# The Valuation Effects of Firm Voluntary Adoption of International Accounting Standards [*]

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## Abstract

Using a unique international setting where the effects of disclosure on firm value can be measured in a constant regulatory environment and in isolation of other confounding factors, this paper shows that firms can increase their value through their choice of accounting standards. Specifically, we document strong positive abnormal returns at the announcement of voluntary adoption of International Accounting Standards (IAS) by a sample of international firms and an economically significant reduction in long-run returns, consistent with a reduction in the cost of capital. In addition, we document a statistically significant upgrade in analyst recommendations after the IAS adoption announcement, a reduction in the implied cost of capital and some evidence of positive revisions in analyst cash flow forecasts, providing further evidence that the documented increase in firm value is primarily driven by a reduction in the cost of capital. Finally, we find that firms with lower valuations and higher growth opportunities experience greater valuation effects. These results highlight the importance of increased disclosure on minority shareholder protection.

# The Valuation Effects of Firm Voluntary Adoption of International Accounting Standards

## I. Introduction

Easley and O´ Hara (2004) demonstrate that investors demand a higher return to hold stocks with greater private information. They conclude that one important implication of their theoretical model is that firms can influence their cost of capital by their selection of accounting standards. Using a sample of international firms this paper investigates the valuation effects of the corporate decision to voluntarily adopt International Accounting Standards (IAS).[1] IAS are financial reporting policies that typically require increased disclosure and restrict the number of measurement method choices relative to the company's home country accounting standards. There is a boom in the number of firms adopting IAS either voluntarily or through a country-wide mandatory switch to IAS. For example, the European Union moved to mandatory adoption of IAS in 2005. The voluntary adoption of IAS provides a unique setting to examine the effects of increased disclosure on firm value in an otherwise constant institutional environment. Our overall results provide return-based evidence that the increased disclosure through voluntary IAS adoption leads to higher firm valuations. Our results contribute to the growing accounting literature on International Accounting Standards, but also extend and compliment the literature in both finance and accounting that links information to the cost of capital.

[1] Our use of IAS refers to all standards issued by the International Accounting Standards Committee or the committee's successor, the International Accounting Standards Board, even though the standards issued by the latter are now referred to as International Financial Reporting Standards (IFRS).

In addition to Easley and O' Hara (2004), the link between increased disclosure and firm value has been established in previous theoretical literature.[2] Barry and Brown (1985) suggest that the cost of capital is a function of "estimation risk" and argue that the better investors are able to assess the prospects of a company the lower its expected cost of capital. Lang, Lins, and Miller (2003), like others in the cross-listing literature, use Merton's (1987) investor recognition hypothesis to argue that a US listing creates value as the enhanced disclosure environment reduces the cost of following the firm. This increases investor base and, therefore, the demand for the firm's securities. Finally, there is evidence that increased voluntary disclosure can act as a positive signal of firm value [see Jovanovic 1982, Verrecchia (1983), Cantale (1996), Fuerst (1998), and Moel (1999)] and reduce the private benefits of control [see Doidge, Karolyi and Stulz (2004), Coffee (1999, 2002), Stulz (1999)].

However, while the theory that relates the level of disclosure to firm value is compelling, the empirical results are not conclusive. First, there is empirical evidence in the cross-listing literature on the relation between increased disclosure and firm value [see Lang, Lins and Miller (2003), Doidge et al. (2004) and Doidge (2004)], with the caveat that disclosure effects are difficult to separate from the other effects of cross-listing, such as order-flow migration, higher capital market integration, and increased investor base [see Miller (1999), Foerster and Karolyi (1999, 2000), Errunza and Miller (2000), Domowitz, Glenn, and Madhavan (1997, 1998)]. Furthermore, attempts to directly measure the effects of disclosure on the cost of capital are hampered by difficulties of measuring the cost of capital directly, and documenting the relation between increased disclosure and the cost of capital in settings where the information environment is already too rich (Leuz and Verrecchia (2000)). Since commitments to

[2] In a related paper, Easley, Hvidkjaer and O'Hara (2002), show both analytically and empirically that the probability of information-based trading affects asset pricing.

increased levels of disclosure in the United States are largely incremental, their economic consequences are difficult to substantiate empirically. This is not the case with international firms where in most cases increases in disclosure can have significant economic effects. For example, a number of international studies link the effects of increased disclosure to factors associated with the cost of capital, which are easier to measure empirically, such as bid-ask spreads, liquidity, analyst following, and analyst forecast accuracy [e.g., Leuz and Verrecchia (2000), Ashbaugh and Pincus (2001), Hope (2003)].

