

Mandatory Governance Reform and Corporate Risk Management

Finance Working Paper N° 552/2018

April 2020

Ulrich Hege

Toulouse School of Economics and ECGI

Elaine Hutson

Monash University

Elaine Laing

Trinity College Dublin

© Ulrich Hege, Elaine Hutson and Elaine Laing 2020. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

This paper can be downloaded without charge from:
http://ssrn.com/abstract_id=3117801

<https://ecgi.global/content/working-papers>

ECGI Working Paper Series in Finance

Mandatory Governance Reform and Corporate
Risk Management

Working Paper N° 552/2018

April 2020

Ulrich Hege
Elaine Hutson
Elaine Laing

Abstract

We use the reform process of the Sarbanes-Oxley Act of 2002 as a quasi-natural experiment to identify the impact of corporate governance reform on foreign exchange risk hedging, and find that the substantial improvements in governance standards reduced foreign exchange exposure and increased derivatives hedging. The results are robust whether we consider initial reform gap or actual implementation, focus on legally required governance measures or include voluntary concomitant reforms. The economic magnitude of the effect is large. Firms with larger foreign markets exposure and a larger distortion in CEO incentives react more strongly to the reform. Financial hedges are implemented rapidly whereas exposure measures that encompass operational hedges take more time to adjust.

Keywords: risk management, financial and operational hedging, foreign exchange risk, Sarbanes-Oxley Act, corporate governance reform, board monitoring, risk-taking incentives

JEL Classifications: F31, F23, G34

Ulrich Hege*

Professor and Vice President
Toulouse School of Economics, Research Faculty
21 allée de Brienne
31015 Toulouse Cedex 6, France
phone: +33 561 128 601
e-mail: ulrich.hege@tse-fr.eu

Elaine Hutson

Adjunct Associate Professor
Monash Business School, Department of Banking and Finance
Caulfield East,
Victoria 3145, Australia
phone: +61 399 032 110
e-mail: Elaine.Hutson@monash.edu

Elaine Laing

Assistant Professor
Trinity College Dublin, Trinity Business School
College Green
Dublin 2, Ireland
phone: + 353 1896 4981
e-mail: elaing@tcd.ie

*Corresponding Author

Mandatory Governance Reform and Corporate Risk Management

Ulrich Hege^a

Elaine Hutson^b

and Elaine Laing^c

March 2020

Abstract

We use the reform process of the Sarbanes-Oxley Act of 2002 as a quasi-natural experiment to identify the impact of corporate governance reform on foreign exchange risk hedging, and find that the substantial improvements in governance standards reduced foreign exchange exposure and increased derivatives hedging. The results are robust whether we consider initial reform gap or actual implementation, focus on legally required governance measures or include voluntary concomitant reforms. The economic magnitude of the effect is large. Firms with larger foreign markets exposure and a larger distortion in CEO incentives react more strongly to the reform. Financial hedges are implemented rapidly whereas exposure measures that encompass operational hedges take more time to adjust.

Key words: risk management, financial and operational hedging, foreign exchange risk, Sarbanes-Oxley Act, corporate governance reform, board monitoring, risk-taking incentives

JEL codes: F31, F23, G34

^a Corresponding Author: Ulrich Hege, Toulouse School of Economics, 1 Esplanade de l'Université, 31015 Toulouse Cedex 6, France, and ECGI. Email: ulrich.hege@tse-fr.eu. Phone +33 5 61 12 86 01. Hege acknowledges funding from the European Research Council, ERC FP7 grant No. 312503-SolSys, and from the ANR, grant no. ANR-17-EURE-0010 (Investissements d'Avenir).

^b Elaine Hutson, Department of Banking and Finance, Monash Business School, Monash University, VIC, Australia. Email: Elaine.Hutson@monash.edu.

^c Elaine Laing, Trinity Business School, Trinity College Dublin, Dublin 2, Ireland. Email: elaing@tcd.ie.

Mandatory Governance Reform and Corporate Risk Management

March 2020

Abstract

We use the reform process of the Sarbanes-Oxley Act of 2002 as a quasi-natural experiment to identify the impact of corporate governance reform on foreign exchange risk hedging, and find that the substantial improvements in governance standards reduced foreign exchange exposure and increased derivatives hedging. The results are robust whether we consider initial reform gap or actual implementation, focus on legally required governance measures or include voluntary concomitant reforms. The economic magnitude of the effect is large. Firms with larger foreign markets exposure and a larger distortion in CEO incentives react more strongly to the reform. Financial hedges are implemented rapidly whereas exposure measures that encompass operational hedges take more time to adjust.

Key words: risk management, financial and operational hedging, foreign exchange risk, Sarbanes-Oxley Act, corporate governance reform, board monitoring, risk-taking incentives

JEL codes: F31, F23, G34

1. Introduction

Do self-interested managers hedge too much or too little relative to the best interest of shareholders? While corporate risk-taking and risk management are a central issue in modern finance, some fundamental aspects of the relationship between agency problems and corporate risk policies are not yet fully understood. Notably, theory and empirical evidence suggest that the relationship between corporate governance practices and risk management is ambiguous, expressed in two popular but conflicting views. In one view, managers hedge too little due to agency problems such as career concerns leading to short-termism and convex incentives; in this view, firms reduce financial corporate risk when exposed to more stringent governance requirements that safeguard shareholders' interest (Smith and Stulz, 1985; Froot, Scharfstein and Stein, 1993; Myers, 1977; Leland, 1998). In the contrasting view, agency models predict the opposite: when managers are imperfectly diversified or overly risk-averse, they may choose hedging policies that suit their own interests and 'overhedge' in the absence of safeguards for shareholders' interests. Stronger governance will then lead to less hedging (Stulz 1984; Smith and Stulz, 1985). There is substantial empirical evidence in support of either view.

This paper attempts to make headway on these conflicting views by studying a large-scale natural experiment, the adoption of the Sarbanes-Oxley (SOX) Act of 2002 in the U.S. and its sweeping governance changes. While the literature on the governance-hedging relationship is substantial, there is almost no earlier empirical work using a quasi-experimental setting for the purposes of identifying this relationship. The 2002 Sarbanes-Oxley Act, arguably the most sweeping reform of governance mandates in a developed market in the past 30 years, presents a particular opportunity in this respect. Our paper is the first, to the best of our knowledge, to apply a systematic difference-in-difference panel analysis to a quasi-experimental governance shock and study its impact on corporate hedging.

We find strong evidence that improvements in governance lead to less foreign exchange risk and more foreign exchange derivatives hedging. This finding is robust whether we look at the initial reform shock or the heterogeneous and staggered adoption of the induced governance reforms, and whether we focus on exogenously imposed governance reforms, the most important transmission channels of reform (board and compensation), or add voluntary governance improvements.

A central contribution of this paper is to strengthen the identification of the governance-risk management relationship, showing that managers with wide discretion tend to hedge too little. We also contribute to the literature in other ways: we show that the level of adoption of required governance reforms is a stronger predictor of hedging than voluntary governance improvements. We refine our tests by exploiting cross-sectional firm heterogeneity concerning the exposure to foreign markets and CEO characteristics, and find further consistent evidence that firms with a larger initial distortion in hedging will respond more strongly to reform. Finally, we separate between financial hedging strategies and overall hedging (combining operational and financial hedges), presenting evidence that financial hedges are increased faster in the post-reform adjustment.

In more detail, we deploy a difference-and-difference approach with firm fixed effects to the SOX reform quasi-experiment for a balanced panel of 507 U.S. corporations. We differentiate our measures of the reform impact on governance in two ways. First, we argue that the assignment of firms to treated and control group should carefully distinguish between the (regulator's) intention to treat, and firms' compliance with the treatment, in the parlance of the literature on heterogeneous treatment effects (e.g. Angrist and Pischke, 2009), since not all firms adopt the new rules fully and immediately. We account for both dimensions of treatment by considering the pre-reform governance gap (intention to treat) as well as the actual reform implementation (compliance with the treatment). The pre-reform governance gap exploits the exogenous nature of the initial shock of the quasi-experiment and compares the difference between post- and pre-reform hedging of firms with high treatment intensity (large gap) to the difference of firms with little or no treatment (small gap). The actual implementation measure accounts for the substantial heterogeneity in compliance across firms as it focuses on the effective year-by-year policy adoption of the governance measures: a considerable fraction of firms eschewed adoption even of mandated measures or adopted them with a delay.

Second, we use a series of nested governance indexes to address the fact that the reform process was effective because it triggered broad changes, with firms, under pressure from shareholders and the public, adopting voluntarily and concomitantly many measures beyond the changes imposed by the Sarbanes-Oxley Act. There is a trade-off between a narrow measure that contains only mandated changes and a broader measure that better captures the full scope and heterogeneous adoption of the reform process. We resolve this trade-off by using a set of five different governance indexes, varying along a continuum between exogeneity and

representativeness. Our most restrictive index includes only the ten governance attributes that the SOX reform rendered obligatory by 2004 (*REG10*), with a strong focus on board policies and board independence. Our second index (*MANDATE-INDUCED*) adds ten governance attributes that were so tightly connected with the SOX law that their simultaneous adoption was highly likely. In an alternative approach, we focus on two indexes that focus on measures affecting the two principal transmission channels of reform, the board of directors and the award of executive compensation (*BOARD&COMP15* includes all mandated and mandate-induced board- and compensation-related measures, *BOARD&COMP22* also voluntary measures). Finally, we use a comprehensive index of 41 governance measures, *GOV41*.

It is challenging to observe corporate risk policies since measures of risk confound hedging, factors outside the firm's control, and deliberate risk-taking. To address these difficulties, we deploy a dual measurement of corporate hedging, by considering the exposure to foreign exchange rate movements as well as the use of FX derivatives. Foreign exchange exposure is widely used (see Section 2.2) and appealing as it reflects all of the different instruments of corporate risk management, including financial and operational hedges. But the use of derivatives is arguably better suited to isolate effects of intentional risk management.

Our findings are as follows. Using the initial governance gap or actual implementation, we find strong evidence that a weak governance environment is associated with insufficient attention to risk management – or ‘underhedging’ by self-interested managers. Foreign exchange exposure is reduced and the use of foreign exchange derivatives intensified after the reform. The effects are highly consistent and significant in 29 out of 30 multivariate tests (examining 3 hedging variables for 5 indexes and 2 measures of governance change). Our results are driven by mandated and mandate-induced attributes, as voluntary changes are less significant.

The economic magnitude of the effect of governance changes on risk management in our study is large: according to our estimates, the median increase in *REG10* attributes between 2002 and 2007 leads to a 20.4% decrease in foreign exchange exposure and a 52.2% increase in *Derivatives Mentions*, and the median increase in *MANDATE-INDUCED* (*GOV41*) to a 21.0% (20.4%) decrease in FX exposure and a 31.1% (48.4%) increase in *Derivatives Mentions*.¹

¹ We get comparable economic effects for the board- and compensation-related indexes, with a median increase in *BOARD&COMP15* (*BOARD&COMP22*) leading to 19.8% (24.0%) lower foreign exchange exposure and to 25.9% (31.2%) more *Derivatives Mentions*. The estimated economic effects on *Derivatives Use* are smaller, with median changes leading to effects between 3% and 15%.

When we deploy a more granular time-trend analysis, we find a noticeable difference in the speed of adjustment between the use of derivatives and FX exposure: whereas governance reform exerts an immediate effect on the use of FX derivatives, consistent with the notion that financial hedges are adjusted quickly, we show that foreign exchange exposure, which comprises operational hedges, is adjusted much more slowly.

We extensively investigate the governance-risk management relationship exploiting firm-level heterogeneity. We find that firms with large exposure to foreign markets, i.e. firms that trade globally or have a large foreign input exposure, exhibit a strong nexus between governance reform and hedging whereas firms with little exposure do not. When we look at differences in managerial incentives, we find that firms where CEOs hold large stock option positions react more strongly to governance reform, and a weak effect in the opposite direction when CEOs hold large equity stakes, consistent with theoretical predictions on executive compensation.

When sorting firms according to major characteristics, notably governance, size, value/growth, we find that large firms show a stronger hedging reaction to the governance shock than smaller firms, but find little differences for the growth/value dimension or the G-index. We verify that our results are not altered when we include variables for CEO characteristics and ownership.

The remainder of the paper is structured as follows. The next section briefly discusses the institutional background, prior literature and hypotheses. Section 3 describes our data and methodology. Section 4 presents summary statistics and univariate findings, and Section 5 discusses the multivariate analysis of our two identification approaches. Section 6 investigates the role of firm heterogeneity, Section 7 covers robustness issues, and Section 8 concludes.

2. Institutional Background, Literature and Hypotheses Development

2.1 *The Sarbanes-Oxley Act and corporate governance reform*

The Sarbanes-Oxley Act (SOX) of 2002 in the U.S. was an unprecedented overhaul of corporate governance standards in reaction to a wave of fraud and accounting scandals in the early 2000s, the most emblematic ones engulfing Enron and WorldCom. The legislation included a number of stringent provisions, including on board composition, board oversight and compensation, intended to safeguard investors and to mitigate governance problems. The main thrust of the Sarbanes-Oxley mandates and associated revisions to NYSE and NASDAQ listing

rules was to strengthen internal governance mechanisms and to better align the incentives of corporate insiders with shareholders' interests. We detail the ten important mandatory rule changes that companies needed to adopt below in our discussion of measures of corporate governance (Section 3.2). The Sarbanes-Oxley Act gave companies until November 2004 to comply with the mandatory policy changes. The reform discussion triggered wider governance reforms in many companies that companies implemented subsequently and voluntarily, over a period of several years. We exploit these features for the purposes of our identification strategy.

The literature on the effects of the SOX legislation mostly asks whether the governance shock had a measurable performance impact. On balance, the literature concludes that the answer is positive, and that the SOX mandates enhanced firm value (e.g., Iliev, 2010; Dicks, 2012; Coates and Srinivasan, 2014). Chhaochharia and Grinstein (2007) study the announcement effects of the SOX reform and find positive abnormal returns for firms that were less compliant with the SOX mandates earned, with the effect concentrated in large firms. Aggarwal, Schloetzer, and Williamson (2019) find that firms with a large pre-SOX gap in the ten required governance attributes (our *REG10* index) experienced a post-SOX increase in firm value, and also show that further improvements in "governance culture" through the adoption of non-mandated governance practices (the 31 measures in our *REG10 COMPL.* index) led to larger firm value increases.

There is extensive literature in corporate governance showing that measures affecting the role and functioning of the Board of Directors and of the award of executive compensation affect corporate decision-making (see e.g., Hermalin and Weisbach, 2017, for a recent survey). Considering this literature and the nature of the SOX reform process that is largely centered around strengthening board control, audit and compensation practices, our *BOARD&COMP* indexes focus on measures relating to the board and to compensation when constructing our indexes that tie down the transmission channels of governance reform.

We add a caveat concerning the external validity of our study: our tests, while based on a far-reaching governance reform, do not allow any inference on the probability that the same outcome would obtain in other governance reforms. We do not explore valuation and corporate performance effects because conventional measures of stock price and accounting performance confound the effects of all corporate decisions affected by the Sarbanes-Oxley reform process, not just the effect on foreign exchange hedging policies on which our study focuses.

2.2 *Hedging, agency problems and corporate governance*

Corporate finance theory generally holds that hedging strategies reduce the volatility of future cash flows and hence in the presence of asymmetric information between investors and company insiders, will help to mitigate underinvestment, increase debt capacity, and reduce financial distress costs (Smith and Stulz, 1985; Myers, 1977; Froot, Scharfstein, and Stein, 1993; Leland, 1998) and increase corporate transparency (Manconi, Massa, and Zheng, 2018). Thus, there is broad consensus that the management of financial risks should be value enhancing. There is also ample empirical evidence for this relationship (Allayannis and Weston, 2001; Carter, Rogers, and Simkins, 2006; MacKay and Moeller, 2007; Disatnik, Duchin, and Schmidt, 2014; Campello et al., 2011; Bartram, Brown and Conrad, 2011).

The modern corporation, however, is run by managers, and the impact of improved corporate governance, the set of rules and arrangements that ensure that corporate decision-making is aligned with the interest of shareholders and other relevant stakeholders,² depends on its effect on managerial decisions. Thus, we limit our discussion to agency theories that explain how managers would decide when governance is weak relative to the efficient hedging policy.

Theoretical arguments and empirical evidence are sharply divided on the question whether managers will hedge too much or too little relative to the best interest of shareholders, and we will briefly lay out the main arguments for the two contrasting views. In the first view, the underhedging hypothesis, managers hedge too little compared with the value-maximizing strategy. From the view point of corporate finance theory, underhedging motives are closely related to managerial risk-taking, starting with the seminal risk-shifting hypothesis of Jensen and Meckling (1976) that is based on managers' and shareholders' limited liability protection. While this effect does not explain a discrepancy in risk-taking between managers and shareholders, there is a number of explanations why managers might tolerate risk beyond the level that is optimal from the point of view of shareholders: even optimal contracts with managers might imply less hedging than preferred by shareholders to preserve managerial incentives (e.g., Holmström and Tirole, 2000); managers could be short-termists and hence neglect the long benefits of hedging in avoiding financial distress risk and facilitating investments, and have career concerns while the benefits of hedging accrue in the long term

² For this discussion, we consider that firm value and equity value maximization coincide, that is we adopt an ex ante perspective where all ex post value transfers between equity, debt and other securities are anticipated.

(Stein, 1988); the explicit and implicit compensation structure may reward managers with a disproportionate stake in the upside (via stock options, bonuses and career concerns) (Smith and Stulz, 1985), or they may be overconfident (e.g., Malmendier and Tate, 2005). When managers are inclined to underhedge, then standard agency models lead to the prediction that better corporate governance will lead to an increase in corporate hedging. These arguments lead us to formulate the first hypothesis:

Hypothesis 1 (*Underhedging*): If companies hedge too little compared with the firm optimum prior to corporate governance reform, improved corporate governance will lead to reduced foreign exchange exposure and to more hedging.

In the empirical literature, there is substantial evidence in support of this view, looking specifically at a variety of governance mechanisms. Borokhovich, Brunarski, and Parinno (2004) report a positive relation between the monitoring of outside directors and the firm's use of interest rate derivatives, and Lel (2012) finds that firms with strong corporate governance use derivatives to reduce risk and maximize firm value whereas those with weak governance use derivatives selectively to satisfy managerial self-interest. Allayannis, Lel, and Miller (2012) show that hedging creates more value in firms with strong internal governance (such as those with a large outside blockholder) as well as better external governance. In firms with good governance, managers are less likely to use financial derivatives for speculative purposes (Géczy, Minton, and Schrand, 2007; Bartram, 2019). Hutson and Stevenson (2010) find that firms in countries with weak shareholder and creditor protection have higher exposure than firms in countries with a strong governance environment.

In the second (and conflicting) view, the overhedging hypothesis, managers, when left to their own devices, decide to hedge too much relative to shareholders' interest. The leading explanation is that they are risk averse but underdiversified because of their large exposure to the volatility of the firm value via their compensation package and stock holdings; hence, when hedging is costly, they will tend to hedge more than is optimal from the point of view of diversified shareholders the firm, as demonstrated in the models by Stulz (1984) and Smith and Stulz (1985). Smith and Stulz (1985) discuss that asymmetric information or other hurdles to optimal contracting can explain that overhedging can occur even when shareholders device second-best incentive contracts. Campbell and Kracaw (1987) show that in a moral-hazard model of hedging under optimal managerial contracts, managers will hedge more than is optimal

for shareholders if their stock holdings are large. Excessive managerial hedging could have other reasons; Breeden and Viswanathan (2016) propose a signaling explanation where high-ability managers hedge because of reputation or career concerns, since hedging allows markets to detect their talent more easily. When managers hedge excessively, stronger governance that will better align manager's actions with shareholders' interest will lead to less hedging. This leads to the following alternative hypothesis:

Hypothesis 2 (*Overhedging*): If companies overhedge prior to corporate governance reform, improved governance will lead to more foreign exchange exposure and less hedging.

There is also empirical evidence in support of this view. Kumar and Rabinovitch (2013) find for the oil and gas industry that hedging decreases with greater board monitoring (board characteristics include independent directors and board incentives), and increases in measures of CEO power and entrenchment (including CEO tenure and board interlocks). Huang et al. (2013) show that CEOs with large equity exposure hedge less when board independence increases. Knopf, Nam, and Thornton (2002) offer indirect evidence in favor of overhedging by showing that managers tend to hedge more when the sensitivity of their stock and option portfolio to firm value increases.

There is also empirical literature on the relationship between risk-taking incentives of managers and hedging. Tufano (1996) shows that in the gold mining industry managers' hedging increases in their holding of company stock, and decreases in their stock option holdings. Francis et al. (2017) measure risk-taking incentives using option metrics of executive compensation and show that CEOs hedging decreases in the sensitivity of CEOs' wealth to the volatility of stock returns (option vega). The theoretical predictions for this relationship are simpler since hedging should decrease in managers' incentives to take risk. However, it is not obvious whether tighter governance would lead to a reinforcement or a softening of CEOs' risk-taking incentives: boards acting in the interest of shareholders should adjust risk incentives in the opposite direction of what they perceive as the existing bias in managerial risk-taking incentives (see the discussion e.g. in Gormley, Matsa, Milbourn, 2013; Gormley and Matsa, 2016; Francis et al., 2017).

We further refine our hypotheses and empirical tests by taking account of firm heterogeneity. Even if a governance reform implements uniform standards for corporate transparency and

more stringent monitoring on behalf of shareholders, it will affect firms differently according to their situation and circumstances. First, firms differ in their exposure to insurable risk; notably, some firms have a larger exposure to sales or inputs in foreign markets (or both). Firms with larger foreign exposure have more expansive needs for risk management, so a given distortion in managerial incentives will result in a larger distance between optimal and actual hedging policies; hence governance reform that reduces managerial discretion uniformly across firms should have a larger impact on firms with larger foreign exposure. Second, managers differ in their incentive structure, with some managers having stronger incentives to underhedge (overhedge) than others. Again, if managers face relatively larger incentive distortions compared to others, then the impact of the external governance shock should be larger at these firms.³ We summarize these considerations as follows:

Hypothesis 3 (*Firm heterogeneity*): (A) (*Foreign markets exposure*) The hedging policy of firms that are more exposed to (unhedged) foreign exchange risk should react more strongly to a reduction in managerial discretion via governance reform, irrespective of whether managers are biased towards overhedging or underhedging.

(B) (*Managerial incentives*) The hedging policy of firms with managers that have a stronger incentive bias compared to the first-best policy should improve more after a reform-induced reduction in managerial discretion, irrespective of whether managers are biased towards overhedging or underhedging.

2.3 *Corporate risk management and the measurement of hedging policies*

Regarding the measurement of foreign exchange exposure and corporate hedging policies, there is an important literature showing that the management of foreign exchange exposure is complex as it involves not only a range of financial hedges (forwards, options, swaps, and foreign currency debt) but also operational hedging decisions that alter the firm's real operations to reduce foreign exchange exposure (see Aretz and Bartram, 2010; Bartram and Bodnar, 2007; and Muller and Verschoor, 2006, for reviews). There is theoretical literature showing that operational hedges can be beneficial as they are associated with currency diversification, lead to currency matching of foreign exchange revenues with costs (Bodnar and

³ This prediction could be obtained in an optimal contracting model (such as Holmström and Tirole, 2000) where firms differ in the magnitude of moral hazard problems; incentive corrections put in place after a uniform corporate governance shock then have a larger impact on firms with more severe pre-reform agency conflicts.

Marston, 2002; Bodnar, Dumas, and Marston, 2002) and enhance operational flexibility when operations and suppliers are spread out in various parts of the world, creating options for firms to manage risks, and to take advantage of international opportunities as they arise (Mello, Parsons and Triantis, 1995; Buckley and Casson, 1998; Kogut and Kulatilaka, 1994). Empirical work confirms that operational hedges reduce risk (e.g., Allen and Pantzalis, 1996; Pantzalis, Simkins, and Laux, 2001; Carter, Pantzalis, and Simkins, 2003). Hoberg and Moon (2017) present evidence that firms rely more on operational hedges when financial hedging strategies are costly or they are faced with illiquidity problems.

