to identify additional observable variables and designate them as instruments. However, prior studies do not suggest any useful variables. Alternatively, it is possible to rely on standard econometric literature

[20] We also estimate Equation (3) with the interaction term $OWNER_{it} \times FRAUD_{it}$ but it was not significantly related to firm performance.

(Baltagi 2002, and Greene 2008) and use lagged differences of the endogenous variables as instruments.

We use five instruments in estimating Equation (3). The first one is lagged change in profitability ($\Delta PROF_{i,t-1}$). As explained in Appendix 2, we use a categorized version of $\Delta FRAUD_{i,t-1}$ as instruments. In particular, we construct the following four dummy variables.[21]

$$D1_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} < -0.04 \\ 0 \text{ otherwise} \end{cases}$$

$$D2_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} < -0.02 \\ 0 \text{ otherwise} \end{cases}$$

$$D3_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} > 0.02 \\ 0 \text{ otherwise} \end{cases}$$

$$D4_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} > 0.04 \\ 0 \text{ otherwise.} \end{cases}$$

We estimate Equation (3) using the GMM method with $\Delta PROF_{i,t-1}$, $D1_{it}$, $D2_{it}$, $D3_{it}$ and $D4_{it}$ as instruments. The GMM method is used because it uses the instrumental information in an efficient manner. Second, GMM yields consistent estimates and robust inference even if some endogenous variables are potentially omitted, provided that the larger system would still be of the VAR(1) type. Third, by using GMM we recognize the possibility of heteroskedastic error terms and avoid making specific assumptions regarding the shape of the distribution of the firm-specific intercepts. Finally, we use the Newey-West estimator, which is robust to serially correlated errors of up to two lags (see Cameron and Trivedi 2005, p. 175, and Greene 2008, p. 643).

[21] All transformations of $\Delta FRAUD_{i,t-1}$ are also valid instruments, because $\Delta FRAUD_{i,t-1}$ itself is a valid instrument (see Appendix 2). Regarding the dummy variables $D1_{it}…D4_{it}$, we use cut-off values of -0.02, +0.02, -0.04 and 0.04 because close-to-zero changes in the proportion of fraudulent board members are unlikely to have economically significant effects. We also estimate Equation (2) using only two dummy variables $D1_{it}$ and $D2_{it}$, and the results were similar to those reported in the paper.

Table 9 reports the results of estimating Equation (3). These results confirm our results on the negative effect of the proportion of fraudulent board members on the firm performance.[22] In particular, when the measure of performance is earnings deflated by lagged share price, the coefficient on *FRAUD** is -0.30 (significant at the 0.01 level). When the measure of performance is operating cash flows, the coefficient on FRAUD* is also negative, as expected, but significant at the 0.10 level.

Regarding the control variables, we find positive coefficients on $MALE_{it}$ (the proportion of male board members) suggesting that the proportion of male board members is positively associated with earnings and cash flows. Also, the coefficients on $MAINOWNER_{it}$ (the existence of controlling shareholder) suggesting the companies with controlling shareholders report, on average, higher earnings and cash flows. Furthermore, the coefficients on leverage are negative, as expected, and significant at the 0.10 level or better. The coefficients on the remaining variables are either not significant or inconsistent across measures of performance.

(Table 9 about here)

5.4. Effect of $FRAUD_{it}$ on the Value-Relevance and Volatility of Earnings and Cash Flows

Next, we investigate whether the relevance of earnings in explaining annual stock returns is affected by the proportion of fraudulent board members. Earlier studies on the relation between earnings management and the level of corporate governance generally conclude that weak governance leads to opportunistic accounting discretion (e.g. Guidry *et*

[22] Because we use five instruments, while the number of parameters attached to endogenous variables is only two, we can test the feasibility of the three extra instruments using Hansen's test (see e.g. Cameron and Trivedi, pp. 181-182). The resulting test statistics are close to 3.00, small compared with (asymptotic) χ^2_3 -distribution. This confirms that the extra instruments are uncorrelated with the combined disturbance terms $\alpha_i + \varepsilon_{it}$.

al. 1999; Klein 2002). For instance, Klein (2002) finds that board independence is negatively related to the extent of earnings management among US firms. Similarly, Bowen *et al*. (2008) find a positive association between poor governance quality and accounting discretion, but they also report evidence that accounting discretion due to poor governance is positively related to future firm performance.

While prior studies have explored the relationship between governance quality and earnings management from various angles, we take a straightforward approach by looking at the effect of governance quality on the value relevance of reported earnings.[23] If the board of directors fails to monitor management, the firm is more likely to engage in earnings management activities that reduce the quality of earnings, which in turn is reflected in the reduction in the value relevance of earnings. In addition, firms influenced by fraudulent board members are more likely to engage in over-risky projects, which could also reduce the value-relevance of earnings (for example, due to losses). To examine this question we use a return-earnings model similar to that used in Easton and Harris (1991):

$$MRET_{it} = \gamma_{0t} + \gamma_{1t} EP_{it} + \gamma_{2t} \Delta EP_{it} + \upsilon_{it} \qquad (4)$$

The dependent variable ($MRET_{it}$) is annual market adjusted stock returns from January to December (firm's annual return minus annual market return in Sweden). Independent variables are earnings levels divided by beginning of period share price (EP_{it}) and earnings changes divided by beginning of period share price (ΔEP_{it}). Both variables are expected to have positive coefficients.

[23] In Section 5.5, we analyze the effect of having fraudulent board members on earnings management in more details.

To address our research question, we allow the coefficients on earnings levels and earnings changes to vary by the proportion of fraudulent board members ($FRAUD_{it}$). We also add firm size (log of total assets) and earnings volatility to the model and allow earnings levels and changes to interact with these variables. Finally, we add year and firm fixed effects to the regression obtaining the following regression equation:

$$\begin{aligned} RET_{it} = {} & \alpha_0 + \sum_{s=1998}^{2007} \alpha_s YEAR_s + \sum_{i=1}^{I} \alpha_i FIRM_i + \delta_1 FRAUD_{it} + \delta_2 EP_{it} + \delta_3 EP_{it} \times FRAUD_{it} \\ & + \delta_4 \Delta EP_{it} + \delta_5 \Delta EP_{it} \times FRAUD_{it} + \delta_6 SIZE_{it} + \delta_7 SIZE_{it} \times EP_{it} + \delta_8 SIZE_{it} \times \Delta EP_{it} + \\ & \delta_9 LEVERAGE_{it} + \delta_{10} LEVERAGE_{it} \times EP_{it} + \delta_{11} LEVERAGE_{it} \times \Delta EP_{it} + \\ & \delta_{12} VOLATILITY_{it} + \delta_{13} VOLATILITY_{it} \times EP_{it} + \delta_{14} VOLATILITY_{it} \times \Delta EP_{it} + \upsilon_{it}. \end{aligned} \quad (5)$$

Table 10 presents the results of estimating Equation (5) using a pooled time-series cross-section with fixed effects, and also using cross sectional estimation as in Fama and MacBeth (1973). In the pooled regression, we use *t*-values based on heteroskedasticity-adjusted standard errors, and we also take into account the firm-level clustering in standard errors as described in Equation (1) and in Petersen (2009).

As the results reported in Table 10 show, the coefficients on earnings levels are positive, as expected, and significantly different from zero at the 0.01 level in all cases. Also as expected, the coefficients on earnings changes are positive and significant at the 0.05 level or better in all cases. However, the value-relevance of earnings decreases with the proportion of fraudulent board members as reflected by the negative coefficients on $EP_{it} \times FRAUD_{it}$ (significant at the 0.10 level or better in all models). The coefficients on $\Delta EP_{it} \times FRAUD_{it}$ are also negative, as expected, and significant at the 0.10 level or better in all models. These results hold after controlling for firm size, leverage and earnings volatility. Thus, the results in Table 10 support the argument that boards with more fraudulent members are less

effective in monitoring the firm, resulting not only in lower earnings, but also in lower quality of earnings.

(Table 10 about here)

Next, we examine the effect of appointing fraudulent board members on the volatility of earnings and operating cash flows. As argued earlier, one of the personal characteristics of fraudulent board members is sensation-seeking, resulting in unwarranted risk-taking. We therefore anticipate a positive association between the proportion of fraudulent board members and the volatility of earnings and cash flows. We use the following model:

$$\begin{aligned} VOLATILITY_i = {} & \alpha_0 + \sum_{r=1}^{R} \alpha_r INDUSTRY_r + \omega_1 FRAUD_i + \omega_2 MALE_i + \omega_3 BUSY_i + \\ & \omega_4 CEODUAL_i + \omega_5 BOARDSIZE_i + \omega_6 MAINOWNER_i + \omega_7 EMPLOYEE_i + \\ & \omega_8 AGE_i + \omega_9 LISTING_i + \omega_{10} INSIDER_i + \omega_{11} LEVERAGE_i + \omega_{12} SIZE_i + \upsilon_i \end{aligned} \quad (6)$$

We use three profitability measures in Equation (6). The first one is the standard deviation of earnings divided by lagged share price (EP_{it}); the second variable is the standard deviation of operating cash flows divided by total assets (CF_{it}); and the third is the standard deviation of return on assets (ROA_{it}). Each dependent variable is measured over the sample period (1999-2007). We limit the analysis to firms with at least three annual observations, resulting in a sample of 253 firms for the total sample, and 222 firms for the sub-sample of non-financial firms. Finally, each independent variable is the firm average over the entire sample period. We include all control variables as in previous models. We expect the coefficients on $EMPLOYEE_i$ to be negative because employee representatives are more interested in reducing firm risk. We also expect the coefficient on AGE_i to be negative because older board members tend to be more risk averse. Finally, as larger firms are more

diversified, we expect the coefficient on $SIZE_i$ to be negative. All other coefficients cannot be signed.

