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The Effect of M&A on Audit Quality and Audit Fees

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ABSTRACT: This paper analyses whether firms' transition of M&A has an effect on audit quality over the period 2005-2016. I find indirect evidence that there is an increase in earnings management through discretionary accruals after M&A compared to before M&A. I find no direct evidence of the effect of M&A on earnings management through the issuance of annual restatements. The results also indicate that audit fees are higher in the post-period of M&A compared to the prior-period of M&A. In the supplemental part of this paper, I find that firms are less likely to be audited by a Big N auditor after an M&A compared to before an M&A. The results contribute to regulators and provide an empirical grounding for the characteristics and consequences of M&A on the accounting and audit profession.

Keywords: *mergers and acquisitions (M&A); audit quality; auditor behaviour; Big N; audit fees; restatements; discretionary accruals; earnings management*.

Data Availability: *Data used in this paper are available from sources as described.*

JEL Classifications: *G34, M41, M42.*

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CONTENTS

I. INTRODUCTION

The cause of mergers and acquisitions[1] (M&A) is the consideration of a cost and benefit analysis of the acquiring firm merging with or acquiring a target firm. Despite the fact that the acquiring firms expect the benefits to exceed the costs, the outcome might be the opposite. Moreover, there might be other effects which the involved firms could be exposed to unintendedly. M&A shifts the ownership structure, which could be seen as a threat to third parties like auditors. Therefore, the consequences on benefits and costs of auditors could be affected by M&A likewise. In particular, in this paper I will investigate the effect of M&A on audit quality of acquiring firm in the post-period of M&A compared to the prior-period of M&A. The research question which this paper seeks an answer to is as follows:

RQ: Does the *ex-post* integration of M&A have an effect on audit quality?

Prior work on M&A has predominantly focussed on the effect of the acquiring firm and the target firm. Until now, little research has been shown a relation between M&A and third parties, such as investors and auditors. Earlier researches show that there is a relation between M&A and earnings management in the prior-period of M&A (Erickson & Wang, 1996; Teoh, Welch, & Wong, 1998). Also, the implications of Big Four auditors (hereafter, Big N auditors) play an important role in the process of M&A (Bugeja, 2011; Louis, 2005; Niemi, Ojala, & Seppälä, 2013; Xie, Han, & Zhang, 2013).

The hypotheses of audit quality and audit fees are based on the theory of audit risk which an auditor may be exposed to after an occurred M&A. This could be due to increased earnings management in the prior-period of M&A, post-acquisition lawsuits, and higher chances of being discovered when providing low assurance audits. This may increase litigation risk, and thus may the auditor be taken more effort. However, internal auditors may also be taken more effort into the audit, which may actually decrease the effort of the external auditor. The increased (decreased) effort may lead to increased (decreased) audit quality, and likewise increased (decreased) audit fees.

The analysis is done by implementing a difference-in-difference design. A treatment group and a control group is constructed by propensity score matching procedures in order to examine before and after effects of M&A of both groups. The control group has been matched to the treatment group with the closest propensity score of one control unit to a treatment unit by determining specific determinants of M&A. The difference-in-difference design has been

[1] The term mergers and acquisitions is used synonymously in this paper. See Section II "Background and Related Studies", subheading "M&A" for further explanation.

conducted by either modelling OLS regressions or probit model, depending on the dependent variable.

There is no clear measure for audit quality and neither is a consistent measurement used in prior literature. Audit quality is indirectly measured as earnings management through discretionary accruals and directly measured as earnings management through annual restatements. The paper also describes other consequences on auditor behaviour, which is measured as the alteration of the audit fees after M&A. An additional analysis is conducted to examine whether or not the auditor is a Big N auditor in the post-period of M&A.

By using a sample of 2 event years of 1,086 firms obtained from Thomson ONE, Compustat and Audit Analytics, I find a relation between M&A and audit quality and audit fees. In particular, I find that there is indirect evidence of the effect of M&A on earnings management through discretionary accruals. However, I find no direct evidence of the effect of M&A on earnings management through annual restatements. Further analyses show that there is a positive effect of M&A on audit fees and a negative effect of M&A on Big N auditors. This suggests that external auditors may rely more on the work of internal auditors. Thus, the audit may be decreasing as a result of the reliance. The results also suggest that in order to avoid earnings management to be detected, firms are more likely to choose a non-Big N auditor.

I contribute to the literature of M&A for two reasons. First, little research has been done on the effect on third parties, and this research is the first one to examine the *ex-post* effect on third parties, as opposed to an *ex-ante* effect on third parties. Second, this research has implications for regulators due to the fact that they are able to create better cost and benefit analyses on regulations of M&A.

There are two major limitations in this paper. Firstly, when modelling the OLS regressions and probit models, I find that some control variables are not collectable from the databases used, as opposed to prior literature. This could have enhanced the fit of the models. Considering the fact that these variables are not included in the models, it may increase biases. Secondly, the data of the paper has been prepared by merging M&A data from Thomson One between the years 2006 and 2015 with accounting and audit data from respectively Compustat and Audit Analytics between the years 2005 and 2016. M&As could have also been occurred in the years 2005 and 2016, which are not taken into account in the M&A Thomson One data. Therefore, a bias could have been appeared by executing this approach.

In section II I discuss audit quality and the relation between M&A and related parties. Section III consists of the construction of the hypotheses. Section IV presents the way the research is operationalized and section V explains the sample selection. Section VI presents the

results of the empirical analysis. In section VII I discuss an additional analysis and section VIII concludes the paper.

II. BACKGROUND AND RELATED STUDIES

M&A

M&A in the legal perspective are considered two different actions. Mergers refer to the unification of two different entities into one entity, whereas acquisitions refer to the takeover of the target firm by the acquiring firm. In accounting and audit research, authors use the economic definition, which is the continuation of two different entities into one entity. Following on from abovementioned, I follow the economic definition of M&A.

Since 2001, the FASB required U.S. public firms to use only the purchase method of accounting for M&A. This means that the net assets of the target firm have to be recognized and measured, including goodwill or a gain from a bargain purchase, at or around the time when the information is available.[2] This is also referred as the "fair value" method (Custodio, 2014). Before then, U.S. public firms were also allowed to use the pooling method of accounting for M&A, which means that the acquiring firm recognizes the book value of the target firm.[3]

A distinction can be made between domestic and cross-border M&A. The process of cross-border M&A are similar to domestic ones, except for the fact that cross-border M&A might be faced with different legal, economic and cultural structures (Hofstede, 1980; House et al., 2002). For example, Rossi and Volpin (2004) suppose that accounting standards, a common-law system and shareholder protection in a particular country are proxies for investor protection, which is positively related to more volume in M&A activity. Due to the international nature of cross-border M&A, information asymmetry and uncertainty in foreign markets may be increasing, which creates barriers for the acquiring firm (Shimizu et al., 2004). However, cross-border M&A is an important factor for different countries moving closer together in terms of corporate governance standards (Coffee, 1999).

Audit Quality

Audit quality is often described as the extent to which an auditor is in compliance with the applicable audit standards and regulations and often implies that it gives affirmation of accounting quality (Krishnan & Schauer, 2001; Tie, 1999; Watkins, Hillison, & Morecroft, 2004). This means that auditors do not only have to consider the acceptability of a client's financial statements, but also the quality of (managers' subjective judgements within) the

[2] See Statement of Financial Accounting Standards (FAS) No. 141 (Revised 2007) for further details regarding the current U.S. GAAP regulations on business combinations.
[3] See Accounting Principles Board (APB) Opinion No. 16 for further details regarding pooling accounting.

financial statements.[4] This relates to the ability of an auditor's professional judgement (DeFond & Zhang, 2014). Thus, the higher the audit quality is, the higher the accounting quality.

Several studies refer to a distinction between the demand and the supply of an audit (e.g., DeFond & Zhang, 2014; Watkins et al., 2004). The demand of audits can be derived from the economic role that an audit has, because the information asymmetry between managers and investors should be as low as possible. Supply of audits is determined by the costs of a high quality auditor. The riskier the client in terms of reputation, litigation and regulation, the lower the chance of an audit engagement between the firm and the auditor, unless there is a reasonable compensation in fee premium. In addition, there is a positive relation between auditor competency and audit fees. In this paper I follow both sides of audit quality in order to determine effect as a result of M&A.

There is no consensus among researchers on what proxies should be used for measuring audit quality. However, according to DeFond & Zhang (2014), there is high consensus among the usage of several proxies: studies focussing on the demand-side of audit quality generally use input-based proxies corresponding to audit fees and Big N auditors, and studies focussing on the supply-side of audit quality generally use output-based proxies corresponding to restatements, going concern opinions[5] and discretionary accruals.

The advantage of input-based variables is that the Big N proxy has strong research validity compared to other proxies and audit fees encompass profound differences due to being a continuous measurement. Nonetheless, the Big N auditors proxy takes into consideration only homogeneous levels of audit quality within all observations which is not accurate, and the audit fees proxy undesirably captures client risk.

Furthermore, as for the usage of output-based proxies, restatement proxies are direct and discrete. However, the absence of restatements by auditors allowing material misstatements may remain undiscovered. The benefit for using discretionary accruals is that it measures financial reporting quality, which is a joint product of both the manager and the auditor. Thus, financial reporting quality is a sufficient measurement for capturing audit quality. Nonetheless, discretionary accruals are less direct because auditors have less influence on this measure compared to restatements.