Other studies such as Botosan (1997) and Botosan and Plumlee (2002) find that increased disclosure reduces the implied cost of capital. However, Easton and Monahan (2003) indicate that there is substantial measurement error in the cross-sectional variation of implied cost of capital estimates. In a recent paper, Hail and Leuz (2006) examine the link between cost of capital and legal institutions. They find that firms in countries with more extensive disclosure requirements and stronger securities regulation, and, to a lesser extent, firms in countries with higher quality legal systems display a lower cost of capital. However, they also acknowledge that it is difficult to disentangle the marginal effects of various legal institutions, including disclosure regulation on the cost of capital, as the variables characterizing countries´ institutional characteristics tend to be highly correlated.[3] In a related study, Francis, Khurana and Pereira (2005), using a multi-country sample and CIFAR ratings for 1991 and 1993, find that firms in industries with greater external financing needs have higher voluntary disclosure levels, which lead to a lower cost of debt and equity capital. They state that a surprising result of their study is that voluntary disclosures appear to operate

[3] Hail and Leuz (2006) measure disclosure regulation at the country level using the arithmetic mean of several sub-indices scoring disclosure requirements at the country's largest stock exchange in the areas of prospectus requirements, directors' compensation, ownership structure and inside ownership, related party transactions, and contracts.

independently of country level factors in lowering the cost of capital. Our paper extends and compliments these findings in that we focus on the voluntary adoption of IAS, a pure disclosure event, while holding the legal and institutional environment constant.

Our findings contribute to the aforementioned streams of literature in three ways. First, we provide return-based evidence on the link between increased disclosure and firm value that compliments existing evidence in both the accounting and finance literatures. Second, we focus on a specific disclosure event, namely the voluntary adoption of IAS, which is of particular interest in light of their recent world-wide acceptance as a set of high quality reporting standards and the efforts to have them recognized by the US monitoring authorities. Since we examine the effects of IAS adoption on the cost of capital in a constant legal environment our research also contributes to the accounting debate on the effects of institutional factors versus accounting policies on accounting quality. Third, we provide evidence explaining the cross-sectional variation in the relation between increased disclosure and firm value. In particular, our evidence suggests that increased disclosure through IAS adoption can bond controlling shareholders to less expropriation of firm resources and can act as a positive signal on firm value.

We find strong positive abnormal returns around the adoption announcement, which are maintained in the post-announcement period. The average abnormal return in our study is very similar to the corresponding abnormal return documented in Miller (1999, table 4) around the US cross-listing announcement of firms from developed countries. In addition, we document a substantial decrease in our sample firms' long-run returns compared to the returns of a matched sample, providing further evidence of a reduction in the cost of capital. This finding is similar to the corresponding result for cross-listed firms in Errunza and Miller (2000). The fact that both of these results are similar to the ones obtained for cross-listed firms suggests that disclosure is a major

driver for the cost of capital reduction observed in US cross-listings. Furthermore, we document a statistically significant decrease in the implied cost of capital for a subsample of our firms for which data were available, an increase in the number of analysts issuing recommendations as well as a significant upgrade in their recommendations after the IAS announcement. We also find some evidence that analysts tend to positively revise their t+1 and t+2 cash flow forecasts. Overall the evidence suggests that even though cash flow effects may be partially responsible for the documented increases in firm value, the primary factor behind this increase is the reduction in the cost of capital.

We proceed to conduct additional tests to identify the factors that explain the cross-sectional variation in abnormal returns around IAS adoption. These factors relate to the signaling and bonding hypotheses as well as to the firms' information environment prior to IAS adoption.[4] We find strong evidence that firms with lower valuations as measured by Tobin's q, and higher growth opportunities as measured by growth in sales, experience higher abnormal returns. The firm's information environment prior to the announcement does not appear to explain the cross-sectional variation in abnormal returns. We also find similar results when the dependent variable is the percentage change in Tobin's q the year after relative to the year before the announcement year.

Overall the results indicate that increased disclosure has a positive, statistically and economically significant effect on firm value.[5] Our findings relate to the cross-listing literature by providing support for the argument that the increased disclosure associated with cross-listings is an important factor in the documented positive listing abnormal returns and reduction in the cost of capital. In addition, our cross-sectional results

[4] The bonding hypothesis refers to increased disclosure bonding controlling shareholders to reduced expropriation of firm resources, thus increasing investor protection.

[5] The event study results capture the market's reaction to the anticipated effects of the announcement rather than the actual effects of implementation.

suggest that the commitment to increased disclosure can serve as a signal of firm value and enhance investor protection.

The remainder of the paper is organized as follows. Section II discusses the effects of increased disclosure on firm value and derives testable empirical hypotheses. Section III describes the data and methodology and offers summary statistics. Section IV presents and discusses the empirical results of the event study and the cross-sectional regression analysis of valuation effects. Finally, section V offers concluding remarks.

## II. Hypotheses development

The connection between increased disclosure and value is made empirically by a number of studies. Studies such as Botosan (1997) and Botosan and Plumlee (2002) find that increased disclosure reduces the implied cost of capital. However, Easton and Monahan (2003) indicate that there is substantial measurement error in the cross-sectional variation of implied cost capital estimates. Hail and Leuz (2004) acknowledge this limitation and point out that their results, relating the effects of cross-listing on the implied cost of capital, should be interpreted carefully and as complementary to prior return-based studies. In a similar spirit our return-based study complements and extends prior studies that link increased disclosure to the implied cost of capital.

