Erasmus University Rotterdam

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Master thesis Corporate Finance

Why firms engage in fraudulent behaviour?

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I would like to thank my coach for supporting me

and my interests during this particular year.

Fraud and ethical behaviour have always interested me,

and this was a great opportunity to widen my knowledge on the field.

Lastly, but most importantly,

I would like to profoundly thank me family for always believing me but

In particular because they always pushed me to be the best version of myself.

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Executive Summary

This study investigates whether fraud is disciplined by industry competition, environment opportunity, and firms' financial conditions. Based on logistic multivariate regression analyses, I find that firms with weak prior financial conditions are more likely to be attracted by fraudulent corporate behaviour, and that firms with higher product market differentiation exhibit higher rates of frauds. This relationship is more pronounced for prestigious firms (firms in Fortune 500 list) and is robust after controlling for various measures of competition and predictors of fraud. To help establish causality, I prove that this relationship still holds when I exploit changes in rival's IPOs and acquisition activity. Overall, my findings suggest that firms who committed fraud were characterised by some specific internal (financial conditions) and external (industry competition) variable that facilitate fraud detection.

Introduction

Firms' fraud in the reporting system breaches the trust necessary for a well-functioning financial system (Greenspan, 2008). Fraud firstly damages the company's reputation but more relevant is that this behavior decreases firm value (Karpoff et al., 2008; Dyck et al., 2010), creates negative externalities (Kedia and Philippon, 2009), affect stock market participation (Guiso et al., 2008), and distort investors' decisions (Giannetti and Wang, 2016; Gurun et al., 2018). Financial reporting plays an essential role in our economic system by facilitating resources allocation through the display of firm's financial position, their performance, and some other important event to stakeholders. Donald Cressey[1] (1953) represent fraud as a form of violation in a relationship of trust, urged by the joint and simultaneous existence of three main elements: Perceived Pressure, Perceived Opportunity, and Rationalization. Cressey synthetised this idea through the model called the "Fraud Triangle".

A person is usually driven to committing fraud: when there is a problem, often to meet earnings expectations or a particular financial target, which cannot be shared with others (*pressure);* when in breaching the trusted relationship there is a way to resolve the problem, it is the only component that a company exercises complete control over (*opportunity) or* when the act of fraud is justified and minimised in order to not let the misconduct conflict

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[1] Donald Ray Cressey (April 27, 1919 – July 21, 1987) was an American penologist, sociologist, and criminologist who made innovative contributions to the study of organized crime, prisons, criminology, the sociology of criminal law, white-collar crime

with the moral and ethical code of conduct (*rationalisation*)[2]. All the studies that have been conducted afterward confirm the validity of this theory by Cressey, which therefore is still used as a reference in the field by professional and researchers. Before that, however, it is necessary to make some considerations.
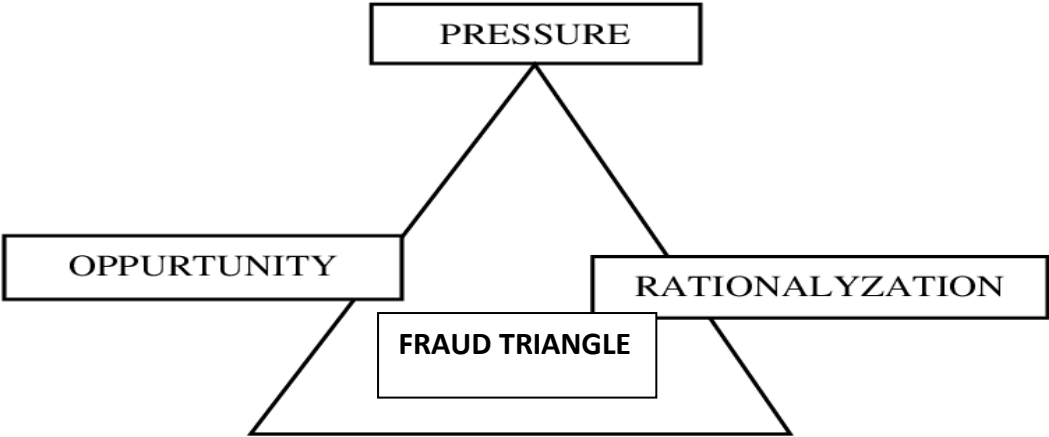
1.1-The fraud triangle. Source: Other People's Money. A study in the Social Psychology of Embezzlement; Patterson Smith, Montclair, 1953 - Cressey, Donald.

Since it does not exist a legal and universally accepted definition of fraud the underlying analysis will try to look at it from different point of view in order to study the event in the most complete way. For explanatory purposes I will start by to examining the meaning that the term fraud assumes. Elliot and Willingham (1980) define financial statement fraud as management fraud: "*the deliberate fraud committed by management that injures investors and creditors through.* Economic researchers added to this definition two other main elements, the first is the the damage caused by the plaintiff, who can also be only potential or not directly willed; the second is the action of concealment carried out by the one committing fraud, which has the purpose of providing a lawful appearance to an illicit action, in order to obscure the fraudulent conduct. The illegal action can be conducted by the firm, through its own directors and representatives, by the employees or by third parties, with or without the complicity of employees of the firm. In the two first cases the plaintiff is a member of the organization and he carry on the violation while offering its activity to the firm, using the

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[2] Here are cited the exact words of Cressey in his study: *«Trusted persons become trust violators when they conceive of themselves as having a financial problem that is non-sharable, are aware that this problem can be secretly resolved by violation of the position of financial trust, and are able to apply to their contacts in that situation verbalizations which enable them to adjust their conceptions of themselves as users of the entrusted funds or property».*

resources of the company itself. Regardless of the fraud scheme adopted the expedient used can always be tracked down to specific categories like artifices, deceptions, and omissions. These fraudulent actions have the purpose of obtaining a profit, by which it is meant any kind of advantage, also a non-monetary one. In general, the actions undertaken by the directors and representatives on behalf of the company bring benefits that translate in the form of an increase in the value of the organization perceived by stakeholders and shareholders.

Beside investors and creditors, more generally all stakeholders, auditors are one of the victims which suffer the most from this misconduct (Rezaee, 2002). They are impacted by great financial loss (e.g loss of position, fines, etc.) and more importantly reputation loss. Gravitt (2006) states that financial statement fraud entails the following schemes:

- Falsification, alteration, or manipulation tangible financial record
- Material and intentional omissions or misrepresentation of events, transactions, accounts, and all the other significant information that can be derived from the financial statements
- Deliberate misapplication of accounting principles on its own advantage, which should be instead used to measure, report, and disclose the true face of economic event and transaction. Which has as a direct consequence the willingness to intentionally omit the disclosures regarding accounting principles and polices.

Recently we have seen a great wave of corporate scandals hitting the market. The collapse of Enron, Adelphia, Tyco, Worldcom and many other publicly help companies shed light on how intentional firm mismanagement impact financial success. As a result of corporate financial frauds thousands of jobs were lost and shareholders value were destroyed (Prechel and Morris 2010). Beside the intangible loss of trust and confidence by investors that those activities bring in, false information spread assessment risk by analyst, suppliers, creditors and more generally the stakeholders.