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[4] See Statement on Auditing Standards 90 and Auditing Standard (AS) No. 16 for further details regarding auditors' judgement.

[5] Audit quality will not be measured by the proxy "going concern opinion" in this paper. A going concern opinion will be published only when the auditor has a reasonable argumentation to doubt about a client's going concern continuation. However, I assume that acquiring firms participating in M&A are generally considered to be a going concern.

Relation Between M&A and Auditors

Early research shows that accounting earnings are important for the appraisal of stock prices of the acquiring firm in M&A and this is primarily of importance to the most recent earnings (e.g., DeAngelo, 1986, 1990). Zhang (2016) states that firms with positive free cash flow and a history of value-destroying M&A undergo a discount in firm value. This suggests that the market value of acquiring firms depends on free cash flows and their prior accounting earnings.

Managers of acquiring firms tend to increase financial leverages and wealth shifting prior to a merger (Shrieves & Pashley, 1984). Erickson and Wang (1996) examined whether prior to stock for stock mergers the acquiring firm is exposed to earnings management. They found out that acquiring firms are likely to attain more upward earnings management in the quarters prior to the merger. The manager of the acquiring firm has an incentive to manage upward earnings considering the fact that a higher stock price reduces the number of shares that the acquiring firm has to sell. However, the upward managed earnings are associated with poor stock return performance in the 3 years after the public offering (Teoh et al., 1998).

Louis (2005) shows that Big N auditors do not provide better services on acquiring firms' values at the time of merger revelations in comparison to non-Big N auditors and in particular when it comes to advisory. In the period prior to the audit scandals in the early 2000's, takeover premiums were likely to be higher when the target firm is audited by a Big N auditor (Bugeja, 2011). Also, when firms are audited by a Big N auditor, the M&A process involves a smaller contribution to the market price of the target firm (Niemi et al., 2013).

III. HYPOTHESIS DEVELOPMENT

I follow DeFond & Zhang (2014) by splitting up this research in roughly two parts: the effect of M&A on audit quality (output measures) and the effect of M&A on auditor behaviour (input measures). The first hypothesis focusses on discretionary accruals and annual restatements as proxies for audit quality. The second hypothesis focusses on auditor behaviour. Figure 1 summarizes the framework for the construction and expected outcomes of the hypotheses.

Predictive Hypothesis Framework

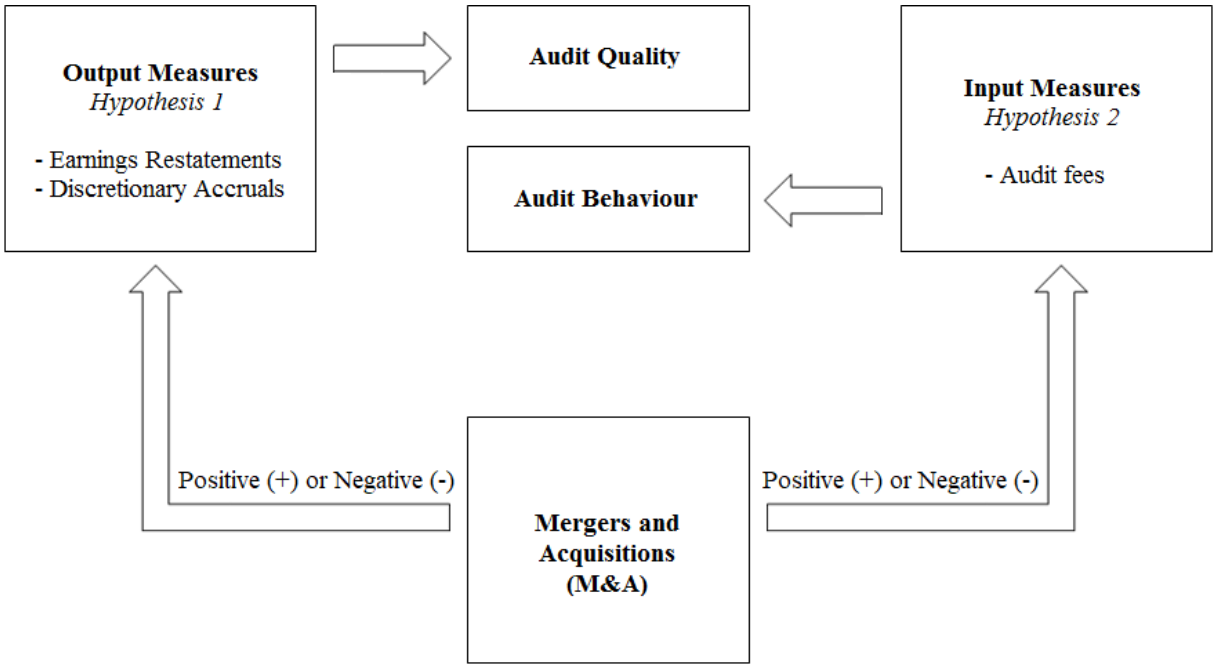

Figure 1: Predictive Hypothesis Framework

There are three reasons why audit risk may be increasing in the post-period of M&A. Firstly, in the prior-period of M&A, the acquiring firm and the target firm are both associated with earnings management (Erickson & Wang, 1996; Teoh et al., 1998). This leads to auditors of those firms being exposed to higher risk. In particular, Abbott, Parker and Peter (2006) argue that managers of firms who manage upward earnings management, contribute to increased litigation risk to auditors. Secondly, after M&A, the probability of misstatements in earnings is higher due to the experienced transition phase of acquiring firms and post-acquisition lawsuits (Gong, Louis, & Sun, 2008; Louis, 2004). Lastly, auditors' threats to be discovered when providing low quality audits are higher due to the increased monitoring of stakeholders in the post-period of M&A.

Suppose that likelihood of an auditor's mistake not detecting distorted accounting numbers is given by φ and *POST* shows the period after M&A. Litigation risk (*LR*) *is* given by:

$$LR = f(POST, \varphi). \quad (1)$$

LR increases as a result of an increase in φ, which can be notated as:

$$\frac{\partial LR}{\partial \varphi} > 0. \quad (2)$$

According to the above findings I assume that in the post-period of M&A, firms are more likely to be exposed to litigation risk compared to the prior-period. This can be described in the following notation:

$$LR(PRIOR \mid \varphi) < LR(POST \mid \varphi), \quad (3)$$

where *PRIOR* indicates the period before M&A. The increased litigation risk leads to higher audit effort.

The first measure of audit quality is discretionary accruals, which can also be seen as an indirect proxy for earnings management. Discretionary accruals refer to the quality of the earnings. A distinction can be made between real and accrual-based earnings management. Real earnings management is the practice of intentionally (not) recording real expenses and accrual-based earnings management indicates earnings management as a result of the change in estimation methods. In this research I follow the analysis of accrual-based earnings management. Because of the increased audit effort, and thus the higher assurance, discretionary accruals may decrease in the post-period of M&A compared to the prior-period of M&A.

The second measure of audit quality is the change in issuances of annual restatements, which can also be seen as a direct proxy for earnings management due to the detection component of annual restatements. Lobo and Zhao (2013) found that there is a negative relation between audit effort and annual restatements. Annual restatements rectify misstatements of earlier issued financial statements. Increasing audit effort and thus increasing audit quality may reduce the likelihood of annual restatements when the financial statements are already issued (Kinney, Palmrose, & Scholz, 2004). Due to the increased effort there may be issued less annual restatements in the period after M&A compared to the period before M&A.

On the other hand, if internal auditors of the acquiring firm already increase their effort due to being more transparent in the post-period of M&A, the external auditor may rely more on the work of the internal auditor. Therefore, the audit effort may be decreasing. This could result in increased annual restatements and discretionary accruals due to overlooked or

unaddressed distorted accounting numbers. Based on this logic, the first null hypothesis is as follows:

Hypothesis 1 (null form): There is no relation between M&A and audit quality.

The asymmetric ligation effects and monitoring from stakeholders may also add to increased audit fees (Bell, Landsman & Shackelford, 2001). In the period after the M&A, I expect auditors to demand higher fees. However, the reason for increased fees may be due to the contribution of two main adjustments of auditors as a result of increased litigation risk: increased effort or risk premium (Bell et al., 2001). Increased effort leads to increased audit quality, whereas increased risk premium only shifts the expected loss due to litigation to the client (DeFond & Zhang, 2014; Hoitash, Markelevich, & Barragato, 2007). Measuring or observing effort or risk premium is yet difficult. Therefore, I do not consider audit fees to be a proxy for audit quality but rather auditor behaviour.

It could also be the case that internal accountants and auditors of acquiring firms themselves put more effort into their financial reporting in the period after M&A in order to be more transparent, which enhances the financial reporting quality and this likewise improves the audit quality. Auditors who take this into consideration will most likely put less effort into the audit, which results in lower audit fees. Based on the above-mentioned findings, the second null hypothesis is stated as follows:

Hypothesis 2 (null form): There is no relation between M&A and audit fees.

IV. RESEARCH DESIGN

The research design is conducted by examining on the effect of M&A on the audit quality of the acquiring firm. This is done by using a difference-in-difference design. The predictive validity framework related to the research question of this paper is attached in Appendix A. It provides the "Predictability Validity Framework" and shows the relation between the two concepts "M&A" and "audit quality" regarding the research question.