It is against the backdrop of this literature that we choose dual measures of hedging policies: Foreign exchange exposure measure encompasses all financial and operational hedges, whereas the variables for the use of derivatives measure only financial hedges. Thus, the dual measures allow us to investigate financial hedges separately (when looking at derivatives) from the combined impact of all financial and operational hedging policies (the exposure variable). In addition, the derivatives variables arguably also validates the intentional character of any observed changes in foreign currency risk. Typically, putting operational hedges in place involves real investments abroad or deep changes in the supply chain. Such adjustment takes longer than financial hedging policies that can be changed very quickly (see for instance, Hoberg and Moon, 2017). Thus we postulate:

Hypothesis 4 (*Speed of reaction*): Firms should react to governance reform by adjusting financial hedges more quickly than they adjust operational hedges.

2.4 *Difference-in difference analysis of the governance-hedging relationship*

No earlier work undertakes a comprehensive difference-in-difference analysis of the effect of the Sarbanes-Oxley Act on corporate hedging policies, but two papers study partial effects. Francis et al. (2017) introduce a post-SOX time dummy that assumes a uniform effect of SOX in the cross section. Their test does not allow to disentangle the SOX effect from other contemporaneous trends and they do not use difference-in-difference or similar methods. Huang et al. (2013) link corporate hedging to a single SOX mandate, the required majority of independent directors. They find that firms with above-median CEO equity ownership hedge less when forced to increase the number of independent directors, and do not find significant

results for other firms. In line with their results, we also find that the effects of our three hedging variables become insignificant when we restrict the analysis to this single governance variable (see Section 7.3), suggesting that only the combined impact of several SOX measures changes risk management practices. Since the hedging-governance relationship could go in either direction, an important validity check for a difference-in-difference approach is to verify that they are consistent with cross-sectional evidence in the pre-reform period (see Section 5.4).

3. Data and methodology

3.1 Data and measures of corporate hedging

We start our sample construction from the set of all Russell 1000 firms that were listed for the period 2000-2007. We remove financial firms and REITs (which have unique governance structures), leaving us with 786 remaining firms.⁴ Financial information – including stock price and financial statement data – is from Compustat and Datastream, and the governance data are drawn from RiskMetrics (formerly ISS). Matching with the governance and control variables sourced from Compustat, Datastream and Riskmetrics yields a final sample of 507 firms.

For our first measure of corporate hedging policies, we estimate each firm's annual *FX Exposure*, or foreign exchange exposure, following the two-factor methodology developed by Jorion (1990) that expands the seminal one-factor model of Adler and Dumas (1984). This widely used measure is well-suited for our purposes as it encompasses all unhedged exposure effects of FX movements and at the same time, through its estimation structure, only picks up *net* exposure, after all offsetting effects of hedging tools including operational hedges. We estimate Jorion's (1990) model as follows:

$$r_t^i = \alpha_0^i + \alpha_1^i R_t + \alpha_2^i s_t + e_t^i, \quad (1)$$

where r_t^i is the log difference return on stock i , R_t the return on the benchmark stock index in time period t , s_t the log difference in the exchange rate over the same period, and e_t^i is a random error term. To estimate equation (1), we use the firm's closing stock price, the S&P 500 index, and the USD nominal trade weighted index (an increase in the index implies an appreciating US dollar relative to its trading partners' currencies). We use weekly data to estimate exposure coefficients for each firm i for each year.

⁴ We remove financial institutions and intermediaries (firms with two-digit SIC codes from 60 to 67).

We transform the exposure coefficients α_2^i by taking their absolute value and then taking their square root. The former is necessary because foreign exchange exposure can be negative or positive, and we need an absolute rather than directional measure of exposure. We then take the square root because taking absolute values imposes truncation bias, which results in non-normal error terms (Dominguez and Tesar, 2006; Hutson and Stevenson, 2010). This leaves the error term normally distributed.

Our second corporate hedging variable and main variable measuring financial hedging policies, the variable *Derivatives Mentions*, is a text-based count variable of the number of mentions of the use of FX derivatives in a company's annual 10-K filings, and hence varies on a yearly basis. This variable is part of the text-based data used in Hoberg and Moon (2017, 2019). We take the data from the Hoberg-Moon data library, and refer to Hoberg and Moon (2017) for details about the variable construction.⁵ We also check the robustness when using an alternative specification of Hoberg and Moon's text-based variable, forwards and futures mentions, that specifically counts the number of mentions of forward and future contracts for FX hedging (results for this variable are only reported in the Internet Appendix).

To verify that our findings do not depend on the use of a text-based variables constructed by algorithm, we employ a manually constructed, alternative financial hedging variable as our third variable, the dummy *Derivatives Use*. This dummy variable is equal to one if a firm hedges using foreign currency derivatives and zero otherwise. We construct it by manually extracting the relevant information from annual reports and from firms' 10-K filings for mentions of hedging activity using derivative instruments.⁶

3.2 Corporate governance measures

We gather data on 41 'good' corporate governance practices from Institutional Shareholder services (ISS) (the *GOV41* index), and then identify, among these 41 governance attributes, the 10 that are mandated by the SOX regulations and included in the related revisions to NYSE and

⁵ The *Derivatives Mentions* variable is available in the Hoberg-Moon data library at Gerard Hoberg's website, <http://faculty.marshall.usc.edu/Gerard-Hoberg/HobergMoonDataSite/index.html>. We use the original count variable of the HobergMoon_FXHedgeData file whereas Hoberg and Moon (2017) use a dummy version.

⁶ We create the *Derivatives Use* dummy from manual extraction of all annual reports from 2000 to 2007 for all sample firms; *Derivatives Use* varies annually. Item 7A in the 10-K reports details the firm's "Quantitative and Qualitative Disclosures About Market Risk", as e.g. in the following excerpt from the 2007 10-K report of Abbott Laboratories: "Abbott enters into foreign currency forward exchange contracts to manage its exposure to foreign currency denominated intercompany loans and trade payables and third-party trade payables and receivables.....".

NASDAQ listing standards (*REG10* index). We follow Aggarwal, Schloetzer, and Williamson (2019) for the construction of both *GOV41* and *REG10*.⁷ Firms had until their first annual meeting or no later than November 15, 2004 to adopt the 10 regulations included in *REG10*:⁸ (1) the Board must consist of majority independent directors; (2) non-management directors must have executive sessions without management; (3) Nominating Committee must have only independent directors; (4) Compensation Committee must have only independent directors; (5) Audit Committee must have only independent directors and a minimum of three members; (6) firms must adopt corporate governance guidelines; (7) performance of the Board is reviewed regularly; (8) board approved succession plan is in place for CEO; (9) stock-incentive plans adopted with shareholder approval; (10) consulting fee paid to auditors is less than audit fee paid to auditors. As a complement to these 10 mandatory governance attributes in *REG10*, we aggregate the remaining 31 governance attributes to create the *REG10 COMPL.* index.

We then identify 10 additional governance attributes that, while not expressly made obligatory by the SOX Act, are so intimately tied to at least one of the governance attributes in *REG10* that the adoption of the obligatory SOX mandates leads to the likely simultaneous adoption of these attributes; they are thus expected to be highly correlated with the *REG10* measures. We call the ensuing index *MANDATE-INDUCED*.⁹ We define *MANDATE-INDUCED COMPL.* as the complement to *MANDATE-INDUCED*, i.e. it consists of the 21 remaining voluntary attributes in *GOV41*. A correlation analysis of adoption (not reported in tables, but the correlations in Table 2 give a good impression) shows that *MANDATE-INDUCED* is a well chosen index, with the 10 additional components highly correlated with the *REG10* components, but substantially less with the components of *MANDATE-INDUCED COMPL.*

⁷ The 41 governance attributes are related to earlier papers, notably Gompers, Ishii and Metrick (2003). Detailed definitions of each of the 41 attributes, and the breakdown off all indexes are contained in the Appendix. As discussed by Aggarwal, Schloetzer, and Williamson (2019), a complete one-to-one mapping between the ISS governance criteria and the SOX-related governance mandates is not possible. For instance, the ISS definition of independent director is more stringent than that mandated by regulation. Also, SOX regulations require only that firms adopt the provisions; ISS also requires that they be public.

⁸ Non-accelerated filers and foreign private issuers were to comply with the section 404 requirements for their first fiscal year ending on or after July 15, 2005.

⁹ *MANDATE-INDUCED* adds to the 10 mandates of *REG10* with the following 10 closely related attributes: (11) board size is at greater than five but less than sixteen; (12) governance committee exists and met in the past year; (13) annually elected board (no staggered board); (14) policy exists on outside directorships (four or fewer boards is the limit); (15) board has the express authority to hire its own advisers; (16) auditors ratified at most recent annual meeting; (17) directors are subject to stock ownership requirements; (18) officers are subject to stock ownership guidelines; (19) no interlocks among compensation committee members; (20) directors receive all or a portion of their fees in stock.

We introduce two additional indexes that focus specifically on the most plausible reform transmission channels on managerial hedging decisions, the powers and functioning of the Board of Directors and the attribution of executive compensation. The narrow index *BOARD&COMP15* consists of the 15 measures in *REG10* and *MANDATE-INDUCED* concerned with boards and compensation (of the measures listed above, these are measures (1) – (7), (10) – (12), (15), (17) – (20)). *BOARD&COMP22* adds 7 more voluntary attributes linked to the Board of Directors and executive compensation.¹⁰

As the ISS database provides consistent data on these attributes only from 2002 onwards, our governance indexes start in 2002; we follow Aggarwal, Schloetzer, and Williamson (2019) in using the 2002 data also for the two previous years. We express all indexes as percentages to make them more easily comparable.

When using indexes of corporate governance, an important consideration is construct validity, the concern that a governance index is a construct in which some components may be important to fit its purpose, to measure good or bad governance, whereas others might not be (Atanassov and Black, 2016).¹¹ Our deployment of nested governance indexes, coupled with the examination of the missing components in the complements indexes *REG10 COMPL.* and *MANDATE-INDUCED COMPL.*, and the use of indexes that isolate the most important transmission channels (*BOARD&COMP15* and *BOARD&COMP22*) could be viewed as a possible strategy to address concerns about construct validity. We recognize that this approach is far from constituting a definite answer to the underlying challenge but robustness across a series of nested indexes and their complements could possibly offer some reassurance.

3.3 *Firm characteristics and control variables*

We control for a wide set of firm characteristics that may influence the governance-risk management relationship and that have been commonly used in prior exchange rate exposure studies as control variables: firm size as measured by total assets (*Assets*), the market-to-book ratio of equity (*M/B ratio*), both expected to load negatively on hedging, the debt-to-assets ratio (*Debt/Assets*), expected to load positively; and the quick ratio (*Quick ratio*) and R&D expenses

¹⁰ The Appendix provides the full list of the governance attributes in each index.

¹¹ Black et al. (2014) propose as a solution in cross-country governance studies the use of country-specific indexes that better fit the local institutional conditions. Our study, however, is limited to a single jurisdiction.

as a proportion of sales (*R&D*), that have no clear predicted sign. These data are annual. We control for industry using Refinitiv's (formerly Thomson Reuters') economic sector classification codes. In the exposure regressions, we also control for the use of derivatives using *Derivatives Mentions*.

Importantly, we include measures of firms' exposure to international markets and to exchange rate risk. We include a measure of foreign sales as a proportion of total sales (*Foreign sales*); limitations in reporting make it impossible to further break down foreign sales by country or region. In addition, we control for the international diversification of a firm's operations and the extent of its operational hedging by using the multinationality classification system of Aggarwal et al., (2011) (*ABHK*) that divides the world into six regions (Africa, Asia, Europe, North America, South America, and Oceania) and classifies a firm as either domestic (*D*), regional (*R*) if it has activities inside its own region, trans-regional (*T*) if has activities in several regions (this category is further subdivided into *T2* (two regions) to *T5* (five regions)), or 'global' (*G*) if the firm has activities in all six regions. We hand-collect data on subsidiary location from the Directory of Corporate Affiliates via Lexis Nexis.¹² To allow for a nonlinear relation between multinationality and the hedging variables that has been shown before (Hutson and Laing, 2014), we include the square of *ABHK* in all regressions.

The effectiveness of corporate governance reform may also depend on CEO characteristics and incentives. To address this possibility, we use several variables measuring CEO characteristics and CEO incentives, namely *CEO Options*, *CEO Equity*, *CEO Tenure*, and *CEO Turnover*. *CEO Options* are used to measure manager's appetite for risk taking, in line with for instance Gormley, Matsa, and Milbourn (2013). *CEO Equity* is viewed as aligning managers with shareholders, and hence should close the gap between managerial actions and shareholder's preferences (e.g., Jensen and Meckling, 1976; Fluck, 1999). *CEO Tenure* and (inversely) *CEO Turnover* are used as a proxy for managerial entrenchment as longer-serving CEOs have greater power over internal governance mechanisms (Berger, Ofek and Yermack, 1997).

¹² By contrast, annual reports are more heterogeneous as firms report their foreign activity differently, and at various levels of granularity. *SFAS 131* gives firms considerable latitude when reporting data on geographic business segments. Some firms are quite specific on the countries in which they operate, others are not.

3.4 *Identification strategy*

Our first measure of treatment, the governance gap, is designed to capture heterogeneous treatment effects in the form of differences in the initial distance (in 2002) between a firm's governance standards and the full implementation of the governance attributes in the index under consideration. We calculate this gap measure for each of our five indexes (plus the two complements) but counting the number of index components where the firm is not in compliance in the year 2002; for example, for a firm that in 2002 is only compliant with 3 out of the 10 components of the REG10 index, its value for Reg10 Gap is 7 in all years after 2003. In other words, we measure the initial distance (in 2002) between a firm's governance and the full implementation of the governance attributes in the index under consideration, and then keep the governance gap measured in 2002 constant for all subsequent years, until 2007; the gap measure is zero prior to 2002. The gap measure puts strong emphasis on the exogenous shock of the governance reform, by isolating the initial shock or need for reform.

Our second measure, actual implementation, exploits the fact that the adoption of the governance mandates contained in the Sarbanes-Oxley Act of 2002 is heterogeneous across firms and staggered, a potentially powerful feature of the data. This heterogeneity arises because not all firms comply: even for the 10 mandatory measures, the mean compliance five years after the reform is only 81.2% (see Table 1), and it is even lower for the wider indexes (63% for *GOV41*). It is staggered because, one, the SOX Act of 2002 left companies with a choice during a two-year transition period, until November 2004; and two, a substantial number of companies had not adopted all required measures by the November 2004 deadline but did so in subsequent years, thus allowing to observe staggered adoptions during a longer time window; as one would expect, the adoption of voluntary governance attributes is slower than that of the mandated ones (see Table 1). We use this heterogeneous adoption of the mandatory governance changes as the basis for our second approach to identification. In each regression using a specific governance index as the independent variable of interest in our balanced panel analysis for the 2000-2007 period, we focus on the actual adoption and approval of governance attributes. That is, each change in component i in year t of the governance index puts the firms with the recorded change in component i in year t in the treated sample, whereas firms with no change in component i in year t are in the control sample for that component and year. Thus, the methodology keeps tracks of heterogeneous and time-varying treatment effects of each firm.

In both approaches, we control for firm-level fixed effects by using a deviations from means estimator, a well-established methodology to absorb firm-level fixed effects in panel studies. We study that the results are robust when we use a firm-fixed effects panel estimation (Section 7.1). The SOX reform constitutes an exogenous shock to corporate governance standards, but it does not allow to identify treated and control sample unambiguously, both when investigating the intention to treat (our first approach) and the compliance with the treatment (our second approach). Both the intention to treat and the compliance are measured by continuous variables, and hence we focus on these continuous variations in treatment and study firms with high treatment intensity (large 2002 governance gap or large compliance) relative to firms with low treatment intensity (small 2002 governance gap or modest compliance).¹³ Also, our approach allows for the treatment intensity of each firm to vary across our family of indexes, as we move from narrow to more comprehensive indexes.

4. Summary statistics and univariate analysis

Table 1 presents in Panel A the mean, median and standard deviation by year (2002-2007) for our five indexes and two complements, ordered from the purely policy-driven index (*REG10*) and its complement to the comprehensive *GOV41* index. There was a significant rise in all of the indexes over time as firms worked towards compliance, as the *t*-tests (difference in means) and Wilcoxon rank sum test statistics (medians) in column (8) show for the 2007 vs. 2002 difference. *REG10* shows the strongest increase in means, an increase of 140 percent from 3.4 in 2002 to 8.1 in 2007, and medians increase threefold. *MANDATE-INDUCED* doubled in the number of adoptions, both in means and medians, and the increase was almost as strong for the two *BOARD&COMP* indexes. *GOV31* has the smallest increase, by only 71% (mean) to 80% (median). Interestingly, the bulk of the increase in levels in *REG10* and *MANDATE-INDUCED* is accomplished by 2005 (in line with the 2004 deadline imposed by the SOX Act), whereas the adoption of the complementary indexes was slower and continued until 2007.

Panel B presents summary statistics on the year-by-year evolution of sample firms' median absolute *FX Exposure*, with a sample split of firms below and above the median of each index.

¹³ Using the terminology proposed in Atanasov and Black (2016), we adopt a difference-in-difference continuous design. Our identifying assumption is that the treatment effect is linear in the governance gap as well as in treatment compliance. Assigning firms in a binary fashion to samples of treated firms and control firms would require the choice somewhat arbitrary cutoff points in the treatment (intention and compliance), and rely on the counterfactual assumption of a homogeneous treatment effects for treated firms, and no treatment effect for firms in the control sample.

We find that median levels of *FX Exposure* are generally lower for firms with stronger governance. This difference is strong for *MANDATE-INDUCED* and somewhat weaker for *REG10*. It is significant (at standard levels) for the broader indexes and the board- and compensation-based indexes, and for *REG10* in only three years. In the final columns, we compare the median exposure for small and large firms, and find that the exposure of small firms exceeds that of large firms as expected (Chow, Lee, and Solt, 1997; Bodnar and Wong, 2003; Dominguez and Tesar, 2006).¹⁴

Panel C tabulates the *Derivatives Mentions* variable. It is clear from this table that firms with strong compliance with governance mandates – as proxied by above-median index values for our indexes – use financial derivatives significantly more. The usage difference between firms above and below the governance index in question is significant for most indexes and years, particularly so for the broader and board and governance indexes. When we break down the proportion of firms using derivatives by small v. large firms, we find that small firms are significantly less likely to use currency derivatives than large firms.

The tabulation for the *Derivatives Use* dummy in Panel D shows differences between the above- and below median groups for all governance indices that are very similar to those in Panel C, and strongest for the broadest index, *GOV41*. This provides a priori validation for the text-based measure, in view of the construction of the derivatives use dummy that abstracts from the intensity of firms' derivative hedging activities. If a firm had improved its derivative hedging activities by, for example, ceasing to selectively or partially hedge foreign currency transactions, this would not show up in the data.

In Table 2, Panel A, we present median values for the control variables, with firms sorted in above and below median for all indexes. As anticipated, firms with above-median adoption of governance attributes are larger and have a higher valuation (*M/B* ratios) and higher foreign sales than below-median firms. However, no clear pattern exists regarding leverage (variable *D/A*) and the *ABHK* multinationality measures. Low-governance index firms also have significantly higher R&D expense ratios and quick ratios than high-governance firms.

¹⁴ When differentiating the adoption of the governance indexes by firm size, we find greater compliance with the SOX mandates for the narrow indexes, consistent with earlier evidence (Linck, Netter and Yang, 2008; Iliev, 2010), but not for the broad indexes (see Table IA.1 in the Internet Appendix).

Panel B of Table 2 presents the correlation matrix for the variables used in the multivariate analysis.¹⁵ The tabulation provides validation for the use of an array of governance indexes: while, unsurprisingly, *GOV41* is strongly correlated with the other six indexes constructed from its components, and *REG10* is almost perfectly correlated with *MANDATE-INDUCED* ($\rho=0.93$), the correlation is only half as strong with *REG10 COMPL.*; the pattern is similar for *MANDATE-INDUCED COMPL.* As expected, there is a strong and significant positive correlation between firm size and the governance indexes, and between foreign trade exposure (*Foreign Sales* and *ABHK*) and the hedging variables. *FX Exposure* is strongly negatively correlated with all seven indexes, with the lowest correlation for *REG10*, and *Derivatives Mentions* and *Derivatives Use* are significantly positively correlated with all index variables except for *MANDATE-INDUCED COMPL.* The correlation matrix reveals that there is little to be concerned about regarding multicollinearity, with the possible exception of R&D and the quick ratio. However, all variables have a Variance Inflation Factor (VIF) of less than two.

5. Multivariate panel analysis

5.1 Analysis of the initial governance reform gap

A graphical analysis of the parallel trends assumption confirms that our two measures of risk management do not exhibit a prior trend to convergence prior to the SOX reform. Figure 1 shows the graphs for all three hedging measures, for the most narrow governance index *REG10* (we plot the top tercile for any of the governance measures against the values of the two remaining terciles). No apparent converging (or diverging) trend is discernible in the three years prior to the SOX reform; in contrast, a continuous albeit moderate trend to convergence can be detected for the three years after the SOX reform. As expected, the convergence is slow for *FX Exposure* variable and more rapid for *Derivatives Mentions* (and in between for the *Derivatives Use* dummy). Since the post-reform trend of convergence is slow and visually not very strong, we perform *t*-tests for the difference in the difference between the pre- and post-reform average hedging levels across the two governance groups, and find a strongly significant difference for 5 out of 7 indexes (see the Internet Appendix, Table IA.2). We find a similar picture for other governance indexes (see Figure A1 in the Internet Appendix).

¹⁵ Two CEO characteristics, *CEO Age* and *CEO Duality*, are relegated to the Internet Appendix for space reasons. They show little correlation with variables other than CEO characteristics.

Table 3 presents the regression results for our first measure of treatment, governance gap. We include industry and time fixed effects in our difference equation, and we control for firm-level fixed effects as all variables are differenced relative to their firm-level means. Panel A reports the results for *FX Exposure*, Panel B for *Derivatives Mentions*, both using OLS panel regressions, and Panel C for the *Derivatives Use* dummy, using logit panel regressions. Each panel presents the five indexes from narrowest (*REG10*) to most comprehensive (*GOV41*), and the two complements *REG10 COMPL.* and *MANDATE-INDUCED COMPL.*

In Panel A, we find that the impact on foreign exchange risk exposure is significant for *REG10 COMPL.*, *MANDATE-INDUCED*, *BOARD&COMP15*, *BOARD&COMP22*, and for the comprehensive *GOV41* index, at the 5% level. The governance reforms are insignificant only for *REG10* and *MANDATE-INDUCED COMPL.* Taken together, these results highlight the role of the highly correlated measures added in *MANDATE-INDUCED* in triggering changes in risk policies, and the smaller role played in the voluntary governance attributes not contained in *MANDATE-INDUCED*. We find consistent results when we include either *REG10* or *MANDATE-INDUCED* and their respective complement index in a joint regression (not reported in tables).

Panel B shows the impact on our principal hedging measure, the *Derivatives Mentions* count, presented in the same format as in Panel A. We find very strong results, with all seven indexes highly significant at the 1%-level. Thus, our text-based measure of the intensity of the use of financial hedges reveals a powerful hedging impact of governance reform. We find almost identical results for Hoberg and Moon's alternative specification of their text-based variables, based on forwards and futures (see the Internet Appendix Table IA.4).

The alternative financial hedging variable, *Derivatives Use*, presented in Panel C, shows comparable strong results, with all indexes again strongly significant at the 1%-level.