The focus of this paper is on misstatements from fraudulent financial reporting which directly affect stakeholders by misleading and deceiving investors and creditors through false financial reports. In this paper an extensive database is retrieved by the US Securities and Exchange Commission (SEC) between 2011 and 2016. The database contains information about firm level and market level economic factors (Compustat) and corporate governance (BoardEx). To test the hypothesis regarding the antecedent conditions of firms more likely to commit fraud, the sample of fraud firms is compared to a selected general sample of public

non-fraud US firms. This paper relates to the literature examining the effect of various measures of competition on managerial discipline and at the same time the financial and operational position of firm in the industry. On one hand, competition can diminish the conflict of interest by incentivizing managerial effort. On the other hand, some researchers argued that competition could pressure managers to distort the perceived performance relative to competitors. I shed light on this relationship by exploiting a newly developed (Hoberg and Phillips; 2010, 2016) firm-level measure of product market differentiation. The results are consistent with a disciplining role by the channel of competition, which document that product market similarity is strongly associated with lower corporate fraud. Specifically, the result show that an increase in product market similarity is associated with a decrease in the probability of the rate e of SEC enforcement actions. The results are robust to the inclusion of control variables that have a documented relation to corporate fraud such as firm size, board independence, industry sectors.

One of the limiting factors of analysis in this field is the scarce availability in rate of observed fraud across industries (Povel et al., 2007; Wang et al., 2010). Indeed, it is cumbersome to perfectly control for time varying industry characteristics that may affect corporate fraud. Therefore, initial public offerings (IPOs) and mergers and acquisitions (M&As) of all firm's rivals will be used as an exogenous shock to control for firm product differentiation. Using this control variable as exogenous shock, I still find strong evidence that the likelihood of committing corporate fraud is significantly lower for firms with a less differentiated product mix. While it is not possible to totally rule out the presence of omitted variables to jointly determine a firm's fraudulent reporting and rival IPO and M&A activity, findings suggested a causal link between product differentiation and corporate fraud.

One empirical concern is that only detected, rather than all committed fraud is observed (Dyck et al., 2013; Dimmock and Gerken, 2012). The latter mean that our empirical measure of fraud capture the outcome of a firm committing fraud and being detected by SEC. However, my findings suggest that firms with higher product market similarity, complex in terms of firms size and which experienced declining earnings still have a higher rates of detected fraud. That is, managers either engage in more fraud or are more likely to be caught. This argument is consistent with prior empirical work stating that benchmarking informs boards regarding CEO ability (Murphy, 1986) as well as market- and industry-wide conditions when determining CEO pay (Oyer, 2004).

The analysis also complements some empirical work conducted by Wang and Winton (2014) who show that industry-level information affects fraud detection. I will examine the impact of financial conditions on distinguishing fraudulent firms from the non-fraudulent counterparts. Nowadays fraudulent behaviours are more likely to be heard coming from prominent firms. Therefore, it is of interest to outline whether this is driven by the fact that high-performing firms are more concerned with maintaining their reputation relative to high aspirations and shareholder's expectations. In fact, these pressures may be greater for prominent firms leading them in the vicious cycle of fraud or the reason could be simply because they are more likely to be detected thanks to media attention. The final goal is to be able to discern whether adjustments in corporate governance have a relevant impact on firm performance for companies that are vulnerable to a corporate culture fraud. Being in a prominent and prestigious position in the market is identified by a dummy variable equal to 1 when the firm is part of Fortune 500. Fortune 500 firms are the largest public companies by revenue in the US and include well-known companies like Bristol-Myers Squibb, Coca-Cola, and Halliburton. The main finding from this paper suggests that being one of these prestigious firm increase the odds of corporate fraud to 2.02 times.

Prominent firm may draw on aggressive or even illegal means to maintain their status and influence especially when faced with potential demotion in the status hierarchy in order to meet expectations. Therefore, after having confirmed these propositions, I will try to shed light on firm financial distress as a precursor of fraud. Although much research has already been conducted in this field the potency of failing financial conditions as a cause of illegal corporate behaviour has not been demonstrated yet. Given that there is still the need to explore the different measures of financial performance, and characteristics such as firm prominence might condition the effect of financial indicators on fraud risks.

This work relates to the literature on corporate governance and corporate fraud (e.g. Beasley, 1996; Faber, 2005; Khanna et al., 2015). Several papers in the past suggested that corporate governance mechanism are endogenous responses driven by internal governance mechanism, or from external monitoring from entities like analyst, banks or institutions s (Gillan et al., 2011). My findings suggest an alternate source of external discipline combined with key driving internal financial variable: product market competition, which complete recent work by showing that competition can be used as a substitute for other corporate governance mechanism (Giroud and Mueller, 2010; Chhaochharia et al., 2016); and I will

explore different dimensions of firm financial performance, and the complexities of how firm characteristics might condition the effects of financial indicators on fraud risk.

This study contributes to the literature in three important aspects. First, although the relationship between corporate governance and likelihood of fraud has been previously analysed, this study by combining an extensive examination of internal performance variable and aspect of the committee of directors (variable including the proportion of outside members on the board) gives a broader interpretation of the event. Second, another interesting aspect concerning prominence of firm (how much the firm is considered prestigious in the market) will be analysed in order to see whether there is any relationship of causation rather than correlation. Finally, in this paper we will move beyond the traditional measures of competition to explore whether product market differentiation helps on avoiding fraud or increases the pressure of committing it on average.

The main questions asked are: How do financial condition of fraud firms behave compared to non-fraud firms (e.g. profit gains or losses, bankruptcy risk, market growth)? To what extent does firm prominence condition the effects of financial performance on fraud risk? Do corporate governance measures affect firm's likelihood of experiencing fraud? In the following sections, we review prior research on corporate financial fraud, describe relevant theoretical literature, and set forth the study's research hypotheses.
We then present data, methods, and findings and discuss implications of results.

Literature

An extensive and robust empirical literature has been done on various form of corporate fraud. Since there are lot of external and internal factors that may influence public firms towards wrongdoing, the investigation on fraudulent behaviour stays complex and prior research are limited. Different papers have documented the relation between corporate governance and the likelihood of financial statement fraud. For instance, Loebbecke, Eming, and Willingham (1989) examine how audit committee and board governance mechanisms is relevant in decreasing the likelihood of financial statement frauds. Later, Beasley (1996) demonstrate the negative relationship between financial frauds and the board composition, finding low percentages of outside directors in fraud firms, compared to no-fraud ones. Similarly, Uzun, Szewczyk, and Varma, in 2004 findings suggest that the board composition and the structure of a board's oversight committees are associated with the corporate fraud

cases. Following the previous perspective, Beasley, Carcello, Hermanson, and Lapides (2000) focus on important corporate governance differences between fraud companies and no-fraud ones. Furthermore, there are many other studies that analyse the fraud frequency correlated to some mechanisms of corporate governance. For example Faber (2005) showed a negative relation between fraud and some characteristics of the board and the audit committee; Dechow, Sloan, and Sweeney (1996) concerning board features; Erickson, Hanlon, and Maydew (2006); and Ndofor, Wesley and Priem (2015) according to the executive compensation system. One of the main limit is that lot of the papers cited above have relied on small samples of frauds firms, because of the challenge on collecting fraud firm related information's.

Some previous study examines competition and the influence it has on different aspects of business, including financial reporting. Although many researchers' findings contradict each other. For instance, Balakrishnan & Cohen (2011), state that competition is a disciplining force that restrains manager from report distortions. While on the contrary, Gertner, Gibbons & Scharfstein (1988) state that companies in more competitive industries are more likely to report distortions on financial information.