Other studies typically do not investigate the effects of disclosure on firm value directly.[6] A number of papers look at the effects of increased disclosure on variables that are assumed to capture the firm's information environment, such as analyst forecast accuracy and analyst following, while other papers link these latter variables to the cost of capital or firm value. For example, Lang and Lundholm (1996) show that for US firms,

[6] Exceptions are Bushee and Leuz (2005) and Greenstone, Oyer and Vissing-Jorgensen (2006) who examine the impact of increased *mandatory* disclosure on stock returns. Both studies examine this issue in a US setting and link increased disclosure to positive market reaction.

analyst following and forecast accuracy are positively related to disclosure quality, Ashbaugh and Pincus (2001) find that analyst forecast accuracy improves after international firms adopt IAS, and Hope (2003), using an international sample, finds that firm level disclosures are positively related to forecast accuracy. On the other hand, Gebhardt, Lee, and Swaminathan (2001) find that firms with more accurate forecasts enjoy a lower implied cost of capital and Lang, Lins, and Miller (2003) find that higher analyst forecast accuracy and following are associated with higher Tobin's q for firms that cross-list their shares in the US. Other papers investigate the impact of increased disclosure on variables that are linked to firm value, such as bid-ask spread, share turnover, price volatility and liquidity [e.g. Leuz and Verrecchia (2000), Bushee and Leuz (2005)]. The beneficial effects of increased disclosure on firm value are also examined in the international cross-listing literature. In particular, in the presence of information asymmetry or information incompleteness the increased disclosure associated with cross-listings can function as a positive signal of firm value [Cantale (1996)], and bond controlling shareholders to less expropriation of firm resources [Doidge et al. (2004)].

A somewhat competing view with respect to the effects of a change in accounting standards lies on the assumption that accounting quality is not so much determined by the set of accounting policies, but rather by the market forces and institutional factors that affect the incentives for the preparation of the accounting information. In particular, Ball, Robin and Wu (2003) examine a sample of firms from countries with high-quality standards, but with institutional features that give preparers incentives to issue low – quality financial reports. They find that accounting earnings quality as measured by the timely recognition of economic losses is not higher for their sample firms than code law

firm reporting.[7] However, Barth, Landsman and Lang (2005) find that after IAS adoption, there is less evidence of earnings management, more timely loss recognition and more value relevance of accounting data and provide preliminary evidence that this improvement in quality is greater for code law countries. Barth et al. (2005) also find some evidence that this improvement in accounting quality associated with IAS adoption may be related to decreases in the cost of capital, in line with recent evidence linking accounting earnings quality to the cost of capital [Francis, LaFond, Olsson, and Schipper (2004), Bhattacharya, Daouk and Welker (2003)]. In addition, Leuz and Verrecchia (2000) and Bartov, Goldberg and Kim (2004) find positive economic effects related to the use of International Accounting Standards by German firms, even though Germany is lacking effective supervisory and enforcement authorities. We further contribute to this debate by examining the effects of accounting disclosure on firm value in a constant enforcement and legal environment.

We evaluate the impact of increased disclosure on firm value by examining the abnormal returns international firms earn at the announcement of voluntary IAS adoption. IAS are a set of accounting standards promulgated by the International Accounting Standards Board (previously, the International Accounting Standards Committee) which is committed to developing a set of high quality standards increasing the transparency, comparability and convergence of accounting information around the world. In 2000, after the successful completion of a core set of standards the International Organization of Securities Commissions (IOSCO) issued a recommendation to its members to allow the use of IAS by issuers in cross-border offerings. In 2005 all publicly listed European firms had to adopt IAS for financial reporting purposes. Research in the area provides further evidence on the superiority of

[7] See also Ball, Kothari and Robin (2000), Hung and Subramanyan (2004), Eccher and Healy (2003) who also provide evidence that properties of accounting earnings may be affected by institutional factors rather than the quality of accounting standards.

IAS compared to local accounting systems and suggests that IAS is of comparative quality to US GAAP [Ashbaugh and Pincus (2001), Barth et al. (2005), Ding, Hope, Jeanjean and Stolowy (2005), Leuz (2003)]. Given that IAS adoption constitutes an enhancement in the firm's information disclosure and given the theoretical evidence that links increased disclosure to firm value we expect positive abnormal returns around the announcement of IAS adoption.[8]

*H1: There are positive abnormal returns around the announcement of IAS adoption.*

We proceed to investigate which firms benefit more from the voluntary adoption of IAS, by identifying factors that could explain the cross-sectional variation in abnormal returns. To achieve this we propose three hypotheses relating the effects of signaling, investor protection and the firm's prior information environment to firm value.

First, a firm's voluntary commitment to increased levels of disclosure well into the future can signal that the firm is of high value. Jovanovic (1982) and Verrecchia (1983) provide analyses in which disclosure has a fixed cost and show that the fixed disclosure cost creates a threshold level of disclosure, so that only firms with sufficiently high values will disclose. Further evidence in support of increased disclosure acting as a signal of firm value can be found in the international cross-listing literature. Cantale (1996), Fuerst (1998), and Moel (1999), who develop models based on information asymmetry or information incompleteness, find a signaling equilibrium where firms that cross-list in markets with high disclosure standards convey that they are high value firms. In a similar vein, a firm that commits to increased disclosure through IAS reporting could signal that it is a high value firm. While the adoption of IAS is voluntary, the additional disclosures are mandatory once the firm has committed to IAS. Leuz and Verrecchia (2000) argue that IAS compliance necessitates changes in the firm's accounting system