Discretionary Accruals

As mentioned before, this paper follows the analysis of accrual-based earnings management. The empirical analysis consist of the application of the Modified Jones Model by Dechow, Sloan and Sweeney (1995)[6] and the Industry Model by Dechow and Sloan (1991) for the calculation of discretionary accruals.

First, I estimate the Jones Model as described by Jones (1991) by using the total accruals, which show the accruals which are explained by both economic factors and non-economic factors and are calculated as follows for firm *i* and event year *t*:

$$TA_{i,t} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + a_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \epsilon_{i,t}, \quad (4)$$

where $TA_{i,t}$ shows the firm-specific total accruals scaled by the lagged total assets. I refer to Appendix B for the detailed calculation of $TA_{i,t}$. A_{t-1} is the total assets of the prior period, $\Delta REV_{i,t}$ represents the growth of the revenues compared to prior period and $PPE_{i,t}$ consists of the gross value of property, plant and equipment. The three parameters α_1, α_2 and α_3 are assumed to be firm-specific.

I follow Dechow et al. (1995) by measuring the first set of non-discretionary accruals. The non-discretionary accruals show the accruals which are explained by economic factors. The calculation is done as follows for firm *i* and event year *t*:

$$NA\_JONES_{i,t} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{A_{i,t-1}}, \quad (5)$$

where $NAMJM_{i,t}$ is the non-discretionary accruals of the Modified Jones Model and $\Delta REC_{i,t}$ is the growth of accounts receivable compared to prior period. I include the growth of accounts receivable to adjust the revenues in order to catch possible discretion from credit sales.

[6] According to prior literature, discretionary accruals of the (Modified) Jones Model might capture non-discretionary accruals as well, as it is correlated with stock prices and firms' performance. This decreases the explanatory power (R^2) of the research design. However, due to the fact that I use discretionary accruals as a dependent variable, it decreases the possibility of any bias in this research.

The second set of non-discretionary accruals are assumed to be industry-specific, which is evaluated in the Industry Model used by Dechow and Sloan (1991). The authors assume that the same variation in the determinants of non-discretionary accruals is applied for firms in the same industry. This leads to the following calculation:

$$NA\_DS_{i,t} = \gamma_1 + \gamma_2 median_1(TA_{i,t}), \quad (6)$$

where $NAIM_{i,t}$ is the non-discretionary accruals of the Industry Model and $median_1(TA_{i,t})$ is the median of the total accruals scaled by lagged total assets for all non-sample firms in the same 2-digit SIC code.[7] The coefficients γ_1 and γ_2 represent the estimations of an OLS regression on the observations in firm *i* and event year *t*.

Lastly, I calculate the discretionary accruals of both the Modified Jones Model ($DA\_JONES_{i,t}$) and the Industry Model ($DA\_DS_{i,t}$), which represent the accruals that are not explained by economic factors. They are assumed to be estimations of audit quality. This is given by the following formula:

$$DA\_JONES_{i,t} = TA_{i,t} - NAMJM_{i,t}. \quad (7)$$

$$DA\_DS_{i,t} = TA_{i,t} - NAIM_{i,t}. \quad (8)$$

Propensity Score Matching

The main objective of this paper is to examine the effect of M&A on audit quality in the post-period of M&A. This is done by analysing whether the effect of M&A is more profound for acquiring firms (the treatment group) than for firms not involved in M&A (the control group). However, for firms not involved in M&A there is no post-period observable. The control group is therefore constructed by matching control units based on specific characteristics of all treatment units by using propensity score matching.

First, the propensity score is calculated based on a probit model given observable similar determinants and based on a specific year *t*, which is the year of the M&A. The estimation of the propensity score is given as:[8]

$$P(M\&A_{i,t}) = Pr(M\&A_{i,t} = 1 \mid A_{i,t}, ATURN_{i,t}, LEV_{i,t}, ROA_{i,t}), \quad (9)$$

[7] The SIC code is usually a 4-digit code which shows industries in the most detailed classification possible. However, by using the 2-digit SIC code I can identify the major group range, which makes it possible to diversify firm-specific effects while still having a narrow range of grouping.

[8] The propensity score matching process is performed in Stata Version 15.0 implementing the "psmatch2" software which is developed by Leuven and Sianesi (2003).

where $A_{i,t}$ and $ATURN_{i,t}$ represent different size categories, based on assets and asset turnover, respectively. $LEV_{i,t}$ shows a the financial leverage in order to observe the financial structure of a firm, calculated as total debt divided by total assets. The return on assets, $ROA_{i,t}$, measures the probability of a firm.

Second, matching is conducted by using the nearest neighbour matching algorithm, which determines the closest propensity score of one control unit to one treatment unit, the so-called one-to-one matching. This means that one control unit is matched to each treatment unit based on the four observable determinants as depicted in formula (9). An extensive mathematical derivation of the propensity score matching procedure is attached in Appendix C.

Finally, after the matching process, the estimation stage is followed by either OLS regressions or probit model with robust standard errors for all hypotheses. The regressions all consist of the interaction effect between the post-period of an M&A ($POST_{i,t}$) and acquiring firms that actually have been involved in M&A (the treatment group, $M\&A_i$). This allows me to consider a difference-in-difference design in order to find the relation between M&A and audit quality, which is given as the interaction effect $M\&A_i * POST_{i,t}$. The next subheadings provide the models for the four hypothesis.

Audit Quality

Audit quality is calculated by the amount of discretionary accruals and whether or not an auditor has issued a restatement of the financial statements. Having calculated discretionary accruals, I model the effect of acquiring firms' M&A on discretionary accruals as:

$$\begin{aligned} DA\_JONES_{i,t} = {} & \alpha_1 M\&A_i + \alpha_2 POST_{i,t} + \alpha_3 M\&A_i * POST_{i,t} + \alpha_4 LNA_{i,t} + \\ & \alpha_5 ATURN_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 MKTVAL_{i,t} + \alpha_8 CLOSS_{i,t} + \\ & \alpha_9 CAPINT_{i,t} + \alpha_{10} ROA_{i,t} + \alpha_{11} INVREC_{i,t} + \alpha_{12} QUICK_{i,t} + \\ & \alpha_{13} BIGN_{i,t} + \alpha_{14} OCF_{i,t} + \alpha_{15} FOREIGN_{i,t} + \alpha_{16} GCO_{i,t} + \\ & IND\_FE + YEAR\_FE + \epsilon_{i,t}. \end{aligned} \tag{10}$$

$$\begin{aligned} DA\_DS_{i,t} = {} & \alpha_1 M\&A_i + \alpha_2 POST_{i,t} + \alpha_3 M\&A_i * POST_{i,t} + \alpha_4 LNA_{i,t} + \\ & \alpha_5 ATURN_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 MKTVAL_{i,t} + \alpha_8 CLOSS_{i,t} + \\ & \alpha_9 CAPINT_{i,t} + \alpha_{10} ROA_{i,t} + \alpha_{11} INVREC_{i,t} + \alpha_{12} QUICK_{i,t} + \\ & \alpha_{13} BIGN_{i,t} + \alpha_{14} OCF_{i,t} + \alpha_{15} FOREIGN_{i,t} + \alpha_{16} GCO_{i,t} + \\ & IND\_FE + YEAR\_FE + \epsilon_{i,t}. \end{aligned} \tag{11}$$

The following probit model is used in order to examine the effect of M&A on annual restatements, $RES_{i,t}$, for firm *i* and year *t*:

$$\begin{aligned} RES_{i,t} = \quad & \alpha_1 M\&A_i + \alpha_2 POST_{i,t} + \alpha_3 M\&A_i * POST_{i,t} + \alpha_4 LNA_{i,t} + \\ & \alpha_5 ATURN_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 MKTVAL_{i,t} + \alpha_8 CLOSS_{i,t} + \\ & \alpha_9 CAPINT_{i,t} + \alpha_{10} ROA_{i,t} + \alpha_{11} INVREC_{i,t} + \alpha_{12} QUICK_{i,t} + \\ & \alpha_{13} BIGN_{i,t} + \alpha_{14} OCF_{i,t} + \alpha_{15} FOREIGN_{i,t} + \alpha_{16} GCO_{i,t} + \\ & IND\_FE + YEAR\_FE + \epsilon_{i,t}. \end{aligned} \tag{12}$$

Since Simunic (1980), authors used various control variables that might have effect on the audit quality in terms of size, complexity and audit risk. The natural logarithm of assets, $LNA_{i,t}$, asset turnover, $ATURN_{i,t}$, capital intensity, $CAPINT_{i,t}$, and market value, $MKTVAL_{i,t}$, control for firm size, which is expected to have a negative effect on audit quality due to higher materiality thresholds, which makes overlooked material misstatement by an auditor more likely. The coefficients are therefore expected to be positive. Leverage, $LEV_{i,t}$, shows the financial structure, calculated as total debt and total assets. A higher financial leverage decreases audit effort and therefore I expect a positive effect on discretionary accruals and restatements. Operating cash flows, $OCF_{i,t}$, return on assets, $ROA_{i,t}$, and firms' loss in current year, $CLOSS_{i,t}$, show the profitability. The more probable the firm is, the more is on the line for an auditor due to increased monitoring from investors. Therefore, the audit quality will most likely be higher due to increased audit effort. Therefore, the coefficients are expected to be positive for $OCF_{i,t}$ and $ROA_{i,t}$, and negative for $CLOSS_{i,t}$. The variable $FOREIGN_{i,t}$, which is equal to one if foreign income is disclosed, is included to control for firm complexity. An increase in complexity stand for increased audit effort, which is likely to be negatively related to discretionary accruals and restatements. The involvement of the firm being audited by a Big N auditor, $BIGN_{i,t}$, controls for difference in assurance, which is expected to have a negative coefficient. $INVREC_{i,t}$ shows the ratio of inventory plus accounts receivable divided by total assets, which will most likely increase the audit effort. Thus, the coefficient is expected to be negative. The liquidity of a firm is given as the quick ratio, $QUICK_{i,t}$, and the issuance of a going concern opinion, $GCO_{i,t}$. The effect of these variables to audit quality is ambiguous. By including *IND_FE*[9] and *YEAR_FE*, I control for industry and year fixed effects, respectively. Both fixed effects are included to assume a fixed quantity for each industry and for each year.