The results of estimating Equation (6), which are reported in Table 11, show a positive association between the proportion of fraudulent board members and the volatility of profit measures. Specifically, the coefficients on $FRAUD_i$ are positive and significant at the 0.05 level or better. The coefficients on AGE_i are negative as expected but significant (at the 0.10 level or better) only in two models. As expected, the coefficients on $SIZE_i$ are negative (significant at the 0.01 level).

Overall, the results in Table 11 suggest that companies with higher proportions of fraudulent board members experience higher earnings and cash flow volatility. This result is consistent with the sensation-seeking argument, where fraudulent board members are more likely to engage in unwarranted risky projects resulting in higher profit volatility and lower overall profits.

(Table 11 about here)

5.5. Additional analyses and robustness checks

Prior studies (Guidry *et al*. 1999, and Klein 2002) show that weaker corporate governance is associated with greater degree of earnings management. Thus, we examine whether companies with higher proportions of fraudulent board members engage more in earnings management activities. We measure earnings management using total accruals ($TOTACCRUALS_{it}$) and discretionary accruals based on residuals obtained from Jones' (1991) residuals ($DISACCRUALS_{it}$). We estimate a model similar to Equation (2) with accrual-based variables as the dependent variables. We find (results not presented in a table) that the coefficient on $FRAUD_{it}$ is positive (significant at the 0.01) level in explaining total accruals, and positive (significant at the 0.05 level) in explaining discretionary accruals.

Moreover, the results indicate that firms with greater proportions of fraudulent board members use earnings management to increase rather than decrease reported earnings.

As an additional check for potential endogeneity effect, we divide our sample period into two sub-periods and explore whether a change in $FRAUD_{it}$ causes a change in the future firm performance or vice versa. For each firm, we first calculate the average values of $FRAUD_{it}$, EP_{it} and CF_{it} for the sub-periods 1999-2003 and 2004-2007. We then calculate the changes in these average values between the two sub-periods, which gives us a measure of whether the proportion of fraudulent board members and performance of a given firm has increased or decreased from the first to second sub-period. For each firm, we also calculate the changes in $FRAUD_{it}$, EP_{it} and CF_{it} over the sub-period 2004-2007, which gives us a measure of a change in the proportion of fraudulent board members and performance of the firm during the latter sub-period. The results (not tabulated) show that firms that increased $FRAUD_{it}$ from the first to second sub-period have significantly lower second-period changes in both EP_{it} and CF_{it} than firms with a decrease in $FRAUD_{it}$.[24] However, firms with an increase in EP_{it} and CF_{it} from the first to second sub-period do not have significantly different second-period changes in $FRAUD_{it}$ relative to firms with a decrease in EP_{it} and CF_{it}. These results indicate that the change in the proportion of fraudulent board members causes a change in future firm performance, but not vice versa.

The results of the instrumental variable estimation reported in Section 5.3 suggest that our results hold after controlling for endogeneity and reverse causality. To examine, whether there exists self-selection bias in the proportion of fraudulent board members, we use a two-step procedure suggested by Heckman (1979) and applied in Garcia-Lara *et al*. (2009). Specifically, we first estimate a logistic regression to model factors affecting the proportion

[24] The difference is statistically significant at the 0.01 level for the change in EP_{it} and at the 0.05 level for the change in CF_{it}.

of fraudulent board members. The dependent variable is a dummy variable equals to "1" if the value of $FRAUD_{it}$ is above the sample median, and otherwise "0". Independent variables are those used in Equation (1). In the second stage, we estimate Equation (2) including the inverse Mills ratio obtained in the first stage as an additional control variable. Because the first stage model must include variables that are not included in the second stage, we exclude $BUSY_{it}$ and $INSIDER_{it}$ from the second stage, as these variables were not significant in Table 8. The results of this procedure (not reported in a Table) show that the slopes for $FRAUD_{it}$ and $FRAUD_{it}\times\ OWNER_{it}$ remain significant in the second-stage regression. This result suggests that selection bias is not driving our results.

So far, our measure of fraudulent behavior ($FRAUD_{it}$) included involvement in multiple bankruptcies of other firms. We concede, however, that a board member's involvements in bankruptcies (even in multiple bankruptcies) may not be a good measure of fraudulent behavior. We therefore estimate all our regressions excluding $BANKRUPTCY_{it}$ from $FRAUD_{it.}$ The results of these regressions are qualitatively similar to those reported in Tables 8-11. Therefore, our results are not sensitive to the inclusion of involvement in bankruptcies in $FRAUD_{it}$.

6. Summary and Conclusions

Surprisingly, many board members in Swedish listed companies have been convicted of crimes while many others have exhibited other types of fraudulent behavior. Moreover, the proportion of convicted board members in Swedish companies listed in the US is similar to that of Swedish companies listed only in Stockholm (Sweden). Recent legislative and self-regulation initiatives, like the Sarbanes-Oxley Act in the US and the corporate governance code in Sweden, have focused on preventing corporate frauds by placing more responsibilities on board members, executives and auditors. Perhaps regulators should focus

more on preventing individuals who have previously exhibited fraudulent behavior from holding key positions in publicly listed corporations.

What are the economic implications of appointing convicted criminals to the boards of directors of listed companies? We address this issue by using unique proprietary data on the criminal convictions of all board members in Swedish listed firms. First, we document the extent to which firms have individuals with prior fraudulent behavior on their boards of directors. Specifically, we compute the proportion of board members who have been convicted of crimes, have an entry in the public non-payment record and have served as board members in three or more bankrupt firms. Our results show that appointing board members who have been convicted of crimes is surprisingly common among listed firms in Sweden, a country where the rule of law is strong and the general level of crime is lower than in many other Western countries. To illustrate, 20% of board members in Swedish listed firms have been convicted of crimes and sentenced to pay a fine or to unconditional or conditional prison sentences. Consequently, 85% of Swedish listed companies have at least one board member who has been convicted of a crime. We also find that many listed firms have board members who have an entry in a public non-payment record and who have served as board members in three or more other bankrupt firms. Furthermore, our results show that male board members are more likely than females to commit crimes. This finding is interesting given the focus of recent corporate governance studies on the importance of gender diversity in boards.

Next, we examine the economic implications of having fraudulent members on the board. We expect that companies with more fraudulent board members have weaker corporate governance mechanisms leading to lower profitability. Also, we expect these companies to engage in riskier projects without being properly compensated for taking those risks (sensation seeking). As expected, we find that the greater the proportion of fraudulent

board members is the lower is the profitability and the higher is the volatility of earnings. In addition, our results show that board members' personal ownership interest in the firm mitigates the negative effect of having fraudulent board members on firm profitability. We also expect the quality of earnings to be negatively associated with the proportion of fraudulent board members. Consistent with our expectation, we find that the power of earnings in explaining stock returns is weaker in companies with more fraudulent board members. These results support our argument that appointing fraudulent board members impairs the ability of the board to monitor and advise management, resulting in lower profits, unwarranted risk-taking, and lower quality financial reporting. Finally, the results of analyzing the direction of causality between the proportion of fraudulent board members and firm performance indicate that appointing fraudulent board members leads to lower profitability rather than vice versa.

The policy implication of our study is obvious. Appointing fraudulent individuals to boards of directors is costly to the firm and its shareholders in terms of lower profits, excessive risk and lower quality reporting. To reduce this cost, companies should avoid appointing fraudulent individuals to boards of directors.

Our results have direct implications for future research on corporate governance and regulatory intervention. Clearly, more research on board members' possible criminal convictions and other fraudulent behavior is important in understanding the role of corporate governance mechanisms in corporate decisions and consequent performance and risk-taking. A natural corollary to our study is to examine the effect of having fraudulent members on the boards of US companies, where the overall crime rates are higher than in Sweden. In addition, it would be interesting to explore the role of fraudulent board members in recent financial reporting scandals and other corporate frauds. As for the regulatory implications,

our results raise concerns as to whether regulators should prohibit listed firms from appointing board members with past fraudulent or otherwise dishonest behavior.