Unsurprisingly, given that our regressions control for firm-fixed effects, most of the control variables are not significant, with only the M/B ratio showing strongly significant coefficients. When we run our regressions without controlling for firm-level fixed effects, we find that firms with higher leverage are more exposed to FX risk (but not less likely to use derivatives)

whereas firms with a greater proportion of sales abroad are more likely to hedge with foreign exchange derivatives (but do not have larger FX risk exposure).¹⁶

In conclusion, our results in Table 3 based on pre-reform governance gap offer strong support for Hypothesis 1, showing that managers tend to underhedge in the pre-reform period. We find that larger governance gaps in 2002 are strongly associated with an expansion in the mention and use of derivatives, and a significant reduction in *FX Exposure*.

5.2 Analysis of actual governance reform implementation

Table 4 presents the findings for our second measure of treatment, based on actual implementation of governance changes. The regression set-up is exactly the same as for the three panels of Table 3, and the findings are presented in the same format. An (unreported) graphical analysis of parallel trends shows patterns similar to those in Figure 1.

In Panel A, we now find that governance quality is strongly correlated with a reduction in foreign exchange exposure, significant at the 1%-level for all governance indexes except for *REG10* which is significant at the 5%-level.

Panel B shows the findings for *Derivatives Mentions*. We find the same strong results that we reported when using the gap mentions (Table 3), with all seven indexes strongly significant at the 1%-level. Results are similar when using forward and futures mentions (not reported).

For the *Derivatives Use* dummy (Panel C), we find somewhat weaker but still uniformly significant results, with *REG10* significant at the 1%-level, and the other main indexes all strongly significant the 5%-level. By contrast, the significance level drops to 10% for the two complements indexes *REG10 COMPL.* and *MANDATE-INDUCED COMPL.*

When we include the narrow indexes *REG10* and *MANDATE-INDUCED* and their complements indexes in joint regressions, it appears that the components in *MANDATE-INDUCED* have a particularly strong impact (see the Internet Appendix Table IA.3).

¹⁶ We lose about 15% of observations because of missing values for the ABHK variable. When we repeat all our analyses using the number of foreign subsidiaries as proxy for the extent of operational hedging (rather than ABHK), our findings are essentially unchanged.

In conclusion, the regression results for our actual implementation identification approach are strong and again in support of Hypothesis 1. They show that the mandated or mandate-induced changes (*REG10* and *MANDATE-INDUCED*) significantly reduce foreign exchange exposure and symmetrically increase the use of FX derivatives. We get just as strong results when considering indexes focusing specifically on board- and compensation-related measures. In addition, when we look at the use of financial hedging instruments, there is evidence of a stronger impact of mandated compared with voluntary governance changes.

5.3 *Subsample tests*

We explore whether our results so far are driven by effects that are limited to subsamples, by splitting the sample at the median according to firm size, growth vs. value firms, and the G-index of Gompers, Metrick, Ishii (2003). To illustrate possible subsample issues for the case of firm size, small firms are less likely to hedge because of the high fixed costs associated with implementing effective hedging programs (Bodnar, Hayt and Marston 1996, 1998; Bodnar et al., 1995; Géczy, Minton and Schrand, 1997; Nance, Smith and Smithson, 1993; Allayannis and Ofek, 2001), and, therefore, better governance may not have as strong an effect on risk management for small firms as for large firms. Concerning firm size, we define large and small firms as firms above and below the median by asset size, respectively, and we do the same for Tobin's Q and the G-index.

Results are reported in Table 5, again for *FX Exposure* (Panel A), *Derivatives Mentions* (Panel B), and *Derivatives Use* (Panel C), and for three indexes, *REG10*, *MANDATE-INDUCED* and *GOV41* (the other indexes show comparable results and the complements, but are not reported to save space). We find similar differences for growth firms (firms with high Tobin's Q) and, in a less pronounced manner, for firms with highly entrenched managers (high G-index). Our findings show that the significance level of the impact is, by and large, more mitigated for smaller (high Q, high G) firms, consistent with the views that these categories of firms face higher hedging costs. When we look at individual indexes, we find that small firms react more to the additional measures in the comprehensive *GOV41* and the *MANDATE-INDUCED* index. While it may look surprising that small firms' hedging and risk management appears to be affected by voluntary measures, the findings confirm the importance of using comprehensive indexes and not just a narrow index of the clearly exogenously imposed reforms (as *REG10* does). There is little difference across indexes for firms with high Tobin's Q or high G-index.

Our results seem to confirm that our results are not driven by small firms, by differences between growth or value firms, or by differences in the G-index.

5.4 Pre-reform tests on the direction of managerial hedging bias

Based on the premise that the SOX reform effectively aligns managers more closely with shareholders' interests, our evidence so far lends support to Hypothesis 1 (underhedging) and appears to reject the alternative view in Hypothesis 2 (overhedging). We undertake an independent consistency test by examining whether the cross-sectional evidence in the pre-reform period also lends support to the underhedging view. While this test is not new, it appears warranted because earlier cross-sectional studies have been carried out for different samples and sample periods, so that the (external) validity cannot be taken for granted, and most importantly are inconclusive about the direction of the managerial bias (see Section 2.2).

We run cross-sectional regressions for the pre-reform years of our sample period, 2000 to 2002. Our main measure of governance quality is a state-level anti-takeover index, a widely used approach since Bertrand and Mullanaithan (2003) to address concerns about endogeneity when using company-specific measures of governance quality. We use the anti-takeover index of Cain, McKeon, and Davidoff Solomon (2017) (CMD) for the state in which the firm is incorporated. The CMD anti-takeover index is the most comprehensive index of state-level anti-takeover protections that we are aware of; it updates and refines earlier state-level indexes such as the seminal business combination law index (Bertrand and Mullanaithan, 2003).¹⁷ To check the robustness of the findings, we also use our broad *GOV41* index as a firm-specific governance index. We include the same control variables as in our earlier regressions.

The regression results, presented in Table 6, show that *FX Exposure* decreases, and *Derivatives Mentions* increase as states adopt lower anti-takeover barriers, and as companies exhibit higher governance standards, measured by *GOV41*. While these tests are subject to the same concerns about endogeneity as the bulk of the earlier governance-hedging literature, they offer nonetheless reassuring evidence that corroborates our interpretation that the observed direction of the reform-induced change in hedging in our main tests allows an inference on the nature of the underlying agency problem and to conclude that underhedging seems to dominate.

¹⁷ The CMD index of Cain, McKeon, and Davidoff Solomon (2017) also fully covers our sample period, unlike updates of the business combination law index used by Bertrand and Mullanaithan (2003) and others. The index is available on the authors' website. We use the 2000-2002 average of the CMD index.

We add a word of caution. Establishing a causal relationship between governance reform and corporate hedging cannot rule out the possibility that the SOX reform may not have contributed to a better alignment of managerial actions and shareholder interests, in particular, cannot completely dismiss the possibility that the reform could have distorted risk management further. This hypothetical possibility, however, would contradict the bulk of empirical evidence on the value effects of the Sarbanes-Oxley reform (see Section 2.1). Still, our paper should not be viewed as contributing to the discussion on the *efficiency* of the Sarbanes-Oxley Act.

5.5 Response path of post-reform risk management adjustments

Hypothesis 4 postulates that firms will react more rapidly to a governance reform shock with adjustments in their financial hedges compared to their operational hedges. To investigate the speed of reaction and understand the trajectory of firm's reaction to the SOX reform, we add a time trend variable¹⁸ that interacts each of our seven governance indexes with year dummies 2002 to 2006 in Table 7. The first term in each column has no time interaction and thus indicates the time-invariant effect of the governance index, whereas the following terms capture the year-specific sensitivity of the governance index. We find similar results for *BOARD&COMP15*, *BOARD&COMP22*, *REG10 COMPL.*, *MANDATE-INDUCED COMPL.*, but relegate these indexes to the Internet Appendix (Table IA.5) to save space.

We consider the impact on *FX Exposure* first (columns (1) to (3) in Table 7). We find that the time-invariant effect is highly significant, but the year-specific effects show a strong additional impact that slowly rises to about double the time-invariant impact two years after the adoption of the law, before falling back again. All three regressions show that the strongest foreign exchange risk-reduction effect of the mandates occurs around 2004 – the year of the mandates' deadline – before the interaction term coefficients decline in an absolute sense. Thus, there appears to emerge a hump-shaped reaction of *FX Exposure* to the governance measures; it seems that the impact of better governance on overall *FX Exposure* is increasing over a number of years, and takes more time to deploy.

In regressions (4) to (9) of Table 7, where *Derivatives Mentions* and *Derivatives Use* are the dependent variables, we find a different time pattern. While we find again a highly significant

¹⁸ This approach follows Aggarwal, Schloetzer and Williamson (2019).

impact of the time-invariant component for all governance index ($p < 0.01$ always), the time-variant pattern exhibits a much more short-lived nature. We find a stronger effect of the governance index on the use of derivatives only in the year of the Sarbanes-Oxley Act adoption, and a quick reversal to the normal sensitivity in all subsequent years. Thus, we find a heightened sensitivity that is very temporary in nature, consistent with strategies in which increased FX risk management is initially borne by financial hedges and subsequently replaced by operational hedges. Overall, these findings lend support to Hypothesis 4.

6. Firm Heterogeneity

6.1 *Heterogeneous firm exposure to foreign markets*

As formulated in Hypothesis 3, firms with more pronounced exposure to sales or inputs in foreign markets and subject to currency risks are likely to have a stronger pre-reform impact of managerial bias, and hence should adjust their hedging more strongly in the wake of the SOX reform. We use two variables, a dummy variable Global Firms vs. Domestic Firms (firms with exposure to foreign sales vs. firms with no exposure), and the text-based variable ININ developed by Hoberg and Moon (2017) that measures mentions of foreign input exposure minus mentions of foreign operational hedges.

The results are reported in Table 8. In line with the predictions of Hypothesis 3, we find that Global firms, i.e. firms with exposure to foreign markets reduce their FX Risk exposure as well increase their financial hedging, and thus exhibit a strong and significant reaction to the SOX reform, whereas firms with only domestic sales show a much weaker, and mostly insignificant reaction. The same relationships hold when we look at our text-based measure of net foreign inputs exposure (variable ININ). To conclude, our test for firm heterogeneity concerning foreign market exposure, conducted by splitting sample according to high or low foreign markets exposure, shows evidence that is consistent with Hypothesis 3: firms with larger foreign markets exposure adjust their hedging more strongly in the wake of the SOX reform.

6.2 *CEO characteristics and CEO incentives*

We investigate the possibility that the effectiveness of corporate governance reform depends on CEO characteristics. Bodnar et al. (2019) show evidence that idiosyncratic characteristics of CEO traits such as risk attitude, wealth, age, experience and education, matter for hedging

choices. To address this possibility, we include four variables of CEO characteristics, CEO tenure, CEO age, CEO turnover, CEO duality, and two variables controlling for CEO compensation incentives, CEO equity and CEO options, in the regressions of Tables 3 and 4. We find that our results are not altered when these CEO variables are included. Table 9, Panel A, shows the results for the *REG10* and *MANDATE-INDUCED* indexes and for four of the CEO variables. The results for the remaining CEO characteristics, CEO age and CEO duality, and for the *GOV41* index are similar and are documented in the Internet Appendix (Table IA.6); the unreported governance indexes show consistent results with those reported in Table 9. While some of the CEO characteristics seem to have a significant impact on hedging choices, in particular CEO turnover, CEO duality and the compensation variables, their inclusion does not alter our main findings that governance reforms leads to more hedging, via a lower *FX Exposure* and more *Derivatives Mentions*.

The use of variables representing CEO incentives also allows us to refine our tests, inspired by Hypothesis 3 on the impact of firm heterogeneity. In line with earlier empirical literature showing that CEOs hedge more when they have larger equity holdings (presumably a consequence of their lack of diversification) and hedge less when they hold more stock options or compensation claims that increase in stock return volatility (e.g., Tufano, 1996; Francis et al., 2017), we investigate the variables *CEO Options* and *CEO Equity* separately. When firms underhedge, then Hypothesis 3 predicts that firms with higher *CEO Options* stakes should show a stronger pre-reform bias and hence show a stronger reaction to the SOX reform. On the other hand, when CEOs have higher *CEO Equity* stakes, firms should underhedge less and hence show a weaker reaction to the SOX reform than CEOs with lower *CEO Equity* stakes. Opposite effects on hedging for *CEO Options* and *CEO Equity* based on cross-sectional evidence are documented in Tufano (1996). We undertake a median split of the sample, and run our baseline regressions by interacting the governance variables with dummies for the subsamples above and below the median in terms of *CEO Options* and *CEO Equity* exposure. We then report the F-statistics for a Wald test of the difference in the coefficient between firms with High and Low *CEO Options* (*CEO Equity*).

The results are reported in Table 10. In line with the predictions of Hypothesis 3, firms with higher *CEO Options* stakes increase their hedging more following the SOX reform. Panel A looks at the difference in the reduction of *FX Exposure* between firms in the High and Low *CEO Options* group is highly significant for all 7 governance indexes, as the Wald test statistics

reveal ($p < 0.001$ in all cases). When examining the effect on *Derivatives Mentions* in the same regression format (Panel B), we find that firms with CEOs in the High Options group intensify their usage of derivatives significantly more compared with firms in the Low *CEO Options* group. The difference is very strong for the *REG10* index ($p < 0.01$), but rather weak ($p < 0.10$) for all other governance indexes except for *REG10 COMPL*. When we look at *Derivatives Use* (Panel C), there is no significant difference between firms in the High and the Low *CEO Options* group. These results are mostly in line with Hypothesis 3. Concerning *CEO Equity* stakes, the results are more mixed. Firms with lower *CEO Equity* indeed show a stronger reduction of *FX Exposure* as predicted (Panel D), but there is only very weak significance, limited to one governance index. When we look at the usage of derivatives we find the right (but always insignificant) sign for *Derivatives Use* but the opposite sign than predicted for *Derivatives Mentions*, and hence we do not report these contradictory findings in the table. The weak results for *CEO Equity* should perhaps not come as a surprise given that earlier cross-sectional studies find related results (e.g. Knopf, Nam and Thornton, 2002). Overall, our results, in particular the analysis on *CEO Options*, offer evidence in support of Hypothesis 3.

7. Robustness and additional tests

7.1 Firm fixed effect and industry-year fixed effect panel estimations

We double check the robustness of our results by reestimating our main regressions of Tables 3 and 4 in panel estimations with firm fixed effects in lieu of deviations-from-means. The results are presented in the Internet Appendix (Tables IA.7 and IA.8) and show that our findings are indeed robust under this alternative specification.¹⁹ In principle, our main estimator in Tables 3 and 4 using deviations-from-means estimation this estimator is equivalent to a panel estimation with firm fixed effects, but it is reassuring that we find consistent results for both estimators.

To further verify the robustness of our findings, we also rerun our main regressions deploying industry-year fixed effects that replace the separate industry fixed effect and year fixed effect dummies used hitherto. The outcome is reported in the Internet Appendix, Table IA.9. We find that the results are very robust to this more granular fixed effect panel estimation.

¹⁹ Our preference for the deviations-of-means estimation in the main tables is motivated by the insight that the use of firm FE in panel data studies using corporate governance indexes may produce problems if the index is slow-moving (see Atanasov and Black, 2016).

7.2 Robustness of the FX Exposure estimation

We estimate the *FX Exposure* variable α_1^i by using the S&P market-weighted index, and then use the square root of the absolute value (see Section 3.1). Considering that there is some variation and debate in the risk management literature on the best market index (see for instance Dominguez and Tesar, 2006; Bodnar and Wong, 2003), we check the robustness of our variable construction and outcomes by using two different market indexes for the estimation of α_i : the CRSP market-weighted index that is the broadest easily available market index and widely used in the empirical asset pricing literature, as well as the Russell 1000 market-weighted index (the index from which our sample of firms is drawn). The results provide evidence that our findings are robust to these changes in the market index, documented in the Internet Appendix (Tables IA.10 and IA.11) using both the governance gap and actual implementation measures. In unreported robustness checks, we also redo our test by using just the absolute value of α_1^i instead of the square root, and find consistent results.

7.3 Additional tests

As an additional robustness test, we re-estimate our exposure regressions using a dynamic panel generalized method of moments (GMM) estimator (Arellano and Bond, 1991). In regressions that are not reported in tables, we find highly significant results for all governance indexes except for *REG10*, mirroring our result in Table 3 and 4. These are reassuring results that confirm our conclusion that the the SOX mandates and related listing rules contribute to substantially lower foreign exchange risk for US firms. We recognize that the use of panel-data GMM relies on the assumption of strict endogeneity of the policy shock (see Grieser and Hadlock, 2015), a condition that may not be valid in the context of the SOX reform and its impact on risk management.

Finally, we explore whether our results still hold up when we use only a single SOX measure, the majority of independent directors, as the explanatory variable of interest. As we show in the Internet Appendix (Table IA.12), when we replicate our analysis for this single SOX measure (majority board independence), we do not find any significant change in either foreign exchange exposure nor in the use of derivatives. This analysis helps to clarify that our findings can be reconciled with the analysis of Huang et al. (2013) who also do not find significant results for most firms (but find an exception for firms with high CEO equity ownership). Thus,

our analysis shows that the combination of several SOX measures rather than a single measure in isolation affects risk management.

8. Conclusion

Following the corporate governance scandals of the early 2000s, the strong regulatory response in the form of the 2002 Sarbanes-Oxley Act led to a comprehensive reform process that strengthened board supervision and limited managerial discretion. We use this strong exogenous shock as a unique, yet unexplored opportunity to advance our understanding of the relationship between corporate governance quality and corporate foreign exchange risk management. Using a large panel of US firms, our strategy is to exploit the rich variation in the reach of the SOX reform recorded in our panel data set: we analyze the initial governance gap, a measure that isolates the exogenous pressure to reform, but also consider the actual timeline of implementation measures at the firm level, and we deploy narrow measures of obligatory governance changes as well as broad indexes that include voluntary reforms and better encompass the comprehensive effect of the rule changes and the manifold transmission channels of better governance.

We obtain strong and robust results showing that improvements in governance lead to a reduction of foreign exchange risk for all governance indexes, consistent with the hypothesis that firms tend to hedge too little on average when managerial discretion is not effectively checked. While our evidence indicates that voluntary changes have a weaker impact than mandated or mandate-induced governance reforms, they are nonetheless important to understand the far-reaching effects of the reform. A cross-sectional validity test for the pre-reform period lead to consistent results. We find evidence confirming the predictions that firms with larger foreign market exposure and firms with a stronger risk-taking bias in managerial incentives should adjust their risk management more. We also present evidence that firms adjust financial hedges substantially more quickly than operational hedges. While our investigation is limited to a single reform event, the SOX Act is arguably the most far-reaching governance reform in many decades. Overall, we shed new light on the hitherto unclear relationship between governance and managerial hedging policies.

References

- Adler, M., Dumas, B. 1984. Exposure to Currency Risk: Definition and Measurement. *Financial Management* 13, 41-50.
- Aggarwal, R., Berrill, J., Hutson, E., Kearney, C., 2011. What is a multinational corporation? Classifying the degree of firm-level multinationality. *International Business Review* 20, 557-577.
- Aggarwal, R., Schloetzer, J.D. and Williamson, R., 2019. Do corporate governance mandates impact long-term firm value and governance culture?. *Journal of Corporate Finance*, 59, 202-217.
- Allayannis, G., Lel, U., Miller, D., 2012. The use of foreign currency derivatives, corporate governance and firm value around the world. *Journal of International Economics* 87, 65-71.
- Allayannis, G., Ofek, E., 2001. Exchange rate exposure, hedging, and the use of foreign currency derivatives. *Journal of International Money and Finance* 20, 273-296.
- Allayannis, G., Weston, J.P., 2001. The use of foreign currency derivatives and firm market value. *Review of Financial Studies* 14, 243-276.
- Allen, L., Pantzalis, C., 1996. Valuation of the operating flexibility of multinational corporations. *Journal of International Business Studies* 27, 633-653.
- Angrist, J., Pischke, S., 2009. *Mostly Harmless Econometrics, An Empiricist's Companion*. Princeton University Press: Princeton NJ.
- Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies* 58, 277-297.
- Aretz, K., Bartram, S., 2010. Corporate hedging and shareholder value. *Journal of Financial Research* 33, 317-371.
- Atanasov, V., Black, B., 2016. Shock-Based Causal Inference in Corporate Finance and Accounting Research. *Critical Finance Review* 5, 207-304.
- Bartram, S., 2019. Corporate hedging and speculation with derivatives. *Journal of Corporate Finance* 57, 9-34.
- Bartram, S., Bodnar, G., 2007. The exchange rate exposure puzzle. *Managerial Finance* 33, 642-666.
- Bartram, S., Brown, G., Conrad, J., 2011. The effects of derivatives on firm risk and value. *Journal of Financial and Quantitative Analysis* 46, 967-999.
- Berger, A.N., Ofek, Yermack, D., 1997. Managerial Entrenchment and Capital Structure Decisions. *Journal of Finance* 52, 1411-1438.

- Bertrand, M., Mullainathan, S., 2003, Enjoying the Quiet Life? Corporate Governance and Managerial Preferences. *Journal of Political Economy* 111, 1043-1075.
- Black, B., Gledson de Carvalho, A., Khannac, V., Kimd, W., Yurtoglu, B., 2014. Methods for multicountry studies of corporate governance: Evidence from the BRIKT countries. *Journal of Econometrics* 183, 230–240.
- Bodnar, G., Dumas, B., Marston, R., 2002. Pass-through and Exposure. *Journal of Finance* 57, 199-231.
- Bodnar, G., Hayt, G., Marston, R., 1996. Wharton 1995 Survey of Derivative Usage by US non-financial firms. *Financial Management* 25, 113-133.
- Bodnar, G., Hayt, G., Marston, R., 1998. Wharton survey of financial risk management by US non-financial firms. *Financial Management* 27, 70–91.
- Bodnar, G., Hayt, G., Marston, R., Smithson, C., 1995. Wharton Survey of Derivative Usage by U.S. Non-Financial Firms. *Financial Management* 24, 104-114.
- Bodnar, G. and Marston, R., 2002. Exchange rate exposure: A simple model. In *Global Risk Management: Financial, Operational, and Insurance Strategies*. Emerald Group Publishing Limited, 107-115.
- Bodnar, G., Wong, M., 2003. Estimating exchange rate exposures: issues in model structure. *Financial Management* 32, 35-67.
- Borokhovich, K., Brunarski, K., Parrino, R., 1997. CEO Contracting and Antitakeover Amendments. *Journal of Finance* 52, 1495-1517.
- Breeden, D.T. and Viswanathan, S., 2015. Why do firms hedge? An asymmetric information model. *The Journal of Fixed Income* 25, 7-25.
- Buckley, P., Casson, M., 1998. Analysing foreign market entry strategies: extending the internalisation approach. *Journal of International Business Studies* 29, 539–561.
- Cain, M.D., McKeon, S.B. and Solomon, S.D., 2017. Do takeover laws matter? Evidence from five decades of hostile takeovers. *Journal of Financial Economics* 124, 464-485.
- Campbell, T., Kracaw, W., 1987. Optimal Managerial Incentive Contracts and the Value of Corporate Insurance. *Journal of Financial and Quantitative Analysis* 22, 315-328.
- Campello, M., Lin, C., Ma, Y., and Zou, H., 2011. The real and financial implications of corporate hedging. *The Journal of Finance* 66, 1615-1647.
- Carter, D., Pantzalis, C., Simkins, B., 2003. Asymmetric exposure to foreign exchange risk: financial and real option hedges implemented by US multinational corporations. Available at SSRN: <http://ssrn.com/abstract=387082>.
- Carter, D., Rogers, D., Simkins, B., 2006. Does hedging affect firm value? Evidence from the US airline industry. *Financial Management* 35, 53-86.