Rezaee (2005) found that consequences associated to fraud are severe and can be dangerous to the society. Among the myriad, one can think about bankruptcy, change in owners, delisting by national stock indexes and the company can be persecuted and sanctioned. Karpoff et al. (2008) additionally find that penalties imposed by SEC (Securities and Exchange Commission) are proportional to the reputational damage that fraud firms has suffered. Given that, we can conclude that fraud has important consequences on both, the company involved and the stakeholders.

In order to be able to prevent this fraudulent behavior from happening it is important to understand how fraud depends on different factors. Therefore, the relation between fraud and competition needs to be examined closer.

Finally, a survey of CFOs by Dichev et al. (2013) showed that comparability between rival firms is an important means for identifying financial reporting abnormalities. Building on their insight, the paper will include a variable to analyse whether greater product market overlap can facilitate the comparability between financial statements, and especially enrich the monitoring activities and improving fraud detection.

Hypothesis

In this paper the analysis has the purpose of proving some hypothesis to test whether and to which extent the previously described internal and external firm variable may distinguish between fraud and non-fraud firms.

> *Hypothesis 1: (Profitability) firm which struggled on term of profitability recently should be more prone to corporate fraud than firms which proved to have solid profits during the past year.*
>
> *Hypothesis 2: (bankruptcy risk) firms with a high risk of bankruptcy should be more prone to corporate fraud than firms that are safe from sudden bankruptcy in the short term.*

In general, corporate fraud is aimed at enhancing the appearance of a firm's financial performance, or to reach a promised target that stakeholders are expecting. One of the fundamental goals for a company is to ensure longevity and financial stability. When the latter is no more assured, it will run against corporate profit seeking goals. Profitability captures the ability to meet near-term financial targets while bankruptcy risk captures the ability to ensure stability and longevity signalled by overreliance on debt. Therefore, firms expecting low profits and struggling to maintain their solvability are more willing to entertain fraudulent behaviour to improve their position. For this purpose we use three main variables the Altman Z score, declining earnings and return on asset.

> *Hypothesis 3: (Growth Opportunities) firms with a rapid growth expectation could be more pressured to engage in corporate fraud than modest growth firms.*

High performance is increasingly difficult to achieve over time, and when expectations become overly optimistic or a planned high risk strategy fails management could be more pressured to resort to corporate securities fraud. Previous studies conducted by researchers like Loebbecke, Eming, and Willingham (1989), Bell and Carcello (2000), Beasley (1996), and Erickson, Hanlon, and Maydew (2006), has shown that firms with a high growth expectation in the market to meet it can induce to misstate the financial statement during a turndown to continue to meet analysts' forecasts. For this purpose we will the Tobin's Quotient variable.

Hypothesis 4: (firm prominence) Prestigious firm status is more susceptible to maintain than less prominent firms

In the stock market is widely recognised a hierarchical structure to public companies more prominent firms have are market-dominant and have US household name-recognition. I will use the privilege to be par of the Fortune 500 to asses this.

Hypothesis 5: (Product market differentiation) firms with low product market similarity are more likely of committing fraud and being caught.

This hypothesis is consistent with evidence that the effect of product market differentiation has a large economic effect on fraud. This argument has been proved also by Murphy, 1986 with the evidence that benchmarking informs boards regarding CEO ability, as well as market- and industry-wide situation when deciding CEO compensation (Oyer, 2004)[3].

Hypothesis 5: (IPOs and M&As) higher IPOs and M&As activity of competitors should be associated with a higher incidence of detected fraud.

Although it's difficult to ascertain the explanation for why the presence of rivals would decrease outsiders' ability to detect fraudulent reports, one reason could be that managers rationally react to an increased detection rates by committing less fraud. To explore this IPOs and M&As activity will be exploited, specifically they will be used as exogenous shock to firm's public information. IPOs increases the public available information's of existing competitors which in turns increases the ability to asses, scrutinise and compare all related firms financial statements (e.g., Bauguess et al., 2013). On the other hand, M&As attract more attention in the merging firms industry due to the potential spill-over effects on rivals, and more generally on all stakeholders (e.g. Fee and Thomas, 2004).

Hypothesis 6: (Product market differentiation) Less product market differentiation activity can be associated with a higher or lower incidence of detected fraud.

Previous research by Dichev et al. (2013) showed that comparability between rival firms is a key factor to identify financial reporting abnormalities. Building on this rational I will try to prove whether greater product market similarity can enrich financial statement comparability,

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[3] This is also consistent with the benchmarking effect of competition of Hsu et al (2017) which showed that analyst produce more accurate forecast for firms that faces more competition.

thus making easier to monitor and improve fraud detection. This benchmarking can be a force disciplining managers' reporting practices, and thus lead them to commit less fraud. Or alternatively, an intense product market competition driven by the fact that in the market there less differentiated product can pressure managers to distort their reports through manipulation (see Shleifer, 2004; Tirole, 2010). Until recently this relationship remained unresearched since only coarse industry-level measures of competition have been available.

Data
Sample Selection
I will follow a recent empirical work of Schwartz et al. (2020) which defines corporate accounting fraud as "the intentional, material misstatement of financial statements that causes damages to investors." Schwartz et al. (2020) advocate using a combination of public and private enforcement realising action through AAER to capture as many as possible reported fraud. Through the government website I scanned through all the reported enforcement release and transformed the information in a database including the company name, when the firm were committed and the reason why.

AAER data are obtained for the sample period from 2011 to 2016. Following the instruction of the U.S. Securities and Exchange Commission (SEC) issues AAERs during, or at the conclusion of, an investigation against a company, an auditor, or an officer for alleged accounting or auditing misconduct. The misstatement investigations in our sample occur mainly for four different reasons:

1. Improper revenue recognition, reflect a false financially strong company by including artificial revenues resulting in increased net worth for the company creation of fictitious revenue transactions.

2. Understatement of expenses, when a company capitalizes current costs that do not benefit future periods just inflate it is net income (e.g WorldCom case)

3. Overstatement of assets, reflect a false financially strong company by including fictious asset or artificial revenues resulting in increased equity

4. Miscellaneous techniques, all the cases of fraud that do not fall in one of the above fraud schemes, they can impact on equity account records, related-party transactions and misclassification of gains

Assessing factors that differ fraud firm from their non-fraudulent counterparts addresses a lack of comprehension about organizational characteristics and fraud conditions.

Our primary independent variable, *fraud*, is a binary variable equal to one for all firms' years in which there is a AAER enforcement release. Since the average time between the beginning year of fraud and the enforcement release is of 3 years in our sample, only firms which existed for at least two years between 2007 and 2013 were targeted. From the final sample data all cases involving a non-US incorporated publicly traded firm were leaving 117 cases. After excluding fraud firms (even those not ultimately analyzed), I selected from nearly 10,000 public US-incorporated firms reporting to SEC for one or more years. We targeted a control group of the same the size of the fraud group.

Standard & Poor's Compustat North America database contains a well organised and consistent financial data on all active and inactive companies over their entire history as public firms. We used this source to select a comparable control group and collect financial data on firms. Whereas I used BoardEx database to retrieve data about corporate governance structure. The sample of IPOs and M&As needed to create our exogenous control variable was collected from Thomson Reuters SDC platinum financial securities database from 2006 to 2013. From the sample collected from Thomson Reuters SDC platinum I examine deals where at least 50% of the target was being bought and focus only totally completed deals that are more likely to drawn attention in the market compared to withdrawn ones.

Variable's description

All our independent variable and control variable measure firm conditions in the fiscal year prior to fraud initiation. We used as a reference year between 2007 and 2013. Firstly, firm characteristics and financial measures were obtained from Compustat, BoardEx, Thomson Reuters and TNICS database.