[9] Industry fixed effects are determined by using 2-digit SIC codes.

Finally, the calculations of all of the three models are based on standard errors clustered by 2-digit SIC code.

Auditor Behaviour

In the last regression model I analyse whether firms and acquiring firms involved in M&A differ significantly in the imposed audit fees by their auditor after M&A. For the following regression model, the continuous dependent variable is measured, following prior literature, by taking the natural logarithm of audit fees, $LNAFEE_{i,t}$, for firm i and event year t:

$$\begin{aligned} LNAFEE_{i,t} = \; & \alpha_1 M\&A_i + \alpha_2 POST_{i,t} + \alpha_3 M\&A_i * POST_{i,t} + \alpha_4 LNA_{i,t} + \\ & \alpha_5 ATURN_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 MKTVAL_{i,t} + \alpha_8 CLOSS_{i,t} + \\ & \alpha_9 CAPINT_{i,t} + \alpha_{10} ROA_{i,t} + \alpha_{11} INVREC_{i,t} + \alpha_{12} QUICK_{i,t} + \\ & \alpha_{13} BIGN_{i,t} + \alpha_{14} OCF_{i,t} + \alpha_{15} FOREIGN_{i,t} + \alpha_{16} GCO_{i,t} + \\ & IND\_FE + YEAR\_FE + \epsilon_{i,t}, \end{aligned} \tag{13}$$

where the model includes the same control variables as formula (10), (11) and (12) in order to capture audit risk, as well as industry and year fixed effects. Also, the standard errors of the model are clustered by 2-digit SIC code. A thorough list of variable definitions is attached in Appendix B.

Observation Period

Figure 2 presents the Observation Period Framework explaining the observation setting I use in this paper. The observation period in this empirical setting consists of two periods: the prior-period, $t = 1$, and the post-period, $t = 2$. The variable $POST_{i,t}$ presents the year after the year in which the M&A occurred. In figure 2, this is shown as $t = 2$. Figure 2 shows a "rolling" time period as there is not one event year of all firms. The years of $t = 1$ and $t = 2$ depend on when the M&A occurs for each firm.

The first timeline shows an M&A occurred for one particular firm between January 1st and December 31st of 2010. This corresponds to a prior-period ($t = 1$) of 2009 and a post-period ($t = 2$) of 2011. Likewise, the second timeline shows an M&A occurred between January 1st and December 31st of 2015 for another firm. The prior-period ($t = 1$) for this event is 2014 and the post-period ($t = 2$) is 2016. This applies to all firms' M&As occurring between January 1, 2006 and December 31, 2015. The reference period for the treatment group and the control group for an M&A to be occurring is from 2006-2015, whereas the full observation period is from 2005-2016. This makes it possible to analyse $t = 1$ and $t = 2$ for all occurred M&As.

Observation Period Framework

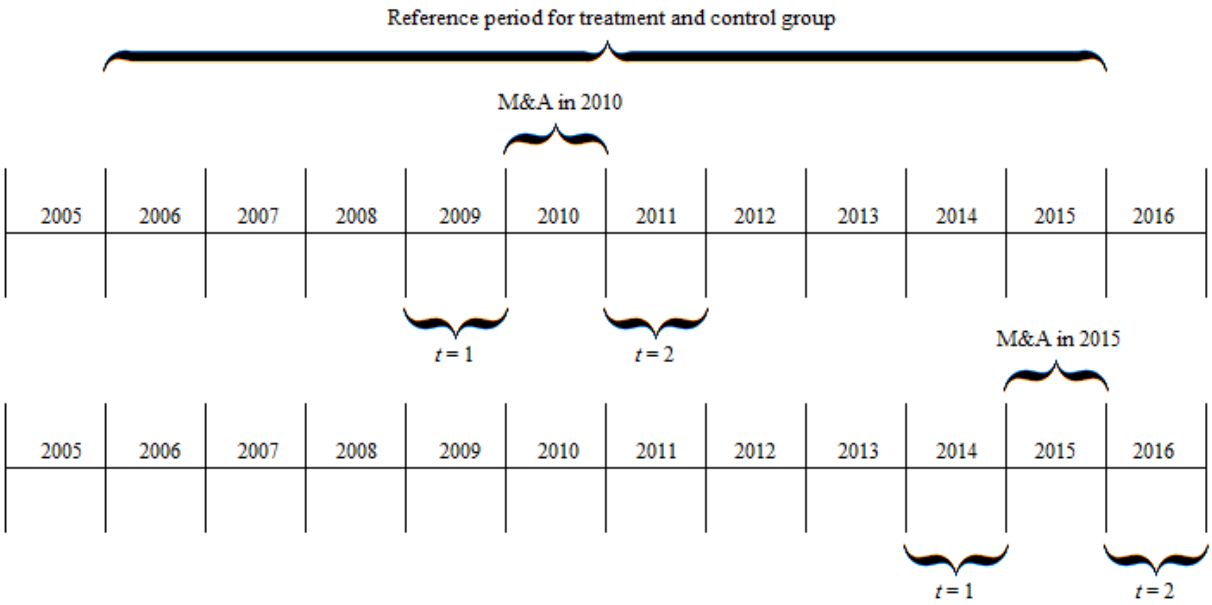

Figure 2: Graphical illustration of the observation period

V. SAMPLE SELECTION

Data Collection

Data of occurred M&A is obtained from the Thomson One database by extracted U.S. acquiring firms from years 2006 until 2015 from the database. Furthermore, the chosen percentage of shares which is owned after transaction has a minimum of 90 and the deal value is at least one million U.S. dollar. Data of accounting information is obtained from Compustat and audit information is received from Audit Analytics of years 2004-2016. I refer to Appendix B for details on the variables obtained. The years obtained from Compustat and Audit Analytics differ from the Thomson One data due to two reasons. First, specific calculations have been done by performing the Modified Jones Model, for which data of prior years is needed for lagged variables. Second, the paper analyses (audit quality) data of firms one year before and after an M&A.

After the data of the three databases have been obtained, the Compustat and Audit Analytics data have been merged by CIK code and year. Next, the Thomson One data is merged with the Compustat and Audit Analytics data by 6-digit CUSIP code[10] and year. After merging, a sample of 103,755 observations[11] is left before selecting the testing sample.

Next, firms of the sample which only have one observation year cannot be used and is therefore dropped. Following prior literature, we exclude firms operating in the financial services industry, which correspond to the SIC codes 6020-6799. After running the Modified Jones Model, observations of event year 2004 are dropped due to the fact that this event year was only needed for the calculation of the lagged variables. Moreover, auditors and firms based outside of the U.S. are excluded from the sample. Lastly, observations with negative sales and observations with missing values are eliminated from the sample. This leads to a sample of 38,909 observations before executing Propensity Score Matching.

The performance of Propensity Score Matching leads to a sample with one-to-one matched pairs.[12] Non-matched firms are dropped after the matching process. Also, only the year before and the year after M&A are relevant for the analysis. Therefore, all other observations

[10] A 6-digit CUSIP code is used due to the fact that Thomson One data only includes a 6-digit CUSIP code, whereas Compustat includes a 9-digit CUSIP code. Therefore, the first six digits were kept from the Compustat CUSIP codes when merging with Thomson One data.

[11] For firms where there were multiple observable M&As between 2006 and 2015, only the most recent M&A of the acquiring firm has been examined, but only if in the year before and the year after the M&A there has not been occurring another M&A of the particular acquiring firm. The number of observations is after this process is done.

[12] The "psmatch2" software of Leuven and Sianesi (2003) does not take into consideration that the same control firm can be included in the control group multiple times. In order to avoid bias in this research as much as possible, the matched firms are only included in the control group once if the control firm happened to be in the control group multiple times.

are dropped from the sample. The final sample amounts to 2,172 total observations of 1,086 firms (i.e., two observation years for all firms). A total overview of the composition of the sample selection can be found in table 1 of Appendix D.

Data Preparation

In order to conduct OLS regressions with minimalized bias, the standard errors need to have a normal distribution. This is done by either winsorizing or taking the natural logarithm of the dependent variables, independent variables and control variables. How the variables are prepared depends on the characteristics of the variables.