- Chhaochharia, V. and Grinstein, Y., 2007. Corporate governance and firm value: The impact of the 2002 governance rules. *Journal of Finance* 62, 1789-1825.
- Chow, E., Lee, W., Solt, M., 1997. The economic exposure of US multinational firms. *Journal of Financial Research* 20, 191-210.
- Coates, J., Srinivasan, S., 2014. SOX after ten years: A multidisciplinary review. *Accounting Horizons* 28, 627-671.
- Dicks, D., 2012. Executive compensation and the role for corporate governance regulation. *Review of Financial Studies* 25, 1971-2004.
- Disatnik, D., Duchin, R., Schmidt, B., 2014. Cash flow hedging and liquidity choices. *Review of Finance* 18, 715-748
- Dominguez, K., Tesar, L., 2006. Exchange rate exposure. *Journal of International Economics* 68, 188-218.
- Fluck, Z., 1999. The Dynamics of the Management-Shareholder Conflict. *Review of Financial Studies* 12, 379-404.
- Francis, B., Hasan, I., Hunter, D., Zhu, Y., 2017. Do managerial risk-taking incentives influence firms' exchange rate exposure? *Journal of Corporate Finance* 46, 154-169.
- Froot, K., Scharfstein, D., Stein, J., 1993. Risk management: coordinating corporate investment and financing policies. *Journal of Finance* 48, 1629-58.
- Géczy, C., Minton, B., Schrand, C., 1997. Why firms use currency derivatives. *Journal of Finance* 52, 1323-1354.
- Géczy, C., Minton, B., Schrand, C., 2007. Taking a view: corporate speculation, governance, and compensation. *Journal of Finance* 62, 2405-2443.
- Gompers, P., J. Ishii, and A. Metrick, 2003. Corporate governance and equity prices. *Quarterly Journal of Economics* 118, 107-155.
- Gormley, T., Matsa, D., 2016. Playing it safe? Managerial preferences, risk, and agency conflicts. *Journal of Financial Economics* 122, 431-455.
- Gormley, T., Matsa, D., Millbourn, T. 2013. CEO compensation and corporate risk: Evidence from a natural experiment. *Journal of Accounting and Economics* 56, 79-101.
- Grieser, W., Hadlock, C., 2015. Panel data estimation in finance: parameter consistency and the standard error sideshow. Working Paper, Tulane U. and MSU.
- Hermalin, B., Weisbach, M., 2017 (eds.). *Handbook of the Economics of Governance*, Amsterdam: North Holland.
- Hoberg, G. and Moon, S.K., 2017. Offshore activities and financial vs operational hedging. *Journal of Financial Economics*, 125(2), 217-244.

- Hoberg, G. and Moon, S.K., 2019. The Offshoring Return Premium, 2019, *Management Science* 65, 2445-2945.
- Holmström-Tirole, 2000. Liquidity and Risk Management. *Journal of Money, Credit and Banking* 32, 295-319.
- Huang, S., Peyer, U., Segal, B., 2013. Do Firms Hedge Optimally? Evidence from an Exogenous Governance Change. INSEAD Working Paper No. 2013/111/FIN/ACC. Available at SSRN: <https://ssrn.com/abstract=2312263>.
- Hutson, E., Laing, E., 2014. Foreign exchange exposure and multinationality. *Journal of Banking & Finance* 43, 97–113.
- Hutson, E., Stevenson, S., 2010. Openness, hedging incentives and exchange exposure: A firm-level multi-country study. *Journal of International Business Studies* 41, 105-122.
- Iliev, P., 2010. The Effect of SOX Section 404: Costs, Earnings Quality, and Stock Prices. *The Journal of Finance* 65, 1163–1196.
- Jensen, M., Meckling, H., 1976, Theory of the firm: Managerial Behavior, agency costs and ownership structure. *Journal of Financial Economics* 3, 305-360.
- Jorion, P., 1990. The exchange rate exposure of U.S. multinationals. *Journal of Business* 63, 331-346.
- Knopf, J., Nam, J., Thornton, J, 2002. The volatility and price sensitivities of managerial stock option portfolios and corporate hedging. *Journal of Finance*, 57, 801-813.
- Kogut, B., Kulatilaka, N., 1994. Operating flexibility, global manufacturing, and the option value of a multinational network. *Management Science* 40, 123–139.
- Kumar, P., Rabinovitch, R., 2013. CEO entrenchment and corporate hedging: Evidence from the oil and gas industry. *Journal of Financial and Quantitative Analysis* 48, 887-917.
- Lel, U., 2012. Currency hedging and corporate governance: A cross country analysis. *Journal of Corporate Finance* 18, 221–237.
- Leland, H., 1998. Agency costs, risk management, and capital structure. *Journal of Finance* 53, 1213-1243.
- Linck, J., Netter, J., Yang, T., 2008. The effects and unintended consequences of the Sarbanes-Oxley Act on the supply and demand for directors. *Review of Financial Studies* 22, 3287-3328.
- MacKay, P. and Moeller, S.B. 2007. The value of corporate risk management. *Journal of Finance* 62, 1379-1419.
- Malmendier, U., Tate, G., 2005. CEO Overconfidence and Corporate Investment. *Journal of Finance* 60, 2661-2700.

- Manconi, A., Massa, M., Zhang, L., 2018. The Informational Role of Corporate Hedging. *Management Science* 64, 3843-3867.
- Mello, A., Parsons, J., Triantis, J., 1995. An integrated model of multinational flexibility and financial hedging. *Journal of International Economics* 39, 27-51.
- Muller, A., Verschoor, W., 2006. Foreign exchange risk exposure: survey and suggestions. *Journal of Multinational Financial Management* 16, 385-410.
- Myers, S., 1977. The determinants of corporate borrowing. *Journal of Financial Economics* 5, 147-175.
- Nance, D., Smith, C., Smithson, C., 1993. On the determinants of corporate hedging. *Journal of Finance* 48, 267-284.
- Pantazis, C., Simkins, B., Laux, P., 2001. Operational hedges and the foreign exchange exposure of US multinational corporations. *Journal of International Business Studies* 32, 793-812.
- Stein, J., 1988. Threats and Managerial Myopia. *Journal of Political Economy* 96, 61-80.
- Smith, W., Stulz, R., 1985. The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis* 20, 391-405.
- Stulz, R., 1984. Optimal Hedging Policies. *Journal of Financial and Quantitative Analysis*, 19, 127-140.
- Tufano, P., 1996. Who manages risk? An empirical examination of risk management practices in the gold mining industry. *Journal of Finance* 51, 1097-1137.

Appendix: Definition of Variables

Dependent variables

$\sqrt{|\alpha_2^i|}$ *Square root of the absolute exposure coefficient*

We take the absolute value of the foreign exchange exposure response coefficient α_2^i estimated via equation [1], and then, to avoid truncation bias, we take its square root.

Derivatives Mentions

Derivatives Mentions is a text-based count variable of the number of mentions of the use of FX derivatives in a company's annual 10-K filings. The Derivatives mention variables is available in the Hoberg-Moon data library at Gerard Hoberg's website, <http://faculty.marshall.usc.edu/Gerard-Hoberg/HobergMoonDataSite/index.html>. Hoberg and Moon (2017) use a dummy version of this variable whereas we use the original count variable (*Siznumfxhedge*) of the HobergMoon_FXHedgeData file.

For robustness when use an alternative specification of Hoberg and Moon's text-based variable, forwards and futures mentions, that specifically counts the number of mentions of forward and future contracts for FX hedging (*Siznumfxfutfor*).

Derivatives Use

The binary variable takes a value of one if the firm uses foreign currency derivatives and zero otherwise. The data were collected from item 7a "quantitative and qualitative disclosures about market risk" in the firm's annual 10-K report filed with the SEC.

Governance variables

GOV41 is a composite index of the 41 governance attributes drawn from the ISS database, first used by Aggarwal, Erel, Ferreira, and Matos (2011) in developing earlier indexes such as Gompers, Ishii, and Metrick (2003). A value of one is assigned if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage. The 41 attributes in *GOV41* are listed at the end of the discussion of governance variables.

REG10 is a composite index of the following 10 attributes that were mandated in the revised stock exchange listing standards denoted by the asterisk * in the table of *GOV41* attributes below. A value of one is assigned to each attribute if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage.

- Board is controlled by more than 50% independent outside directors
 - Compensation committee composed solely of independent outsiders
 - Nominating committee composed solely of independent outsiders
 - Governance guidelines are publicly disclosed
 - Performance of the board is reviewed regularly
 - Board-approved succession plan in place for the CEO
 - Outside directors meet without CEO and disclose number of times met
 - Consulting fees paid to auditors are less than audit fees paid to auditors
 - Audit committee composed solely of independent outsiders
- All stock-incentive plans adopted with shareholder approval

REG10 COMPL. is a composite index of the 41 attributes in the table above minus the 10 attributes that comprise *REG10* (as denoted by the asterisk *). A value of one is assigned if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage.

MANDATE-INDUCED is a composite index of the 20 attributes denoted by the † symbol in the table of *GOV41* attributes below. These 20 attributes include the 10 mandatory attributes in *REG10* plus 10 more that are so closely associated with the legal requirements in *REG10* that a joint introduction is likely, as the very high correlation with *REG10* shows. A value of one is assigned to each attribute if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage. In addition to the 10 attributes of the *REG10* index, the 10 following attributes are included:

- Board size is at greater than five but less than sixteen
- Governance committee exists and met in the past year
- Annually elected board (no staggered board)
- Policy exists on outside directorships (four or fewer boards is the limit)
- Board has the express authority to hire its own advisers
- Auditors ratified at most recent annual meeting
- Directors are subject to stock ownership requirements
- Officers are subject to stock ownership guidelines
- No interlocks among compensation committee members
- Directors receive all or a portion of their fees in stock

MANDATE-INDUCED COMPL. is a composite index of the 41 attributes in the table above minus the 20 attributes that comprise the *MANDATE-INDUCED* index (as denoted by the † symbol) in the table above. A value of one is assigned to each attribute if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage.

BOARD&COMP15 is a composite index of 15 mandated or mandate-induced attributes that are contained in *MANDATE-INDUCED* and that are all related to changes in the Board of Directors or the award of executive compensation. They are denoted by the † symbol in the table of *GOV41* attributes below. A value of one is assigned if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage. *BOARD&COMP15* consists of the following 15 measures:

- Board is controlled by more than 50% independent outside directors
- Board size is at greater than five but less than sixteen
- Compensation committee composed solely of independent outsiders
- Nominating committee composed solely of independent outsiders
- Governance committee exists and met in the past year
- Governance guidelines are publicly disclosed
- Board has the express authority to hire its own advisers
- Performance of the board is reviewed regularly
- Board-approved succession plan in place for the CEO
- Outside directors meet without CEO and disclose number of times met
- Directors are subject to stock ownership requirements
- Officers are subject to stock ownership guidelines
- No interlocks among compensation committee members
- Directors receive all or a portion of their fees in stock
- All stock-incentive plans adopted with shareholder approval

BOARD&COMP22 is a composite index of 22 governance attributes that are all related to changes in the board of Directors or the award of executive compensation. They are denoted by the ² symbol in the table of *GOV41* attributes below. A value of one is assigned if the firm meets minimally acceptable guidelines on that attribute, and zero otherwise. The index is expressed as a percentage. In addition to the 15 attributes contained in *BOARD&COMP15*, it contains the following 7 voluntary measures:

- CEO is not listed as having a related-party transaction
- Chairman and CEO positions are separated, or there is a lead director
- Does not ignore shareholder proposal
- Qualifies for proxy contest defenses combination points
- Options grants align with company performance and reasonable burn rate
- Officers’ and directors’ stock ownership is at least 1% but not over 30% of total shares outstanding
- Repricing prohibited

GOV41 Components list

Aggarwal, Schloetzer and Williamson (2019) identify the following 41 firm-level ‘good’ governance attributes, under four categories, relating to *board*, *audit*, *anti-takeover provisions*, and *compensation and ownership*.

* denotes attributes that are included in the *REG10* index.

† denotes attributes that are included in the *MANDATE-INDUCED* index.

¹ denotes attributes that are included in the *BOARD&COMP15* index.

² denotes attributes that are included in the *BOARD&COMP22* index.

Board

1. All directors attended 75% of board meetings or had a valid excuse
2. CEO serves on the boards of two or fewer public companies
3. Board is controlled by more than 50% independent outside directors * † ^{1 2}
4. Board size is at greater than five but less than sixteen † ¹
5. CEO is not listed as having a related-party transaction
6. Compensation committee composed solely of independent outsiders * † ^{1 2}
7. Chairman and CEO positions are separated, or there is a lead director
8. Nominating committee composed solely of independent outsiders * † ^{1 2}
9. Governance committee exists and met in the past year † ^{1 2}
10. Shareholders vote on directors selected to fill vacancies
11. Governance guidelines are publicly disclosed * † ^{1 2}
12. Annually elected board (no staggered board) †
13. Policy exists on outside directorships (four or fewer boards is the limit) †
14. Shareholders have cumulative voting rights
15. Shareholder approval is required to increase/decrease board size
16. Majority vote requirement to amend charter/bylaws (not supermajority)
17. Board has the express authority to hire its own advisers † ^{1 2}
18. Performance of the board is reviewed regularly * † ^{1 2}
19. Board-approved succession plan in place for the CEO * † ^{1 2}
20. Outside directors meet without CEO and disclose number of times met * † ^{1 2}
21. Directors are required to submit resignation upon a change in job
22. Board cannot amend bylaws without shareholder approval or can do so under limited circumstances
23. Does not ignore shareholder proposal
24. Qualifies for proxy contest defenses combination points

Audit committee

25. Consulting fees paid to auditors are less than audit fees paid to auditors * †

26. Audit committee composed solely of independent outsiders *†
27. Auditors ratified at most recent annual meeting †

Anti-Takeover provisions

28. Single class, common
29. Majority vote requirement to approve mergers (not supermajority)
30. Shareholders may call special meetings
31. Shareholders may act by written consent
32. Company either has no poison pill or a pill that is shareholder approved.
33. Company is not authorized to issue blank check preferred stock

Compensation and ownership

34. Directors are subject to stock ownership requirements †^{1 2}
 35. Officers are subject to stock ownership guidelines †^{1 2}
 36. No interlocks among compensation committee members †^{1 2}
 37. Directors receive all or a portion of their fees in stock †^{1 2}
 38. All stock-incentive plans adopted with shareholder approval *†^{1 2}
 39. Options grants align with company performance and reasonable burn rate
 40. Officers' and directors' stock ownership is at least 1% but not over 30% of total shares outstanding
 41. Repricing prohibited
-

GOVERNANCE GAP (for example, *REGIO GAP*) is calculated for each governance index as the theoretical index value under full compliance with all index components minus the actual index value of the governance index in year 2002.

Δ *GOVERNANCE GAP* (for example, Δ *REGIO GAP*) is calculated for each governance variable as the *GOVERNANCE GAP* value of year t minus the mean *GOVERNANCE GAP* for the 2000-2007 period (Δ *GOVERNANCE GAP* is used as the variable of interest in the difference estimations in Table 3).

Δ *VALUE*

Δ *VALUE* for any control or dependent variable *VALUE* is calculated as the variable *VALUE* in year t minus the mean variable of *VALUE* for the 2000-2007 period (Δ values are used in the difference estimations in Tables 3 and 4).

Control variables

Antitakeover-Index

Comprehensive index of state-level changes in antitakeover laws, see Cain, McKeon, and Solomon, 2017, for detail both the construction and data.

Assets

Total assets is the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

CEO Options

The fair value (in thousands of dollars) of options awarded during the year. Before 2006, Execucomp calculated options value using the Black-Scholes model.

CEO Equity

Shares owned (in thousands of dollars) by the executive, excluding options that are exercisable or will become exercisable within 60 days.

CEO Tenure

The number of years the current CEO has held the position in the firm.

CEO Duality

The binary variable takes a value of 1 if the CEO also holds the position of the chairman.

CEO Turnover

The binary variable takes a value of 1 if the CEO changed during the year.

CEO Age

The age of the executive as reported in the annual proxy statement.

Debt/Assets

Debt-to-assets ratio is long-term total debt divided by total assets.

Foreign sales

Foreign sales is the International Sales / Net Sales or Revenues * 100.

Industry

Using the two-digit standard industry classification codes we create industry dummies that take the value of 1 if the firm is in an industry category and 0 otherwise. We removed financial, insurance and real estate firms that which had two digit codes in the range 60 to 67.

Multinationality: the ABHK Scheme

The ABHK multinationality classification system divides the world into six regions based on the inhabited continents: Africa, Asia, Europe, North America (including Central America), South America, and Oceania (Australia, New Zealand and the Pacific islands). A firm is considered to have a presence in a particular region if it has at least one subsidiary there. The ABHK scheme index ranges in value from one to seven. A firm with activities entirely within the United States is defined as domestic (*D*) and is assigned a value of one in the index. A firm with activities in the region of North and Central America is classified as regional (*R*), and is assigned a value of two in the index. If a firm has activities in two regions (*T2*), it is assigned a value of three, three regions (*T3*) is assigned a value of four, four regions (*T4*) is assigned a value of five and five regions (*T5*) is assigned a value of six. A firm is classified as 'global' (*G*) if it has activities in all six regions and is assigned a value of seven in the index. The data were collected from the Directory of Corporate Affiliates via Lexis Nexis.

Number of foreign subsidiaries

Number of foreign subsidiaries is the total number of the firm's foreign subsidiaries. The data on subsidiary location were collected from the Directory of Corporate Affiliates via Lexis Nexis.

M/B ratio

Market-to-book value ratio is defined as the market value of the ordinary (common) equity divided by the balance sheet value of the ordinary (common) equity.

Quick ratio

Quick ratio (also referred to as the liquidity ratio) is defined as (Cash & Equivalents + Receivables (Net)) / Current Liabilities-Total.

R&D

R&D expense is research and development expenses / net sales or revenues * 100.

Figure 1: Graphical analysis of the parallel trends assumption (REG10 governance index)

The graphs compare the evolution of the mean of *FX Exposure* (Figure 1A), *Derivatives Mentions* (Figure 1B) and *Derivatives Use* (Figure 1C), plotting the top tercile of firms according to the initial gap in the REG10 governance index (blue dashed line) and the two remaining terciles of firms (red solid line), in the period prior and after the year of SOX implementation (between 2002 and 2003). Tests for convergence of the lines in the post-SOX period are contained in the Internet Appendix (Table IA.2)

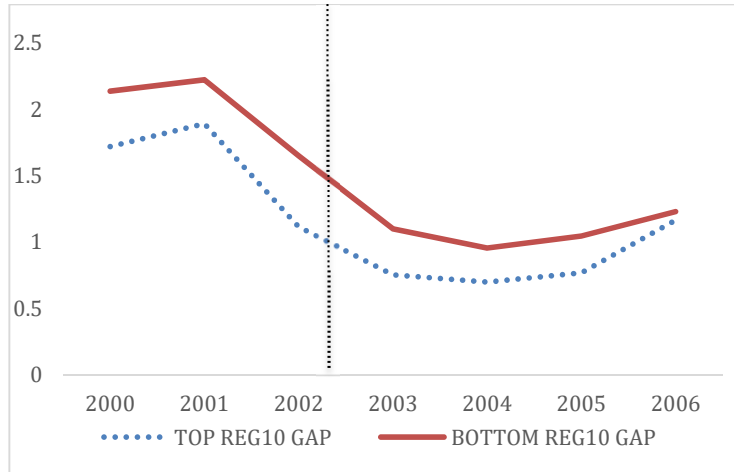


Figure 1A: *FX Exposure*, by *REG10* gap

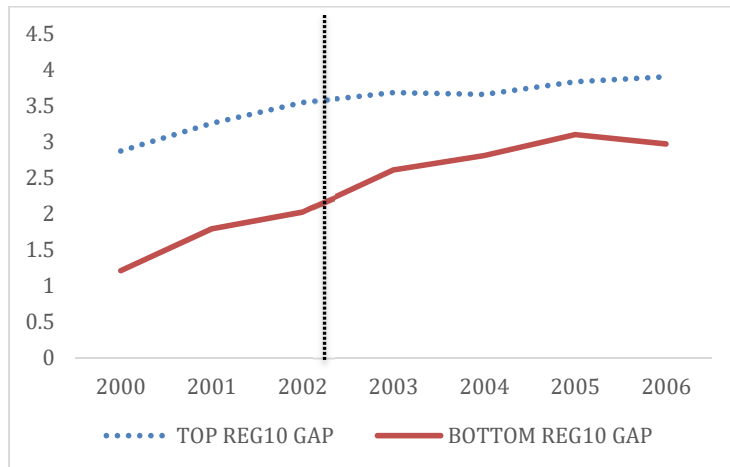


Figure 1C: *Derivatives Mentions*, by *REG10* gap

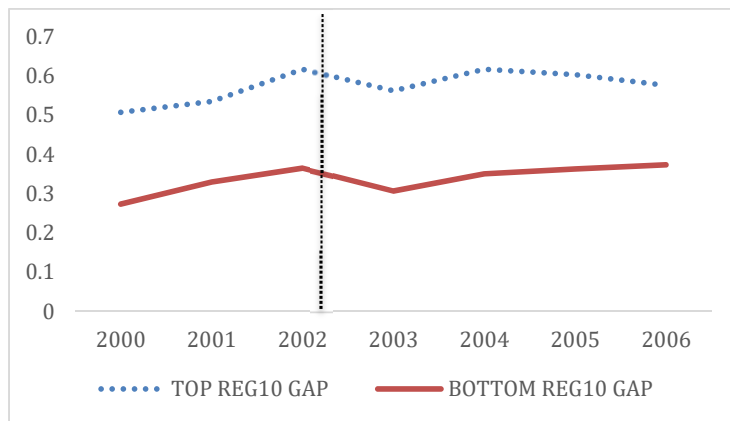


Figure 1B: *Derivatives Use*, by *REG10* gap

Table 1 Summary statistics: Corporate governance and risk management

Panel A: Governance indexes over time		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		2002	2003	2004	2005	2006	2007	% change, 2007- 2002	Rank sum/ <i>t</i> -test, 2007-2002
REG10	Mean	3.38	4.38	4.77	7.79	8.07	8.12	140	52.80 (0.00)*
	Median	3.00	5.00	5.00	8.00	9.00	9.00	200	27.02 (0.00)*
	Standard deviation	1.51	1.54	1.56	1.71	1.53	1.43		
REG10 COMPL.	Mean	10.34	14.54	15.97	16.65	16.18	17.69	71	47.35 (0.00)*
	Median	10.00	15.00	16.00	17.00	16.00	18.00	80	27.26 (0.00)*
	Standard deviation	1.92	3.02	2.80	2.95	2.98	3.03		
BOARD&COMP15	Mean	5.71	7.10	9.00	10.75	10.52	10.76	89	34.94 (0.00)*
	Median	6.00	7.00	10.00	12.00	11.00	11.00	83	23.94 (0.00)*
	Standard deviation	2.41	2.59	2.36	3.00	2.58	2.39		
BOARD&COMP22	Mean	8.04	10.48	12.6	14.77	14.56	15.16	89	40.44 (0.00)*
	Median	8.00	11.00	13.00	16.00	15.00	16.00	100	25.75 (0.00)*
	Standard deviation	2.97	3.16	2.82	3.61	3.1	2.88		
MANDATE-IND	Mean	7.53	10.21	11.76	14.77	14.47	14.63	94	45.29 (0.00)*
	Median	8.00	10.00	12.00	15.00	15.00	15.00	88	26.64 (0.00)*
	Standard deviation	2.74	2.39	2.41	2.78	2.51	2.46		
MANDATE-IND COMPL	Mean	5.52	8.70	8.98	9.68	9.79	11.18	103	45.66 (0.00)*
	Median	6.00	9.00	9.00	10.00	10.00	11.00	83	27.77 (0.00)*
	Standard deviation	1.98	2.11	2.01	2.08	2.16	2.14		
GOV41	Mean	13.05	18.91	20.74	24.45	24.25	25.81	98	54.56 (0.00)*
	Median	13.00	19.00	21.00	25.00	25.00	26.00	100	28.27 (0.00)*
	Standard deviation	4.01	3.58	3.55	3.86	3.79	3.76		