I will now examine our main variable of interest. Profitability is proxied by return on assets (ROA), bankruptcy risk, growth opportunities proxied by Tobin's Quotient, firm prominence proxied by being part of Fortune 500 and lastly, product market differentiation proxied by the average similarity score.

First, pressure as a result from competition will be measured through the our main variable of interest Altman z score and declining earnings. The Altman Z score is used to predict the chances of a company going bankrupt in the next two years. The model was developed by the American finance professor Edward Altman in 1968 as a measure of the financial stability of companies. DeAngelo & Skinner (1995) show that only a small part of their

sample firms, ranging from 5% to 24% over the years, face earnings decline. Earnings data were collected from Compustat, using this data we calculated the percentage change in earning from one to the other. The sample shows a mean earnings growth of 59.15 yet most firms shows a negative percentage change therefore I consider a decline of 60% or more as a decline that can affect the management behaviour.

Next to earnings decline and Altman Z score, I examine also the pressure of having high debt to control for any possible omitted variable regarding pressure from competition and bankruptcy risk. Following the definition of Skousen & Wright (2006) I use the leverage as proxy to measure external pressure, representing high debts. Richardson, Tuna & Wu (2002) define leverage as the sum of short-term debt and long-term debt divided by the end of year total assets. Burns & Kedia (2005) state that restatement firms' leverage has a mean of 0.256. Based on this numbers I conclude that a value of 0.4 results in pressure for the management. This variable as well is a dummy variable, with a value of 1 if the leverage is higher than 0.4 and a value of 0 when leverage is lower.

The third variable of interest factor is growth-risk opportunity. A firm potential future growth/risk is to be considered stronger when the market capitalization exceeds accounting-based worth. Under strong growth/risk conditions the management are more incentivised by additional capital available to implement aggressive growth strategies. To this mean I calculate the Tobin's Quotient which is the ratio between market capitalization and replacement cost of assets. When the Tobin's quotient is close to 1 hint to a stable cash flow with little opportunity for stunning growth or decline. This is also in line with Wang & Winton (2014) who state that fraud monitoring is less effective when competition is low, because there are only a few companies to benchmark.

The fourth variable of interest is a measure of product differentiation developed by Hoberg and Phillips (2010,2016). They created the product market similarity score, which uses textual analytics to capture how much is a firm's product market related with the other firms. The process consists on vectorizing the product market vocabulary from the business from text analysis of firm 10K product descriptions. They assigned to each firm its own set of rivals. The measure ranges from 0 (no similarity) to 1 (perfect similarity). I made use of the text-based network industry competitors (TNIC) that Hoberg and Phillips define as a by-product of their product similarity score. The latter is a network way of identifying competitors to each firm. Competitors are all those firms with close product characteristics to each firm based on a

continuous measure of similarity. The TNIC competitor set includes all firms with a similarity score above a given threshold. Thus, for any two firms i and j that exceed a given threshold, c, we have a real number in the interval [c,1] describing the similarity in the two firms vectorized product market description. I created one the of the main independent variables of interest, Average Similarity Score, using TNIC competitor classification and product similarity scores. The variable is equal to the average pairwise similarity score of all competitors within a firm-s TNIC-3 classification in each year. As we can notice from Table 3, firms in the sample have 54 competitors on average (59 for fraud firms, and 50 non-fraud-firms). Classic models of competition suggest that the more firms there are offering similar products, the competition would be more intense.

Product market differentiation should capture the degree to which each firm's rivals provide a suitable benchmarking of performance, and thus facilitating the detection of fraud. However, this definition also proves the fact that competition is an endogenous outcome of market forces and that firms can choose to differentiate their product as much as they can (e.g., Tirole, 1988). To isolate this benchmarking effect another alternative measure for product market differentiation was created. I control for a commonly used measure in the literature, the HHI I (Hirschman, 1945; Herfindahl, 1950), and also the marginal profitability (Bain, 1951). HHI has a maximum value of 1 that is attained if a single firm makes up an entire industry, and a minimum value of $1/NN_{jj}$ if each firm has equal weight in industry j.

One potential constrain with the main variable Average Similarity Score is that similarity within market product could be related to other external factor like pervasive differences in fraudulent activity across industries which has been previously documented in the literature (e.g., Povel et al., 2007; Wang et al., 2010). For example, a CEO more likely to commit fraud can decide a particular industry based on characteristics that are potentially associated with the underlying product market differentiation. For this reason, industry and industry-year fixed effect are in included in this research, this will help to mitigate this concern. Even so it is still difficult to perfectly control for this concern, differences in the industry characteristics that are related to fraud. We therefore exploit the effect of within-industry changes in product similarity.

To this end, IPOs and M&As of a firm's rivals as an exogenous shock to firm-level product differentiation which should be for sure out of a firm's control. In particular, I control for the number of competitors firm undergoing an IPO or being acquired as an instrument for

firm *i*'s total product market differentiation. For every couple of observation between competitors, *i* and *z*, I reported whether firm *z* underwent and IPO or M&As in year *t.* I then created my variable, *ipo_acq*, equal to firm's rivals number of time they had an IPO and if they have been acquired. All firms that did not undergo an IPO or M&As were simply not included in the sum. On average Table 3 evidenced that there are 3.29 rival IPO or acquisition by competitors per firm-year for fraud firms, and 2.88 for non-fraud firms. this could already suggest that firms that are more likely to commit fraud are the one subject to market pressure.

The control variable I created, *ipo_acq,* counts the number of acquisition or IPOs underwent by competitors of a firm in a particular year. When a competitors undergo an IPO, they inject capital for previously existing competitors, thus they can potentially change the pressure and increase competition with those rivals. Similarly, when a competitor is acquired, this can consolidate market power and change (threaten) within-industry relationships. Summarizing both event, IPO and M&As, can influence a firm's total degree of product market differentiation. The positive sign between *ipo_acq* and *AverageSimilarityScore* (Table 4) hint to the fact that when competitors undergo an IPO or M&As are more similar with firm *i*, this in turn will on average increase firm *i*'s overall similarity score.

The purpose of this control is to circumvent the joint decision of selection into industries and fraudulent behaviour since it is an endogenous effect, the average firm likely has very little control over the timing of a competitor's IPO or M&As decisions. However, one potential restriction against this is that acquisitions and IPOs usually happen in waves that mostly correspond to industry evolutions, which in turn can be associated to incentive to commit fraud because of the pressure. For this reason, we control for industry fixed effect. Moreover, the variation in this setting comes from the rival undergoing an IPO or M&As based on similarity.

Lastly there we have the control variables. For fraud detection risk this are firm size and the industry environment; for product market differentiation I use the number of IPOs and M&As retrieved from Thomson Reuters database and the Herfindahl-Hirschman index. This last measure is often used in researchers to calculate the industry concentration ratio, by researchers like Dedman & Lennox (2009) and Ali et al. (2014). The HHI can be derived through a formula equal to the sum of squares of individual public company's market share within the industry in a given year. The market share is equal to total sales per firm in a year divided by the sum of all sales industry (I used the 2 digits SIC).

To calculate firm size, I used the natural logarithm of asset. This a well-known method to determine firm size, priory used by Carcello & Nagy (2004). Dalbor, Kim & Upneja (2004) also use other methods to calculate firm size, such as number of employees and the natural logarithm of sales.