[8] The degree of enhancement in the firm's information environment depends on the firm's country of origin and the quality of home country accounting and disclosure rules.

that are not easily reversed. Furthermore, as Siegel (2005) suggests, the prospect of a positive reputational effect can lead firms to observe rules that they are not forced to follow. This could provide strong incentives for firms to commit to IAS despite lack of enforcement. Whether the announcement of the switch is a strong enough commitment to be a positive signal remains an empirical question. Therefore, the positive abnormal returns we expect at the announcement of the switch to IAS can be associated with this positive signal. The signal will be less powerful for firms that already enjoy high valuations as this reflects the market's prior knowledge of their better type. Thus, we expect abnormal returns to be higher for firms that are undervalued prior to the IAS switch.

*$H_2$: Other things being equal, the greater a firm's undervaluation prior to the IAS adoption announcement, the higher the abnormal return.*

La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) conjecture that high quality accounting could mitigate the negative effects of weak investor protection on the development of financial markets. This relates to the bonding hypothesis in the international cross-listing literature proposed by Doidge et al. (2004), which is based on Coffee (1999, 2002), Stulz (1999) and Reese and Weisbach (2002). This hypothesis posits that both the increased disclosure associated with a US cross-listing and the increased monitoring from US laws and regulations bond controlling shareholders to less expropriation of firm resources. In fact, the role of increased disclosure in bonding is emphasized more than the role of US laws and regulations. Siegel, (2005) suggests that even without effective law enforcement the voluntary disclosure associated with cross-listings enables firms to effectively bond themselves by building their reputation. In addition, the extent to which US laws and regulations provide an effective bonding mechanism is limited. First, the recovery of damages awarded to shareholders by US courts is contingent upon the size of the assets held by the firm in the US [Siegel,

(2005)]. Second, foreign firms listed in the US do not reincorporate in a US state limiting the efficiency of corporate governance mechanisms which largely depend on the State's corporate law [Doidge, Karolyi and Stulz, (2004)]. Therefore, the increased disclosure associated with the voluntary adoption of IAS can be related to an increase in shareholder protection and a reduction in cash flow expropriation by controlling shareholders, even in the presence of lax enforcement.

Doidge et al. (2004) show that it is costly for controlling shareholders to relinquish control through the increased disclosure and monitoring associated with cross-listing and that they would do so in the presence of high growth opportunities, which can only be financed externally. They develop testable hypotheses regarding the bonding and monitoring benefits of cross-listing. In the same spirit we propose that the increased disclosure resulting from IAS adoption can be associated with similar bonding benefits. Specifically, given the country level of shareholder protection we expect the abnormal return to increase with the value of growth opportunities. Firms with higher growth opportunities can benefit more from the increased investor protection associated with increased disclosure not only through the reduced cash flow expropriation by controlling shareholders, but also from the fact that these growth opportunities can now be attained as external financing will be more readily available. Consistent with the latter argument, Reese and Weisbach (2002) find evidence of increased equity issuance at home after cross-listing in the US because minority shareholders are better protected; Ashbaugh (2001) finds that firms are more likely to report IAS financial information when they participate in seasoned equity offerings; and Ashbaugh and Pincus (2001) find that firms tend to issue share capital in the year of or year after IAS adoption.

*$H_3$: Other things equal, the higher the growth opportunities prior to the IAS adoption announcement, the higher the abnormal return.*

The information environment prior to the adoption of IAS both at a country level as dictated by local accounting standards and at the firm level as dictated by other firm specific characteristics can vary across firms. [9] Therefore, the impact of IAS adoption on firm value can be associated with the firm's information environment prior to the announcement of IAS adoption. The better the firm's information environment prior to IAS adoption, the lower the incremental benefit of the additional disclosures and hence, the lower the abnormal returns.

*$H_4$: Other things equal, the poorer the information environment prior to the IAS adoption announcement, the higher the abnormal return.*

## III. Data and methodology

### *IIIa. Price reaction to the announcement of voluntary IAS adoption*

#### *Data*

To construct our sample we first identify 564 firms from Global Vantage reporting the use of IAS for at least one year in the period 1989-1999. We also identify an additional 53 firms from the International Accounting Standards Board website not included in the Global Vantage initial sample. The IASB list includes firms which used IAS for financial reporting purposes for fiscal years ending in 1999/2000.

From the Global Vantage initial sample we keep firms with a change from domestic GAAP to IAS in the period and a voluntary IAS adoption based on their country of domicile. Specifically, we eliminate firms from countries with mandatory use of IAS as well as firms that report the use of IAS for the whole period. These constraints result in a total of 140 firms. Similarly, we eliminate 22 firms from countries with mandatory use of

[9] For example, Ashbaugh and Pincus (2001) find that for the period before IAS adoption analyst forecast accuracy is lower the greater the difference between home GAAP and IAS.

IAS from the IASB supplementary list of firms. Thus our total initial sample consists of 171 firms with voluntary use of IAS.