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Figure 1
Proportion of firms with at least one board member convicted of a crime per year

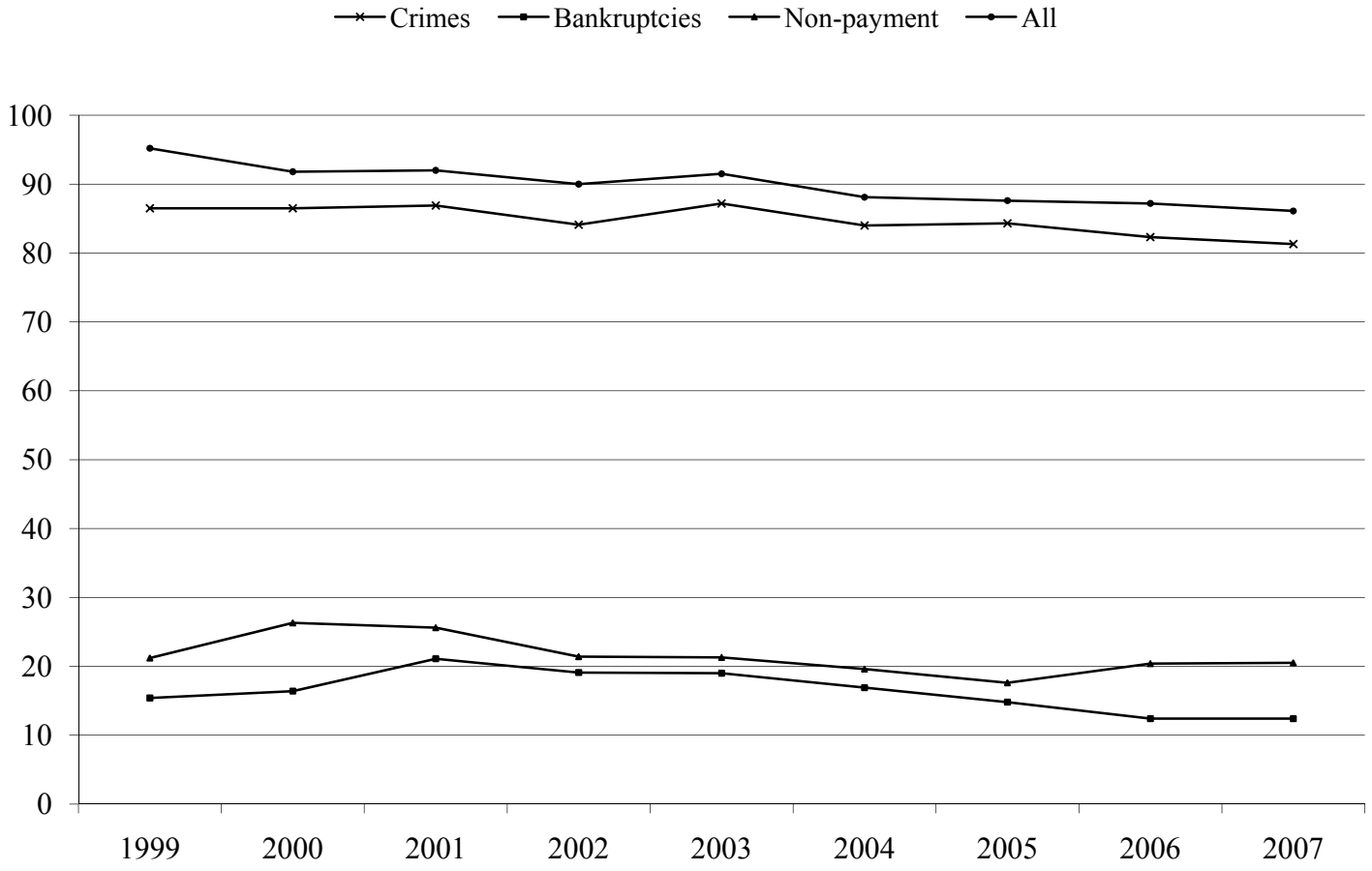

Table 1
Sample Selection and the Effects of Data Restrictions*

	Number of Companies	Firm-year Observations
All listed Swedish companies	650	3,560
Companies with complete accounting and other data	448	2,419
Full sample − Companies with lagged variables, and after truncating 1% on each side as outliers.	382	2,017
Sub-sample of *non-financial companies* (to be used in model involving accruals and operating cash flows.	334	1,767
Full sample − Companies with at least three observations for the purpose of calculating standard deviation of earnings.	253	NA
Sub-sample of *non-financial companies* with at least three observations for the purpose of calculating standard deviation of earnings and operating cash flows.	222	NA

*Note: The Table presents information on the sample selection process in terms of firms and the corresponding number of observations. The sample includes companies listed on the Swedish stock markets for the period 1999-2007 and monitored by the Swedish Financial Supervisory Authority.

Table 2
The Number and Proportions of Criminal Convictions*

Panel A: Crime convictions by gender

		Convictions		Convicted Board Members	
		N	%	N	%
Monetary Fine		1,094	100.0	794	100.0
	Males	1,049	95.9	756	95.2
	Females	45	4.1	38	4.8
Imprisonment		101	100.0	82	100.0
	Males	100	99.0	81	98.8
	Females	1	1.0	1	1.2

Panel B: Proportions of personal fraudulent behavior variables for sub-samples

	Mean	Median	Std.	Min	Max
Full sample (2,017 observations)					
$CRIME_{it}$	0.262	0.222	0.195	0.000	1.000
$BANKRUPTCY_{it}$	0.029	0.000	0.070	0.000	0.500
$PAYMENT_{it}$	0.038	0.000	0.087	0.000	1.000
$FRAUD_{it}$	0.320	0.286	0.228	0.000	1.000
Non-financial firms (1,767 observations)					
$CRIME_{it}$	0.257	0.222	0.195	0.000	1.000
$BANKRUPTCY_{it}$	0.030	0.000	0.072	0.000	0.500
$PAYMENT_{it}$	0.038	0.000	0.089	0.000	1.000
$FRAUD_{it}$	0.315	0.273	0.227	0.000	1.000
Financial firms (250 observations)					
$CRIME_{it}$	0.293	0.286	0.189	0.000	0.750
$BANKRUPTCY_{it}$	0.021	0.000	0.056	0.000	0.333
$PAYMENT_{it}$	0.039	0.000	0.077	0.000	0.375
$FRAUD_{it}$	0.353	0.375	0.230	0.000	0.857
Swedish firms listed in the US (59 observations)					
$CRIME_{it}$	0.252	0.200	0.262	0.000	1.000
$BANKRUPTCY_{it}$	0.000	0.000	0.000	0.000	0.000
$PAYMENT_{it}$	0.061	0.000	0.121	0.000	0.500
$FRAUD_{it}$	0.288	0.222	0.284	0.000	1.000

*Notes:

1. Panel A presents the number of convictions and the number of convicted board members in Swedish listed companies. Panel B presents proportions of fraudulent behavior variables. See Table 1 for sample selection criteria.

2. The term ‘Imprisonment’ refers to convictions resulting in either unconditional or suspended sentences of imprisonment, whereas the term ‘Fine’ refers to a conviction resulting in paying a fine.
3. Variables are defined as follows:
   - $CRIME_{it}$ – The ratio of the number of board members convicted of crimes to the total number of board members for firm *i* at the end of year *t*.
   - $BANKRUPTCY_{it}$ – The number of board members serving as board members in three or more other bankrupt firms divided by the total number of board members for firm *i* at year-end *t*.
   - $PAYMENT_{it}$ – The number of board members having a non-payment record divided by the total number of board members for firm *i* at year-end *t*.
   - $FRAUD_{it}$ – The sum of $CRIME_{it}$, $BANKRUPTCY_{it}$ and $PAYMENT_{it}$.

Table 3
Average Values of $FRAUD_{it}$ in Double-sorted Portfolios by Size ($SIZE_{it}$), Leverage ($LEVERAGE_{it}$) and Market-to-Book ratios (PB_{it})

Panel A: Average $FRAUD_{it}$ in portfolios first sorted by $SIZE_{it}$ and then by $LEVERAGE_{it}$

	$SIZE_{it}$			
	Low (N = 672)	Medium (N = 673)	High (N = 672)	t-test for diff. Between Low and High
$LEVERAGE_{it}$				
Low (N = 672)	0.34	0.34	0.23	0.26
Medium (N= 673)	0.38	0.28	0.27	**4.97+**
High (N = 672)	0.40	0.31	0.29	**4.61+**
t-test for diff. between Low and High	**-2.11+**	1.12	1.73	

Panel B: Average $FRAUD_{it}$ in portfolios first sorted by PB_{it} and then by $LEVERAGE_{it}$

	PB_{it}			
	Low (N = 672)	Medium (N = 673)	High (N = 672)	t-test for diff. between Low and High
$LEVERAGE_{it}$				
Low (N = 672)	0.37	0.34	0.32	**2.02***
Medium (N= 673)	0.33	0.27	0.33	0.05
High (N = 672)	0.34	0.28	0.31	1.37
T-test for diff. between Low and High	1.24	**2.65+**	0.53	

Panel C: Average $FRAUD_{it}$ in portfolios first sorted by PB_{it} and then by $SIZE_{it}$

	PB_{it}			
	Low (N = 672)	Medium (N = 673)	High (N = 672)	t-test for diff. between Low and High
$SIZE_{it}$				
Low (N = 672)	0.39	0.31	0.38	0.46
Medium (N= 673)	0.35	0.30	0.28	**3.30+**
High (N = 672)	0.30	0.28	0.27	1.57
T-test for diff. between Low and High	**3.80+**	1.47	**4.86+**	

*Note: The Table presents average $FRAUD_{it}$ for double sorted portfolios based on firm size and financial leverage (Panel A), market-to-book ratios and financial leverage (Panel B), and market-to-book ratios and firm size (Panel C). +, * denote significance at the 0.01 and 0.05 levels, respectively.