Panel B: FX Exposure by governance index over time														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Low REG10	High REG10	<i>Z</i> (<i>p</i>)	Low REG10 COMPL.	High REG10 COMPL.	<i>Z</i> (<i>p</i>)	Low BOARD& COMP15	High BOARD& COMP15	<i>Z</i> (<i>p</i>)	Low BOARD& COMP22	High BOARD& COMP22	<i>Z</i> (<i>p</i>)		
Year														
2000	1.396	1.294	0.95 (0.34)	1.343	2.161	-1.30 (0.19)	1.464	1.261	2.08 (0.03)†	1.462	1.267	1.84 (0.06) †		
2001	1.488	1.223	1.13 (0.25)	1.457	1.637	-0.31 (0.75)	1.542	1.210	1.78 (0.07)‡	1.540	1.196	1.32 (0.18)		
2002	1.106	0.747	1.97 (0.04)†	1.085	1.068	1.36 (0.17)	1.125	0.756	2.15 (0.03)†	1.119	0.793	1.91 (0.06)‡		
2003	0.834	0.651	1.29 (0.19)	0.819	0.749	2.14 (0.03)†	0.862	0.709	3.09 (0.00)*	0.933	0.746	3.24 (0.00)*		
2004	0.715	0.675	1.32 (0.18)	0.806	0.654	2.74 (0.00)*	0.90	0.657	3.60 (0.00)*	0.886	0.670	2.72 (0.00)*		
2005	0.937	0.693	2.66 (0.00)*	1.029	0.685	2.30 (0.02)†	0.983	0.696	2.39 (0.02)‡	0.954	0.703	1.67 (0.09)‡		
2006	1.048	0.891	0.24 (0.81)	0.905	0.891	0.24 (0.81)	0.937	0.891	-0.04 (0.96)	0.762	0.899	-0.39 (0.69)		
2007	1.248	0.978	1.86 (0.06) †	1.405	0.952	2.87 (0.00)*	1.187	0.995	1.76 (0.08)‡	1.248	0.985	2.15 (0.03)†		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Low MAND- IND	High MAND- IND	<i>Z</i> (<i>p</i>)	Low MAND-IND COMPL.	High MAND-IND COMPL.	<i>Z</i> (<i>p</i>)	Low GOV41	High GOV41	<i>Z</i> (<i>p</i>)	All firms	Prop. Sig	Small firms	Large firms	<i>Z</i> (<i>p</i>)
Year														
2000	1.400	1.179	2.10 (0.04)†	1.398	1.055	1.06 (0.29)	1.350	1.497	0.80 (0.42)	1.394	0.05	1.678	1.211	3.18 (0.00)*
2001	1.497	1.217	1.24 (0.21)	1.457	1.605	0.54 (0.58)	1.478	1.227	0.54 (0.59)	1.458	0.07	1.668	1.225	3.39 (0.00)*
2002	1.109	0.625	2.35 (0.02)†	1.101	0.709	0.87 (0.39)	1.107	0.612	1.94 (0.05)‡	1.085	0.08	1.201	0.992	2.64 (0.00)*
2003	0.847	0.678	2.11 (0.04)†	0.81	0.782	1.49 (0.14)	0.837	0.713	2.59 (0.00)*	0.803	0.09	0.966	0.688	3.29 (0.00)*
2004	0.741	0.670	2.37 (0.02)†	0.758	0.670	1.95 (0.05)‡	0.828	0.637	3.37 (0.00)*	0.694	0.10	0.789	0.624	3.29 (0.00)*
2005	1.058	0.700	2.52 (0.01)†	0.832	0.700	1.92 (0.05)‡	1.118	0.702	2.34 (0.02)†	0.720	0.07	0.922	0.659	3.03 (0.00)*
2006	0.864	0.893	-0.6 (0.54)	0.853	0.905	-0.25 (0.80)	0.767	0.893	-0.36 (0.72)	0.891	0.10	1.008	0.801	3.08 (0.00)*
2007	1.226	0.978	2.15 (0.03)†	1.293	0.985	1.34 (0.18)	1.248	0.985	1.85 (0.06) †	1.017	0.11	1.305	0.896	4.73 (0.00)*

Panel C: Derivatives Mentions by governance index over time													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Year	Low REG10	High REG10	<i>t</i> -stat.	Low REG10 COMPL.	High REG10 COMPL.	<i>t</i> -stat.	Low BOARD&COMP15	High BOARD&COMP15	<i>t</i> -stat.	Low BOARD&COMP22	High BOARD&COMP22	T-stat.	
2000	2.16	5.34	-5.90 (0.00)*	2.40	2.31	0.10 (0.92)	1.93	5.09	-8.10 (0.00)*	1.99	5.19	-7.67 (0.00)*	
2001	2.65	5.19	-4.19 (0.00)*	2.88	1.54	1.26 (0.21)	2.43	5.22	-6.26 (0.00)*	2.48	5.37	-6.10 (0.00)*	
2002	2.91	5.62	-4.16 (0.00)*	3.15	2.00	0.99 (0.32)	2.65	5.76	-6.54 (0.00)*	2.73	5.75	-5.95 (0.00)*	
2003	3.24	3.97	-1.59 (0.11)	2.65	4.12	-4.04 (0.00)*	2.36	4.81	-6.90 (0.00)*	2.40	4.33	-5.43 (0.00)*	
2004	3.36	3.49	-0.34 (0.74)	2.94	3.62	-1.63 (0.11)	2.26	3.81	-3.51 (0.00)*	2.16	3.78	-3.53 (0.00)*	
2005	2.68	3.75	-1.76 (0.08)†	2.64	3.95	-2.92 (0.00)*	2.26	3.85	-2.93 (0.00)*	1.84	3.84	-3.25 (0.00)*	
2006	2.42	3.75	-1.89 (0.06)‡	2.77	4.01	-2.96 (0.00)*	2.3	3.81	-2.54 (0.01)†	2.55	3.76	-1.86 (0.06)‡	
2007	1.58	3.81	-2.99 (0.00)*	2.49	3.87	-2.67 (0.00)*	1.65	3.85	-3.39 (0.00)*	1.58	3.81	-3.08 (0.00)*	
Year	Low MAND-IND	High MAND-IND	<i>t</i> -stat.	Low MAND-IND COMPL.	High MAND-IND COMPL.	<i>t</i> -stat.	Low GOV41	High GOV41	<i>t</i> -stat.	All firms	Small firms	Large firms	<i>t</i> -stat.
2000	2.06	5.71	-7.62 (0.00)*	2.27	3.19	-2.23 (0.02)†	2.21	5.29	-5.21 (0.00)*	2.4	1.36	3.81	-8.80 (0.00)*
2001	2.56	5.62	-5.64 (0.00)*	2.73	3.5	-1.66 (0.09)‡	2.73	4.54	-2.73 (0.00)*	2.85	1.73	4.26	-8.11 (0.00)*
2002	2.78	6.29	-6.03 (0.00)*	3.09	3.31	-0.45 (0.65)	2.99	5.00	-2.82 (0.00)*	3.12	1.94	4.54	-7.75 (0.00)*
2003	2.51	4.47	-5.40 (0.00)*	3.11	3.5	-0.96 (0.33)	2.51	4.17	-4.54 (0.00)*	3.38	2.16	4.74	-7.41 (0.00)*
2004	2.28	3.84	-3.62 (0.00)*	2.97	3.57	-1.38 (0.16)	2.23	3.81	-3.59 (0.00)*	3.42	2.11	4.76	-7.18 (0.00)*
2005	1.78	3.83	-3.12 (0.00)*	3.57	3.65	-0.15 (0.88)	1.98	3.78	-2.53 (0.01)†	3.63	2.23	4.86	-7.24 (0.00)*
2006	2.37	3.77	-2.04 (0.04)†	3.25	3.71	-0.86 (0.38)	2.33	3.75	-1.96 (0.05)‡	3.64	2.21	4.77	-6.95 (0.00)*
2007	1.58	3.81	-2.99 (0.00)*	3.00	3.68	-0.58 (0.56)	2.50	3.71	-1.28 (0.20)	3.66	2.25	4.66	-6.63 (0.00)*
Panel D: Derivatives Use by governance index over time													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Year	Low REG10	High REG10	<i>t</i> -stat.	Low REG10 COMPL.	High REG10 COMPL.	<i>t</i> -stat.	Low BOARD&COMP15	High BOARD&COMP15	<i>t</i> -stat.	Low BOARD&COMP22	High BOARD&COMP22	T-stat.	
2000	0.29	0.49	-2.73 (0.00)*	0.31	0.15	1.19 (0.23)	0.26	0.54	-5.12 (0.00)*	0.27	0.54	-4.70 (0.00)*	
2001	0.34	0.58	-3.20 (0.00)*	0.36	0.23	0.96 (0.34)	0.32	0.55	-4.08 (0.00)*	0.32	0.57	-4.05 (0.00)*	
2002	0.38	0.55	-2.51 (0.00)*	0.41	0.31	1.31 (0.50)	0.36	0.64	-4.86 (0.00)*	0.36	0.67	-4.99 (0.00)*	
2003	0.32	0.46	-2.57 (0.00)*	0.25	0.43	-4.47 (0.00)*	0.25	0.46	-5.13 (0.00)*	0.26	0.42	-4.03 (0.00)*	
2004	0.35	0.46	-2.37 (0.04)†	0.28	0.43	-3.48 (0.00)*	0.24	0.43	-4.13 (0.00)*	0.24	0.43	-3.65 (0.00)*	
2005	0.21	0.44	-4.64 (0.00)*	0.27	0.43	-3.34 (0.00)*	0.25	0.42	-2.85 (0.00)*	0.19	0.42	-3.37 (0.00)*	
2006	0.30	0.42	-1.86 (0.09)‡	0.29	0.44	-3.31 (0.00)*	0.31	0.41	-1.61 (0.11)	0.31	0.41	-1.44 (0.14)	
2007	0.26	0.44	-2.63 (0.00)*	0.29	0.45	-2.73 (0.00)*	0.22	0.44	-3.00 (0.00)*	0.20	0.44	-2.92 (0.00)*	
Year	Low MAN-IND	High MAN-IND	<i>t</i> -stat.	Low MAN-IND COMPL.	High MAN-IND COMPL.	<i>t</i> -stat.	Low GOV41	High GOV41	<i>t</i> -stat.	All firms	Small firms	Large firms	<i>t</i> -stat.
2000	0.29	0.45	-1.99 (0.01)†	0.31	0.24	0.71 (0.28)	0.30	0.38	-0.78 (0.12)	0.3	0.2	0.44	-6.16 (0.00)*
2001	0.34	0.55	-2.62 (0.00)*	0.36	0.32	0.39 (0.84)	0.35	0.48	-1.17 (0.11)	0.36	0.25	0.48	-5.60 (0.00)*
2002	0.38	0.61	-2.70 (0.00)*	0.40	0.40	-0.02 (0.28)	0.39	0.57	-1.66 (0.03)†	0.4	0.28	0.54	-6.16 (0.00)*
2003	0.29	0.44	-3.34 (0.00)*	0.32	0.36	-1.09 (0.11)	0.29	0.41	-3.04 (0.00)*	0.34	0.26	0.42	-4.00 (0.00)*
2004	0.29	0.45	-3.75 (0.00)*	0.34	0.42	-1.77 (0.08)‡	0.28	0.44	-3.86 (0.00)*	0.39	0.27	0.50	-5.65 (0.00)*
2005	0.20	0.42	-3.47 (0.00)*	0.31	0.44	-2.87 (0.00)*	0.12	0.43	-4.66 (0.00)*	0.39	0.29	0.48	-4.52 (0.00)*
2006	0.31	0.41	-1.63 (0.11)	0.34	0.43	-2.06 (0.04)†	0.27	0.42	-2.33 (0.04)†	0.4	0.29	0.49	-4.78 (0.00)*
2007	0.25	0.44	-2.81 (0.00)*	0.32	0.43	-1.57 (0.29)	0.22	0.43	-2.48 (0.03)†	0.42	0.3	0.51	-4.95 (0.00)*

Notes: Panel A of this table presents the annual mean, median and standard deviation for each of the governance indices for 2002-2007. Column (7) shows the percentage change in the governance indexes in 2007 relative to 2002. Column (8) presents the *t*-statistic and Wilcoxon rank sum *z*-statistic for the test of difference between mean and median values of the governance indices in 2007 relative to 2002. Panel B presents the median absolute foreign exchange rate exposure coefficients (α_2^i) as estimated in equation [1] for firms in high and low governance groups. Panel C also presents the overall median exposure coefficients for the full sample and the proportion of the firms with significant exposure (at the 5 percent level or better). Panel C presents the mean number of mentions of the firm using foreign currency derivatives. Panel D presents the mean proportion of derivatives use for firms in high and low governance groups. Low and high *REG10*, *REG10 COMPL.*, *BOARD&COMP15*, *BOARD&COMP22*, *MANDATE-INDUCED*, *MANDATE-INDUCED COMPL.* and *GOV41* governance groups are defined as having values less than or equal to (greater than) the overall median index values of 5, 15, 8, 11, 11, 8 and 22 respectively. Small (large) firms are defined as having total assets less (greater) than the overall median value of \$1,374.2 million for the period 2000 to 2007. The rank sum *Z* (*t*-test) statistic presents the significance tests for the difference in median (mean) values. *p*-values are located in the parenthesis. The governance variables are defined in the Appendix. *, † and ‡ indicate significance at the 1, 5 and 10 percent levels respectively.

Table 2 Summary statistics of control variables

Panel A: Control variables by governance index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Mean	All firms Median			Low	REG10 High	(6)-(5)	Z
Assets	58643.32	1374.23			955.18	2223.79	1268.61	-13.90 (0.00)*
R&D	1.54	0.01			0.06	0.03	-0.03	5.29 (0.00)*
Quick ratio	2.49	1.41			1.55	1.30	-0.25	7.78 (0.00)*
M/B ratio	2.37	1.74			1.69	1.81	0.11	-2.23 (0.03)†
Leverage	0.23	0.21			0.19	0.21	0.02	-2.35 (0.02)†
Foreign sales	24.41	16.69			13.37	24.59	11.22	-4.56 (0.00)*
ABHK	4.08	4.00			4.00	4.00	0.00	-3.73 (0.00)*
		REG10 COMPL.				BOARD&COMP15		
	Low	High	(2)-(1)	Z (p)	Low	High	(6)-(5)	Z (p)
Assets	904.68	2323.52	1418.85	-14.49 (0.00)*	748.17	2471.07	1722.90	-22.41 (0.00)*
R&D	0.05	0.04	-0.01	-0.97 (0.33)	0.06	0.04	-0.02	4.81 (0.00)*
Quick ratio	1.52	1.36	-0.16	4.78 (0.00)*	1.60	1.28	-0.32	9.86 (0.00)*
M/B ratio	1.65	1.83	0.18	-5.76 (0.00)*	1.71	1.78	0.06	-1.05 (0.29)
Leverage	0.20	0.21	0.01	-0.24 (0.80)	0.20	0.22	0.02	-2.10 (0.04)†
Foreign sales	13.68	21.90	8.22	-4.86 (0.00)*	9.85	24.00	14.15	-9.38 (0.00)*
ABHK	4.00	4.00	0.00	-1.56 (0.12)	4.00	4.00	0.00	-3.48 (0.00)*
		BOARD&COMP22				MANDATE-INDUCED		
	Low	High	(2)-(1)	Z (p)	Low	High	(6)-(5)	Z (p)
Assets	762.59	2353.19	1590.61	-20.43 (0.00)*	838.64	2407.33	1568.69	-18.71 (0.00)*
R&D	0.06	0.04	-0.02	4.02 (0.00)*	0.06	0.04	-0.01	3.78 (0.00)*
Quick ratio	1.58	1.30	-0.29	8.06 (0.00)*	1.54	1.29	-0.24	7.75 (0.00)*
M/B ratio	1.71	1.78	0.07	-1.26 (0.20)	1.71	1.8	0.09	-2.00 (0.04)†
Leverage	0.20	0.22	0.02	-1.06 (0.29)	0.21	0.22	0.01	-1.33 (0.18)
Foreign sales	9.95	23.73	13.78	-9.25 (0.00)*	11.81	23.82	12.01	-8.12 (0.00)*
ABHK	4.00	4.00	0.00	-1.96 (0.05)‡	4.00	4.00	0.00	-1.46 (0.14)
		MANDATE-INDUCED COMPL				GOV41		
	Low	High	(2)-(1)	Z (p)	Low	High	(6)-(5)	Z (p)
Assets	1023.19	2078.04	1054.84	-12.37 (0.00)*	890.48	2225.08	1334.6	-16.60 (0.00)*
R&D	0.05	0.04	-0.01	0.86 (0.38)	0.06	0.04	-0.02	3.74 (0.00)*
Quick	1.44	1.38	-0.05	1.77 (0.08)†	1.51	1.32	-0.2	5.82 (0.00)*
Mtbv	1.69	1.82	0.13	-3.68 (0.00)*	1.69	1.81	0.12	-2.91 (0.00)*
Leverage	0.22	0.21	-0.01	1.34 (0.18)	0.21	0.21	0.00	-0.02 (0.98)
Foreign sales	15.09	18.73	3.64	-3.73 (0.00)*	13.09	21.79	8.7	-6.52 (0.00)*
ABHK	4.00	4.00	0.00	5.03 (0.00)*	4.00	4.00	0.00	1.29 (0.20)

Panel B: Spearman rank correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1 FX Exposure	1.00																			
2 Assets	-0.15*	1.00																		
3 R&D	0.10*	-0.14*	1.00																	
4 Quick ratio	0.15*	-0.45*	0.43*	1.00																
5 M/B ratio	0.05*	-0.09*	0.35*	0.27*	1.00															
6 Leverage	-0.06*	0.27*	-0.29*	-0.45*	-0.38*	1.00														
7 Foreign sales	0.03	0.11*	0.40*	0.15*	0.13*	-0.13*	1.00													
8 ABHK	-0.03	0.28*	0.25*	-0.05*	0.09*	-0.05*	0.61*	1.00												
9 Derivatives Mentions	-0.04	0.32*	0.25*	-0.12*	0.05*	0.03	0.58*	0.54*	1.00											
10 Derivatives Use	-0.04	0.22*	0.22*	-0.07*	0.01	-0.01	0.49*	0.46*	0.69*	1.00										
11 REG10	-0.13*	0.25*	-0.06*	-0.13*	0.04	0.01	0.01	0.02	0.07*	0.04	1.00									
12 REG10 COMPL.	-0.18*	0.28*	0.00	-0.07*	0.07*	-0.04	0.03	-0.01	0.08*	0.08*	0.63*	1.00								
13 BOARD&COMP15	-0.18*	0.38*	-0.05*	-0.21*	0.04	0.04	0.05*	0.10*	0.16*	0.11*	0.89*	0.72*	1.00							
14 BOARD&COMP22	-0.18*	0.35*	-0.03	-0.17*	0.05*	0.01	0.05*	0.07*	0.14*	0.10*	0.88*	0.80*	0.96*	1.00						
15 MAN.-IND.	-0.17*	0.31*	-0.02	-0.14*	0.05*	0.00	0.04	0.04	0.12*	0.08*	0.93*	0.79*	0.95*	0.95*	1.00					
16 MAN.-IND. COMPL.	-0.15*	0.21*	-0.02	-0.03	0.06*	-0.04*	-0.01	-0.05*	0.02	0.03	0.57*	0.93*	0.58*	0.68*	0.63*	1.00				
17 GOV41	-0.17*	0.29*	-0.03	-0.10*	0.06*	-0.02	0.02	0.01	0.09*	0.06*	0.86*	0.94*	0.87*	0.92*	0.93*	0.87*	1.00			
18 CEO tenure	0.02	-0.09*	-0.03	0.05	0.06	-0.02	-0.04	-0.12*	-0.08*	-0.06*	0.00	-0.02	-0.06*	-0.08*	-0.02	0.00	-0.01	1.00		
19 CEO equity	0.03	0.19*	-0.01	0.01	0.13*	-0.01	-0.01	0.01	0.02	0.01	0.00	0.01	0.00	-0.02	0.01	-0.01	0.01	0.40*	1.00	
20 CEO options	0.01	0.28*	0.23*	0.01	0.20*	-0.10*	0.18*	0.23*	0.23*	0.19*	-0.11*	0.00	0.00	-0.02	-0.05	-0.03	-0.05	-0.11*	-0.01	1.00
21 CEO duality	-0.03	0.07*	-0.05	-0.05	0.00	0.01	0.07*	0.08*	0.01	0.03	0.04	0.00	0.06*	0.07*	0.06*	-0.05	0.01	-0.04	0.01	0.04

Notes: Panel A of this table reports the median values for the control variables for all firms and low/high governance groups. Low and high *REG10*, *REG10 COMPLEMENT*, *BOARD&COMP15*, *BOARD&COMP22*, *MANDATE-INDUCED*, *MANDATE-INDUCED COMPLEMENT* and *GOV41* governance groups are defined as having values less than or equal to (greater than) the overall median index values of 5, 15, 8, 11, 11, 8 and 22 respectively. The ‘Z-statistic’ reports the results of a Wilcoxon rank sum test of the difference in medians. Panel B presents the Spearman rank correlation matrix ($n = 3774$; the sample size for correlation matrix for the CEO characteristic variables (including tenure, equity, options and duality) is $n = 1908$). The absolute foreign exchange exposure estimates α_1^2 , are estimated via eq. (1). Detailed information on the variables can be found in the Appendix. The governance and control variables are defined in the Appendix. *, † and ‡ indicate significance at the 1, 5 and 10 percent levels respectively.