We then search for announcement dates for each of the 171 firms from *Lexis-Nexis* and *Factiva* and by directly contacting the firms (whenever possible) through electronic mail. We search the text and headlines of *Lexis-Nexis* and *Factiva* articles using the company name and the key words IAS, International Accounting Standards, switch, adoption and announcement.[10] In addition, to ensure that the firm selection procedure does not erroneously eliminate any firms, we also search for announcements in our sample period using the aforementioned general search criteria without specifying company names. We keep firms that have identifiable announcement dates of IAS adoption and the necessary daily price data on the underlying stock and its national market index from *Datastream International*. In case of multiple announcements, we use the earliest clear announcement.

There are a total of 54 firms that meet the above criteria. Panel A of table 1 reports the number of companies in each of the countries that appear in our sample. The sample spans six countries, with Germany and Switzerland more heavily represented. Panel B of the same table reports the industry classification (2-digit SIC) for our sample firms. All major groups (1-digit SIC) are represented in the sample except for the services and public administration groups.[11]

[ INSERT TABLE 1]

[10] Most of the announcements came from Reuters News Service, Dow Jones International News, AFX News, the Financial Times, and the Regulatory News Service. Others came from such sources as the Financial Times, the Independent, Agence France-Presse, and PR Newswire.

[11] We run the cross-sectional analysis excluding financial firms and qualitative results do not change.

The majority of announcements, 36 out of 54, came after 1996, as opposed to 18 in the period from 1989 through 1996.[12] IAS have been continuously revised and improved through the years. Yet, even in the early part of our sample period we expect that IAS would provide significant information benefits compared to local GAAP. In 1987 the IASC (International Accounting Standards Committee) initiated the comparability project which was completed in 1993 with the adoption of 10 revised standards. Ashbaugh and Pincus (2001) document a significant increase in analyst accuracy after the voluntary adoption of IAS in the years 1990-1993, consistent with IAS exhibiting significant informational advantages to local GAAP during this period.

*Methodology*

We use a standard event study methodology to measure the changes in share value around the announcement of voluntary IAS adoption. One of the advantages of event studies with a short event window is that it mitigates the possibility that a firm characteristic or event, other than the increase in disclosure, is related to the stock price reaction. To measure abnormal returns we estimate a market model for each firm using local currency daily returns. As a proxy for the market return we use the market index for each country from *Datastream*. Denoting the announcement day as day 0, the OLS market model coefficients are estimated in a pre-announcement period (day -150 to day -26). Abnormal returns from day -25 to day +150 are then calculated as the prediction errors from the OLS market model. Abnormal returns are averaged across firms to form the mean abnormal return. A t-test is used to test the null hypothesis of no abnormal performance.

Furthermore, in order to assess the long-run effects of IAS adoption we estimate the change in weekly excess returns over a four-year period around the announcement

[12] One company in our sample which was listed on IASB website as using IAS in 2000 when contacted returned an announcement date in year 2003. Both the event study and cross-sectional results hold when this observation is eliminated.

using a matched sample long horizon methodology similar to the one in Errunza and Miller (2000)[13]. More specifically, we compute the excess returns of our sample firms relative to the returns of a control sample, matched on country, industry and size.[14] As in Errunza and Miller (2000) we break up the period into three sub-periods. The pre-announcement period spans weeks -104 to -7, the post-announcement period spans weeks 7 to 104, while the revaluation period includes weeks -6 to +6, to allow for possible information leakage regarding the IAS switch.

*IIIb. Cross-sectional analysis*

*Data and methodology*

Hypothesis 2 posits that the market's reaction to the announcement is positively related to the firm's undervaluation prior to the announcement, while hypothesis 3 positively links the firm's growth opportunities with announcement abnormal returns. We proxy for a firm's valuation prior to the announcement by Tobin's q, TOBINS_Q, computed at the end of the fiscal year prior to the announcement year. Tobin's q has been used extensively in the literature as a valuation proxy [see, Doidge, Karolyi and Stulz (2004), Lang, Lins and Miller (2003)]. Tobin's q is a measure of the firm's valuation and does not necessarily capture the relative valuation of the firm compared to its fundamental value. Hence, a low Tobin's q may not indicate undervaluation but to the extent that it does, then Tobin's q should be negatively related to abnormal returns. As in Doidge et al. (2004), Tobin's q is measured as the ratio of the market value of equity less the book value of equity plus the book value of assets divided by the book value of

[13] Kothari and Warner (1997) and Barber and Lyon (1996) find that benchmarking performance by a matched firm approach yields well-specified test statistics for detecting long run excess performance avoiding the bias test statistics resulting from using a reference portfolio.