Table 4
Characteristics of Sample Firms*

	Mean	Median	Std.	Min	Max
Panel A: Other corporate governance variables					
$MALE_{it}$	0.868	0.875	0.137	0.000	1.000
$BUSY_{it}$	0.171	0.143	0.174	0.000	1.000
$CEODUAL_{it}$	0.403	0.000	0.491	0.000	1.000
$BOARDSIZE_{it}$	2.044	2.079	0.378	0.693	2.996
$MAINOWNER_{it}$	0.523	1.000	0.500	0.000	1.000
$EMPLOYEE_{it}$	0.151	0.000	0.183	0.000	0.667
AGE_{it}	52.882	53.000	4.169	29.000	67.000
$LISTING_{it}$	0.029	0.000	0.169	0.000	1.000
$INSIDER_{it}$	0.021	0.000	0.060	0.000	0.500
$OWNER_{it}$	0.140	0.011	0.226	0.000	1.000
Panel B: Firm specific variables					
ROA_{it}	-0.016	0.037	0.192	-1.502	0.638
ROE_{it}	-0.001	0.101	0.587	-12.266	5.519
EP_{it}	-0.005	0.042	0.210	-1.188	0.528
CF_{it}	0.022	0.069	0.186	-0.922	0.429
$LEVERAGE_{it}$	0.190	0.154	0.184	0.000	0.814
$abs(TOTACCRUALS_{it})$	0.081	0.058	0.079	0.000	0.570
$SIZE_{it}$	6.952	6.723	2.167	1.353	12.654
$MRET_{it}$	0.030	-0.023	0.486	-1.038	2.306

*Notes:

1. The table provides descriptive statistics on the main variables in our analysis. The full sample includes 382 listed Swedish firms (2,017 firm-year observations) during the period 1999-2007. Operating cash flows (CF_{it}) and the absolute value of total accruals $abs(TOTACCRUALS_{it})$ is calculated using a sub-sample of non-financial companies.

2. Variables are defined as follows:
   - $MALE_{it}$ – The proportion of male board members for firm *i* at year-end *t.*
   - $BUSY_{it}$ – The proportion of board members with three or more board memberships in the listed Swedish firms for firm *i* at the end of year *t*.
   - $CEODUAL_{it}$ – A dummy variable that obtains the value of "1" if the CEO of firm *i* at year-end *t* is also a member of the board, and otherwise "0".
   - $BOARDSIZE_{it}$ – The logarithm of the total number of board members for firm *i* at year-end *t*.
   - $MAINOWNER_{it}$ – A dummy variable that obtains the value of "1" if there is at least one controlling shareholder (that is owns 10% or more of the firm's equity) in the firm *i* at year-end *t*, and otherwise "0".

- $EMPLOYEE_{it}$ – The proportion of employee representatives on the board of firm *i* at year-end *t*.
- AGE_{it} – The average age of the board members of firm *i* at year-end *t*.
- $LISTING_{it}$ – A dummy variable that obtains the value of "1" if firm *i* is listed also in the United States (NYSE, NASDAQ or AMEX) at year-end *t*, and otherwise "0".
- $INSIDER_{it}$ – The proportion of board members who hold executive positions in the firm in addition to being on the board.
- $OWNER_{it}$ – the average market value of the board members' holdings in firm *i* at year *t* divided by the average value of their total wealth at year *t* (the market value of holdings in all insider and outsider stocks and the value of other wealth).
- ROA_{it} – Return on total asset, measured as earnings before interest and taxes divided by lagged total asset for firm *i* at year-end *t*.
- *ROE* – Return on equity, measured as net income divided by shareholders' equity.
- EP_{it} – Firm *i*'s earnings per share for period *t* divided by beginning of period share price.
- $abs(TOTACCRUALS_{it})$ – The absolute value of the total accruals for firm *i* at year-end *t*, measured as change in inventory plus change in receivables plus change in other current assets minus change in payables minus change in other current liabilities minus depreciation.
- CF_{it} – Net income minus total accruals, deflated by average total assets.
- $LEVERAGE_{it}$ – Interest bearing debt divided by total assets.
- $SIZE_{it}$ – Log of total assets.
- $MRET_{it}$ – Annual market-adjusted stock return measured from January to December of each year.

3. We truncate the distributions of EP_{it}, CF_{it} and $MRET_{it}$ by deleting observations below/above 1%/99% of the distributions of these variables.

Table 5
Selected Correlations*

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	$FRAUD_{it}$		0.87	0.38	0.47	0.22	-0.02	-0.26	0.19	-0.25	-0.07	-0.02	0.08	0.01	-0.16	-0.01	-0.15
2	$CRIME_{it}$	0.87		0.06	0.20	0.20	-0.04	-0.19	0.18	-0.16	-0.06	-0.01	0.06	0.02	-0.09	0.05	-0.10
3	$BANKRUPTCY_{it}$	0.35	0.03		0.08	0.08	-0.09	-0.27	0.10	-0.23	-0.00	-0.07	-0.05	-0.02	-0.19	-0.08	-0.20
4	$PAYMENT_{it}$	0.38	0.15	0.06		0.11	0.08	-0.12	0.07	-0.14	-0.11	0.05	0.06	0.02	-0.11	-0.07	-0.04
5	$MALE_{it}$	0.23	0.18	0.10	0.11		0.06	-0.20	0.15	-0.21	0.05	0.01	0.07	0.05	-0.04	0.04	-0.12
6	$CEODUAL_{it}$	-0.03	-0.03	-0.08	0.09	0.05		0.07	0.03	0.03	0.06	-0.05	0.08	0.16	0.09	0.03	0.10
7	$BOARDSIZE_{it}$	-0.24	-0.15	-0.21	-0.03	-0.24	0.08		-0.23	0.77	0.03	0.17	0.11	-0.07	0.21	0.15	0.65
8	$OWNER_{it}$	0.19	0.18	0.10	0.07	0.13	0.03	-0.23		-0.19	-0.02	-0.14	-0.03	0.09	-0.07	-0.05	-0.27
9	$EMPLOYEE_{it}$	-0.23	-0.14	-0.20	-0.06	-0.23	0.04	0.78	-0.18		-0.03	0.14	-0.02	-0.10	0.14	0.09	0.45
10	AGE	-0.07	-0.06	-0.00	-0.09	0.06	0.06	-0.01	0.00	-0.04		0.01	0.13	-0.06	0.15	0.17	0.20
11	$LISTING_{it}$	-0.06	-0.04	-0.08	0.05	0.00	-0.05	0.17	-0.14	0.13	0.00		0.10	-0.06	0.05	0.03	0.28
12	$BUSY_{it}$	0.05	0.04	-0.05	0.09	0.03	0.06	0.18	-0.06	0.07	0.10	0.14		-0.12	0.14	0.04	0.39
13	$INSIDER_{it}$	0.02	0.02	-0.00	0.03	0.05	0.15	-0.02	0.09	-0.06	-0.07	-0.06	-0.12		0.01	-0.03	-0.04
14	EP_{it}	-0.11	-0.05	-0.15	-0.08	-0.07	0.11	0.23	-0.02	0.17	0.18	0.03	0.16	0.01		0.09	0.36
15	$LEVERAGE_{it}$	-0.04	0.03	-0.07	-0.06	-0.00	0.03	0.23	-0.07	0.18	0.17	0.06	0.08	-0.04	0.18		0.37
16	$SIZE_{it}$	-0.14	-0.07	-0.19	0.00	-0.17	0.11	0.65	-0.26	0.45	0.17	0.23	0.43	-0.00	0.43	0.45	

*Note: The table presents pair-wise Pearson's (upper diagonal) and Spearman's (lower diagonal) correlations for selected variables. Correlations above 0.06 and below -0.06 are significant at the 0.05 level. The sample includes 382 listed Swedish firms (2.017 firm-year observations) during the period 1999-2007. See Table 3 for variable definitions.