To determine in which sector a company is operating I use the full 4 digits SIC code provided by Compustat. The SIC codes provides classification into industries, and I use the same classification to divide each firm in the sector it belongs. The SIC codes that ranges from 0100-0999 is for agriculture, forestry and mining, from 1000 to 1499 is for mining industry, from 1500 to 1799 is for cnstruction, from 2000 to 3999 is for manufacturing, from 4000 to 4999 is for transportation, communication, electric gas and sanitary services, from 5000 to 599 is for the trade sector (retail and wholesale), from 9100 to 9729 is for public administration, from 9900 to 9999 non classifiable firms.

Research design

The methodology executed in this research consists of a logit cross-sectional regression analysis while using a sample of X fraud firms and X no-fraud firms. No-fraud firms were then matched to the fraud firms based on:

1. total asset which should be greater or smaller than 30% than the fraud firm total asset to be considered a valid counterpart,

2. the industry which has to be the same

3. the year of matching, this imply that the counterpart (non-fraud firm) should respect the above criteria in the same year where the fraud by the fraud firm was detected.

The correctness of the hypothesis formulated in the paragraph above is verified through a logistic regression analysis where the dependent variable "fraud" is equal to one for firms that engaged in financial fraud and zero otherwise. We calculated a scheme duration using information available on the report provided by SEC of when the financial frauds started until when the frauds ended. Although of great impact fraud were short in duration, on average they ended within a year.

Analytic Technique

The reason why I use a case-control study design for fraud event is to examine whether a given factor is more prevalent among fraud firm cases rather than among the control group of non-

fraud firms, excluding all the statistical controls; meaning that, our analysis aim is to detect whether a condition serves as a distinguishing risk factor for fraud. Logistic regressions are used as a predictive model and mostly appropriate for a binomial outcome in order to predict the likelihood of an event happening, specifically its magnitude and direction of significant associations between the element of interest and the fraudulent behavior. Robust standard errors were specified to control for potential heteroskedasticity and to provide a more conservative overview. The intercept coefficients are not meaningful because all fraud cases were selected for inclusion and after that a sample of non-fraud firms were selected according to some criteria. Since logistic regression is quite unique in that it estimates on unbalanced case-control data yield a correct coefficient whatsoever (King & Zeng 2001). Odds ratios contrast the change of fraud mainly through two conditions, excluding potential omitted variable. A large odds ratio means that the chance of committing fraud by a firm is much greater than that of the reference group (non-fraud firms).

The model I will perform are three. In the first regression only opportunity environment variable are created.

$$Fraud_{it} = \alpha + \beta_1 Agriculture\ Foresty\ Fishing_{it} + \beta_2 Mining_{it} + \beta_3 Construction_{it} + \beta_4 Manufacturing_{it} + \beta_5 Trasportation_{it} + \beta_6 Trade_{it} + \beta_7 Finance, Insurance\ \&\ Real\ Estate_{it} + \beta_8 Services_{it} + \beta_9\ independence\ of\ director_{it}$$

Next the factors of market position, firm size, the market share and whether firms belong to the list of firms of Fortune 500.

$$Fraud_{it} = \alpha + \beta_1 Agriculture\ Foresty\ Fishing_{it} + \beta_2 Mining_{it} + \beta_3 Construction_{it} + \beta_4 Manufacturing_{it} + \beta_5 Trasportation_{it} + \beta_6 Trade_{it} + \beta_7 Finance, Insurance\ \&\ Real\ Estate_{it} + \beta_8 Services_{it} + \beta_9\ independence\ of\ director_{it} + \beta_{10} Firm\ size_{it} + \beta_{11} Market\ share_{it} + \beta_{12} Fortune\ 500_{it}$$

In regression 3 the factors of competition and financial performance are added. Precisely:

$$Fraud_{it} = \alpha + \beta_1 Agriculture\ Foresty\ Fishing_{it} + \beta_2 Mining_{it} + \beta_3 Construction_{it} + \beta_4 Manufacturing_{it} + \beta_5 Trasportation_{it} + \beta_6 Trade_{it} + \beta_7 Finance, Insurance\ \&\ Real\ Estate_{it} + \beta_8 Services_{it} + \beta_9\ independence\ of\ director_{it} + \beta_{10} Firm\ size_{it} + \beta_{11} Market\ share_{it} + \beta_{12} Fortune\ 500_{it} + \beta_{13} High\ competition_{it} + \beta_{14} Leverage_{it} + \beta_{15} HHI_{it} + \beta_{15} ROA_{it} + \beta_{16} Declining\ Earnings_{it} + \beta_{17} Tobin's\ Q_{it}$$

By including all variables in one regression it is possible to see if there are reciprocal relations between any of the variables.

Summary statistics

I will now briefly describe and compare characteristics of fraud and non-fraud firms, after which we will apply a multivariate logistic regression to evaluate the study hypothesis about financial circumstances of fraud and non-fraud firms. Table 1 presents the descriptive statistics and shows all the similarities versus differences between the market circumstances and organizational characteristics of fraud and non-fraud firms. the independent variable created have been important in our analysis. Since one of our matching criteria was by industry, we have an almost perfect representation among fraud firm and non-fraud firm. Board independence structure is more prevalent in non-fraud firms, which what I expected. Indeed board independence is more likely to guarantee that insiders and executive owners are able to exercise diligent control over the board's activities and decisions.

Turning to the prominence in Table 1, two main key findings emerge that both fraud firms and non-fraud firms are more likely to have a great market share. However, on average firms more likely to be detected for frauds have a greater market share. The maximum market share a fraud firm have in our sample is 80.71%, while for firms non committed for fraud is 61.30%. Second, the share of fraud firms designated as Fortune 500 is much greater in the fraud firms sample compared to our control group. This is a dummy variable, therefore the mean is between 0 and 1, fraud firms which are part of the fortune list are almost one fourth compared, compared to non-fraud firm which are les than one seventh.

Switching now to the importance of financial characteristics as antecedent's conditions for committing fraud firms, Table 1 shows descriptive results comparing profitability, bankruptcy risk, and growth/risk ratio for fraud and non-fraud firms. First of all, the fraud firms from our sample have a homogeneous and similar profitability as compared to the control sample but fraud firms shows a slightly higher mean profitability, even if the higher peak of profitability reached in the whole sample belongs to no fraud.

Second, bankruptcy risk is higher for non-fraud firms – thirty percent were at imminent risk of bankruptcy compared to over forty-six of non-fraud firms (see Table 3).

In the appendix in Panel C, Table 3 Third fraud firm showed a higher growth risk profile as assessed by comparing the market valuation to replacement costs (Tobin's Q). About eighty percent of fraud firms have higher growth opportunities but with a perhaps higher organizational risk compared to sixty-nine percent of non-fraud firms.

Table 1. The table below shows some other summary statistics, including mean, percentile grouped by observations on firms that committed fraud and firms that did not. Overall the value shows what we predicted by the logistic regression we performed in Table 2.