[14] We used a 2-digit SIC code to match on industry but if no match was found we used 1-digit SIC. We were able to match 51 of our 54 firms based on the above criteria.

assets.[15] Table 2 presents summary statistics for all the variables used in the analysis. The average Tobin's q in our sample is 1.35 with a standard deviation of 0.68.[16]

We proxy for growth opportunities using average growth in sales for the two years prior to the announcement fiscal year. Sales growth has been used by Doidge, Karolyi and Stulz (2004) in testing the bonding hypothesis in cross-listings. Our sample firms exhibit on average sales growth, SALES_GR, of 14.14% with a standard deviation of 0.239. The data used to compute Tobin's q and sales growth are obtained from *Datastream/Worldscope.*

[INSERT TABLE 2]

The market's assessment of a firm's growth opportunities and their valuation is also reflected in the measure of Tobin's q. The signaling hypothesis states that the lower the market's assessment of a firm's value the greater the benefit of IAS adoption as a signal of high value. However, differences in Tobin's q across firms can also reflect differences in the magnitude of growth opportunities as well as differences in the discounting of their value by the market due to variation in controlling shareholders' ability to expropriate firm resources. This, unavoidably, links the relation between Tobin's q and abnormal returns to the bonding hypothesis as well. The direction of the relationship however, is not clear. If the variation in Tobin's q reflects differences in the magnitude of growth opportunities then the bonding hypothesis predicts that firms with higher growth opportunities (higher Tobin's q) will experience higher abnormal returns. On the other hand, if the variation in Tobin's q reflects differences in the discounting of

[15] Cross-country differences in Tobin's q may be affected by differences in accounting practices in the valuation of assets. To address this concern, we run the cross-sectional regressions including only Germany and Switzerland as their accounting practices are very similar. The results with respect to Tobin's q are similar to those reported. In addition, the model controls for cross-country accounting differences.

[16] The average Tobin's q in our sample (1. 35) is similar to the average Tobin's q reported by Doidge et al. (2004, table 1), for non-cross-listed firms across forty countries (1.33) and slightly lower than their average across the 6 countries in our sample (1.499).

growth opportunities due to greater controlling shareholder expropriation, then the bonding hypothesis predicts that firms with higher discounts (lower Tobin's q) will experience higher abnormal returns.

Since the bonding hypothesis is consistent with both a negative and a positive sign on Tobin's q, while the signaling hypothesis predicts a negative sign, we can not isolate the effects of signaling from those of bonding when the sign on Tobin's q is negative.[17] On the other hand, the sales growth variable can be used to solely test the bonding hypothesis, which predicts that firms with higher sales growth will experience higher abnormal returns at the announcement of IAS adoption.

Hypothesis 4 predicts that abnormal returns will be negatively associated with the quality of the firm's information environment prior to the announcement of IAS adoption. We measure the effects of the information environment on the announcement abnormal returns using four variables that proxy for the richness of the information environment prior to the announcement. First, we measure the information environment on a country level using the country coding scheme developed by Gray (1988), which classifies countries based on their level of transparency. Specifically, we construct a dummy variable, D_IAS, that takes the value of 1 for countries that are classified by Gray as secretive (Germany, Switzerland, Turkey and Austria) and 0 for countries that are more transparent (South Africa and Denmark). As an alternative proxy, we use the accounting standards variable obtained from La Porta et al. (1998), ACC_STDS. This variable is an index that ranges from 0 to 90 with higher scores indicating a better disclosure environment.

Secondly, we follow prior research by Lang and Lundholm (1996), Healy, Hutton, and Palepu (1999), Gebhardt, Lee, and Swaminathan (2001), and Lang, Lins, and Miller (2003) and use analyst following, FOLL, and forecast accuracy, ACCU, as proxies for

[17] Signaling effects are difficult to isolate empirically in the cross-listing literature as well.

the information environment at the firm level. Analyst forecast and actual earnings data are obtained from the *IBES* International detail history database. For the computation of the variables we use forecasts made for the fiscal year ending prior to the announcement year. In addition, only forecasts made during this fiscal year are kept. Finally, for analysts with multiple forecasts we keep only the most recent forecast issued. If an analyst's code is not displayed then the elimination of multiple forecasts is made using the brokerage code.

We measure analyst following, FOLL, as the natural logarithm of the number of analysts (or brokerage firms) issuing at least one forecast in the period. The mean number of analysts following a firm in our sample is 12.8, ranging from a minimum of 0 to a maximum of 39 with a standard deviation of 10.9. We measure analyst forecast accuracy, ACCU, as the absolute value of the difference between actual earnings for the year and the median forecast. This difference is deflated by beginning price and multiplied by -1 so that greater values reflect greater accuracy. The mean forecast accuracy in our sample is -0.0327 with a standard deviation of 0.0546.

Since our firms come from six different countries, in our empirical analysis we control for the quality of investor protection in the home country. Following other studies, we proxy for investor protection using two variables taken from La Porta et al. (1998). Anti-director rights, ANTI_DIR, is an index that ranges from 0-6 with higher values reflecting more rights and better protection of minority shareholders. Judicial efficiency, EFFIC, is an index that ranges from 0-10 with higher scores reflecting higher levels of efficiency, which proxies for the quality of enforcement of investor rights. In addition to controlling for the home country's quality of investor protection, we control for firm size, SIZE, which is computed as the natural logarithm of the firm's total assets measured in US dollars at the end of the fiscal year prior to the announcement year. Data for this variable are obtained from *Datastream*.

We run the following cross-sectional model:[18]

$$AR = a + \beta_1 TOBINS\_Q + \beta_2 SALES\_GR + \beta_3 D\_IAS + \beta_4 FOLL + \beta_5 EFFIC + \beta_6 ANT\_DIR + \beta_7 SIZE + \varepsilon \quad (1)$$

where, *AR* is the 2-day (0,1) abnormal return for firm i around the announcement of IAS adoption as described in section *IIIa*. All other variables are defined above.