Table 6
Determinants of Proportions of Fraudulent Board Members ($FRAUD_{it}$)*

		Pooled			Fama-MacBeth
Variable	**Exp. Sign**	**(1)**	**(2)**	**(3)**	**(4)**
$MALE_{it}$	+	**0.27** **(4.21)+**	**0.25** **(3.83)+**	**0.24** **(3.58)+**	**0.30** **(7.55)+**
$CEODUAL_{it}$	?	-0.01 (-0.78)	-0.00 (-0.09)	0.02 (1.48)	0.00 (0.34)
$MAINOWNER_{it}$	?	**0.06** **(3.01)+**	**0.06** **(3.36+**	0.00 (0.15)	**0.07** **(6.28)+**
$EMPLOYEE_{it}$	?	**-0.24** **(-4.17)+**	**-0.25** **(-3.92)+**	-0.03 (-0.30)	**-0.24** **(-7.74)+**
AGE_{it}	?	**-0.01** **(-2.80)***	**-0.01** **(-2.21)***	-0.00 (-1.48)	**-0.00** **(-3.09)***
$LISTING_{it}$	?	0.02 (0.29)	0.05 (0.73)	0.01 (0.15)	**0.07** **(3.62)+**
$BUSY_{it}$	-	**0.12** **(1.96)^**	**0.13** **(2.02)+**	0.09 (1.90)	**0.13** **(4.17)+**
$INSIDER_{it}$	-	-0.07 (-0.51)	-0.10 (-0.80)	**-0.29** **(-1.83)***	-0.09 (-1.40)
$LEVERAGE_{it}$	+	0.04 (0.84)	0.06 (1.05)	0.03 (0.64)	**0.07** **(2.01)^**
$SIZE_{it}$	-	-0.00 (-0.75)	-0.01 (-0.90)	-0.01 (-0.83)	-0.00 (0.83)
Year fixed-effects		YES	YES	YES	N/A
Industry fixed-effects		NO	YES	NO	YES
Firm fixed-effects		NO	NO	YES	N/A
Adjusted R^2		0.13	0.13	0.13	0.26
Observations		2,017	2,017	2,017	9

*Notes:

1. The Table provides results for estimating Equation (1). The model is:

$$FRAUD_{it} = \alpha_0 + \sum_{s=1998}^{2007} \alpha_s YEAR_s + \sum_{i=1}^{I} \alpha_i FIRM_i + \beta_1 MALE_{it} + \beta_2 CEODUAL_{it} + \beta_3 MAINOWNER_{it}$$
$$+ \beta_4 EMPLOYEE_{it} + \beta_5 AGE_{it} + \beta_6 LISTING_{it} + \beta_7 BUSY_{it} + \beta_8 INSIDER_{it} + \beta_9 LEVERAGE_{it}$$
$$+ \beta_{10} SIZE_{it} + \varepsilon_{it}$$

The dependent variable is $FRAUD_{it}$ (the proportion of fraudulent board members). Independent variables are: $MALE_{it}$ (the proportion of male board members); $CEODUAL_{it}$ (a dummy variable that obtains the value of "1" if the CEO is also a board member); $MAINOWNER_{it}$ (a dummy variable that obtains the value of "1" if there is at least one shareholder that owns 10% or more of the firm's equity); $EMPLOYEE_{it}$ (the proportion of employee representatives on the board); AGE_{it} (the average age of the board members); $LISTING_{it}$ (a dummy variable that obtains the value of "1" if the firm is listed also in the United States); $BUSY_{it}$ (the proportion of board members with three or more board memberships in listed Swedish firms); $INSIDER_{it}$ (the proportion of board members who hold other positions in the firm); $LEVERAGE_{it}$ (interest-bearing debt divided by total assets); and $SIZE_{it}$ (the logarithm of total assets).

2. Pooled regressions are estimated using pooled data with fixed-effects. All *t*-values in the pooled regression are based on heteroskedasticity-adjusted standard errors. We also take into account the firm-level clustering in standard errors as in Petersen (2009). Specifically, we allow both a firm and time effect to be present in the panel data and address the time effect parametrically by including yearly dummies and then estimate standard errors clustered on the firm dimension.

3. In addition to pooled regressions, we report results using average coefficients and corresponding *t*-statistics from cross-sectional annual regressions as in Fama and MacBeth (1973). In the Fama-MacBeth regressions, we compute *t*-values based on nine annual observations.

4. +, *, ^ denote significance levels at the 0.01, 0.05, and 0.10 levels respectively.

Table 7
Firm Characteristics by Level of Fraudulent Board Members
Univariate Portfolio Analysis*

	Low	2	3	High	High - Low	
					t-test	P-value
Panel A: Equal-sized portfolios sorted by $FRAUD_{it}$						
# of firms	**95**	**96**	**96**	**95**		
EP_{it}	0.018	0.001	0.003	-0.091	**4.16**	**(0.00)**
CF_{it}	0.030	0.048	0.026	-0.063	**3.40**	**(0.00)**
$SIZE_{it}$	7.050	6.754	6.900	5.652	**4.32**	**(0.00)**
$abs(TOTACCRUALS_{it})$	0.076	0.089	0.081	0.114	**-3.85**	**(0.00)**
MRET	0.005	-0.012	0.021	-0.036	0.80	(0.43)
Std(EP_{it})	0.018	0.122	0.145	0.193	**-4.55**	**(0.00)**
Std(CF_{it})	0.098	0.099	0.123	0.149	**-3.23**	**(0.00)**
Panel B: Variable-sized portfolios sorted by $FRAUD_{it}$						
	<30%	**30%-50%**	**50%-70%**	**>70%**		
# of firms	**188**	**105**	**62**	**27**		
EP_{it}	0.011	-0.000	-0.082	-0.129	**4.64**	**(0.00)**
CF_{it}	0.040	0.018	-0.061	-0.075	**3.40**	**(0.00)**
$SIZE_{it}$	6.911	6.915	5.772	4.971	**4.12**	**(0.00)**
$abs(TOTACCRUALS_{it})$	0.082	0.084	0.115	0.148	**-3.84**	**(0.00)**
MRET	-0.000	0.009	-0.055	0.014	0.50	(0.62)
$Std(EP_{it})$	0.104	0.149	0.178	0.233	**-3.36**	**(0.00)**
$Std(CF_{it})$	0.099	0.122	0.158	0.148	**-3.23**	**(0.00)**

*Notes:

1. Panel A presents mean variables for quartile-portfolios sorted according to the proportion of fraudulent board members ($FRAUD_{it}$). Panel B presents mean variables for variable-sized portfolios for different levels of $FRAUD_{it}$. The table reports average values for each variable along with the *t*-test (and corresponding *p*-values) for the difference in means between the extreme portfolios. See Table 3 for variable definitions.

2. The sample includes Swedish listed companies with sufficient data (2,017 firm-year observations) over the period 1999-2007. Variables CF_{it} and $abs(TOTACCRUALS_{it})$ are calculated for the sample of non-financial firms (1,767 firm-year observations).

3. Time-series averages for the variables EP_{it}, CF_{it}, $SIZE_{it}$, and $FRAUD_{it}$ are calculated for each firm over the sample period. Standard deviations – Std(EP_{it}) and Std(CF_{it}) – are calculated for each firm over the sample period. When calculating these volatility measures, each firm has to have at least three years of data, which reduces the number of firms for which we can have the volatility measures. Then we classify each firm into portfolio based on the average value of $FRAUD_{it}$.

Table 8
Association between Profitability and the Proportion of Fraudulent Board Members (*FRAUD*)*

	Exp. Sign	Dependent Variable EP_{it}	EP_{it}	Dependent Variable CF_{it}	CF_{it}
$FRAUD_{it}$	-	**-0.14** **(-3.79)+**	**-0.11** **(-2.81)+**	**-0.12** **(-3.64)+**	**-0.06** **(-1.76)^**
$FRAUD_{it}$ x $OWNER_{it}$	+	**0.30** **(1.71)^**	**0.42** **(2.77)+**	**0.32** **(2.02)+**	0.17 (1.14)
$OWNER_{it}$	**?**	-0.02 (-0.38)	-0.04 (-0.88)	-0.06 (-1.29)	-0.03 (-0.71)
$MALE_{it}$	**?**	0.07 (1.55)	0.06 (0.90)	0.05 (1.08)	0.01 (0.22)
$BUSY_{it}$	**?**	0.01 (0.18)	-0.04 (-0.99)	-0.03 (-0.84)	-0.03 (-0.92)
$CEODUAL_{it}$	**?**	0.01 (1.33)	0.01 (0.66)	0.01 (0.75)	0.01 (1.18)
$BOARDSIZE_{it}$	**?**	-0.03 (-0.88)	0.00 (0.06)	-0.03 (-0.77)	-0.01 (-0.23)
$MAINOWNER_{it}$	**?**	0.01 (0.90)	-0.02 (-1.01)	**0.02** **(1.89)^**	-0.01 (-0.50)
$EMPLOYEE_{it}$	**?**	0.07 (1.34)	**0.20** **(1.88)^**	**0.12** **(2.47)+**	**0.15** **(2.58)+**
AGE_{it}	**?**	0.00 (1.17)	-0.00 (-0.28)	0.00 (1.04)	0.00 (0.19)
$LISTING_{it}$	**?**	-0.01 (-0.41)	**0.05** **(1.75)^**	-0.05 (-1.58)	-0.01 (-0.14)
$INSIDER_{it}$	**?**	-0.02 (-0.15)	0.09 (0.53)	0.11 (1.22)	-0.05 (-0.38)
$LEVERAGE_{it}$	-	**-0.19** **(-4.34)+**	**-0.29** **(-3.86)+**	**-0.17** **(-4.25)+**	**-0.29** **(-6.70)+**
$SIZE_{it}$	**?**	**0.03** **(7.01)+**	**0.09** **(5.97)+**	**0.04** **(7.09)+**	**0.05** **(3.16)+**