Table 3 Multivariate analysis: Initial governance gap (intention to treat)

Panel A: Dep. variable FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Assets	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
	(0.09)	(0.09)	(0.09)	(0.09)	(0.08)	(0.09)	(0.09)
R&D	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Quick	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.74)	(0.77)	(0.72)	(0.75)	(0.75)	(0.76)	(0.76)
M/B ratio	0.034***	0.035***	0.034***	0.034***	0.034***	0.035***	0.035***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	0.024	0.016	0.024	0.023	0.023	0.016	0.019
	(0.80)	(0.87)	(0.80)	(0.81)	(0.81)	(0.86)	(0.84)
Foreign sales	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.96)	(0.99)	(0.94)	(0.95)	(0.95)	(1.00)	(0.97)
ABHK	0.054	0.051	0.051	0.051	0.052	0.054	0.052
	(0.33)	(0.35)	(0.35)	(0.36)	(0.35)	(0.33)	(0.34)
ABHK ²	-0.006	-0.005	-0.005	-0.005	-0.005	-0.006	-0.005
	(0.38)	(0.42)	(0.42)	(0.43)	(0.41)	(0.39)	(0.42)
Derivatives Mentions	0.006	0.006	0.006	0.006	0.006	0.006	0.006
	(0.28)	(0.26)	(0.25)	(0.26)	(0.26)	(0.28)	(0.25)
REG10	-0.166						
	(0.17)						
REG10 COMPL.		-0.464**					
		(0.04)					
BOARD&COMP15			-0.289**				
			(0.02)				
BOARD&COMP22				-0.325**			
				(0.03)			
MANDATE-INDUCED					-0.293**		
					(0.05)		
MANDATE-INDUCED COMPL.						-0.316	
						(0.16)	
GOV41							-0.435**
							(0.04)
Constant	-0.156***	-0.088	-0.135***	-0.126***	-0.133***	-0.116*	-0.095*
	(0.00)	(0.11)	(0.00)	(0.00)	(0.00)	(0.05)	(0.07)
Observations	2,547	2,547	2,547	2,547	2,547	2,547	2,547
R-squared	0.118	0.119	0.119	0.119	0.119	0.118	0.119

Table 3 (continued) Multivariate analysis: Initial governance gap (intention to treat)

Panel B: Dep. variable Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Assets	-0.000 (0.115)	-0.000 (0.123)	-0.000 (0.116)	-0.000 (0.115)	-0.000 (0.109)	-0.000 (0.138)	-0.000 (0.124)
R&D	0.000 (0.985)	0.000 (0.963)	0.000 (0.944)	0.000 (0.932)	0.000 (0.976)	0.000 (0.955)	0.000 (0.981)
Quick ratio	0.009 (0.668)	0.007 (0.746)	0.009 (0.658)	0.008 (0.702)	0.008 (0.710)	0.007 (0.731)	0.007 (0.727)
M/B ratio	-0.124*** (0.000)	-0.130*** (0.000)	-0.122*** (0.000)	-0.126*** (0.000)	-0.124*** (0.000)	-0.133*** (0.000)	-0.130*** (0.000)
Leverage	0.669* (0.070)	0.757** (0.040)	0.695* (0.060)	0.705* (0.057)	0.700* (0.058)	0.770** (0.037)	0.729** (0.048)
Foreign sales	0.021*** (0.000)	0.020*** (0.000)	0.021*** (0.000)	0.021*** (0.000)	0.021*** (0.000)	0.020*** (0.000)	0.020*** (0.000)
ABHK	-0.229 (0.284)	-0.207 (0.332)	-0.207 (0.332)	-0.203 (0.343)	-0.209 (0.327)	-0.223 (0.296)	-0.212 (0.320)
Abhk ²	0.060** (0.018)	0.058** (0.023)	0.058** (0.023)	0.057** (0.024)	0.058** (0.022)	0.059** (0.019)	0.057** (0.024)
REG10	2.283*** (0.000)						
REG10 COMPL.		3.472*** (0.000)					
BOARD&COMP15			2.040*** (0.000)				
BOARD&COMP22				2.252*** (0.000)			
MANDATE-INDUCED					2.332*** (0.000)		
MANDATE-INDUCED COMPL.						3.756*** (0.000)	
GOV41							4.004*** (0.000)
Constant	-0.350*** (0.010)	-0.625*** (0.003)	-0.254* (0.051)	-0.309** (0.037)	-0.318** (0.028)	-0.760*** (0.001)	-0.743*** (0.000)
Observations	2,547	2,547	2,547	2,547	2,547	2,547	2,547
R-squared	0.129	0.127	0.127	0.127	0.127	0.128	0.130

Panel C: Dep. variable Derivatives Use	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Assets	-0.000 (0.661)	-0.000 (0.660)	-0.000 (0.674)	-0.000 (0.671)	-0.000 (0.652)	-0.000 (0.660)	-0.000 (0.685)
R&D	0.000 (0.938)	0.000 (0.932)	0.000 (0.917)	0.000 (0.937)	0.000 (0.938)	0.000 (0.925)	0.000 (0.940)
Quick ratio	0.001 (0.673)	0.001 (0.728)	0.001 (0.667)	0.001 (0.705)	0.001 (0.700)	0.001 (0.711)	0.001 (0.712)
M/B ratio	-0.011** (0.020)	-0.011** (0.013)	-0.010** (0.022)	-0.011** (0.017)	-0.011** (0.019)	-0.012** (0.011)	-0.011** (0.014)
Leverage	-0.018 (0.718)	-0.011 (0.822)	-0.017 (0.725)	-0.014 (0.779)	-0.017 (0.731)	-0.009 (0.855)	-0.014 (0.774)
Foreign sales	0.002*** (0.003)	0.002*** (0.003)	0.002*** (0.003)	0.002*** (0.002)	0.002*** (0.003)	0.002*** (0.004)	0.002*** (0.003)
ABHK	0.035 (0.275)	0.037 (0.247)	0.037 (0.249)	0.038 (0.242)	0.037 (0.251)	0.035 (0.271)	0.037 (0.255)
ABHK ²	-0.002 (0.524)	-0.003 (0.469)	-0.003 (0.482)	-0.003 (0.466)	-0.003 (0.485)	-0.003 (0.511)	-0.003 (0.472)
REG10	0.181*** (0.010)						
REG10 COMPL.		0.377*** (0.004)					
BOARD&COMP15			0.190*** (0.009)				
BOARD&COMP22				0.241*** (0.006)			
MANDATE-INDUCED					0.230*** (0.007)		
MANDATE-INDUCED COMPL.						0.351*** (0.007)	
GOV41							0.386*** (0.002)
Constant	-0.001 (0.964)	-0.046 (0.152)	0.001 (0.957)	-0.045** (0.043)	-0.008 (0.721)	-0.046 (0.178)	-0.048 (0.117)
Observations	2,586	2,586	2,586	2,586	2,586	2,586	2,586
R-squared	0.035	0.035	0.035	0.035	0.035	0.035	0.036

Notes: This table presents the results for the panel regression analysis using deviations from means. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha_2^i|}$, with α_2^i , estimated in eq. (1). Panel B presents the results where the dependent variable is *Derivatives Mentions*. Panel C presents the results for *Derivatives Use*. The estimation equation is specified as follows:

$$y_{it} = \beta_0 + f_t + f_i + \beta_1 GOV.INDEX GAP_i \times D(POST SOX) + \beta_2 X_{it} + \varepsilon_{it}$$

where y_{it} is the outcome variable (e.g. *FX EXPOSURE*), f_t and f_i are time and firm fixed effects, $GOV.INDEX GAP_i$ measure the treatment intensity of firm i (gap) (replacing the standard *TREATED* dummy), $D(POST SOX)$ is a dummy for the Post-SOX period (after 2003), and X_{it} are the control variables. The firm-specific but time-invariant variable $GOV.INDEX GAP_i$ years is omitted for the pre-SOX and hence absorbed by the firm fixed effect. Industry and year dummy variables are included in the analysis. The governance and control variables are defined in the Appendix. p -values are reported in parentheses below the coefficients. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 4 Multivariate analysis: Actual governance implementation (compliance measure)

Panel A: Dep. variable FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.160** (0.022)						
REG10 COMPL.		-0.771*** (0.000)					
BOARD&COMP15			-0.293*** (0.000)				
BOARD&COMP22				-0.417*** (0.000)			
MANDATE-INDUCED					-0.495*** (0.000)		
MANDATE-INDUCED COMPL.						-0.605*** (0.000)	
GOV41							-0.731*** (0.000)
Constant	-0.197*** (0.000)	-0.136*** (0.000)	-0.172*** (0.000)	-0.167*** (0.000)	-0.171*** (0.000)	-0.164*** (0.000)	-0.161*** (0.000)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.055	0.067	0.057	0.059	0.062	0.062	0.065
Panel B: Dep. variable Derivatives mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.995*** (0.000)						
REG10 COMPL.		1.635*** (0.000)					
BOARD&COMP15			1.087*** (0.000)				
BOARD&COMP22				1.192*** (0.001)			
MANDATE-INDUCED					1.435*** (0.000)		
MANDATE-INDUCED COMPL.						1.499*** (0.000)	
GOV41							1.977*** (0.000)
Constant	0.210** (0.014)	0.040 (0.654)	0.091 (0.290)	0.092 (0.287)	0.101 (0.233)	0.092 (0.283)	0.078 (0.363)
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.084	0.084	0.083	0.083	0.085	0.083	0.086
Panel C: Dep. variable Derivatives use	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.109*** (0.007)						
REG10 COMPL.		0.132* (0.099)					
BOARD&COMP15			0.115** (0.015)				
BOARD&COMP22				0.146** (0.014)			
MANDATE-INDUCED					0.131** (0.018)		
MANDATE-INDUCED COMPL.						0.145* (0.080)	
GOV41							0.204** (0.011)
Constant	-0.064*** (0.000)	-0.069*** (0.000)	-0.067*** (0.000)	-0.063*** (0.001)	-0.064*** (0.001)	-0.068*** (0.000)	-0.056*** (0.004)
Observations	3,374	3,374	3,374	3,374	3,374	3,374	3,374
R-squared	0.028	0.027	0.027	0.028	0.027	0.027	0.028

Notes: This table presents the results for the panel regression analysis using deviations from means. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|a'_2|}$, with a'_2 , estimated in equation (1). Panel B presents the results for *Derivatives Mentions* as the dependent variable, and Panel C for *Derivatives Use*. The estimation equation is specified as follows:

$$y_{it} = \beta_0 + f_t + f_i + \beta_1 GOV.INDEX_{it} + \beta_2 X_{it} + \varepsilon_{it},$$

where y_{it} is the outcome variable (e.g. *FX EXPOSURE*), f_t and f_i are time and firm fixed effects, $GOV.INDEX_{it}$ measures the treatment intensity of firm i in year t (replacing the standard *TREATED×POST* and *TREATED* dummies), and X_{it} are the control variables. Industry and year dummy variables are included in the analysis. p -values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 5 Multivariate analysis of governance implementation: FX Exposure and Derivatives by firm size, pre-reform Q, and G-index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Dep. var. FX Exposure	Large	Small	Large	Small	Large	Small	High Q	Low Q	High Q	Low Q	High Q	Low Q
REG10	-0.081 (0.380)	-0.240** (0.023)					-0.012 (0.932)	-0.270*** (0.002)				
MANDATE-INDUCED			-0.415*** (0.000)	-0.578*** (0.000)					-0.495*** (0.010)	-0.514*** (0.000)		
GOV41					-0.621*** (0.000)	-0.865*** (0.000)					-0.902*** (0.000)	-0.676*** (0.000)
Constant	-0.161*** (0.000)	-0.234*** (0.000)	-0.142*** (0.000)	-0.200*** (0.000)	-0.133*** (0.000)	-0.189*** (0.000)	-0.231*** (0.000)	-0.172*** (0.000)	-0.221*** (0.000)	-0.138*** (0.000)	-0.206*** (0.000)	-0.132*** (0.000)
Control Variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,823	1,502	1,823	1,502	1,823	1,502	900	2,107	900	2,107	900	2,107
R-squared	0.056	0.061	0.062	0.069	0.064	0.073	0.113	0.035	0.120	0.041	0.125	0.042
Panel B: Dep. var. Derivatives Mentions	Large	Small	Large	Small	Large	Small	High Q	Low Q	High Q	Low Q	High Q	Low Q
REG10	1.452*** (0.000)	0.564* (0.071)					-0.075 (0.867)	1.407*** (0.000)				
MANDATE-INDUCED			1.652*** (0.001)	1.232*** (0.003)					0.515 (0.387)	1.845*** (0.000)		
GOV41					2.136*** (0.001)	1.893*** (0.000)					1.611** (0.043)	2.217*** (0.000)
Constant	0.330** (0.011)	0.102 (0.346)	0.191 (0.139)	0.024 (0.821)	0.166 (0.201)	-0.000 (0.998)	0.083 (0.567)	0.203* (0.067)	0.081 (0.566)	0.060 (0.586)	0.047 (0.739)	0.047 (0.676)
Control Variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,823	1,502	1,823	1,502	1,823	1,502	900	2,107	900	2,107	900	2,107
R-squared	0.078	0.105	0.077	0.109	0.077	0.111	0.167	0.062	0.168	0.063	0.171	0.062
Panel C: Dep. Var. Derivatives Use	Large	Small	Large	Small	Large	Small	High Q	Low Q	High Q	Low Q	High Q	Low Q
REG10	0.103* (0.096)	0.100* (0.058)					0.187*** (0.010)	0.110** (0.043)				
MANDATE-INDUCED			0.079 (0.340)	0.175** (0.015)					0.266*** (0.009)	0.149** (0.037)		
GOV41					0.054 (0.662)	0.344*** (0.001)					0.378** (0.017)	0.228** (0.024)
Constant	-0.042 (0.108)	-0.088*** (0.000)	-0.048* (0.075)	-0.079*** (0.001)	-0.053* (0.072)	-0.059** (0.020)	-0.010 (0.764)	-0.085*** (0.000)	-0.000 (0.995)	-0.082*** (0.001)	0.009 (0.802)	-0.074*** (0.003)
Control Variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,864	1,510	1,864	1,510	1,864	1,510	907	2,143	907	2,143	907	2,143
R-squared	0.022	0.066	0.021	0.067	0.021	0.071	0.062	0.034	0.063	0.034	0.061	0.034

Table 5 (continued) Multivariate analysis of governance implementation: FX Exposure and Derivatives by firm size, pre-reform Q, and G-index

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var. FX Exposure	High G-index	Low G-index	High G-index	Low G-index	High G-index	Low G-index
REG10	-0.178* (0.075)	-0.197* (0.084)				
MANDATE-INDUCED			-0.516*** (0.000)	-0.612*** (0.000)		
GOV41					-0.828*** (0.000)	-0.907*** (0.000)
Constant	-0.154*** (0.000)	-0.240*** (0.000)	-0.129*** (0.000)	-0.206*** (0.000)	-0.116*** (0.000)	-0.193*** (0.000)
Control Variables	Y	Y	Y	Y	Y	Y
Observations	1,580	1,391	1,580	1,391	1,580	1,391
R-squared	0.047	0.080	0.055	0.089	0.061	0.093
Panel B:	(7)	(8)	(9)	(10)	(11)	(12)
Dep. var. Derivatives Mentions	High G-index	Low G-index	High G-index	Low G-index	High G-index	Low G-index
REG10	1.141*** (0.005)	0.758* (0.069)				
MANDATE-INDUCED			1.663*** (0.001)	1.159** (0.033)		
GOV41					2.518*** (0.000)	1.446** (0.039)
Constant	0.091 (0.479)	0.418*** (0.002)	-0.021 (0.867)	0.327** (0.014)	-0.057 (0.659)	0.314** (0.020)
Control Variables	Y	Y	Y	Y	Y	Y
Observations	1,580	1,391	1,580	1,391	1,580	1,391
R-squared	0.070	0.095	0.071	0.095	0.074	0.095
Panel C:	(13)	(14)	(15)	(16)	(17)	(18)
Dep. var. Derivatives Use	High G-index	Low G-index	High G-index	Low G-index	High G-index	Low G-index
REG10	0.002 (0.978)	0.153** (0.016)				
MANDATE-INDUCED			-0.030 (0.730)	0.211** (0.019)		
GOV41					-0.081 (0.521)	0.335** (0.011)
Constant	-0.083*** (0.001)	-0.055** (0.050)	-0.088*** (0.001)	-0.048 (0.102)	-0.095*** (0.001)	-0.036 (0.255)
Control Variables	Y	Y	Y	Y	Y	Y
Observations	1,595	1,418	1,595	1,418	1,595	1,418
R-squared	0.024	0.044	0.024	0.043	0.024	0.044

Notes: This table presents the results for the panel regression analysis using deviations from means. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results regression where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha_2^i|}$, with α_2^i , estimated in equation (1). Panel B presents the results where the dependent variable is *Derivatives Mentions*. Panel C presents the results where the dependent variable is *Derivatives Use*. Results are presented for small and large firm, high and low growth firms and firms with high and low pre-reform G-index values (Gompers, Ishhi, and Metrick, 2003). Small (large) firms are defined as having total assets less (greater) than the overall median value of \$1,374.2 million for the period 2000 to 2007. Low (high) growth firms are defined as having a Tobin's *Q* value less (greater) than the overall median value of 2.43 for the pre-reform period of 2000 to 2002. Low (high) entrenched firms are defined as having a *G-index* value less (greater) than the overall median value of 8.64 for the pre-reform period of 2000 to 2002. Industry and year dummy variables are included in the analysis. *p*-values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 6 Cross-sectional test on the pre-reform managerial bias

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Panel A: Mean anti-takeover index			Panel B: Anti-takeover index			Panel C: GOV41		
Assets	0.004 (0.826)	0.458*** (0.000)	0.127** (0.039)	0.000 (0.997)	0.378*** (0.000)	0.085 (0.193)	-0.004 (0.804)	0.418*** (0.000)	0.125** (0.047)
R&D	0.048 (0.660)	0.252 (0.619)	-0.106 (0.736)	0.056 (0.611)	0.210 (0.684)	-0.121 (0.706)	0.058 (0.593)	0.239 (0.641)	-0.128 (0.684)
Quick ratio	0.113** (0.021)	-0.440** (0.049)	-0.069 (0.684)	0.094* (0.056)	-0.425* (0.058)	-0.080 (0.646)	0.141*** (0.004)	-0.545** (0.014)	-0.165 (0.338)
M/B ratio	0.090* (0.065)	0.247 (0.344)	0.208 (0.222)	0.115** (0.020)	0.346 (0.173)	0.288* (0.092)	0.101** (0.038)	0.172 (0.501)	0.155 (0.354)
Leverage	0.003 (0.983)	0.912 (0.175)	0.401 (0.317)	-0.008 (0.944)	0.885 (0.193)	0.329 (0.419)	0.041 (0.725)	0.925 (0.159)	0.336 (0.389)
Foreign sales	0.001 (0.168)	0.042*** (0.000)	0.026*** (0.000)	0.001 (0.301)	0.044*** (0.000)	0.026*** (0.000)	0.001 (0.256)	0.043*** (0.000)	0.026*** (0.000)
ABHK	0.028 (0.704)	0.405 (0.313)	0.152 (0.576)	0.005 (0.945)	0.356 (0.391)	0.161 (0.575)	0.019 (0.798)	0.473 (0.241)	0.197 (0.470)
ABHK ²	-0.004 (0.600)	-0.003 (0.944)	0.007 (0.819)	-0.002 (0.803)	-0.002 (0.965)	0.006 (0.862)	-0.003 (0.706)	-0.012 (0.799)	0.001 (0.965)
Derivatives Mentions	0.001 (0.904)			-0.001 (0.841)			0.001 (0.917)		
Mean anti-takeover index	-0.918*** (0.000)	2.880* (0.056)	2.915*** (0.003)						
Anti-takeover index				-0.867*** (0.001)	4.817*** (0.004)	3.632*** (0.001)			
GOV41							-0.395** (0.037)	4.244*** (0.001)	2.554*** (0.003)
Constant	1.174*** (0.000)	-3.632*** (0.002)	-1.244* (0.084)	1.258*** (0.000)	-3.239*** (0.006)	-1.090 (0.145)	1.221*** (0.000)	-4.339*** (0.000)	-1.635** (0.029)
Year controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,018	1,018	1,018	1,018	1,018	1,018	1,018	1,018	1,018
R-squared	0.098	0.278	0.225	0.111	0.280	0.216	0.090	0.284	0.226

Notes: This table presents the results for fixed effects regression analysis. Panels A and B include the mean and original value of the anti-takeover index of Cain, McKeon, and Davidoff Solomon (2017) for the pre-reform period of 2000-2002, respectively. Panel C includes the mean *GOV41* index value for the pre-reform period of 2000-2002. The dependent variable is: *FX Exposure* in columns (1), (4) and (7), *Derivatives Mentions* in columns (2), (5) and (8), and *Derivatives Use* in columns (3), (6) and (9) is. Industry and year dummy variables are included in the analysis. Robust *p*-values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 7 Time trend analysis of governance implementation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	FX Exposure			Derivatives Mentions			Derivatives Use		
Assets	-0.032*** (0.000)	-0.017** (0.015)	-0.015** (0.028)	0.554*** (0.000)	0.382*** (0.000)	0.396*** (0.000)	0.301*** (0.002)	0.284*** (0.004)	0.276*** (0.005)
R&D	0.058 (0.300)	0.086* (0.100)	0.086* (0.099)	0.121 (0.487)	0.139 (0.338)	0.154 (0.293)	-1.270 (0.269)	-1.290 (0.263)	-1.312 (0.258)
Quick ratio	0.018 (0.440)	0.085*** (0.000)	0.090*** (0.000)	-0.539*** (0.000)	-0.742*** (0.000)	-0.760*** (0.000)	-0.589*** (0.008)	-0.599*** (0.007)	-0.616*** (0.005)
M/B ratio	0.087*** (0.001)	0.083*** (0.000)	0.082*** (0.000)	0.502*** (0.001)	0.529*** (0.000)	0.531*** (0.000)	-0.598*** (0.006)	-0.589*** (0.007)	-0.585*** (0.007)
Leverage	0.191*** (0.002)	0.121** (0.025)	0.117** (0.031)	0.027 (0.945)	0.559* (0.091)	0.532 (0.109)	-0.669 (0.266)	-0.631 (0.292)	-0.584 (0.327)
Foreign sales	-0.000 (0.919)	0.000 (0.508)	0.000 (0.376)	0.052*** (0.000)	0.055*** (0.000)	0.055*** (0.000)	0.039*** (0.000)	0.039*** (0.000)	0.038*** (0.000)
ABHK	0.036 (0.129)	0.050** (0.021)	0.043** (0.045)	0.347** (0.019)	0.343** (0.019)	0.335** (0.023)	1.170*** (0.000)	1.173*** (0.000)	1.181*** (0.000)
ABHK ²	-0.005 (0.104)	-0.006** (0.012)	-0.006** (0.022)	0.010 (0.576)	0.012 (0.524)	0.013 (0.484)	-0.076** (0.032)	-0.076** (0.032)	-0.077** (0.030)
Derivatives Mentions	0.002 (0.431)	0.000 (0.865)	0.000 (1.000)						
REG10	-0.125*** (0.007)			0.512* (0.057)			1.137*** (0.001)		
REG10×2002	-0.212** (0.012)			1.321** (0.019)			1.587*** (0.005)		
REG10×2003	-0.559*** (0.000)			1.095*** (0.002)			-0.193 (0.652)		
REG10×2004	-0.572*** (0.000)			0.498 (0.174)			0.204 (0.605)		
REG10×2005	-0.251*** (0.000)			0.272 (0.259)			-0.178 (0.520)		
REG10×2006	-0.164*** (0.000)			0.167 (0.482)			-0.297 (0.271)		
MANDATE-INDUCED		-0.250*** (0.000)			1.198*** (0.002)			1.658*** (0.001)	
MANDATE-INDUCED×02		-0.274*** (0.001)			1.316** (0.018)			1.542*** (0.003)	
MANDATE-INDUCED×03		-0.510*** (0.000)			0.884** (0.016)			-0.408 (0.272)	
MANDATE-INDUCED×04		-0.495*** (0.000)			0.420 (0.223)			0.006 (0.987)	
MANDATE-INDUCED×05		-0.263*** (0.000)			0.281 (0.333)			-0.256 (0.392)	
MANDATE-INDUCED×06		-0.191*** (0.000)			0.175 (0.549)			-0.323 (0.278)	
GOV41			-0.364*** (0.000)			0.929* (0.065)			2.101*** (0.000)
GOV41×2002			-0.360*** (0.000)			1.301* (0.058)			1.983*** (0.002)
GOV41×2003			-0.567*** (0.000)			0.864** (0.037)			-0.629 (0.135)
GOV41×2004			-0.585*** (0.000)			0.491 (0.229)			-0.017 (0.967)
GOV41×2005			-0.339*** (0.000)			0.524 (0.136)			-0.216 (0.548)
GOV41×2006			-0.232*** (0.000)			0.348 (0.321)			-0.309 (0.386)
Constant	1.288*** (0.000)	1.220*** (0.000)	1.255*** (0.000)	-3.981*** (0.000)	-3.211*** (0.000)	-3.057*** (0.000)	-13.193* (0.061)	-13.349* (0.058)	-13.268* (0.058)
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,374	3,374	3,374
R-squared	0.160	0.122	0.124	0.477	0.357	0.355			
Wald chi2							280.50*** (0.000)	283.20*** (0.000)	285.72*** (0.000)
Prob > chi2									

Notes: Panel A of this table presents the results for the fixed effects panel regression analysis where the dependent variable is *FX Exposure*, in columns (1) – (3), operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha_2^i|}$, with α_2^i estimated in equation (1). *Derivatives Mentions* in columns (4) – (6), and *Derivatives Use* in columns (7) – (9). We include the time trend interaction terms, whereby the *REG10*, *BOARD&COMPI5*, *MANDATE-INDUCED* and *GOV41* indexes are interacted with year dummies. Industry dummies are included in the analysis. *p*-values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, **and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 8 Heterogeneous firm exposure to foreign markets