The independent variables $MKTVAL_{i,t}$, $QUICK_{i,t}$, $INVREC_{i,t}$, $ATURN_{i,t}$, are all winsorized at the 99% level only. They have not been winsorized at the 1% level due to the fact that there are no negative values for these variables. Independent variables $LEV_{i,t}$ and $CAPINT_{i,t}$ are respectively winsorized at the 98% level and the 97% level because of the extreme outliers on the right side of the normal distribution of both variables. The independent variable $ROA_{i,t}$ is winsorized at the 1% level and the 99% level and the independent variable $OCF_{i,t}$ is winsorized at the 2% level and at the 98% level due to extreme dispersion in observations. The natural logarithm is taken of both the dependent variable $LNAFEE_{i,t}$ and the control variable $LNA_{i,t}$ following Simunic (1980).[13]

The discretionary accruals of both the Modified Jones Model and the Industry Model are given as absolute values in order to ignore the (positive or negative) signs of the discretionary accruals. Only the amount of the discretionary accruals are relevant for examining the OLS regression.

Descriptive statistics

The descriptive statistics and Pearson correlation statistics of the sample are provided in table 2. Panel A suggests that the means and medians are generally in correspondence with those found in prior literature examining audit quality and auditor behaviour (e.g., Dao, Raghunandan, & Rama, 2011; Simunic, 1980). As seen in panel B and C, the means of the control variables all differ significantly among the treatment group and the control group (M&A

[13] Evidence of Simunic (1980) suggests that firms' assets is a significant determinant of audit fees and have a non-linear relation. Therefore, the used natural logarithm is necessary for these variables in order to conduct the analysis.

TABLE 2

Descriptive Statistics and Pearson Correlation Statistics

Panel A: Descriptive Statistics of Full Sample (n = 1,086 firms * 2 years)

	Mean	Standard Deviation	1st Percentile	Median	99th Percentile
DA_JONES	0.498	0.561	0.005	0.310	2.881
DA_DS	0.134	0.373	0.000	0.043	2.050
LNAFEE	13.437	1.423	9.852	13.642	16.204
LNA	5.606	2.430	-1.650	5.890	10.073
ATURN	1.032	0.806	0.000	0.850	4.173
LEV	0.684	0.898	0.043	0.499	5.908
MKTVAL	1923.831	4268.879	1.019	396.213	28402.920
CAPINT	2.269	3.789	0.000	1.120	20.051
ROA	0.355	0.386	-0.865	0.306	2.096
INVREC	0.227	0.175	0.000	0.190	0.728
QUICK	2.345	2.908	0.018	1.495	19.667
OCF	146.965	307.017	-58.158	23.258	1504.000

Panel B: Comparison of Subsamples Divided by *M&A*: Mean of Continuous Variables Used in Regression Models and Probit Models

	M&A Firms (n = 1,086)	Non-M&A Firms (n = 1,086)	p-value Mann-Whitney U test
A	2006.277	1841.244	0.000
LNA	6.128	5.085	0.000
ATURN	1.042	1.022	0.011
LEV	0.544	0.824	0.000
MKTVAL	2151.902	1695.759	0.000
CAPINT	1.970	2.568	0.714
ROA	0.326	0.384	0.548
INVREC	0.238	0.215	0.000
QUICK	2.265	2.426	0.002
OCF	161.996	131.933	0.000

TABLE 2 (continued)

Panel C: Comparison of Subsamples divided by *M&A*: Proportion of Discrete Variables Used in Regression Models and Probit Models

	M&A Firms (n = 1,086)	Non-M&A Firms (n = 1,086)	p-value Chi-Square test
BIGN	0.705	0.577	0.000
CLOSS	0.047	0.073	0.015
FOREIGN	0.493	0.240	0.000
GCO	0.050	0.137	0.000

Panel D: Pearson Correlation Statistics (n = 1,086 firms * 2 years)

For each correlation, the correlation coefficient is reported below and the p-value is reported below.

	DAIM	***RES***	***LNAFEE***	***BIGN***	***M&A***	***POST***	***LNA***	***ATURN***	***LEV***	***MKTVAL***	***CLOSS***	***CAPINT***	***ROA***	***INVREC***	***QUICK***	***OCF***	***FOREIGN***	***GCO***
DA_JONES	0.50	0.01	-0.23	-0.14	-0.17	-0.05	-0.18	0.02	0.32	-0.09	0.06	0.09	-0.00	-0.20	-0.12	-0.05	0.01	0.23
	0.00	*0.49*	*0.00*	*0.00*	*0.00*	*0.04*	*0.00*	*0.30*	*0.00*	*0.00*	*0.00*	*0.00*	*0.86*	*0.00*	*0.00*	*0.03*	*0.75*	*0.00*
DA_DS	1.00	0.05	-0.33	-0.23	-0.10	-0.06	-0.40	-0.05	0.50	-0.10	0.15	0.14	-0.00	-0.10	0.05	-0.13	0.02	0.41
		0.03	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.02*	*0.00*	*0.00*	*0.00*	*0.00*	*0.90*	*0.00*	*0.03*	*0.00*	*0.61*	*0.00*
RES		1.00	-0.05	-0.02	-0.05	-0.10	-0.07	0.01	0.02	-0.04	0.03	0.02	-0.01	0.02	0.02	-0.03	-0.08	0.03
			0.02	*0.40*	*0.02*	*0.00*	*0.00*	*0.72*	*0.26*	*0.06*	*0.15*	*0.32*	*0.50*	*0.40*	*0.36*	*0.11*	*0.05*	*0.24*
LNAFEE			1.00	0.69	0.23	0.05	0.87	0.04	-0.26	0.47	-0.20	-0.22	-0.06	0.04	-0.17	0.51	-0.16	-0.43
				0.00	*0.00*	*0.02*	*0.00*	*0.10*	*0.00*	*0.00*	*0.00*	*0.00*	*0.01*	*0.05*	*0.00*	*0.00*	*0.00*	*0.00*
BIGN				1.00	0.13	-0.01	0.66	-0.04	-0.21	0.30	-0.11	-0.13	-0.09	-0.08	-0.04	0.32	-0.05	-0.35
					0.00	*0.56*	*0.00*	*0.07*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.05*	*0.00*	*0.22*	*0.00*
M&A					1.00	0.00	0.21	0.01	-0.16	0.05	-0.05	-0.08	-0.08	0.06	-0.03	0.05	0.02	-0.15
						1.00	*0.00*	*0.57*	*0.00*	*0.01*	*0.01*	*0.00*	*0.00*	*0.00*	*0.20*	*0.02*	*0.57*	*0.00*
POST						1.00	0.03	-0.02	0.04	0.01	0.02	0.01	0.00	0.00	-0.07	0.02	0.02	0.04
							0.20	*0.27*	*0.04*	*0.51*	*0.37*	*0.55*	*0.85*	*0.92*	*0.00*	*0.35*	*0.61*	*0.09*
LNA							1.00	-0.02	-0.41	0.53	-0.23	-0.16	-0.15	-0.03	-0.12	0.60	-0.13	-0.54
								0.39	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.15*	*0.00*	*0.00*	*0.00*	*0.00*

TABLE 2 (continued)

	DAIM	***RES***	***LNAFEE***	***BIGN***	***M&A***	***POST***	***LNA***	***ATURN***	***LEV***	***MKTVAL***	***CLOSS***	***CAPINT***	***ROA***	***INVREC***	***QUICK***	***OCF***	***FOREIGN***	***GCO***
ATURN								1.00	0.06	-0.01	-0.28	-0.45	0.64	0.60	-0.26	0.02	-0.05	-0.10
									0.01	*0.55*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.45*	*0.22*	*0.00*
LEV									1.00	-0.06	0.16	0.05	0.13	-0.04	-0.29	-0.05	-0.01	-0.56
										0.01	*0.00*	*0.02*	*0.00*	*0.05*	*0.00*	*0.02*	*0.83*	*0.00*
MKTVAL										1.00	-0.10	-0.06	-0.01	-0.06	-0.08	0.86	-0.23	-0.14
											0.00	*0.01*	*0.63*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
CLOSS											1.00	0.61	-0.47	-0.21	0.17	-0.13	0.01	0.23
												0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.76*	*0.00*
CAPINT												1.00	-0.46	-0.35	0.21	-0.11	0.03	0.22
													0.00	*0.00*	*0.00*	*0.00*	*0.38*	*0.00*
ROA													1.00	0.37	-0.19	-0.02	-0.04	-0.05
														0.00	*0.00*	*0.25*	*0.30*	*0.03*
INVREC														1.00	-0.18	-0.07	-0.02	-0.09
															0.00	*0.00*	*0.62*	*0.00*
QUICK															1.00	-0.14	0.03	-0.15
																0.00	*0.48*	*0.00*
OCF																1.00	-0.19	-0.16
																	0.00	*0.00*
FOREIGN																	1.00	-0.01
																		0.84
GCO																		1.00

Variable definitions can be found in Appendix B.
The p-values are two-tailed.

and non-M&A firms), except for $CAPINT_{i,t}$ and $ROA_{i,t}$.[14] Notice that among M&A firms, 70% of the observation years are audited by Big N auditors, whereas only 58% is audited by Big N auditors among the non-M&A firms.

As expounded upon in panel D, Pearson correlations are conducted among all variables used in both the OLS regressions and probit models. The data suggests that multicollinearity is not a concern in this paper, as all of the Pearson correlations have a value below 1.00.

The additional controls industry fixed effects based on firms' 2-digit SIC codes and year fixed effects are also included in all analysis, even though they are not included in the descriptive statistics. Predicted signs of tables 4, table 5 and table 6 given in the results section are based on prior research.