Year fixed-effects		YES	YES	YES	YES
Industry fixed-effects		YES	NO	YES	NO
Firm fixed-effects		NO	YES	NO	YES
Adjusted R^2		0.21	0.22	0.24	0.24
Observations		2,017	2,017	1,767	1,767

*Notes:

1. The Table provides results for estimating Equation (2). The model is:

$$PROF_{it} = \alpha_0 + \sum_{s=1998}^{2007} \alpha_s YEAR_s + \sum_{i=1}^{I} \alpha_i FIRM_i + \beta_1 FRAUD_{it} + \beta_2 FRAUD_{it} \times OWNER_{it} + \beta_3 OWNER_{it} + \beta_4 MALE_{it} + \beta_5 BUSY_{it} + \beta_6 CEODUAL_{it} + \beta_7 BOARDSIZE_{it} + \beta_8 MAINOWNER_{it} + \beta_9 EMPLOYEE_{it} + \beta_{10} AGE_{it} + \beta_{11} LISTING_{it} + \beta_{12} INSIDER_{it} + \beta_{13} LEVERAGE_{it} + \beta_{14} SIZE_{it} + \varepsilon_{it}$$

   The dependent variables are EP_{it} (earnings deflated by the beginning of year market value of equity) and CF_{it} (operating cash flows deflated by total assets) in the current period. Independent variables are: $FRAUD_{it}$ (the proportion of fraudulent board members); $OWNER_{it}$ (the average market value of the board members' holdings in the firm divided by the average value of his/her total wealth); $MALE_{it}$ (the proportion of male board members); $BUSY_{it}$ (the proportion of board members with three or more board memberships in listed Swedish firms); $CEODUAL_{it}$ (a dummy variable that obtains the value of "1" if the CEO is also a board member); $BOARDSIZE_{it}$ (log of the number of board members); $MAINOWNER_{it}$ (a dummy variable that obtains the value of "1" if there is at least one shareholder that owns 10% or more of the firm's equity); $EMPLOYEE_{it}$ (the proportion of employee representatives on the board); AGE_{it} (the average age of the board members); $LISTING_{it}$ (a dummy variable that obtains the value of "1" if the firm is also listed in the United States); $INSIDER_{it}$ (the proportion of board members who hold other positions in the firm); $LEVERAGE_{it}$ (debt divided by total assets); and $SIZE_{it}$ (the logarithm of total assets).

2. The regressions are estimated using pooled data with fixed-effects. All *t*-values in the pooled regression are based on heteroskedasticity-adjusted standard errors. We also take into account the firm-level clustering in standard errors as in Petersen (2009). Specifically, we allow both a firm and time effect to be present in the panel data and address the time effect parametrically by including yearly dummies and then estimate standard errors clustered on the firm dimension.

3. +, * and ^ denote significance levels at the 0.01, 0.05 and 0.10 levels respectively.

Table 9
GMM Instrumental Variable Estimations of the Association between Profitability and the Proportion of Fraudulent Board Members (*FRAUD*)*

	Exp. Sign	Dependent Variable EP_{it}	Dependent Variable CF_{it}
$FRAUD^*_{it}$	-	**-0.30** **(-2.90)+**	**-0.16** **(-1.93)^**
EP_{it-1}	+	**0.35** **(4.69)+**	---
CF_{it-1}	+	---	**0.16** **(1.91)^**
$MALE_{it}$	**?**	**0.17** **(3.01)+**	**0.10** **(2.03)***
$BUSY_{it}$	**?**	-0.02 (-0.29)	-0.05 (-1.42)
$CEODUAL_{it}$	**?**	**0.02** **(1.71)^**	0.00 (0.43)
$BOARDSIZE_{it}$	**?**	-0.05 (-1.24)	**-0.06** **(-1.74)^**
$MAINOWNER_{it}$	**?**	**0.03** **(1.92)^**	**0.03** **(2.64)+**
$EMPLOYEE_{it}$	?	**-0.14** **(-2.26)***	0.03 (0.61)
AGE_{it}	?	-0.14 (-1.08)	-0.00 (-0.73)
$LISTING_{it}$	?	0.00 (0.17)	-0.03 (-1.51)
$INSIDER_{it}$	**?**	-0.06 (-0.52)	0.01 (0.05)
$LEVERAGE_{it}$	-	**-0.08** **(-1.80)^**	**-0.12** **(-2.79)+**
$SIZE_{it}$	**?**	**0.03** **(4.45)+**	**0.03** **(6.40)+**

Year fixed-effects		YES	YES
Firm fixed-effects		YES	YES
Observations		1,309	1,149

*Notes:

1. The Table presents results of estimating Equation (3) using a non-linear Generalized Method of Moments (GMM) with instrumental variables. We estimate the model using the Newey-West estimator combined with random year (α_{1t}) and firm (α_{2i}) effects.

2. The equation is:

$$PROF_{it} = \alpha_0 + \alpha_{1t} + \alpha_{2i} + \gamma_1 FRAUD^*_{it} + \phi PROF_{it-1} + \beta_1 MALE_{it} + \beta_2 BUSY_{it} + \beta_3 CEODUAL_{it} + \beta_4 BOARDSIZE_{it} + \beta_5 MAINOWNER_{it} + \beta_6 EMPLOYEE_{it} + \beta_7 AGE_{it} + \beta_8 LISTING_{it} + \beta_9 INSIDER_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} SIZE_{it} + \varepsilon_{it}$$

   The dependent variables are EP_{it} (earnings deflated by the beginning of year market value of equity) and CF_{it} (operating cash flows deflated by total assets) in the current period. Independent variables are: $FRAUD^*_{it}$ is a dummy variable, which obtains the value of "1" if $FRAUD_{it}$ (the proportion of fraudulent board members) is above 0.5, and otherwise zero; $MALE_{it}$ (the proportion of male board members); $BUSY_{it}$ (the proportion of board members with three or more board memberships in listed Swedish firms); $CEODUAL_{it}$ (a dummy variable that obtains the value of "1" if the CEO is also a board member); $BOARDSIZE_{it}$ (log of the number of board members); $MAINOWNER_{it}$ (a dummy variable that obtains the value of "1" if there is at least one shareholder that owns 10% or more of the firm's equity); $EMPLOYEE_{it}$ (the proportion of employee representatives on the board); AGE_{it} (the average age of the board members); $LISTING_{it}$ (a dummy variable that obtains the value of "1" if the firm is also listed in the United States); $INSIDER_{it}$ (the proportion of board members who hold other positions in the firm); $LEVERAGE_{it}$ (debt divided by total assets); and $SIZE_{it}$ (the logarithm of total assets).

3. We use the lagged differences of the endogenous variables as instruments. Specifically, instruments are $\Delta PROF_{i,t-1}$ and the following four dummy variables (see Appendix 2 for a more detailed discussion on the instruments):

$$D1_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} < -0.04 \\ 0 \text{ otherwise} \end{cases}, \quad D2_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} < -0.02 \\ 0 \text{ otherwise} \end{cases},$$

$$D3_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} > 0.02 \\ 0 \text{ otherwise} \end{cases}, \text{ and } D4_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} > 0.04 \\ 0 \text{ otherwise.} \end{cases}.$$

4. +, * and ^ denote significance levels at the 0.01, 0.05 and 0.10 levels respectively.

Table 10
Effect of *FRAUD* on the Value-Relevance of Earnings*

	Exp Sign	*Pooled*				*Fama-MacBeth*
$FRAUD_{it}$	?	-0.01 (-0.13)	-0.01 (-0.13)	-0.14 (-1.65)	-0.12 (-1.23)	0.01 (0.18)
EP_{it}	+	**0.94** **(8.04)+**	**0.92** **(7.37)+**	**0.84** **(5.36)+**	**0.80** **(2.69)+**	**1.08** **(5.79)+**
$FRAUD_{it} \times EP_{it}$	-	**-0.38** **(-1.80)^**	**-0.39** **(-1.87)^**	**-0.60** **(-2.46)***	**-0.59** **(-2.34)***	**-0.80** **(-2.52)***
ΔEP_{it}	+	**0.40** **(4.61)+**	**0.40** **(4.59)+**	**0.46** **(4.88)+**	**0.67** **(3.45)+**	**0.57** **(2.85)***
$FRAUD_{it} \times \Delta EP_{it}$	-	**-0.49** **(-4.04)+**	**-0.48** **(-4.02)+**	**-0.55** **(-4.28)+**	**-0.68** **(-4.08)+**	**-0.65** **(-1.94)^**
$SIZE_{it}$	**?**				-0.06 (-1.62)	
$SIZE_{it} \times EP_{it}$	+				-0.02 (-0.37)	
$SIZE_{it} \times \Delta EP_{it}$	+				-0.03 (-1.57)	
$LEVERAGE_{it}$	?				0.09 (0.60)	
$LEVERAGE_{it} \times EP_{it}$	?				0.41 (1.06)	
$LEVERAGE_{it} \times \Delta EP_{it}$	?				0.21 (0.91)	
$VOLATILITY_{it}$	+				**106.75** **(3.59)+**	
$VOLATILITY_{it} \times EP_{it}$	-				-0.02 (-0.69)	
$VOLATILITY_{it} \times \Delta EP_{it}$	-				0.00 (0.41)	