		Decl. Earnings	Rivals	Leverage	Firm Size	Fortune 500	IPOs and M&As	Market share	HHI sale	Board Indep.	Tobin's Q	Altman Z Score	ROA	Avg. Sim. Score
No. Obs		881	881	875	881	868	881	810	881	881	875	847	881	841
Mean	Fraud	0.12	59.78	0.51	6.95	0.23	3.29	3.05	0.37	0.16	2.83	5.43	5.75	0.03
	Non-fraud	0.16	50.62	0.48	6.77	0.14	2.88	2.51	0.39	0.2	3.06	5.82	5.13	0.03
Std. Dev	Fraud	0.33	87.86	0.24	2.2	0.42	5.64	8.39	0.21	0.36	4.1	18.11	9.4	0.02
	Non-fraud	0.37	74.36	0.26	2.26	0.35	5.32	7.38	0.21	0.4	10.4	17.16	5.99	0.03
25th Percentile	Fraud	0	5	0.34	5.16	0	0	0.02	0.23	0	1.36	2.33	0	0.02
	Non-fraud	0	4	0.28	5.27	0	0	0.01	0.25	0	1.13	1.63	0	0.02
75th Percentile	Fraud	0	79	0.65	8.58	0	4	1.6	0.46	0	3.18	7.73	7.59	0.04
	Non-fraud	0	63.5	0.65	8.33	0	3	0.78	0.5	0	3.48	8.43	8.48	0.04

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Worth of notice in the above Table 1, is that the number of competitors in the market is higher for fraud firms (59) compared to non-fraud firms (50).

Empirical findings

So far, the findings show that weak financial performance as well as financial distress are characteristic of non-fraud firms. Firm prominence and market dominance also are different between our two group of interest. Large market share, and Fortune 500 status were more characteristics of fraud firms. that larger and more well-known firms look like they are more prone to fraud might be a casualty reflecting their greater opportunity thanks to larger assets and more organised corporate structure, therefore I will control for this possibility in the logistic regression. However, if the effect of market prominence prevails after we control for the latter, it would present a paradox that more prestigious, highly regarded from theorised audience firms were more prone to financial accounting fraud -which is what I already theorised.

Logistic regression model helps to identify various opportunity-related factors and identify independent effects of firm prominence, financial conditions and future growth expectations on odds of fraud. Table 2 shows different model of logistic regression predicting corporate fraud based on firm: operating environment, market prominence, and firm financial performance conditions.

Table 2- Model 1 reports the results using only control variables that proxy for opportunities to commit fraud related to a firm's operating environment, including industry sector and firm governance structure. Overall, these factors account for 3% percent of the variance in fraud status. Precisely we can see that being in the sector of Finance, Insurance and Real Estate is negatively associated, meaning that there is about 80% lower chance of committing fraud if a firm belong to this sector. Likewise, a structured corporate governance where the company is more likely to have an independent board of directors have a lower likelihood of 18% to commit fraud.

In Table 2, Model 2 augment model 1 by including variables concerning firm market dominance and firm prestige characteristics as fraud predictors, controlling for opportunity/operating environment. Having a great share of the market both increase the

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probability of committing fraud. For example, being part of Fortune 500 is at 1.8 the odds of fraud compared to those of other firms.

Table 2. Logistic regression predicting fraud (vs. non-fraud) status based on firm opportunity environment, prominence, financial well-being, and growth/risk profile, product market differentiation

	Model 1		Model 2		Model 3	
	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE
Firm fianncial performance						
Profitability (return-on-Assets)			-	-	1.01*	0.004
Declining Earnings			-	-	1.11	0.215
Growth/risk Profile (Tobin's Quotient)						
Low Growth/risk			-	-	-	-
Modest Growth (>1 & 1.3)			-	-	1.80*	0.532
Strong Growth/risk			-	-	1.51*	0.316
Firm Market Position						
Market Share (firm's % of industry sales)			1.01*	0.003	1.01**	0.004
Fortune 500 status			1.76**	0.375	3.61***	1.055
Firm size			0.90*	0.041	0.85**	0.051
Product market differentiation						
Average score similarity			-	-	0.001***	0.042
IPO & M&As						
high competition			-	-	1.72**	0.311
Herfindahl Hirschman index (HHI)			-	-	0.71	0.477
Leverage					1.57*	0.275
Opportunity/Operating Environment						
Industry Sector						
AgricultureForestryFishing	1.00	0.850	0.47	0.434	0.29	0.338
Mining	0.75	0.573	0.64	0.534	0.53	0.468
Construction	2.80	2.459	2.27	2.164	2.62	2.648
Manufacturing	1.05	0.753	0.86	0.667	0.91	0.760
Trasportation	1.64	1.316	0.90	0.781	1.13	1.053
Trade	1.15	0.844	0.90	0.714	1.31	1.128
Finance, Insurance & Real Estate	0.20*	0.190	0.12*	0.123	0.07*	0.071
Services	1.14	0.819	1.03	0.802	1.33	1.123
Board Independence	0.72*	0.129	0.64*	0.117	0.55**	0.114
Pseudo R2		0.03		0.03		0.06

Model 3 in Table 2 further develops the logistic regression by including all the main variables measuring antecedent firm financials on ensuing fraud risk: prior-year profitability, bankruptcy risk and opportunity for growth. Firm experiencing increasing profitability has proven a statistically significant higher odds of fraud. While when we account for the risk of bankruptcy risk we do not distinguish a statistically significant effect on fraud, therefore for simplicity we did not include this variable.

Furthermore, when we account for growth-risk profiles exhibited significantly increase odds of financial securities fraud in the following year compared to undervalued firms. indeed, firms under a potential growth have from 1.5 to 1.8 times higher odds those that of stable firms. Surprisingly, firms with a prominent market position reflecting a position in Fortune 500 and even after accounting for firm financial position, being part of the index has odds of fraud that are 3 time those that were not included.

In this last model we accounted as well for average market similarity which has shown a really strong negative odd to fraudulent behavior. This suggest that the disciplining effect of product market similarity decreases the propensity of fraud. This result is robust to several variation indeed by trying to avoid result driven by omitted variables, I controlled for the variable *high_comp* which did not change the sign of *AverageScoreSimilarity* and gave a positive correlation between an increased number of IPO and M&As. In particular, the empirical results showed that we have 1.7 higher odds of committing fraud in the event that the firms belong to a sector highly affected by IPOs and M&As.

Robustness check
Different control sample and excluding special firms
Previous tests were all performed through a detailed matching criteria (by asset, sector and year) and we included all firms from all industries. In the following chapter I will conduct the same analysis on a different control sample, for instance, a sample randomly selected from the population without any criteria, and I will exclude some firms.

A comparison through a randomly selected group of non-fraud firms may bring different benefits to our analysis and strengthen the already found relations between firm characteristics and firm prominence (Schwartz et al., 2020).

Table 5.				
	Fraud firms		Non-fraud Firms	
Panel B. Opportunity/Operating Environment	Percent	n	Percent	n
Industry Sector				
Agriculture, Forestry & Fishing	1	1	0	0
Mining	4	3	5	3
Construction	4	3	2	1
Manufacturing	46	35	46	28
Transportation	3	2	11	7
Retail/Wholesale trade	9	7	11	7
Finance, insurance & real estate	1	1	5	3
Services	30	23	20	12
Corporate Governance & Oversight				
Board Independence	18	14	23	14
	Fraud firms		Non-fraud Firms	
Panel B. Firm Prominence	Percent	n	Percent	n
Fortune 500 Status	21	16	6	4
Market Position Within Industry				
Small market share	0	0	6.6	4
Average market share	1.3	1	16	1
Strong market share	98.7	75	91.8	56
	Fraud firms		Non-fraud Firms	
Panel C. Firm Financial Conditions	Percent	n	Percent	n
Financial Well-Being				
Profitability				
Declining profitability	28	21	41	25
Marginal profitability	11	8	7	4
Solid profitability	62	47	53	32
	Fraud firms		Non-fraud Firms	
Financial Distress	Percent	n	Percent	n
Bankruptcy risk (Altman Z-score)				
High-risk of bankruptcy	16	12	20	12
Gray zone (Altman Z > 1.8 & < 3.0)	18	14	10	6
Safe from imminent bankruptcy	66	50	70	43
	Fraud firms		Non-fraud Firms	
Growth/Risk Profile	Percent	n	Percent	n
Tobin's quotient of market-to-book value				
Low growth/risk	12	9	28	17
Modest growth (Tobin's Q >= 1 & < 1.3)	12	9	5	3
Strong growth/risk	76	58	67	41

Firstly, overmatching may happen if the matching criteria are associated to independent rather than dependent variables, or if we variables along the causal pathway, therefore leading to a loss of information or spurious relation. Matching variables are chosen a priori therefore in Table 2 we saw no variation within sectors and firm size because we had asset and industry matched perfectly, and therefore I

had to delete the variables as object of analysis. Secondly, unmatched design could result in a more efficient way and produce less biased results than the matched-case design (Rose and van der Laan 2009).