[14] The fact that in panel B of table 2 only $ROA_{i,t}$ insignificantly differs among the determinants of M&A ($A_{i,t}$, $ATURN_{i,t}$, $LEV_{i,t}$, $ROA_{i,t}$) for the propensity score matching, makes it seem like the propensity score matching has been done incorrectly. There are two factors that contribute to this perception. Firstly, the propensity score matching has been done by performing determinants of M&A in the year of the M&A, whereas the statistics in panel B represent the values of the observation years one year before the M&A and one year after the M&A (i.e., data of the year of the M&A is excluded from the statistics). Secondly, after the propensity score matching procedure, the variables are all either winsorized or converted to a natural logarithm, which makes the means of the statistics different than before. Notice that $A_{i,t}$ is the only variable in the table which has neither been winsorized nor converted to a natural logarithm due to the fact that this variable has only been used for the propensity score matching procedure.

VI. RESULTS

Propensity Score Matching

Table 3 shows the probit model results for the prediction of the p-score in order to conduct the propensity score matching. As mentioned in the research design, the variables $A_{i,t}$, $ATURN_{i,t}$, $LEV_{i,t}$, and $ROA_{i,t}$ respectively control for size, financial structure and probability of a firm. As presented in table 3, all variables have a significant effect on M&A. In particular, Assets and return on assets are positively and significantly associated with the likelihood of being involved in an M&A. Contrarily, asset turnover and leverage are negatively and significantly related to M&A. Notice that the variables of table 3 are neither winsorized nor expressed in natural logarithm to minimize bias in the propensity score matching process.

TABLE 3

Probit Model Results for Tests of the Determinants of M&A
(n = 38,909)

Dependent Variable:
Model = *M&A* (see formula 9)

For the model, the coefficient is reported in column (a) and the p-value is reported in column (b).

		M&A Model	
Variable	**Expected Sign**	**(a)**	**(b)**
A	?	0.000	0.000
ATURN	?	-0.015	0.002
LEV	?	-0.002	0.000
ROA	?	0.057	0.000
CONSTANT	?	-0.067	0.000
R^2		0.019	
n		38,909	

The p-values are two-tailed.
t-statistics are calculated using standard errors which are not clustered.
Variable definitions can be found in Appendix B.

Audit Quality

Table 4 represents the results for the examination of the *ex-post* effect of M&A on Audit Quality. Model 1, model 2 and model 3 show the effect on discretionary accruals based on the Modified Jones Model, discretionary accruals based on the Industry Model, and annual restatements, respectively.

TABLE 4

Regression and Probit Model Results for Tests of the Relation between M&A and Audit Quality
(n = 1,086 firms * 2 years)

Dependent Variables:
Model 1 = *DA_JONES* (see formula 10)
Model 2 = *DA_DS* (see formula 11)
Model 3 = *RES* (see formula 12)

For each model, the coefficient is reported in column (a) and the p-value is reported in column (b).

		Audit Quality					
		Model 1		**Model 2**		**Model 3**	
Variable	**Expected Sign**	**(a)**	**(b)**	**(a)**	**(b)**	**(a)**	**(b)**
M&A	?	-0.163	0.005	-0.611	0.009	0.042	0.869
POST	?	-0.065	0.052	-0.089	0.000	0.017	0.955
*M&A * POST*	?	0.076	0.027	0.084	0.002	-0.211	0.502
LNA	+	-0.063	0.019	-0.063	0.000	-0.158	0.033
ATURN	+	0.248	0.000	0.038	0.075	0.253	0.442
LEV	+	0.304	0.000	0.259	0.000	0.015	0.928
MKTVAL	+	-0.000	0.929	0.000	0.000	0.000	0.050
CLOSS	-	-0.405	0.002	-0.252	0.001	-0.659	0.015
CAPINT	+	0.007	0.645	0.009	0.358	-0.036	0.075
ROA	+	-0.277	0.007	-0.227	0.036	-0.986	0.004
INVREC	-	-0.969	0.000	-0.148	0.369	-0.366	0.772
QUICK	?	0.015	0.440	0.033	0.008	-0.072	0.104
BIGN	-	-0.080	0.244	0.010	0.684	0.086	0.804
OCF	+	0.000	0.346	0.000	0.253	-0.002	0.091
FOREIGN	-	-0.000	0.159	-0.000	0.489	-0.011	0.011
GCO	?	0.106	0.649	0.194	0.350	-0.217	0.700
IND_FE		YES		YES		YES	
YEAR_FE		YES		YES		YES	
R^2		0.411		0.484		0.152	
n		2,172		2,172		2,172	

The p-values are two-tailed.
t-statistics are calculated using standard errors clustered by industry. Industries are defined by 2-digit SIC codes. Variable definitions can be found in Appendix B.

Surprisingly, the interaction of *M&A * POST* in model 1 is positive and significant at the 5% level. This means that there is a positive and significant association between M&A and discretionary accruals according to the Modified Jones Model, suggesting that in the post-period of an M&A, firms which are involved in M&A report significantly more discretionary accruals than non-M&A firms, compared to the prior-period of an M&A (i.e., this indicates that M&A is negatively and significantly associated with audit quality).

Similarly, model 2 shows that the interaction of *M&A * POST* is positive and significant at the 1% level. This also shows that M&A is positively and significantly associated with discretionary accruals, but this time according to the Industry Model. Model 2 is therefore consistent with the results of model 1. These results suggest even more that firms which are involved in M&A in fact report significantly more discretionary accruals in the post-period of an M&A than firms which are not involved in M&A, compared to the prior-period of an M&A.

However, in model 3, the interaction of *M&A * POST* is negative and insignificant. This indicates that there is no significant effect between M&A and annual restatements (i.e., there is no association between M&A and audit quality), which is inconsistent with model 1 and model 2.

While the test variable of model 1 and model 2 suggests that there is a positive and significant association between M&A and audit quality, the test variable of model 3 shows that there is no significant association between M&A and audit quality. In accordance to the expected audit effort and the results of Lobo and Zhao (2013) and Kinney et al. (2004), the results indicate that there is indirect evidence of the association between M&A and audit quality through discretionary accruals, but there is no direct evidence through annual restatements.

Auditor Behaviour

Table 5 presents the regression results of the association between M&A and audit fees. The test variable of the model, *M&A * POST*, has a positive and significant result. Therefore, the results suggest that after an M&A, the audit fees of M&A firms increase significantly more than non-M&A firms, compared to before an M&A.

As mentioned in the hypothesis development, in this paper the audit fees are not considered to be a proxy of audit quality, but rather auditor behaviour. The increase in audit fees are may be due to increased effort and/or risk premium (Bell et al., 2001). The results show, an overall change in auditor behaviour due to increased audit fees, similar to prior literature (Bell et al., 2001).

TABLE 5

Regression Model Results for Tests of the Relation between M&A and Auditor Behaviour (n = 1,086 firms * 2 years)

Dependent Variable:
Model = *LNAFEE* (see formula 13)

For the model, the coefficient is reported in column (a) and the p-value is reported in column (b).

		Audit Fees Model	
Variable	**Expected Sign**	**(a)**	**(b)**
M&A	?	-0.049	0.254
POST	?	-0.158	0.009
*M&A * POST*	?	0.159	0.001
LNA	+	0.534	0.000
ATURN	+	-0.147	0.031
LEV	+	0.100	0.084
MKTVAL	+	-0.000	0.001
CLOSS	?	0.251	0.090
CAPINT	+	-0.008	0.507
ROA	-	0.371	0.049
INVREC	?	1.046	0.001
QUICK	-	-0.014	0.409
BIGN	+	0.389	0.000
FOREIGN	+	-0.002	0.035
GCO	+	0.430	0.000
IND_FE		YES	
YEAR_FE		YES	
R^2		0.820	
n		2,172	

The p-values are two-tailed.
t-statistics are calculated using standard errors clustered by industry. Industries are defined by 2-digit SIC codes. Variable definitions can be found in Appendix B.

VII. SUPPLEMENTAL ANALYSIS

Big N Auditors

In the supplemental analysis I will examine whether Big N auditors are more profound in acquiring firms' audits in the post-period of M&A compared to the prior-period of M&A. Researchers argue extensively that Big N auditors provide more assurance in their audit due to multiple reasons. First, firms audited by Big N auditors tend to report less absolute discretionary accruals compared to firms audited by non-Big N auditors (Becker et al., 1998; Francis, Maydew, & Sparks, 1999). Reported discretionary accruals are also better reflected in stock returns and future income among Big N clients than non-Big N clients (Krishnan, 2003). Second, Big N clients perceive lower *ex-ante* cost of capital than non-Big N clients, which implies that Big N clients' earnings are more reliable (Khurana & Raman, 2004). Therefore, more assurance is provided to clients by Big N auditors in comparison with non-Big N auditors. Lastly, Behn, Choi and Kang (2008) found that analysts of firms audited by Big N auditors experience higher forecast accuracy of firms' future income compared to firms audited by non-Big N auditors, which again implies more reliable earnings for Big N clients.

Auditors are likely to have more interest in larger firms (e.g., merged or acquisitioned firms) compared to smaller firms, which leads to providing higher quality audits to larger firms compared to smaller firms in the end (Reynolds & Francis, 2000). Also, Big N auditors are known as firms dealing with larger firms compared to non-Big N auditors. Due to the fact that after M&A firms will increase in size, I expect that after M&A, firms are more likely to be audited by a Big N auditor.