Year fixed-effects		YES	YES	YES	NO	NO
Industry fixed-effects		NO	YES	NO	NO	NO
Firm fixed-effects		NO	NO	YES	YES	NO
Adjusted R^2		0.16	0.16	0.16	0.16	0.19
Observations		2,017	2,017	2,017	2,017	9

*Notes:

1. The table presents results for estimating Equation (5). The model is:

$$RET_{it} = \alpha_0 + \sum_{s=1998}^{2007} \alpha_s YEAR_s + \sum_{i=1}^{I} \alpha_i FIRM_i + \delta_1 FRAUD_{it} + \delta_2 EP_{it} + \delta_3 EP_{it} \times FRAUD_{it}$$
$$+ \delta_4 \Delta EP_{it} + \delta_5 \Delta EP_{it} \times FRAUD_{it} + \delta_6 SIZE_{it} + \delta_7 SIZE_{it} \times EP_{it} + \delta_8 SIZE_{it} \times \Delta EP_{it} +$$
$$\delta_9 LEVERAGE_{it} + \delta_{10} LEVERAGE_{it} \times EP_{it} + \delta_{11} LEVERAGE_{it} \times \Delta EP_{it} +$$
$$\delta_{12} VOLATILITY_{it} + \delta_{13} VOLATILITY_{it} \times EP_{it} + \delta_{14} VOLATILITY_{it} \times \Delta EP_{it} + \upsilon_{it}.$$

   The dependent variable (RET_{it}) is annual market adjusted stock returns from January to December (firm's annual return minus annual market return in Sweden). Independent variables include $FRAUD_{it}$ (the percentage of fraudulent board members); EP_{it} (earnings levels per share divided by beginning of period share price), ΔEP_{it} (earnings changes divided by beginning of period share price); $SIZE_{it}$ (log of total assets); $LEVERAGE_{it}$ (interest bearing debt divided by total assets); $VOLATILITY_{it}$ (standard deviation of earnings divided by lagged share price); and interaction variables.

2. The pooled regression is estimated using pooled data with fixed-effects. All *t*-values in the pooled regression are based on heteroskedasticity-adjusted standard errors. We also take into account the firm-level clustering in standard errors as in Petersen (2009). Specifically, we allow both a firm and time effect to be present in the panel data and address the time effect parametrically by including yearly dummies and then estimate standard errors clustered on the firm dimension.

3. In addition to pooled regression, we report results using average coefficients and corresponding *t*-statistics from cross-sectional annual regressions as in Fama and MacBeth (1973). In the Fama-MacBeth regressions, we compute t-values based on nine annual observations.

4. +, * indicates significance at the 0.01, 0.05 levels respectively.

Table 11
Association between the Volatility of Earnings and Cash Flows and the Proportion of Fraudulent Board Members ($FRAUD_{it}$)*

	Exp. Sign	Std(EP_{it})	Std(CF_{it})	Std(ROA_{it})
***FRAUD**$_i$*	+	**0.13** **(2.62)+**	**0.07** **(2.57)***	**0.09** **(2.25)***
***MALE**$_i$*	**?**	-0.07 (-1.10)	-0.05 (-1.12)	-0.07 (-1.40)
***BUSY**$_i$*	**?**	-0.01 (-0.18)	0.05 (1.12)	0.03 (0.49)
***CEODUAL**$_i$*	**?**	-0.02 (-1.10)	-0.01 (-1.17)	-0.02 (-1.20)
***BOARDSIZE**$_i$*	**?**	0.02 (0.43)	0.02 (0.92)	**0.05** **(1.74)^**
***MAINOWNER**$_i$*	**?**	**0.05** **(2.82)+**	-0.01 (-1.30)	0.00 (0.32)
***EMPLOYEE**$_i$*	-	0.02 (0.19)	**-0.08** **(-1.78)^**	**-0.09** **(-1.02)^**
***AGE**$_i$*	-	-0.00 (-1.31)	**-0.00** **(-2.37)***	**-0.00** **(-1.94)^**
***LISTING**$_i$*	?	0.00 (0.00)	0.00 (0.04)	0.02 (0.58)
***INSIDER**$_i$*	?	0.04 (0.35)	-0.05 (-0.63)	-0.00 (-0.00)
***LEVERAGE**$_i$*	?	**0.23** **(3.41)+**	-0.05 (-1.42)	-0.06 (-1.44)
***SIZE**$_i$*	-	**-0.02** **(-2.85)+**	**-0.02** **(-3.42)+**	**-0.02** **(-3.39)+**
Industry fixed-effects		YES	YES	YES
Adjusted R^2		0.22	0.35	0.33
Observations		253	222	253

*Notes:

1. The table presents results for estimating equation (6) using a sample of listed Swedish companies. The model is:

$$VOLATILITY_i = \alpha_0 + \sum_{r=1}^{R} \alpha_r INDUSTRY_r + \omega_1 FRAUD_i + \omega_2 MALE_i + \omega_3 BUSY_i + \omega_4 CEODUAL_i + \omega_5 BOARDSIZE_i + \omega_6 MAINOWNER_i + \omega_7 EMPLOYEE_i + \omega_8 AGE_i + \omega_9 LISTING_i + \omega_{10} INSIDER_i + \omega_{11} LEVERAGE_i + \omega_{12} SIZE_i + \upsilon_i$$

   The dependent variables are the standard deviation of earnings divided by lagged share price, $Std(EP_i)$, standard deviation of operating cash flows divided by total assets, $Std(CF_i)$, and standard deviation of return on assets, $Std(ROA_i)$, and. We required at least three observations per firm in order to calculate $Std(EP_i)$ and $Std(ROA_i)$ for the full sample of 253 firms, and to calculate $Std(CF_i)$ for the sub-sample of 222 non-financial firms.

2. Independent variables are measured as averages per-firm (one observation per firm): $FRAUD_i$ (average firm proportion of fraudulent board members); $MALE_i$ (the proportion of male board members); $BUSY_i$ (the proportion of board members with three or more board memberships in listed Swedish firms); $CEODUAL_i$ (a dummy variable that obtains the value of "1" if the CEO is also a board member); $BOARDSIZE_i$ (log of the number of board members); $MAINOWNER_i$ (a dummy variable that obtains the value of "1" if there is at least one shareholder that owns 10% or more of the firm's equity); $EMPLOYEE_i$ (the proportion of employee representatives on the board); AGE_{it} (the average age of the board members); $LISTING_i$ (a dummy variable that obtains the value of "1" if the firm is also listed in the United States); $INSIDER_{it}$ (the proportion of board members who hold other positions in the firm); $LEVERAGE_i$ (debt divided by total assets); and $SIZE_i$ (the logarithm of total assets).

3. Regressions are estimated with industry fixed-effects. All *t*-values are based on heteroskedasticity-adjusted standard errors. Also, we take into account the firm-level clustering in standard errors as in Petersen (2009).

4. +, * denote significance levels at the 0.01 and 0.05 levels respectively.

Appendix 1 - Laws Violated by Board Members

Code	Title	# of convictions	# of board members convicted	Example	Minimum penalty	Maximum penalty
1951:649	Act on Criminal Responsibility for Certain Traffic Offences	280	208	Drunken or reckless driving	Fines	2 years in prison
1972:603	Road Traffic Promulgation	186	123	Various traffic-related crimes, all types of vehicles	Fines	Fines
1998:1276	Vehicle Ordinance	135	80	Various traffic related crimes, all kinds of vehicles	Fines	Fines
1960:418	Act on Criminal Responsibility for Smuggling	115	88	Importing/Exporting goods without proper payment of duty or other taxes	Fines	6 years in prison
Ch. 8	Theft, robbery, other stealing	58	41	Shoplifting, robbery	Fines	10 years in prison
1972:595	Vehicle Promulgation	38	33	Driving a car with a driving ban	Fines	Fines
Ch. 3	On Crimes against Life and Health	28	20	Assault, manslaughter	Fines	Life time in prison
Ch. 9	Fraud and Other Acts of Dishonesty	23	12	Fraud	Fines	6 years in prison
1986:300	Sea Traffic Ordinance	27	20	Violation of international sea traffic rules	Fines	Fines
Ch. 12	Crimes Inflicting Damage	16	10	Damage to public property	Fines	4 years in prison
1941:967	The Conscription Act	16	11	Failure to appear for military service	Fines	1 year in prison

1971:69	Tax Offence Act	12	10	Incorrect information to tax authorities, obstruction of tax control	Fines	6 years in prison
1956:617	Public Order Act	11	9	Arranging public meetings without permit	Fines	6 months in prison
Ch. 11	Crime Against Creditors	9	5	Crime against creditors	Fines	6 years in prison
Ch. 17	On Crime Against Public Activity	9	4	Obstruction of police	Fines	8 years in prison
Ch. 4	On Crimes against Liberty and Peace	8	8	Unlawful coercion	Fines	Life in prison
1988:327	Vehicle Tax Act	9	8	Driving a vehicle without paying vehicle tax	Fines	6 months in prison
1990:1342	Insider Act	8	7	Insider trading based on non-public information	Fines	2 years in prison
	All others	169	122			