Panel A: Dep. variable FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Low ININ			High ININ			Domestic firms			Global Firms		
REG10	-0.181*			-0.135			-0.126			0.069		
	(0.094)			(0.144)			(0.503)			(0.663)		
MANDATE-INDUCED		-0.625***			-0.397***			-0.239			-0.402**	
		(0.000)			(0.000)			(0.341)			(0.036)	
GOV41			-0.990***			-0.579***			-0.168			-0.758***
			(0.000)			(0.000)			(0.648)			(0.002)
Constant	-0.190***	-0.160***	-0.145***	-0.202***	-0.180***	-0.172***	-0.162***	-0.146***	-0.147***	-0.172***	-0.167***	-0.151***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.004)	(0.005)	(0.001)	(0.001)	(0.003)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,368	1,368	1,368	1,957	1,957	1,957	344	344	344	572	572	572
R-squared	0.071	0.082	0.088	0.053	0.058	0.060	0.079	0.080	0.078	0.080	0.088	0.096
Panel B: Dep. variable Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Low ININ			High ININ			Domestic firms			Global Firms		
REG10	0.286			1.546***			0.830**			1.541*		
	(0.302)			(0.000)			(0.022)			(0.055)		
MANDATE-INDUCED		0.597			1.986***			0.359			2.248**	
		(0.109)			(0.000)			(0.463)			(0.020)	
GOV41			0.665			2.787***			-0.510			2.983**
			(0.177)			(0.000)			(0.478)			(0.025)
Constant	0.025	-0.010	-0.016	0.360***	0.197	0.164	-0.079	-0.139	-0.099	0.394	0.228	0.182
	(0.777)	(0.907)	(0.863)	(0.007)	(0.137)	(0.217)	(0.419)	(0.157)	(0.331)	(0.131)	(0.370)	(0.519)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,368	1,368	1,368	1,957	1,957	1,957	344	344	344	572	572	572
R-squared	0.113	0.114	0.113	0.088	0.089	0.091	0.043	0.029	0.029	0.066	0.069	0.070

Notes: This table replicates the panel regression analysis presented in Table 4 to examine the heterogeneous firm exposure to foreign markets. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. The change in the governance and control variables is defined in the Appendix. Panel A presents the results regression where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha'_2|}$, with α'_2 , estimated in equation (1). Panel B presents the results where the dependent variable is *Derivatives Mentions*. Columns (1) – (3) and columns (4) – (6) present the results for the low and high ININ groups, respectively. Low (high) ININ groups are based on Hoberg and Moon's (2017) text-based measure of net foreign inputs exposure and defined as having a median ININ number of less than or equal to 10 (greater than 10). Columns (7) – (9) and column (10) – (12) present the results for the domestic and global firms, respectively. Domestic firms are defined as having as having zero foreign sales and an ABHK equal to 1. Global firms are defined as having foreign sales ≥ 0 and an ABHK equal to 7. Industry and year dummy group variables are included in the analysis. *p*-values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 9 CEO characteristics and incentives

Panel A: Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
REG10	-0.141*	-0.139*	-0.128	-0.118	-0.096					
MANDATE-INDUCED	(0.067)	(0.071)	(0.116)	(0.148)	(0.250)	-0.484***	-0.481***	-0.497***	-0.502***	-0.484***
CEO Tenure	0.000				0.002	-0.000				0.002
CEO Turnover	(0.945)				(0.401)	(0.970)				(0.494)
CEO Equity		0.096***			0.090***		0.095***			0.090***
CEO Options		(0.002)			(0.007)		(0.002)			(0.006)
Constant			0.000		0.000			0.000		0.000
			(0.681)		(0.769)			(0.703)		(0.783)
Control variables				0.008**	0.008**				0.008**	0.007**
Observations				(0.028)	(0.038)				(0.033)	(0.048)
R-squared				-0.191***	-0.196***				-0.167***	-0.174***
	-0.193***	-0.193***	-0.195***	(0.000)	(0.000)	-0.167***	-0.167***	-0.171***	(0.000)	(0.000)
	(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,829	2,829	2,589	2,556	2,483	2,829	2,829	2,589	2,556	2,483
R-squared	0.059	0.062	0.061	0.062	0.065	0.066	0.069	0.070	0.070	0.073

Panel B: Dep. var. Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
REG10	1.045***	1.019***	0.957***	0.985***	1.060***					
MANDATE-INDUCED	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	1.424***	1.393***	1.236***	1.234***	1.341***
CEO Tenure	0.022**				0.025***	0.022**				0.025***
CEO Turnover	(0.011)				(0.009)	(0.010)				(0.009)
CEO Equity		-0.054			0.072		-0.055			0.069
CEO Options		(0.653)			(0.581)		(0.650)			(0.596)
Constant			-0.000		-0.000			-0.000		-0.000
			(0.863)		(0.522)			(0.828)		(0.493)
Control variables				0.021	0.028*				0.021	0.027*
Observations				(0.152)	(0.065)				(0.157)	(0.069)
R-squared				0.285***	0.293***	0.146	0.154	0.194*	0.184*	0.185*
	0.257***	0.262***	0.293***	(0.006)	(0.005)	(0.131)	(0.111)	(0.056)	(0.070)	(0.072)
	(0.008)	(0.007)	(0.004)							
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,829	2,829	2,589	2,556	2,483	2,829	2,829	2,589	2,556	2,483
R-squared	0.087	0.085	0.083	0.082	0.084	0.088	0.086	0.083	0.082	0.084

Notes: This table replicates the panel regression analysis presented in Table 4 and includes control for CEO characteristics and incentives. Results are presented for the regression estimation analysis using deviations from means. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results regression where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha'_2|}$, with α'_2 estimated in equation (1). Panel B presents the results where the dependent variable is *Derivatives Mentions*. Industry and year dummy group variables are included in the analysis. *p*-values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table 10: The role of CEO contract and ownership incentives**Panel A: CEO Options - Dependent variable: FX Exposure**

Dependent variable FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10*HIGH OPTIONS GROUP	-0.259*** (0.005)						
REG10*LOW OPTIONS GROUP	-0.007 (0.937)						
REG10 COMPL. *HIGH OPTIONS GROUP		-1.060*** (0.000)					
REG10 COMPL. *LOW OPTIONS GROUP		-0.506*** (0.001)					
BOARD&COMP 15*HIGH OPTIONS GROUP			-0.445*** (0.000)				
BOARD&COMP 15*LOW OPTIONS GROUP			-0.099 (0.347)				
BOARD&COMP 22*HIGH OPTIONS GROUP				-0.585*** (0.000)			
BOARD&COMP 22*LOW OPTIONS GROUP				-0.171 (0.163)			
MANDATORY*HIGH OPTIONS GROUP					-0.699*** (0.000)		
MANDATORY*LOW OPTIONS GROUP					-0.313*** (0.007)		
MANDATORY COMPL. *HIGH OPTIONS GROUP						-0.885*** (0.000)	
MANDATORY COMPL. *LOW OPTIONS GROUP						-0.307** (0.046)	
GOV41*HIGH OPTIONS GROUP							-1.006*** (0.000)
GOV41*LOW OPTIONS GROUP							-0.491*** (0.001)
Constant	-0.195*** (0.000)	-0.130*** (0.000)	-0.170*** (0.000)	-0.167*** (0.000)	-0.168*** (0.000)	-0.160*** (0.000)	-0.157*** (0.000)
Wald test F- statistic	10.16	11.96	10.97	12.14	12.81	12.31	14.00
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	2,556	2,556	2,556	2,556	2,556	2,556	2,556
R-squared	0.064	0.079	0.067	0.068	0.073	0.073	0.076

Table 10 (continued): The role of CEO contract and ownership incentives

Panel B: CEO Options - Dependent variable: Derivatives Mentions

Dependent variable Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10*HIGH OPTIONS GROUP	1.243*** (0.001)						
REG10*LOW OPTIONS GROUP	0.736** (0.038)						
REG10 COMPL. *HIGH OPTIONS GROUP		1.739*** (0.003)					
REG10 COMPL. *LOW OPTIONS GROUP		0.674 (0.273)					
BOARD&COMP 15*HIGH OPTIONS GROUP			1.457*** (0.000)				
BOARD&COMP 15*LOW OPTIONS GROUP			0.695* (0.097)				
BOARD&COMP 22*HIGH OPTIONS GROUP				1.617*** (0.001)			
BOARD&COMP 22*LOW OPTIONS GROUP				0.730 (0.135)			
MANDATORY*HIGH OPTIONS GROUP					1.549*** (0.001)		
MANDATORY*LOW OPTIONS GROUP					0.886* (0.056)		
MANDATORY COMPL. *HIGH OPTIONS GROUP						1.812*** (0.002)	
MANDATORY COMPL. *LOW OPTIONS GROUP						0.576 (0.348)	
GOV41*HIGH OPTIONS GROUP							2.149*** (0.000)
GOV41*LOW OPTIONS GROUP							1.181** (0.049)
Constant	0.293*** (0.004)	0.143 (0.176)	0.172* (0.094)	0.174* (0.092)	0.189* (0.063)	0.179* (0.080)	0.169* (0.100)
Wald test F- statistic	2.60	2.75	3.35	3.53	2.37	3.54	3.10
Prob >F	0.10	0.09	0.07	0.06	0.12	0.06	0.08
Observations	2,556	2,556	2,556	2,556	2,556	2,556	2,556
R-squared	0.082	0.081	0.082	0.082	0.082	0.081	0.083

Table 10 (continued): The role of CEO contract and ownership incentives

Panel C: CEO Options - Dependent variable: Derivatives Use

Dependent variable Derivatives Use	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10*HIGH OPTIONS GROUP	0.066 (0.221)						
REG10*LOW OPTIONS GROUP	0.094* (0.071)						
REG10 COMPL. *HIGH OPTIONS GROUP		-0.055 (0.518)					
REG10 COMPL. *LOW OPTIONS GROUP		-0.013 (0.885)					
BOARD&COMP 15*HIGH OPTIONS GROUP			0.053 (0.391)				
BOARD&COMP 15*LOW OPTIONS GROUP			0.103* (0.096)				
BOARD&COMP 22*HIGH OPTIONS GROUP				0.041 (0.572)			
BOARD&COMP 22*LOW OPTIONS GROUP				0.095 (0.188)			
MANDATORY*HIGH OPTIONS GROUP					0.023 (0.736)		
MANDATORY*LOW OPTIONS GROUP					0.068 (0.320)		
MANDATORY COMPL. *HIGH OPTIONS GROUP						-0.040 (0.638)	
MANDATORY COMPL. *LOW OPTIONS GROUP						-0.006 (0.943)	
GOV41*HIGH OPTIONS GROUP							-0.001 (0.989)
GOV41*LOW OPTIONS GROUP							0.048 (0.588)
Constant	0.016 (0.304)	0.014 (0.389)	0.007 (0.662)	0.008 (0.618)	0.009 (0.530)	0.012 (0.425)	0.010 (0.499)
Wald test F- statistic	0.39	0.20	0.68	0.60	0.51	0.12	0.37
Prob >F	0.53	0.66	0.41	0.44	0.47	0.72	0.54
Observations	2,587	2,587	2,587	2,587	2,587	2,587	2,587
R-squared	0.029	0.028	0.029	0.028	0.028	0.028	0.028

Table 10 (continued): The role of CEO contract and ownership incentives

Panel D: CEO Equity - Dependent variable: FX Exposure

Dependent variable FX exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10*HIGH EQUITY GROUP	0.003 (0.983)						
REG10*LOW EQUITY GROUP	-0.142* (0.084)						
REG10*COMPL. HIGH EQUITY GROUP		-0.418 (0.167)					
REG10*COMPL. LOW EQUITY GROUP		-0.822*** (0.000)					
BOARD&COMP 15*HIGH EQUITY GROUP			-0.106 (0.610)				
BOARD&COMP 15*LOW EQUITY GROUP			-0.291*** (0.002)				
BOARD&COMP 22*HIGH EQUITY GROUP				-0.112 (0.642)			
BOARD&COMP 22*LOW EQUITY GROUP				-0.397*** (0.000)			
MANDATORY*HIGH EQUITY GROUP					-0.326 (0.116)		
MANDATORY*LOW EQUITY GROUP					-0.511*** (0.000)		
MANDATORY COMPL. *HIGH EQUITY GROUP						-0.127 (0.684)	
MANDATORY COMPL. *LOW EQUITY GROUP						-0.645*** (0.000)	
GOV41*HIGH EQUITY GROUP							-0.460* (0.092)
GOV41*LOW EQUITY GROUP							-0.766*** (0.000)
Constant	-0.195*** (0.000)	-0.135*** (0.000)	-0.172*** (0.000)	-0.169*** (0.000)	-0.171*** (0.000)	-0.164*** (0.000)	-0.161*** (0.000)
Wald test F- statistic	1.12	1.86	0.90	1.59	0.93	2.84	1.46
Prob >F	0.29	0.17	0.34	0.21	0.34	0.09	0.23
Observations	2,589	2,589	2,589	2,589	2,589	2,589	2,589
R-squared	0.058	0.072	0.061	0.062	0.066	0.067	0.069

Notes: This table replicates the panel fixed effects regression analysis presented in Table 4 and examines the effect of CEO incentives. Results are presented for the estimation analysis using deviations from means. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results regression where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha'_2|}$, with α'_2 , estimated in equation (1). Panel B present the results where the dependent variable is *Derivatives Mentions*. Panel C present the results where the dependent variable is *Derivative Use*. High (*Low*) CEO equity firms are, respectively, defined as having a median value greater or equal to (*less than*) 3729.85. Industry and year dummy group variables are included in the analysis. *p*-values are reported in parentheses below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Internet Appendix
to
“Mandatory Governance Reform and Corporate Risk Management”

March 2020

Internet Appendix

Table IA.1: Summary statistics small versus large firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2002	2003	2004	2005	2006	2007	Rank sum test, small vs large
REG10							
Small firm median	3.00	4.00	4.00	8.00	8.00	8.00	12.57***
Large firm median	4.00	5.00	5.00	9.00	9.00	9.00	
REG10 COMPL.							
Small firm median	10.00	13.00	15.00	16.00	15.00	16.00	15.96***
Large firm median	11.00	15.50	17.00	18.00	17.00	18.00	
BOARD&COMP15							
Small firm median	5.00	6.00	8.00	10.00	10.00	10.00	23.50***
Large firm median	6.00	8.00	10.00	12.00	12.00	12.00	
BOARD&COMP22							
Small firm median	7.00	9.00	12.00	14.00	14.00	14.00	21.94***
Large firm median	9.00	12.00	14.00	17.00	16.00	17.00	
MANDATE-INDUCED							
Small firm median	8.00	11.00	13.00	16.00	16.00	16.00	19.70***
Large firm median	7.00	9.00	11.00	14.00	14.00	14.00	
MANDATE-INDUCED COMPL.							
Small firm median	6.00	9.00	9.00	10.00	10.00	11.00	12.50***
Large firm median	5.00	8.00	8.50	9.00	9.00	10.00	
GOV41							
Small firm median	14.00	20.00	22.00	26.00	26.00	27.00	18.32***
Large firm median	13.00	17.00	19.50	23.00	23.00	24.00	

Notes: This table presents the median *REG10*, *REG10 COMPL.*, *BOARD&COMP15*, *BOARD&COMP22*, *MANDATE-INDUCED*, *MANDATE-INDUCED COMPL.* and *GOV41* governance indices respectively for the 2002-2007 period. Column (7) displays the Wilcoxon rank sum z-statistic for the test of overall difference in medians between small and large firms. Small (large) firms are classified as having total assets less than or equal to (greater than) the overall median value of \$1,374.2 million. *** denotes significance at the 1% level. The governance variables are defined in the Appendix.

Table IA.2: Tests for convergence (non-parallel trends) between pre- and post-SOX periods

	(1) FX Exposure	(2) Derivatives Mentions	(3) Future/ Forward Mentions	(4) Derivatives Use
REG10 TOP33: Δ Mean (2005/2006 – 2000/2001)	-0.976	0.814	0.435	0.061
REG10 BOTTOM 33: Δ Mean (2005/2006 – 2000/2001)	-1.110	1.491	0.880	0.082
<i>t</i> -test stat. Δ (TOP33 - BOTTOM 33)	-2.182	7.550	7.371	1.851
Pr ($ T > t $)	0.029	0.000	0.000	0.064
REG10 COMPL. TOP33: Δ Mean (2005/2006 – 2000/2001)	-0.797	0.773	0.432	0.061
REG10 COMPL. BOTTOM 33: Δ Mean (2005/2006 – 2000/2001)	-1.167	1.173	0.654	0.071
<i>t</i> -test stat. Δ (TOP33 - BOTTOM 33)	-6.618	4.848	3.999	0.924
Pr ($ T > t $)	0.000	0.000	0.000	0.356
BOARD&COMP15 TOP33: Δ Mean (2005/2006 – 2000/2001)	-0.810	0.818	0.425	0.036
BOARD&COMP15 BOTTOM 33: Δ Mean (2005/2006 – 2000/2001)	-1.083	1.071	0.609	0.077
<i>t</i> -test stat. Δ (TOP33 - BOTTOM 33)	-4.294	2.708	2.922	3.461
Pr ($ T > t $)	0.000	0.000	0.000	0.000
MANDATE-INDUCED TOP33: Δ Mean (2005/2006 – 2000/2001)	-0.882	1.009	0.514	0.049
MANDATE-INDUCED BOTTOM 33: Δ Mean (2005/2006 – 2000/2001)	-1.075	1.007	0.584	0.075
<i>t</i> -test stat. Δ (TOP33 - BOTTOM 33)	-3.236	-0.023	1.188	2.330
Pr ($ T > t $)	0.001	0.982	0.235	0.020
MANDATE-IND. COMPL. TOP33: Δ Mean (2005/2006 – 2000/2001)	-0.950	0.794	0.432	0.051
MANDATE-IND. COMPL. BOTTOM 33: Δ Mean (2005/2006 – 2000/2001)	-1.083	1.236	0.702	0.084
<i>t</i> -test stat. Δ (TOP33 - BOTTOM 33)	-2.403	5.442	4.946	3.196
Pr ($ T > t $)	0.016	0.000	0.000	0.000
GOV41 TOP33: Δ Mean (2005/2006 – 2000/2001)	-0.901	0.969	0.520	0.059
GOV41 BOTTOM 33: Δ Mean (2005/2006 – 2000/2001)	-1.208	1.074	0.635	0.081
T-test statistic	-5.347	1.246	2.032	2.084
Pr ($ T > t $)	0.000	0.210	0.040	0.040

Notes. This table presents the *t*-test results for the difference in the mean *FX exposure* (column 1), *Derivatives Mentions* (FX hedge (column 2), *Futures and Forwards Mentions* as constructed from Hoberg-Moon's data library, (column 3) and *Derivatives Use* (column 4) for the top and bottom gap tercile for each governance index. The purpose of these tests is to show post-reform convergence of the trend lines in Figure 1. We add the fourth hedging variable, *Futures and Forwards Mentions*, in these tests. The *t*-tests test for the difference in the average at the end of the sample period, 2005 and 2006, against the difference at the beginning of the sample period, 2000 and 2001.

Table IA.3 Analysis of indices and their complements in one joint regression

	(1) PANEL A	(2)	(3) PANEL B	(4)	(5) PANEL C	(6)
Assets	0.000 (0.184)	0.000 (0.172)	-0.000 (0.229)	-0.000 (0.232)	-0.000 (0.639)	-0.000 (0.632)
R&D	0.001* (0.053)	0.001* (0.056)	0.000 (0.983)	0.000 (0.985)	-0.000 (0.981)	-0.000 (0.975)
Quick	0.001 (0.783)	0.001 (0.772)	-0.007 (0.710)	-0.007 (0.711)	0.000 (0.957)	0.000 (0.957)
Mtbv	0.039*** (0.000)	0.039*** (0.000)	-0.118*** (0.000)	-0.118*** (0.000)	-0.010** (0.021)	-0.010** (0.021)
Leverage	0.132 (0.133)	0.138 (0.116)	0.660** (0.046)	0.664** (0.045)	-0.004 (0.928)	-0.004 (0.926)
Foreign sales	-0.001 (0.559)	-0.001 (0.497)	0.023*** (0.000)	0.023*** (0.000)	0.002*** (0.001)	0.002*** (0.001)
Abhk	0.060 (0.237)	0.067 (0.189)	-0.298 (0.122)	-0.292 (0.129)	0.026 (0.363)	0.028 (0.342)
Abhk ²	-0.007 (0.221)	-0.008 (0.186)	0.066*** (0.004)	0.065*** (0.005)	-0.001 (0.772)	-0.001 (0.752)
Derivatives mentions	-0.005 (0.296)	-0.005 (0.317)				
REG10	0.018 (0.803)		0.712** (0.011)		0.099** (0.020)	
REG10 COMPL.	-0.781*** (0.000)		1.227*** (0.005)		0.082 (0.323)	
MANDATE-INDUCED		-0.335*** (0.001)		1.105*** (0.004)		0.110* (0.063)
MANDATE-INDUCED COMPL.		-0.403*** (0.001)		0.830* (0.078)		0.086 (0.329)
Constant	-0.134*** (0.000)	-0.161*** (0.000)	0.110 (0.237)	0.080 (0.350)	-0.056*** (0.005)	-0.057*** (0.004)
Observations	3,325	3,325	3,325	3,325	3,374	3,374
R-squared	0.067	0.065	0.086	0.086	0.034	0.034

Notes: This table replicates the main regressions of the panel regression analysis presented in Table 4, using deviations from means, by including both the *REG10* and *MANDATE-INDUCED* variables and their complements in a single regression. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results for a panel fixed effects regression where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|a'_2|}$, with a'_2 , estimated in equation (1). Panels B and C present the results for a panel fixed effects regression where the dependent variable is *Derivatives Mentions* and *Derivatives Use*, respectively. Year and industry dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.4 Multivariate analysis with Forwards/Futures Derivatives Mentions

Panel A:							
Dep. var. Forwards/Futures Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	1.298*** (0.000)						
REG10 COMPL.		1.801*** (0.001)					
BOARD&COMP15			1.108*** (0.000)				
BOARD&COMP22				1.298*** (0.001)			
MANDATE-INDUCED					1.387*** (0.000)		
MANDATE-INDUCED COMPL.						1.740*** (0.002)	
GOV41							2.160*** (0.000)
Constant	-0.212** (0.016)	-0.329** (0.018)	-0.147* (0.082)	-0.192** (0.045)	-0.206** (0.028)	-0.348** (0.020)	-0.409*** (0.002)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	2,547	2,547	2,547	2,547	2,547	2,547	2,547
R-squared	0.102	0.099	0.100	0.100	0.100	0.099	0.101
Panel B:							
Dep. var. Forwards/Futures Derivatives mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.457*** (0.007)						
REG10 COMPL.		0.837*** (0.002)					
BOARD&COMP15			0.478** (0.014)				
BOARD&COMP22				0.518** (0.025)			
MANDATE-INDUCED					0.693*** (0.001)		
MANDATE-INDUCED COMPL.						0.767*** (0.004)	
GOV41							0.978*** (0.000)
Constant	0.097* (0.079)	0.013 (0.818)	0.044 (0.432)	0.044 (0.425)	0.046 (0.400)	0.040 (0.470)	0.034 (0.539)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.066	0.067	0.066	0.065	0.067	0.066	0.067