On the other hand, in the prior-period of M&A, both the acquiring and target firm are associated with upward earnings management (Erickson & Wang, 1996; Teoh et al., 1998; Anilowski, Macias, & Sanchez, 2009). Therefore, firms may have incentives to choose for a non-Big N auditor in order to avoid earnings management being detected due to lower assurance services of non-Big N auditors. This leads to the following null hypothesis:

Hypothesis 3 (null form): There is no relation between M&A and Big N auditors.

I use data of firms and acquiring firms' involved in M&A to analyse whether acquiring firms are more likely to be audited by a Big N auditor after M&A. Following Chaney, Jeter and Shivakumar (2004) and Choi and Wong (2007), the used probit model for firm *i* and event year *t* is given as:

$$BIGN_{i,t} = \alpha_1 M\&A_i + \alpha_2 POST_{i,t} + \alpha_3 M\&A_i * POST_{i,t} + \alpha_4 LNA_{i,t} + \alpha_5 ATURN_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 CLOSS_{i,t} + \alpha_8 CAPINT_{i,t} + \alpha_9 ROA_{i,t} + \alpha_{10} INVREC_{i,t} + IND\_FE + YEAR\_FE + \epsilon_{i,t}, \quad (14)$$

where $BIGN_{i,t}$ is a dummy variable equal to one if the firm is audited by a Big N auditor. The same control variables are used as the prior models of this paper in order to capture audit risk. In addition, the variables capital intensity, $CAPINT_{i,t}$, and recent debt of equity issuance, $ISSUE_{i,t}$, are included to control for size, complexity and thus for audit effort, which is likely to be positively related to Big N auditors.

The results of the analysis are presented in table 6. The interaction of *M&A * POST* is negative and significant, which means that M&A is negatively and significantly associated with Big-N auditors. In the post-period of an M&A, the an M&A firm rather chooses to be audited by a non-Big N auditor than non-M&A firm, compared to the prior period of an M&A. This suggests that in order to avoid earnings management to be detected, M&A firms choose to be audited by a non-Big N auditor due to lower assurance provided by these auditors, in accordance to Erickson and Wang (1996), Teoh et al. (1998) and Anilowski et al. (2009).

TABLE 6

Probit Model Results for Tests of the Relation between M&A and Big N Auditors
(n = 1,086 firms * 2 years)

Dependent Variable:
Model = *BIGN* (see formula 14)

For the model, the coefficient is reported in column (a) and the p-value is reported in column (b).

		Big N Auditor Model	
Variable	**Expected Sign**	**(a)**	**(b)**
M&A	?	-0.152	0.091
POST	?	0.065	0.347
*M&A * POST*	?	-0.149	0.002
LNA	+	0.759	0.000
ATURN	+	-0.043	0.677
LEV	+	0.022	0.850
CLOSS	-	0.808	0.000
CAPINT	+	-0.029	0.097
ROA	+	0.375	0.175
INVREC	?	-0.833	0.162
IND_FE		YES	
YEAR_FE		YES	
R^2		0.485	
n		2,172	

The p-values are two-tailed.
t-statistics are calculated using standard errors clustered by industry. Industries are defined by 2-digit SIC codes. Variable definitions can be found in Appendix B.

VIII. CONCLUSION

I examine whether the audit quality and audit behaviour changes after an M&A in comparison to before an M&A. The reason for conducting this analysis originates from an earlier research investigating the *ex-ante* M&A existence of earnings management. Earnings management plays an important role in audit quality, which makes it interesting to empirically investigate the *ex-post* analysis of M&A and audit quality in order to compare the post-period to the prior-period of M&A. I implement difference-in-difference estimations in combination with propensity score matching in order to analyse this effect.

The results indicate that there is an *ex-post* effect of M&A on audit quality. Audit quality is measured through the proxies discretionary accruals and annual restatements, which also capture earnings management. I find indirect evidence that there is more earnings management in the post-period of M&A compared to the prior-period of M&A. However, I find no direct evidence for earnings management through the issuance of annual restatements. Also, the audit fees are higher in the post-period of M&A compared to the period-period of M&A. The supplemental analysis implies that there is a decrease in the number of Big N audits in the post-period of M&A compared to the prior-period of M&A. Overall, the results suggest that external auditors may rely more on the work of the internal auditor, and therefore the audit effort may be decreasing. The supplemental results suggest that firms are more likely to choose a non-Big N auditor in order to avoid earnings management being detected.

This paper contributes to existing literature for two reasons. Firstly, the *ex-post* effect of M&A on third parties, has not been analysed yet. Secondly, regulators are able to implicate better regulations of M&A.

This paper is subject to two limitations. First, prior literature examining audit quality use the control variable of which I am not able to collect this data from the databases. These variables are “debt or equity issuance”, which takes the value one if debt or equity has been issued in year *t*, and takes the value zero otherwise, and “number of business segments”. I leave these variables out of the formulas, which may lead to omitted variable bias. Second, the extracted data of M&As between the years 2006-2015 from Thomson One is later merged with 2005 and 2016 data from Compustat and Audit Analytics. However, M&As could also have been occurred in the years 2005 and 2016, which I do not took into consideration in my analysis, and thus may lead to a bias.

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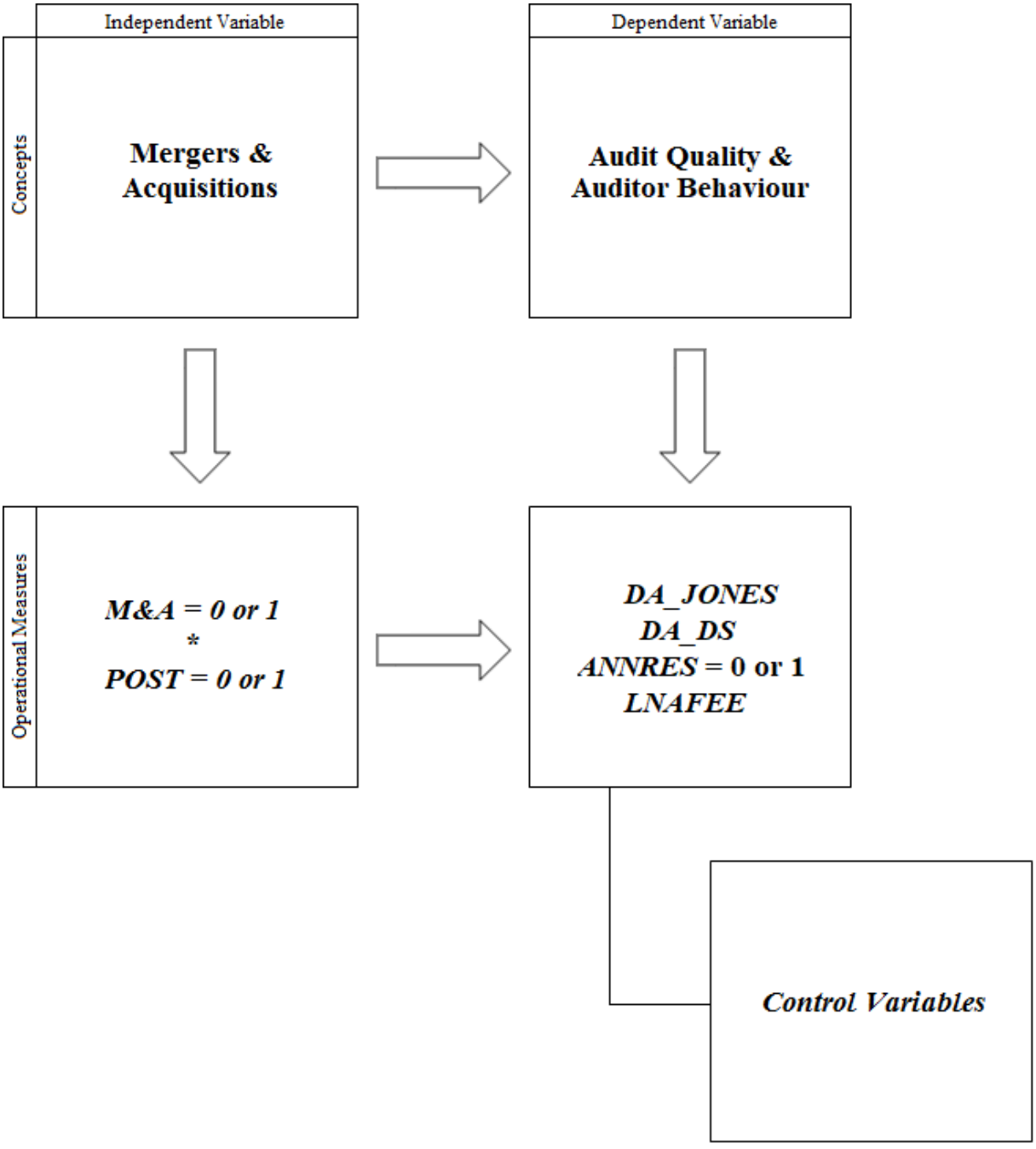
APPENDIX A

PREDICTABILITY VALIDITY FRAMEWORK ("LIBBY BOXES")



APPENDIX B

VARIABLE DEFINITIONS

Economic data

Industry fixed effects (*IND_FE*)	=	estimator that takes non-random quantities over industries based on the 2-digit SIC code;
Year fixed effects (*YEAR_FE*)	=	estimator that takes non-random quantities over time per year.