Appendix 2 – Instrumental Variables Approach

Consider the following potentially non-linear but additive Vector Autoregressive (VAR) system:

$$PROF_{it} = \mu_i^* + \lambda_t + \emptyset^* PROF_{i,t-1} + g^*\left(FRAUD_{i,t-1}, \gamma^*\right) + \beta^{*'} X_{it} + \varepsilon_{it}^* \quad \text{(A1)}$$

$$FRAUD_{it} = \mu_i^\diamond + \gamma_1^\diamond PROF_{i,t-1} + g^\diamond\left(FRAUD_{i,t-1}, \gamma_2^\diamond\right) + \beta^{\diamond'} X_{it} + \varepsilon_{it}^\diamond \quad \text{(A2)}$$

where the random error vectors $(\varepsilon_{it}^* \; \varepsilon_{it}^\diamond)'$ have zero expectations and are mutually independent for different firms *i* and different years *t*. The vector X_{it} contains exogenous (that is, control) variables. Consequently, some of the parameters in the vectors β^* and $\beta^\diamond$ could be zeros. Also note that the variables *FRAUD* and *PROF* are as described in Equation (2).We assume that the intercept vectors $(\mu_i^* \; \mu_i^\diamond)'$ are random variables, and independent for different firms *i*. The error and intercept vectors are assumed independent of each other. We also assume that both intercept vectors have a finite second order moment. The expectations and the covariance matrix are denoted by:

$$E\begin{pmatrix}\mu_i^* \\ \mu_i^\diamond\end{pmatrix} = \begin{pmatrix}\mu^* \\ \mu^\diamond\end{pmatrix} \quad \text{and} \quad G = \begin{pmatrix}g_{11} & g_{12} \\ g_{12} & g_{22}\end{pmatrix} = cov((\mu_i^* \;\; \mu_i^\diamond)').$$

Similarly, the covariance matrix of the error terms $(\varepsilon_{it}^* \; \varepsilon_{it}^\diamond)'$ is assumed to be finite and is denoted by:

$$\Sigma = cov((\mu_i^* \;\; \mu_i^\diamond)') = \begin{pmatrix}\sigma_*^2 & \rho\sigma_*\sigma_\diamond \\ \rho\sigma_*\sigma_\diamond & \sigma_\diamond^2\end{pmatrix}.$$

The yearly coefficients, λ_t, on the other hand, are treated as parameters. These coefficients capture the common factor in profitability caused, for instance, by business cycles. $\emptyset^*$, γ^* and $\gamma^\diamond$ denote unknown parameters.

Denote the upper triangular Cholesky decomposition of the error covariance matrix Σ by U,

$$\Sigma = UU' = \begin{pmatrix} \sigma_*\sqrt{1-\rho^2} & \rho\sigma_* \\ 0 & \sigma_\diamond \end{pmatrix}\begin{pmatrix} \sigma_*\sqrt{1-\rho^2} & 0 \\ \rho\sigma_* & \sigma_\diamond \end{pmatrix}.$$

Premultiplying the system (A1) and (A2) by the non-singular matrix

$T = \sigma_*\sqrt{1-\rho^2}U^{-1} = \begin{pmatrix} 1 & -\rho\frac{\sigma_*}{\sigma_\diamond} \\ 0 & \frac{\sigma_*}{\sigma_\diamond}\sqrt{1-\rho^2} \end{pmatrix}$, denoting the expression $\rho\frac{\sigma_*}{\sigma_\diamond}$ as γ_0 and rearranging terms, the first equation becomes

$$PROF_{it} = \mu_i^* + \gamma_0\mu_i^\diamond + \lambda_t + (\emptyset^* - \gamma_0\gamma_1^\diamond)PROF_{i,t-1} + g^*\left(FRAUD_{i,t-1}, \gamma^*\right)$$

$$+\gamma_0 FRAUD_{it} + (\beta^* - \gamma_0\beta^\diamond)'X_{it} + \varepsilon_{it}^* - \gamma_0\varepsilon_{it}^\diamond \qquad \text{(A3)}$$

(A3) can be simplified into the following equation:

$$PROF_{it} = \mu_i + \lambda_t + \emptyset PROF_{i,t-1} + g\left(FRAUD_{it}, FRAUD_{i,t-1}, \gamma\right) + \beta' X_{it} + \varepsilon_{it}, \qquad \text{(A4)}$$

where $\mu_i = \mu_i^* - \gamma_0\mu_i^\diamond$, $\emptyset = \emptyset^* - \gamma_0\gamma_1^\diamond$, $\varepsilon_{it} = \varepsilon_{it}^* - \gamma_0\varepsilon_{it}^\diamond$, etc. Equation (A4) is potentially more useful than the original form (A1) because *a priori* it is clear that the simultaneous dependence structure must be recursive from $FRAUD_{it}$ to $PROF_{it}$. This is because boards of directors are appointed at the beginning of the year and the proportion of fraudulent board members, $FRAUD_{it}$, is determined *before* $PROF_{it}$ is revealed. However, the model endogenizes both $PROF_{it}$ and $FRAUD_{it}$ through two mechanisms: $FRAUD_{it}$ correlates with ε_{it} ($\rho \neq 0$) and also with μ_i ($g_{12} \neq 0$). The estimation of the autoregressive parameter, $\emptyset$, is also problematic, because $PROF_{i,t-1}$ involves μ_i and consequently correlates with it. This is why we will use the

generalized method of moments (GMM) based on instrumental variables that are observable, legitimate and feasible within the framework of the model.

In order to derive these instruments, we use the framework proposed by Arellano and Bover (1995). A concise presentation of it and the GMM estimation method is found in Cameron and Trivedi (2005, pp. 765-766). Denote $E\mu_i$ by μ and the deviations from it by $\alpha_i = \mu_i - \mu$. When all the unobservable random elements with zero expectations are joined into one single disturbance term $\kappa_{it} = \alpha_i + \varepsilon_{it}$, Equation (A4) becomes:

$$PROF_{it} = \mu + \lambda_t + \emptyset PROF_{i,t-1} + g\left(FRAUD_{it}, FRAUD_{i,t-1}, \gamma\right) + \beta' X_{it} + \kappa_{it}. \qquad \text{(A5)}$$

Note that the lagged and differenced endogenous variables $\Delta PROF_{i,t-1} = PROF_{i,t-1} - PROF_{i,t-2}$ and $\Delta FRAUD_{i,t-1} = FRAUD_{i,t-1} - FRAUD_{i,t-2}$ are *independent* of the combined disturbance term κ_{it}, because neither variable involves the original intercept terms. Moreover, as the error terms ε_{it} are serially independent, lagged observations are also independent of the current error term, ε_{it}. Similarly, all older differences $\Delta PROF_{i,t-2}$, $\Delta FRAUD_{i,t-2}$ etc. could also serve as instruments but the informativeness of these variables deteriorates rapidly as the lag increases. Consequently, we will generate our instruments based on $\Delta PROF_{i,t-1}$ and $\Delta FRAUD_{i,t-1}$.

After estimating different versions of model (A5), it became clear that the inclusion of the lagged variable $\Delta FRAUD_{i,t-1}$ did not improve the fit in any way, so we dropped it from the model. In addition, we approximated the unknown g-function by a two-level step function

$$g(FRAUD_{it}\ ,\gamma_1\ ) = \begin{cases} 0 \text{ if } FRAUD_{it} < 0.5 \\ \gamma_1 \text{if } FRAUD_{it} \geq 0.5. \end{cases}$$

The reason for choosing this class limit was, that $FRAUD_{it} \geq 0.5$ means that fraudulent members dominate the board. This model includes two parameters that are coefficients of endogenous variables, namely $\emptyset$ and γ_1.

As explained above, we use $\Delta PROF_{i,t-1}$ and categorized versions of $\Delta FRAUD_{i,t-1}$ as our instruments. In particular, we use four categories of the variable $\Delta FRAUD_{i,t-1}$:

$$D1_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} < -0.04 \\ 0 \text{ otherwise} \end{cases}$$

$$D2_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} < -0.02 \\ 0 \text{ otherwise} \end{cases}$$

$$D3_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} > 0.02 \\ 0 \text{ otherwise} \end{cases}$$

$$D4_{it} = \begin{cases} 1 \text{ if } \Delta FRAUD_{i,t-1} > 0.04 \\ 0 \text{ otherwise.} \end{cases}$$

In the estimation of the covariance structure we use the Newey-West estimator, which is robust to autocorrelations up to two lags (see Cameron and Trivedi (2005, p. 175), and Greene (2008, p. 643)). The validity of the extra instruments can be tested using Hansen's test as suggested by Cameron and Trivedi (2005, pp. 181-182). A small test statistic indicates that the extra instruments are uncorrelated with the disturbance terms κ_{it} in Equation (A5).