Additionally, the following analysis will exclude financial firms' sector and all the non-classifiable firms. I decided to exclude non-classifiable firms because as Wang (2013) they are most likely to be acquisition vehicles or shell holdings. Moreover, their asset size and other firms' characteristics change dramatically over the years. For what it concerns the financial sector I decided to delete those firms because one may think that they bring noise to our odds ratio interpretation. Indeed, in the financial industry it is normal to have a high amount of leverage and therefore, they probably do not have the same meaning as for non-financial firms (Fama & French, 1992).

The whole screaming process leads to 1.013 observations. In Table 5 we can see the new summary statistics results. Looking at the industry sector we may notice that overall we have a quite homogeneous distribution. The Finance, Insurance & Real Estate industry sector, Transportation sector, and Retail & Wholesale Trade sector are slightly under-represented within fraud firms while the Services sector is over-represented.

An independent board of directors was more prevalent in the non-fraud firms. Turning to the Prominence variable always in Panel B we see that on average that fraud firms have a stronger market position. Secondly the share of firms designated as Fortune 500 within the fraud group was nearly four times as great as in the random sample e (21% vs. 6% of non-fraud firms).

Turning next to the role of firm financial circumstances in Panel C, Table 5 as possible conditions for commission of corporate fraud, Panel B shows results comparing profitability, bankruptcy risk, and growth/risk ratios for fraud and non-fraud firms. First, the fraud firms are more likely to have a solid profitability compared to the randomly selected group. Second, bankruptcy risk was lesser overall among fraud firms—16% of fraud firms were at imminent risk of bankruptcy compared to the 20 percent in the control sample. Third, fraud firms show

a stronger growth-risk profile as displayed by the Tobin's Q ratio which is comparing a firm's subjective market valuation against its accounting-based replacement value.

Findings

Next, we will analyse the result produced by this new sample. Table 6 shows the new odds ratio for the three different model. In contrast with the first regression in main model we can notice that all sectors but construction have now a negative statistical significant odds of being detected for fraud . Services sector is excluded for collinearity. However, we may notice that also   Agriculture, Forestry & Fishing sector is excluded, this is because it predicts success perfectly.

Additional differences emerges as we look at firm market position, firm size in this new regression is significant and with a positive odd of being detected for fraud as the firm increase in size. Being designated on the Fortune 500 status impact is still significant but slightly weakened. The Herfindahl Hirschman index they all predict grater odds of commission of fraud by companies.

For what concerns firms' financial condition as precursor of fraud we see that growth-risk variables profile are all no more significant. Declining earnings is still significant, i recall that declining earnings is a dummy variable equal to 1 if the decline in earnings compared to the previous year was greater than 40%. Therefore, firms with declining earnings have 1.5 times more chance to be detected for fraud.

Overall, the main results from this robustness check that lower levels of competition generally lead to less fraud, is unchanged. Therefore, we conclude that the results are robust. Yet, having the possibility to research the financial firms separately could be very interesting.

Table 6.

	Model 1		Model 2		Model 3	
	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE
Firm financial performance						
Profitability (return-on-Assets)			-	-		
Declining Profitability					1.31	0.245
Marginal Profitability (+0% to <2.5% ROA)					1.1	0.291
Solid Profitability					-	-
declining earnings			-	-	1.51*	0.346246
Growth/risk Profile (Tobin's Quotient)						
Low Growth/risk			-	-	0.75	0.150595
Modest Growth (>1 & 1.3)			-	-	0.91	0.223322
Strong Growth/risk			-	-	-	-
			-	-		
Firm Market Position						
Market Share (firm's % of industry sales)			0.98*	0.003	1.00	0.003965
Fortune 500 status (¼1)			2.3**	0.622	2.02*	0.573781
Firm size			1.35***	0.065	1.34***	0.082489
Product market differentiation						
Average score similarity					0.10*	0.111607
IPO & M&As						
high competition			-	-	1.01	0.152691
leverage			-	-	1.2	0.213711
HHI index			-	-	0.15***	0.065469
Opportunity/Operating Environment						
Industry Sector						
AgricultureForestryFishing	-	-	-	-	-	-
Mining	0.23***	0.067	0.10***	0.033	0.13***	0.045
Construction	1.8	0.787	1.48	0.694	2.25	1.131
Manufacturing	0.71*	0.110	0.58**	0.096	0.83	0.189
Trasportation	0.17***	0.052	0.13***	0.042	0.17***	0.060
Trade	0.64*	0.149	0.39***	0.098	0.62	0.189
Finance, Insurance & Real Estate	-	-	-	-	-	-
Services	-	-	-	-	-	-
Board Independence	0.75*	0.123	0.93	0.162	0.99	0.187
Pseudo R2		0.06		0.13		0.15

Conclusion and Future paths

In this paper we analysed the relationship between financial parameters, opportunity environment, competition, and product market differentiation on the incidence of fraud. Having rivals with an important product market overlap can impact firms in two different ways. On one hand, less product market differentiation could facilitate the ability to evaluate

shocks faced by firms, indeed the latter may enhance monitoring by external parties such as regulators, auditors, and stockholders. In turn this effect can result in an increased likelihood that committed fraud would be detected. On the other hand, less differentiation could mean as well that there is more competition, leading firms to commit fraud to boost their perceived relative performance. We find that firms with less product market differentiation exhibit a significantly lower incidence of fraud. This still hold when we control for rivals' firm IPOs and M&As. This relationship still holds even after I controlled for another traditional measure of competition, and I found that they do not have explanatory power in predicting fraud. Collectively, this paper provides new insight on how an interesting aspect of competition, product market differentiation, influences the incentives to commit fraud through its own ability to benchmark a firm against similar peers. Thus, it highlights the role of one market-based mechanism that can affect commission and detection of corporate fraud. For the first time these results are integrated with an analysis of internal firm variable of firms and suggest that external parties could focus efforts on examining firms with fewer comparable rivals when looking for fraudulent reporting, the ones that are financially week and higher growth-risk.

The role of firm prominence and financial conditions as precursor of corporate fraud has been rarely empirically examined. To redress, the present study linked the likelihood of U.S public firm being involved with fraudulent behaviour to firm prominence, as well as to financial performance indicators. The tests started from previous research which incorporated a broad study population of U.S public firms that include companies of varied characteristics (Fortune 500) and in all economic sectors. The findings were consistent with the hypothesis and the theoretical background. First, in term of firm characteristics, fraud was more likely among firms that belonged to Fortune 500, therefore considered prestigious. Although we may think that this association reflect partly greater opportunity of America's most complex and visible firms, even after I controlled for other variable the effect persisted and stayed statistically significant. Therefore, overall we can say that also all the variables that were supposed to result in pressure, earning declining & leverage and high competition, all behaved differently. Declining earnings did not result in pressure, at least not in a significant way. On the other hand, high competition and high debt were significant and carrying a positive odd to fraud. Another las important result is that my main findings did not give any reason to believe that there any significant differences between the classified industries.