M&A data

Mergers and acquisitions ($M\&A_i$)	=	indicator variable that takes the value of one if the client of the auditor is involved in M&A and is the acquiring firm;
Post-period of M&A ($POST_{i,t}$)	=	indicator variable that takes the value of one for observation in the year after the M&A.

Accounting data

Asset turnover ($ATURN_{i,t}$)	=	ratio of the annual sales divided by the average total assets of a firm;
Capital intensity ($CAPINT_{i,t}$)	=	ratio of average total assets divided by sales, which could also be calculated as 1 divided by the asset turnover;
Current loss ($CLOSS_{i,t}$)	=	indicator variable that takes the value of one for a firm's loss in a calendar year;
Discretionary accruals ($DA\_DS_{i,t}$)	=	absolute value of discretionary accruals calculated using the Industry Model by Dechow and Sloan (1991);
Discretionary accruals ($DA\_JONES_{i,t}$)	=	absolute value of discretionary accruals calculated using the Modified Jones Model by Dechow et al. (1995);
Financial leverage ($LEV_{i,t}$)	=	ratio of total debt divided by total assets;
Foreign income ($FOREIGN_{i,t}$)	=	indicator variable that takes the value of one if the firm discloses foreign income;
Growth of accounts receivable ($\Delta REC_{i,t}$)	=	difference between current amount of accounts receivable and amount of accounts receivable of prior year;
Growth of revenues ($\Delta REV_{i,t}$)	=	difference between current sales and sales of prior year;
Inventories and receivables ratio ($INVREC_{i,t}$)	=	ratio of inventory plus accounts receivable divided by total assets;
Lagged assets ($A_{i,t-1}$)	=	prior-period total assets, retrieved from annual Compustat data item 6;

Market value of equity ($MKTVAL_{i,t}$) = the market value of a firm's equity;

Natural logarithm of total assets ($LNA_{i,t}$) = natural logarithm of the total assets of the firm;

Non-discretionary accruals ($NA\_DS_{i,t}$) = non-discretionary accruals calculated using the Industry Model by Dechow and Sloan (1991);

Non-discretionary accruals ($NA\_JONES_{i,t}$) = non-discretionary accruals calculated using the Modified Jones Model by Dechow et al. (1995);

Operating cash flows ($OCF_{i,t}$) = annual Compustat data item 308;

Property, plant and equipment ($PPE_{i,t}$) = gross value of a firm's property, plant and equipment;

Quick ratio ($QUICK_{i,t}$) = ratio of current assets minus inventories divided by current liabilities;

Return on assets ($ROA_{i,t}$) = ratio of total net income divided by total assets;

Total accruals ($TA_{i,t}$) = total accruals, calculated as:
$\frac{\Delta CA_{i,t} - \Delta CASH_{i,t} - \Delta CL_{i,t} + \Delta STDEBT_{i,t} - DEP_{i,t}}{A_{i,t-1}}$;
where $\Delta CA_{i,t}$ is the difference between current assets in year *t* and year *t-1*, $\Delta CASH_{i,t}$ is the difference between cash and cash equivalents in year *t* and year *t-1*, $\Delta CL_{i,t}$ is the difference between current liabilities in year *t* and year *t-1*, $\Delta STDEBT_{i,t}$ is the difference between short term debt in year *t* and year *t-1*, and $DEP_{i,t}$ is the depreciation and amortization expense in year *t*;

Total assets ($A_{i,t}$) = annual Compustat data item 6.

Audit data

Big N auditor ($BIGN_{i,t}$) = indicator variable that takes the value of one if the audit of the firm is performed by a Big Four auditor;

Going concern opinion ($GCO_{i,t}$) = indicator variable that takes the value of one if for a particular firm year the auditor issues a going concern opinion;

Natural logarithm of audit fees ($LNAFEE_{i,t}$) = natural logarithm of the fee a firm pays to their external auditor for performing the audit.

Restatements annually ($RES_{i,t}$) = indicator variable that takes the value of one if for a particular firm year the auditor issues a restatement of annual earnings;

APPENDIX C
MATHEMATICAL DERIVATION OF PROPENSITY SCORE MATCHING

Suppose that $Y_i(1)$ is the outcome if the (acquiring) firm participated in an M&A (the treatment group) and $Y_i(0)$ is the outcome if the firm is not involved in an M&A (the control group). In order to analyse if the effect of M&A differs between the treatment group and the control group, the measurement can be written as:

$$\Delta = \quad Y_i(1) - Y_i(0). \tag{15}$$

Logically, it is not possible to identify Δ due to the fact that at one time period, only one outcome $Y_i(1)$ or $Y_i(0)$ is identifiable for firm i and the counterfactual is not observable. Therefore, I will not focus on the use of the observation of a single firm but differences in the mean values between the treatment group and the control group. This difference is often called the average treatment effect on the treated firms, $\Delta_{M\&A}$, which shows the expected outcome given the fact that an M&A in fact took place. Let *M&A* be an indicator that equals one if a firm in fact experienced an M&A, and zero otherwise. The average treatment effect on the treated firms is represented as follows:

$$\Delta_{M\&A} = \quad E\{Y(1) \mid M\&A = 1\} - E\{Y(0) \mid M\&A = 1\}. \tag{16}$$

However, in this case it is not possible to calculate the counterfactual, $E\{Y(0) \mid M\&A = 1\}$, due to the fact that the mean outcome of a control group involved in M&A is not observable. One way to overcome this is to calculate the mean of the control group, $E\{Y(0) \mid M\&A = 0\}$, instead. By comparing this to the treatment group with treatment, the *prima facie* effect, Δ_{PF}, can be calculated:

$$\Delta_{PF} = \quad E\{Y(1) \mid M\&A = 1\} - E\{Y(0) \mid M\&A = 0\}, \tag{17}$$

which can also be written as:

$$\Delta_{PF} = \quad \Delta_{M\&A} + E\{Y(0) \mid M\&A = 1\} - E\{Y(0) \mid M\&A = 0\}, \tag{18}$$

of which $E\{Y(0) \mid M\&A = 1\} - E\{Y(0) \mid M\&A = 0\}$ could lead to a selection bias if the outcome variable depends on the assignment of firms of the treatment group ($M\&A = 1$) and the control group ($M\&A = 0$).

One way to solve this problem is to assume conditional independence. This "conditional independence assumption" makes it possible to have an unbiased estimator by assigning on

covariates, so the outcome will only be determined by capturing information of the X variable. This assumption holds if:

$$Y(0), Y(1) \perp M\&A \mid X, \forall X, \tag{19}$$

where $\perp$ shows independence and $\forall X$ means that the assumption holds for all X variables.

By matching the treatment group with a corresponding control group based on observable similar characteristics X. The propensity score is given as P(M&A) and represents the probability of an M&A of a firm conditional on specific characteristics X. Calculation of the propensity score is done by performing a probit model, after which matching is determined by using the propensity score of the treatment group and the control group, measured in year t. This is mathematically given as:[15]

$$P(M\&A_{i,t}) = \quad Pr(M\&A_{i,t} = 1 \mid X_{i,t}), \tag{20}$$

where the propensity score is measured given a set of determinants X. The probit model of formula (20) is performed by using determinants of M&A, which in this paper is given by a firm's size, profitability and financial structure. Size is determined by the total assets and asset turnover. Profitability of the firm is given by a return on assets. The financial structure of the firm is given by a the leverage of the firm, which is calculated as total debt divided by total assets.

The unbiased average treatment effect on the treated firms can then be calculated as:[16]

$$\Delta_{\text{M\&A}} = \qquad E\{Y(1) \mid M\&A = 1, P(\text{M\&A})\} - E\{Y(0) \mid M\&A = 0, P(\text{M\&A})\}. \tag{21}$$

This is done by performing the nearest neighbour matching algorithm. In particular, one single control unit j is matched to a treatment unit i, also known as one-to-one matching. Nearest neighbour matching is a mechanism which determines a propensity score of a control unit j which is closest to the propensity score of a treatment unit i. Suppose that the propensity score of control j and treated i is given as P_j and P_i, respectively. The set of treatment units are given as T and the set of control units is given as C. The nearest neighbour propensity score matches are calculated as:

$$C_i = \qquad \min_j || P_i - P_j ||, \tag{22}$$

[15] The propensity score matching process is performed in Stata Version 15.0 implementing the software which is developed by Leuven and Sianesi (2003).
[16] This calculation is based on the conditional independence assumption.

where C_i represents the set of control units which are matched to the treatment units by the closest possible distance between the two groups in terms of propensity scores.

APPENDIX D

SAMPLE SELECTION PROCESS

TABLE 1

Composition of Sample Observations

Merged data from Thomson One, Compustat and Audit Analytics	**103,755**
Less: Firms with only one observation year	832
Less: Financial services (SIC 6020-6799)	37,680
Less: Observations of event year 2004	5,390
Less: Auditor country outside the U.S.	8,320
Less: Firms ISO country code outside the U.S.	2,267
Less: Observations with negative sales	16
Less: Observations with missing values	10,341
Observations used before Propensity Score Matching	**38,909**
Less: Non-matched firms after matching	22,001
Less: Observations other than one year prior to M&A and one year post M&A	14,736
Observations used for all tabulated results	**2,172**
Firms used for all tabulated results	**1,086**