Notes: Panels A and B of this table replicates the main regressions of the panel industry fixed effects regression analysis, using deviations from means presented in Tables 3 and 4 (Panel A examines the initial governance shortfall and Panel B examines the actual governance implementation.) All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. The dependent variable is Hoberg and Moon's text-based variable, *Forwards and Futures Mentions*, that specifically counts the number of mentions of forward and future contracts for FX hedging. Industry and Year group dummy variables are included in the analysis. *p*-values are shown in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.5 Time trend analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel A: Dep. var. FX Exposure				Panel B: Dep. var. Derivatives Mentions				Panel C: Dep. var. Derivatives Use			
REG10 COMPL.	-0.356*** (0.000)				0.817 (0.146)				2.177*** (0.001)			
REG10 COMPL.×02	-0.328*** (0.001)				1.120 (0.101)				1.876*** (0.003)			
REG10 COMPL.×03	-0.524*** (0.000)				0.766* (0.066)				-0.857** (0.042)			
REG10 COMPL.×04	-0.551*** (0.000)				0.456 (0.271)				-0.175 (0.665)			
REG10 COMPL.×05	-0.392*** (0.000)				0.687* (0.075)				-0.147 (0.707)			
REG10 COMPL.×06	-0.287*** (0.000)				0.504 (0.195)				-0.206 (0.598)			
BOARD&COMP15		-0.202*** (0.001)				1.113*** (0.002)				1.711*** (0.000)		
BOARD&COMP15×02		-0.229*** (0.002)				1.224** (0.015)				1.496*** (0.002)		
BOARD&COMP15×03		-0.512*** (0.000)				1.037*** (0.002)				-0.330 (0.376)		
BOARD&COMP15×04		-0.452*** (0.000)				0.340 (0.263)				-0.043 (0.894)		
BOARD&COMP15×05		-0.259*** (0.000)				0.255 (0.330)				-0.266 (0.368)		
BOARD&COMP15×06		-0.196*** (0.000)				0.195 (0.461)				-0.291 (0.325)		
BOARD&COMP22			-0.274*** (0.000)				1.058** (0.012)				1.906*** (0.000)	
BOARD&COMP22×02			-0.272*** (0.001)				1.163** (0.044)				1.581*** (0.003)	
BOARD&COMP22×03			-0.535*** (0.000)				0.894** (0.021)				-0.490 (0.200)	
BOARD&COMP22×04			-0.488*** (0.000)				0.371 (0.298)				-0.038 (0.913)	
BOARD&COMP22×05			-0.283*** (0.000)				0.374 (0.224)				-0.239 (0.450)	
BOARD&COMP22×06			-0.206*** (0.000)				0.254 (0.411)				-0.306 (0.331)	
MANDATE-INDUCED COMPL.				-0.198** (0.013)				-0.240 (0.643)				1.961*** (0.002)
MANDATE-INDUCED COMPL.×02				-0.288** (0.019)				0.651 (0.415)				2.146*** (0.005)
MANDATE-INDUCED COMPL.×03				-0.588*** (0.000)				0.828* (0.075)				-0.941** (0.048)
MANDATE-INDUCED COMPL.×04				-0.681*** (0.000)				0.566 (0.243)				-0.038 (0.935)
MANDATE-INDUCED COMPL.×05				-0.485*** (0.000)				0.880** (0.041)				0.008 (0.985)
MANDATE-INDUCED COMPL.×06				-0.321*** (0.000)				0.622 (0.143)				-0.131 (0.760)
Constant	1.374*** (0.000)	1.292*** (0.000)	1.331*** (0.000)	1.182*** (0.000)	-2.999*** (0.000)	-4.123*** (0.000)	-3.094*** (0.000)	-2.629*** (0.000)	-13.262* (0.058)	-13.134* (0.062)	-13.089* (0.062)	-13.114* (0.060)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325	3,325	3,374	3,374	3,374	3,374
R-squared	0.170	0.165	0.168	0.116	0.355	0.479	0.356	0.354				
Wald chi2									285.51*** (0.000)	283.13*** (0.000)	284.65*** (0.000)	284.57*** (0.000)

Notes: Panel A of this table presents the results for the fixed effects panel regression analysis where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|ai2|}$, with $ai2$, estimated in equation (1). Panel B presents the results for the fixed effects panel regression analysis where the dependent variable is *Derivatives Mentions*. Panel C presents the findings of panel random effects logit regression analysis in which the dependent variable is the *Derivatives Use* binary variable. We include the time trend interaction terms, whereby the *REG10 COMPL.*, *BOARD&COMP15*, *BOARD&COMP22* and the *MANDATE-INDUCED COMPL.* indexes are interacted with year dummies. Industry dummies are included in the analysis. P-values are in parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, **and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.6 CEO Characteristics

Panel A: Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
REG10	-0.141*	-0.115	-0.068						
	(0.087)	(0.162)	(0.482)						
MANDATE-INDUCED				-0.536***	-0.479***	-0.487***			
				(0.000)	(0.000)	(0.000)			
GOV41							-0.824***	-0.723***	-0.738***
							(0.000)	(0.000)	(0.000)
CEO Duality	0.508*		0.533*	0.521*		0.553*	0.497*		0.531*
	(0.072)		(0.072)	(0.064)		(0.061)	(0.076)		(0.072)
CEO Age		-0.000	-0.001		-0.000	-0.000		-0.001	-0.001
		(0.875)	(0.813)		(0.914)	(0.890)		(0.795)	(0.728)
Constant	-0.193***	-0.188***	-0.186***	-0.166***	-0.165***	-0.166***	-0.153***	-0.155***	-0.155***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,416	2,547	1,893	2,416	2,547	1,893	2,416	2,547	1,893
R-squared	0.056	0.054	0.055	0.065	0.061	0.063	0.069	0.064	0.066
Panel B: Dep. var. Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
REG10	1.109***	0.979***	1.177***						
	(0.000)	(0.001)	(0.002)						
MANDATE-INDUCED				1.381***	1.258***	1.322***			
				(0.000)	(0.001)	(0.004)			
GOV41							1.807***	1.741***	1.712***
							(0.000)	(0.001)	(0.005)
CEO Duality	-1.952***		-2.164***	-1.982***		-2.219***	-1.925***		-2.159***
	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)		(0.000)
CEO Age		0.011	0.007		0.010	0.006		0.011	0.007
		(0.355)	(0.671)		(0.403)	(0.729)		(0.364)	(0.661)
Constant	0.212*	0.257**	0.234	0.098	0.157	0.120	0.078	0.137	0.101
	(0.068)	(0.027)	(0.115)	(0.387)	(0.166)	(0.405)	(0.492)	(0.230)	(0.486)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,416	2,547	1,893	2,416	2,547	1,893	2,416	2,547	1,893
R-squared	0.083	0.084	0.087	0.083	0.084	0.086	0.083	0.085	0.086

Notes: This table replicates the main regressions of the panel regression analysis presented in Table 4, and includes the CEO characteristics *CEO Duality* and *CEO Age* control variables. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. Panel A presents the results for a panel fixed effects regression where the dependent variable is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|a'_2|}$, with a'_2 , estimated in equation (1). Panel B presents the results for a panel fixed effects regression where the dependent variable is *Derivatives Mentions*. Year and industry dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively. The governance and control variables are defined in the Appendix.

Table IA.7 Multivariate analysis: Initial governance short fall with firm fixed effects

Panel A: Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.564*** (0.000)						
REG10 COMPL.		-0.805*** (0.000)					
BOARD&COMP15			-0.519*** (0.000)				
BOARD&COMP22				-0.596*** (0.000)			
MANDATE-INDUCED					-0.592*** (0.000)		
MANDATE-INDUCED COMPL.						-0.936*** (0.000)	
GOV41							-0.778*** (0.000)
Constant	0.494* (0.068)	0.528* (0.050)	0.504* (0.062)	0.503* (0.063)	0.491* (0.069)	0.557** (0.039)	0.522* (0.053)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.070	0.079	0.071	0.074	0.075	0.078	0.078
Panel B Dep. var. Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.581** (0.030)						
REG10 COMPL.		1.499*** (0.000)					
BOARD&COMP15			0.766*** (0.002)				
BOARD&COMP22				1.005*** (0.000)			
MANDATE-INDUCED					0.938*** (0.000)		
MANDATE-INDUCED COMPL.						1.640*** (0.000)	
GOV41							1.288*** (0.000)
Constant	0.309 (0.765)	0.204 (0.843)	0.272 (0.792)	0.261 (0.800)	0.286 (0.782)	0.163 (0.875)	0.231 (0.823)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.087	0.092	0.089	0.090	0.090	0.091	0.091

Notes: This table re-estimates our main regressions analysis presented in Table 3 examining initial governance shortfall with firm fixed effects in lieu of deviations-from-means. The dependent variable in Panel A is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha'_2|}$, with α'_2 , estimated in equation (1). The dependent variable in Panel B is *Derivatives Mentions*. Year dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively. The governance and control variables are defined in the Appendix.

Table IA.8 Multivariate analysis: Actual governance implementation with firm fixed effects

Panel A: Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.440*** (0.000)						
REG10 COMPL.		-0.585*** (0.000)					
BOARD&COMP15			-0.459*** (0.000)				
BOARD&COMP22				-0.501*** (0.000)			
MANDATE-INDUCED					-0.517*** (0.000)		
MANDATE-INDUCED COMPL.						-0.582*** (0.000)	
GOV41							-0.591*** (0.000)
Constant	0.369 (0.172)	0.408 (0.129)	0.426 (0.115)	0.407 (0.131)	0.392 (0.145)	0.400 (0.138)	0.392 (0.145)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.075	0.081	0.075	0.077	0.081	0.075	0.080
Panel B Dep. var. Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.878*** (0.000)						
REG10 COMPL.		1.114*** (0.000)					
BOARD&COMP15			0.878*** (0.000)				
BOARD&COMP22				0.946*** (0.000)			
MANDATE-INDUCED					0.992*** (0.000)		
MANDATE-INDUCED COMPL.						1.125*** (0.000)	
GOV41							1.137*** (0.000)
Constant	0.509 (0.621)	0.428 (0.677)	0.395 (0.701)	0.429 (0.677)	0.459 (0.655)	0.445 (0.665)	0.460 (0.655)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.091	0.093	0.092	0.092	0.093	0.092	0.093

Notes: This table re-estimates our main regressions analysis presented in Table 4 examining actual governance implementation with firm fixed effects in lieu of deviations-from-means. The dependent variable in Panel A is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha^i_2|}$, with α^i_2 , estimated in equation (1). The dependent variable in Panel B is *Derivatives Mentions*. Year group dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.9 Robustness when using industry-time fixed effects

Panel A:							
Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.573*** (0.000)						
REG10 COMPL.		-0.803*** (0.000)					
BOARD&COMP15			-0.530*** (0.000)				
BOARD&COMP22				-0.605*** (0.000)			
MANDATE-INDUCED					-0.598*** (0.000)		
MANDATE-INDUCED COMPL.						-0.929*** (0.000)	
GOV41							-0.781*** (0.000)
Constant	0.537** (0.048)	0.575** (0.034)	0.550** (0.043)	0.551** (0.043)	0.537** (0.048)	0.603** (0.026)	0.568** (0.036)
Industry-time FE	Y	Y	Y	Y	Y	Y	Y
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.081	0.088	0.082	0.084	0.085	0.087	0.088
Panel B:							
Dep. var. Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.485* (0.071)						
REG10 COMPL.		1.391*** (0.000)					
BOARD&COMP15			0.682*** (0.005)				
BOARD&COMP22				0.912*** (0.001)			
MANDATE-INDUCED					0.851*** (0.001)		
MANDATE-INDUCED COMPL.						1.513*** (0.000)	
GOV41							1.178*** (0.000)
Constant	-0.003 (0.998)	-0.110 (0.916)	-0.039 (0.970)	-0.054 (0.959)	-0.029 (0.978)	-0.146 (0.888)	-0.080 (0.938)
Industry-time FE	Y	Y	Y	Y	Y	Y	Y
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.096	0.101	0.098	0.099	0.099	0.100	0.100

Panel C:							
Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.449*** (0.000)						
REG10 COMPL.		-0.583*** (0.000)					
BOARD&COMP15			-0.464*** (0.000)				
BOARD&COMP22				-0.504*** (0.000)			
MANDATE-INDUCED					-0.518*** (0.000)		
MANDATE-INDUCED COMPL.						-0.583*** (0.000)	
GOV41							-0.592*** (0.000)
Constant	0.422 (0.121)	0.448* (0.098)	0.473* (0.081)	0.453* (0.095)	0.442 (0.103)	0.438 (0.107)	0.436 (0.108)
Industry-time FE	Y	Y	Y	Y	Y	Y	Y
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.081	0.091	0.085	0.087	0.091	0.085	0.090
Panel D:							
Dep. var. Derivatives Mentions	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	0.825*** (0.000)						
REG10 COMPL.		1.039*** (0.000)					
BOARD&COMP15			0.810*** (0.000)				
BOARD&COMP22				0.878*** (0.000)			
MANDATE-INDUCED					0.926*** (0.000)		
MANDATE-INDUCED COMPL.						1.052*** (0.000)	
GOV41							1.062*** (0.000)
Constant	0.164 (0.875)	0.113 (0.913)	0.067 (0.948)	0.102 (0.921)	0.125 (0.904)	0.132 (0.898)	0.136 (0.896)
Industry-time FE	Y	Y	Y	Y	Y	Y	Y
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.100	0.102	0.101	0.101	0.102	0.101	0.102

Notes: This table replicates the main regressions of Tables 3 and 4, but including a full set of industry-time fixed effects in the regressions instead of separate industry and time fixed effect variables in the analysis. Panels A and C examine the initial governance shortfall, and Panels C and D examine the actual governance implementation. In Panels A and C, the dependent variable is *FX Exposure*. In Panels B and D, the dependent variable is *Derivatives Mentions*. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. *p*-values are located in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.10 FX Risk Exposure estimation with Russell 1000 market-weighted index

Panel A: Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.309*** (0.000)						
REG10 COMPL.		-0.571*** (0.000)					
BOARD&COMP15			-0.329*** (0.000)				
BOARD&COMP22				-0.392*** (0.000)			
MANDATE-INDUCED					-0.395*** (0.000)		
MANDATE-INDUCED COMPL.						-0.615*** (0.000)	
GOV41							-0.529*** (0.000)
Constant	0.511* (0.056)	0.573** (0.032)	0.533** (0.046)	0.539** (0.044)	0.534** (0.046)	0.579** (0.030)	0.562** (0.035)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.091	0.097	0.093	0.094	0.095	0.096	0.096
Panel B: Dep. var. FX Exposure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.251*** (0.000)						
REG10 COMPL.		-0.402*** (0.000)					
BOARD&COMP15			-0.280*** (0.000)				
BOARD&COMP22				-0.330*** (0.000)			
MANDATE-INDUCED					-0.324*** (0.000)		
MANDATE-INDUCED COMPL.						-0.435*** (0.000)	
GOV41							-0.411*** (0.000)
Constant	0.482* (0.071)	0.521* (0.051)	0.478* (0.073)	0.488* (0.067)	0.472* (0.077)	0.563** (0.035)	0.519* (0.051)
Control variables	Y	Y	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.093	0.097	0.094	0.095	0.096	0.097	0.098

Notes: This table re-estimates our main regressions analysis presented in Table 3 (Panel A) and Table 4 (Panel B) examining initial governance shortfall and actual governance implementation respectively, with firm fixed effects in lieu of deviations-from-means. The dependent variable is *FX Exposure* operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha_2^i|}$, with α_2^i estimated in equation (1) with the Russell 1000 market index. Year group dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.11 FX Risk Exposure estimation with CRSP market-weighted index

Panel A: Governance gap	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.402*** (0.000)						
REG10 COMPL.		-0.636*** (0.000)					
BOARD&COMP15			-0.358*** (0.000)				
BOARD&COMP22				-0.427*** (0.000)			
MANDATE-INDUCED					-0.426*** (0.000)		
MANDATE-INDUCED COMPL.						-0.773*** (0.000)	
GOV41							-0.610*** (0.000)
Constant	0.809*** (0.003)	0.868*** (0.001)	0.821*** (0.003)	0.828*** (0.002)	0.819*** (0.003)	0.896*** (0.001)	0.860*** (0.002)
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.085	0.090	0.084	0.086	0.086	0.091	0.089
Panel B: Actual implementation	(1)	(2)	(3)	(4)	(5)	(6)	(7)
REG10	-0.219*** (0.000)						
REG10 COMPL.		-0.501*** (0.000)					
BOARD&COMP15			-0.287*** (0.000)				
BOARD&COMP22				-0.368*** (0.000)			
MANDATE-INDUCED					-0.357*** (0.000)		
MANDATE-INDUCED COMPL.						-0.528*** (0.000)	
GOV41							-0.474*** (0.000)
Constant	0.758*** (0.005)	0.821*** (0.002)	0.759*** (0.005)	0.773*** (0.004)	0.755*** (0.005)	0.870*** (0.001)	0.812*** (0.003)
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
R-squared	0.081	0.094	0.084	0.088	0.088	0.092	0.092
Number of ISIN groups	504	504	504	504	504	504	504

Notes: This table re-estimates our main regressions analysis presented in Table 3 (Panel A) and Table 4 (Panel B) examining initial governance shortfall and actual governance implementation respectively, with firm fixed effects in lieu of deviations-from-means. The dependent variable is *FX Exposure* operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha_2^i|}$, with α_2^i , estimated in equation (1) with the CRSP market-weighted index. Year group dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Table IA.12 Examining a single SOX measure: board independence

	(1) Panel A	(2) Panel B	(3) Panel C
Assets	0.000 (0.243)	-0.000** (0.014)	-0.000* (0.083)
R&D	0.024 (0.531)	-0.076 (0.235)	-0.037 (0.130)
Quick ratio	-0.003 (0.677)	-0.012 (0.487)	-0.000 (0.994)
M/B ratio	0.044*** (0.000)	-0.134*** (0.002)	-0.015** (0.021)
Leverage	0.196 (0.171)	1.007* (0.051)	-0.041 (0.431)
Foreign sales	-0.001 (0.636)	0.019*** (0.000)	0.002** (0.031)
ABHK	0.067 (0.257)	-0.156 (0.508)	0.023 (0.548)
ABHK ²	-0.010 (0.167)	0.048* (0.095)	-0.001 (0.755)
Derivatives Mentions	-0.005 (0.401)		
Board Independence	-0.092 (0.390)	0.763* (0.055)	0.102 (0.120)
Constant	-0.181*** (0.000)	0.150 (0.130)	0.015 (0.282)
Observations	2,425	2,425	2,458
R-squared	0.052	0.076	0.022

Notes: This table replicates tests for the panel regression analysis, by using a single mandatory SOX measure (board independence) in lieu of our governance indexes. All variables are expressed as differences from the firm's means and thus absorb firm fixed effects. The dependent variable in Panel A is *FX Exposure*, operationalized as the square root of the absolute exposure coefficient $\sqrt{|\alpha_2^i|}$, with α_2^i estimated in equation (1). The dependent variable in Panels B and C is *Derivatives Mentions* and *Derivatives Use*, respectively. *Board Independence* is the proportion of independent directors on the board. Year and industry dummy variables are included in the analysis presented in panels A and B. *p*-values are located in the parenthesis below the coefficients. The governance and control variables are defined in the Appendix. ***, ** and * indicates significance at the 1, 5 and 10 percent level respectively.

Appendix Figures: Additional parallel trends

Figure A1: Graphical analysis of the parallel trends assumption (*REG10 COMPL.* governance index)

The graphs present the complementary set of plots (to those in Figure 1) to examine the validity of the parallel trends assumption in the pre-reform period. We plot the governance index for the top tercile of firms (blue dashed line) and the governance index for the two remaining terciles of firms (red line), using the initial governance gap in *REG10 COMPL.* as measure. We plot the two groups for the evolution of the mean *FX Exposure* (Figure A1.A), *Derivatives Mentions* (Figure A1.B), *Forwards/Futures Derivatives Mentions* (Figure A1.C) and *Derivatives Use* (Figure A1.D), in the period prior and after the year of SOX implementation (2003).

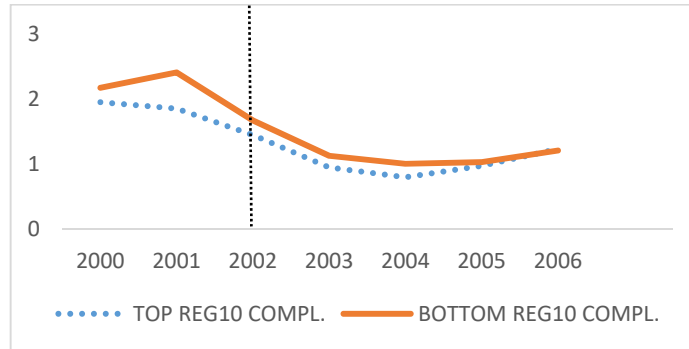


Figure A1.A: Foreign exchange rate exposure by REG10 COMPL.

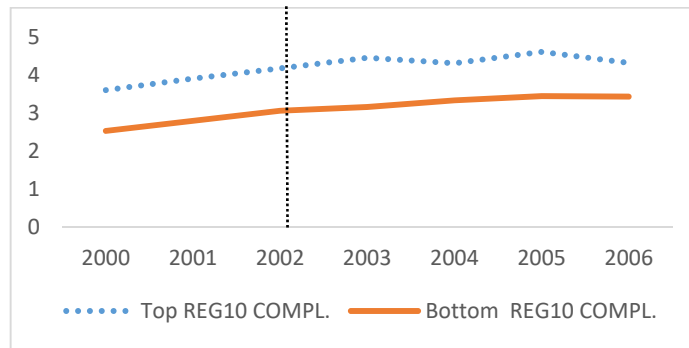


Figure A1.B: Derivatives Mentions by REG10 COMPL.

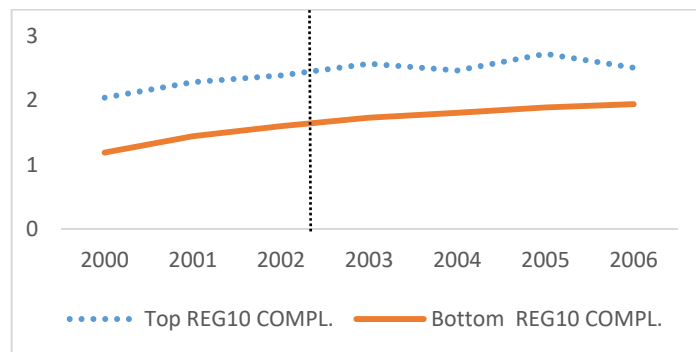


Figure A1.C: Forwards/Futures Derivatives Mentions by REG10 COMPL.

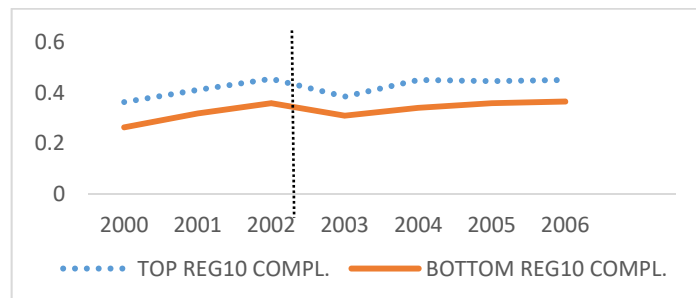


Figure A1.D: Derivatives use by REG10 COMPL.

about ECGI

The European Corporate Governance Institute has been established to improve *corporate governance through fostering independent scientific research and related activities*.

The ECGI will produce and disseminate high quality research while remaining close to the concerns and interests of corporate, financial and public policy makers. It will draw on the expertise of scholars from numerous countries and bring together a critical mass of expertise and interest to bear on this important subject.

The views expressed in this working paper are those of the authors, not those of the ECGI or its members.

ECGI Working Paper Series in Finance

Editorial Board

Editor	Mike Burkart, Professor of Finance, London School of Economics and Political Science
Consulting Editors	Franklin Allen, Nippon Life Professor of Finance, Professor of Economics, The Wharton School of the University of Pennsylvania Julian Franks, Professor of Finance, London Business School Marco Pagano, Professor of Economics, Facoltà di Economia Università di Napoli Federico II Xavier Vives, Professor of Economics and Financial Management, IESE Business School, University of Navarra Luigi Zingales, Robert C. McCormack Professor of Entrepreneurship and Finance, University of Chicago, Booth School of Business
Editorial Assistant	Úna Daly, ECGI Working Paper Series Manager

Electronic Access to the Working Paper Series

The full set of ECGI working papers can be accessed through the Institute's Web-site (<https://ecgi.global/content/working-papers>) or SSRN:

Finance Paper Series	http://www.ssrn.com/link/ECGI-Fin.html
-----------------------------	---

Law Paper Series	http://www.ssrn.com/link/ECGI-Law.html
-------------------------	---

<https://ecgi.global/content/working-papers>