As an additional robustness test of the valuation effects of IAS adoption we re-run equation (1) with the percentage change in Tobin's q around the announcement year as the dependent variable[19], measured as follows:

$$\Delta TQ_{t+1} = [TQ_{t+1} - TQ_{t-1}] / TQ_{t-1},$$

where, t is the announcement year. Tobin's q (TQ), as in Doidge, Karolyi and Stulz (2004), represents a long-run valuation proxy as opposed to the abnormal return variable used above.[20]

## IV: Results

### *IVa: Event Study Analysis*

This sub-section provides the results of empirical tests around the event of the announcement of voluntary IAS adoption. In addition to the short-run and long-run return-based event studies discussed in the methodology section we conduct an analysis of the change in analyst following, the change in recommendation values, the change in the implied cost of capital and cash flow forecast revisions around the event.

[18] Firm subscripts are dropped for ease of exposition.

[19] Here we regress growth in Tobin's q on the initial value of Tobin's q among other variables. In the empirical economic growth literature we often find regressions of economic growth on initial income, see for example, Mankiw, Romer, and Weil (1992).

[20] The measurement of TQ in t-1 will be based on home GAAP while the measurement of TQ in t+1 may be based on IAS if the firm implemented the adoption of IAS by that point in time. Thus, this potential difference in the accounting measurement rules will also inherently affect the measurement of the dependent variable. Even though extant research suggests that IAS adoption is more likely to reduce Tobin's q at least for German firms (Hung and Subramanyan (2005), we would still like to draw the attention of the reader to this potentially confounding factor.

Table 3 presents mean daily abnormal returns and cumulative abnormal returns for the 50-day period surrounding the announcement of IAS adoption. Figure 1 summarizes the evidence by plotting cumulative abnormal returns.

[INSERT TABLE 3]

Consistent with the main hypothesis of the paper, $H_1$, that voluntary IAS adoption increases firm value and reduces the cost of capital, abnormal returns around the announcement period are positive and significant. Between days -1 to +1 firms announcing the voluntary adoption of IAS experience a positive abnormal return of 0.88%, which is significantly different from zero at the 10% level, whereas for days 0 and +1 the cumulative abnormal return is 0.95%, statistically significant at the 2% level. The day -1, day 0, and day +1 abnormal returns are -0.08% (t=-0.26), 0.65% (t=2.48), and 0.30% (t=1.04), respectively. The percentage of non-negative values for days -1, 0 and +1 is 45.28%, 59.26%, and 50%, respectively, of which only the day 0 value is statistically significant at the 5% level.

Furthermore, figure 1 reveals that the increase in share value around the announcement date is maintained in the 150-day period after the announcement. The cumulative abnormal return between day +2 and day +150 is 1.1% (t=0.22). The event study results provide strong evidence in support of the argument that increased disclosure is associated with a reduction in the firm's cost of capital.

[INSERT FIGURE 1]

Table 4 reports the results from the long-run event study using weekly returns.[21] It presents cumulative returns for the pre and post announcement periods as well as for the revaluation period for the sample firm, the control firm and the difference in returns between the two samples (excess returns). The analysis of the revaluation effect shows

[21] The sample does not include two firms that announced their intention to list in the US with the IAS adoption announcement. See section *IVd* for a more detailed analysis of the announcements and additional robustness checks.

that for the sample firms the revaluation occurs in the period covering weeks 0 to 6 as evidenced by the significantly positive cumulative excess return of 2.77% (annualized 20.58%, p-value=0.05). No such effect is observed for the control firms. It also appears that there is no information leakage prior to the announcement as the -6:-1 week cumulative return difference is not significant.

[ INSERT TABLE 4 ]

During the pre-announcement period both sample and control firms exhibit positive and statistically significant returns at the 0.01 level. Similarly, in the post-announcement period cumulative returns for both samples are positive and significant at the 0.05 level.[22] However, the sample firm returns decrease significantly in the post-announcement period by 24.91% (p-value 0.04), while the control firms exhibit a smaller decrease of 4.98% that it is not statistically significant (p-value=0.64). In addition, excess returns are positive and significant in the pre-announcement period (15.99% cumulative return, 8.48% annualized) but are negative and not significant in the post-announcement period (-3.93% cumulative return, -2.08% annualized). The difference between excess returns in the pre vs. post announcement periods is -19.93% (annualized -10.58%) with a significance level of 13%. This evidence is consistent with a long-run reduction in the cost of capital. Figure 2 plots the cumulative excess returns per sub-period examined in the four year sample period. Results exhibit a sharp increase in returns in the 7-week period starting with the announcement week, indicating

[22] Our results are very similar to those reported in Errunza and Miller (2000) in a number of ways. First, in the pre-announcement period sample firms exhibit higher returns than the control sample with the difference being statistically significant (the annualized return in Errunza and Miller (2000) for the sample and control firms is 26.8 and 16.55, respectively). In addition, in the post-announcement period sample firms experience a greater decrease in returns than their matched counterparts with the control firms exhibiting higher returns than the sample firms (the annualized return in Errunza and Miller (2000) for the sample and control firms is 9.98 and 11.04, respectively).