As every study this study is limited in different ways. The most important is about our fraud data. Indeed, only fraud firms which are detected are included in the sample, of course. We should therefore consider the chance that there exist lots of other firms the commit fraud on a greater scale but are not detected by governmental organizations like SEC. As a consequence, the sample may be flawed. Another limitation is the about the product market similarity. I already analysed the main concern about the possible endogeneity in this variable, and I decided to reduce noises from this variable by controlling for the main instrument that may be considered as omitted variable, however finding an instrumental variable and developing a two-stage least square approach could create more clarity in the subject.

Moreover, future research may build upon these findings and framing to advance theory and research. In general, while all firms have in common the fact that they prioritize profits and strive to outperform other, they differ in the emphases they put in goals and appropriate means, as well to which group of firms most serve as their reference group or comparison. For example, a Fortune 500 firm seem more likely to compare its financial situation to other Fortune 500 versus smaller competitors. Different types of financial performance may matter more (or less) according to their size and market share. My study perspective emphasizes the importance that reference group may have, by anticipating that greater financial pressure on prestigious firms who rely on the rational that they will have future positive market assessment.

The macroeconomic environment ongoing are also likely to drive different reputational and financial motivations. The pressure to show how profitable and growing is their own company may be more severe during economic booms when competitors seem to be thriving, and vice versa the same apply during economic downturns where competitors are affected too and lower their expectations. Future research should examine the economic impact on firms by extending the time frame of analyse and engaging in more dynamic panel models. It is reasonable to assume that companies change strategies and also illicit behaviour according to external contingencies. Prior research by Simpson (1986) and Simpson and Rorie (2011) showed that firm differed on their competitive behaviour they were willing to adopt depending on whether the industry was experiencing downturn.

It would be interesting to further investigate whether firm belonging to Fortune 500 are more likely to commit fraud because they are simply more covered by media or because they essentially lose some qualities in corporate culture when they start to grow and once, they

get prestigious. Prominent firms may be more closely scrutinised and subject to hard enforcement on financial anomalies. Some prior research conducted by McDonnell & King (2018), suggested the opposite which is that the "halo effect" associated with most famous firms protected them against blameworthiness and use of legal sanctions over informal means of resolution. Additional studies would provide much needed insight regarding how firm reputation and financial factors may affect offending and enforcement effort. Therefore, a promising path would be to explore the origins and features of firm cultures that strongly emphasize profit or growth goals with lesser regard for strict adherence to rules. Firm cultures ae identified in company values and their reward system, management, and other functional aspects. Firm cultures is essential for building reputation, but as companies develop and grow they are influenced by leadership. The top management can start to focus only on short term goals and decide to purse aggressive strategies that destroy value, and this determine acceptable risks in pursuing such strategies, and set the "tone at the top" regarding goals and acceptable means (Brown, Trevino, Harrison 2005; Hambrick and Mason 1984). This brings the need to analyse CEO and top management characteristics to increase attention on the fraud-risk of some firms, in particular prominent ones.

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Table 3. Firm characteristics and financial performance among fraud firms compared to non-fraud firms.				
	Fraud firms		Non-fraud Firms	
Panel A. Opportunity/Operating Environment	Percent	n	Percent	n
Industry Sector				
Agriculture, Forestry & Fishing	2	1	2	1
Mining	6	4	6	4
Construction	3	2	3	2
Manufacturing	45	30	45	29
Transportation	3	2	3	2
Retail/Wholesale trade	11	7	11	7
Finance, insurance & real estate	3	2	3	2
Services	24	16	25	16
Corporate Governance & Oversight				
Board Independence	13	9	17	11
	Fraud firms		Non-fraud Firms	
Panel B. Firm Prominence	Percent	n	Percent	n
Fortune 500 Status	23	15	14	9
Market Position Within Industry				
Small market share	23	14	14	9
Average market share	14	9	22	14
Strong market share	67	43	64	41
	Fraud firms		Non-fraud Firms	
Panel C. Firm Financial Conditions	Percent	n	Percent	n
Financial Well-Being				
Profitability				
Declining profitability	34	22	31	20
Marginal profitability	14	9	17	11
Solid profitability	52	34	52	33
	Fraud firms		Non-fraud Firms	
Financial Distress	Percent	n	Percent	n
Bankruptcy risk (Altman Z-score)				
High-risk of bankruptcy	20	13	30	19
Gray zone (Altman Z > 1.8 & < 3.0)	16	10	6	4
Safe from imminent bankruptcy	64	42	64	41
	Fraud firms		Non-fraud Firms	
Growth/Risk Profile	Percent	n	Percent	n
Tobin's quotient of market-to-book value				
Low growth/risk	9	6	20	13
Modest growth (Tobin's Q >= 1 & < 1.3)	12	8	11	7
Strong growth/risk	79	51	69	44

Table 4. Correlation coefficients are reported. The asterisk shows correlations that are significant at 10% 5%, and 1% level is denoted by * , ** , and *** , respectively.

	fraud	Average Sim.	IPO, M&As	Rivals	Firm Size	Declining	ROA	Altman Z score	Tobin's Q	Board Indepen	HHI	Leverage	Market share	Fortune 500
fraud	1													
Average Sim. Score	-0.0611*	1												
IPO, M&As	0.0372	0.2522***	1											
Rivals	0.056*	0.2807***	0.8632***	1										
Firm Size	0.041	0.1573***	-0.082*	-0.1085**	1									
Declining earnings	-0.0577*	0.0686*	-0.0157	-0.0051	-0.1423***	1								
ROA	0.0491	-0.0385	-0.2146***	-0.2635***	0.4234***	0.0626*	1							
Altman Z score	-0.0146	-0.0466	-0.0245	-0.0612*	-0.0705*	0.1125**	0.2376***	1						
Tobin's Q	-0.008	0.0449	0.0047	0.0029	-0.0201	-0.0549	0.0088	0.0616*	1					
Board Independence	-0.056*	-0.0807*	-0.0435	-0.0334	-0.0655*	0.0592*	0.0448	0.0128	-0.0219	1				
HHI	-0.0044	0.0592*	-0.1482***	-0.142***	0.138***	0.1262**	0.1191***	0.1381***	0.053	-0.052	1			
Leverage	0.0557*	0.2063***	-0.1256***	-0.1035**	0.4358***	-0.0322	0.0261	.29***	0.0353	-0.0553	0.195	1		
Market share	0.0342*	0.0117	0.1292***	-0.1575***	0.4176***	0.0939**	0.1153**	0.0062	0.0474	-0.0571	0.2297	0.1893***	1	
Fortune 500	0.1108*	0.1221***	-0.0725*	0.1089**	0.6158***	0.1014*	0.1721***	0.0219	0.013	-0.0163	0.1123	0.2524***	0.4622***	1

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Appendix

 For explanatory purposes, in the table below I show how many firm-year level observation I started by research with. As you can see, I hand collected 333 fraud firms from SEC database which were halved once I merged it with financial information retrieved from Compustat. I finally ended with 82 fraud firms which were then added to 82 non-fraud firms

Number Firms	Database Merge
333	AAER SEC filings
126	AAER SEC filings+ Compustat
82	AAER SEC filings+ Compustat+ BoardEx