increases in price as the cost of capital falls and a decrease in excess returns in the post-announcement period consistent with a lower cost of capital.[23]

[INSERT FIGURE 2]

*IVb: Additional tests*

The theory presented in the paper mainly supports the expectation of a reduction in the cost of capital stemming from the anticipated reduction in information asymmetry from the adoption of higher quality accounting standards. We also propose in this paper that possible reasons for the voluntary adoption of IAS relate to the signaling and bonding benefits that the firm will enjoy. If signaling and bonding benefits are realized the firm should also experience increases in future cash flows. Thus, even though the results of the long-term return analysis provide evidence on the cost of capital effect and in fact are consistent with a reduction in the cost of capital, the increases in firm value documented in the event study are consistent with both an expected decrease in the cost of capital and expected increases in future cash flows. In this part of the paper we try to disentangle the two effect of the two factors affecting firm value.

First, we look at the change in analyst activity around the announcement of IAS adoption. Specifically, we compute the change in the number of analysts issuing recommendations, the change in the value of the recommendations issued, and analyst revisions of cash flow forecasts around the adoption announcement. We obtain recommendation data and cash flow forecasts from the *IBES* International Detail Database. IBES codes recommendations on a scale of 1 to 5 with lower values indicating stronger recommendations. We conducted the analysis for two periods, a 90-day and a 180-day period before and after the announcement, respectively.[24]

[23] Results are qualitatively unchanged when the pre- and post-announcement windows are reduced to -104 to -9 and 9 to 104 weeks, or extended to -104 to -5 and 5 to 104.

[24] In cases of multiple recommendations per analyst in each sub-period we keep the one closest to the announcement.

Table 5 reports the results. Panel A reports the results on analysts following and recommendations. We find that the number of analysts per firm issuing a recommendation increases after the announcement of IAS adoption by an average of 1.26 (1.16), which is significant at the 1% (11%) level for the 90-day (180-day) period around the announcement. The Wilcoxon sign rank test on the number of positive following changes is consistent with these results. This evidence is consistent with extant research showing that analysts tend to follow firms with better disclosure practices [Lang and Lundholm, (1996)].

Furthermore, the change in the recommendation value per analyst for both the 90-day and 180-day periods is negative (-0.44 and -0.36, respectively) and statistically significant (p-value= 0.06 and 0.02, respectively), indicating that after the announcement analysts upgrade their firms, as IBES represents more favorable recommendations with lower values. The Wilcoxon sign rank test on whether the recommendation change is negative supports this result. Analyst recommendations indicate the analyst's assessment of anticipated changes in short term firm value. "Buy" recommendations for example are consistent with the expectation that firm value will increase in the near future. Hence, the evidence presented in panel A of table 5 is consistent with analysts reacting positively to the announcement and valuing their firms higher, providing further support for the valuation effects of increased disclosure.

Panel B of the same table reports the results on cash flow forecasts. The results suggest that the observed increase in firm value around the adoption announcement and the upgrade in analyst's recommendations is to some extent driven by positive revisions in future cash flow expectations. In the 180-day window around the announcement analysts positively revise their one, two and three year-ahead cash flow forecasts by 0.8%, 0.9% and 1.6%, respectively, but none of these changes is statistically significant at conventional levels. In the 90-day window the revision in the two-year ahead cash

flow forecasts is positive and significant at the 2% level while the sign rank test indicates that the percentage of positive revisions of cash flow forecasts for years t+1 and t+2 is statistically significant.

Finally, panel C of the same table shows the results for the implied cost of capital computations.[25] To compute firm cost of capital we followed the method in Hail and Leuz (2006) which is explained in greater detail in the Appendix. Specifically, we compute cost of capital based on two models, namely the Claus and Thomas (2001) and the Ohlson and Juettner-Nauroth (2005). The results suggest that our sample firms experienced a reduction in their cost of capital after the adoption announcement. Specifically, based on the Ohlson and Juettner-Nauroth (2005) model the change in the cost of capital from year t-1 to year t and t+1 is negative and significant at the 0.07 and 0.01, respectively. The Claus and Thomas (2001) model shows that even though there is no reduction in the cost of capital from year t-1 to t, the reduction from year t-1 to year t+1 is negative and statistically significant at the 0.01 level.

Overall, results suggest that the increase in firm value obtained at the announcement of the switch is mostly related to a decrease in the cost of capital and to a lesser degree due to increases in future cash flow expectations.

[INSERT TABLE 5]

The finding that a firm's voluntary decision to adopt IAS is associated with a reduction in the cost of capital as evidenced by a significantly positive abnormal return around the event and an economically significant reduction in long-run cumulative excess returns, provides empirical support for the theoretical model of Easley and O'Hara (2004, p.1578), who state that: "An important empirical implication of our research is that firms can influence their cost of capital by affecting the precision and

[25] Due to the extensive data requirements for these tests the sample size is reduced.

quantity of information available to investors. This can be accomplished by the firm's selection of its accounting standards, as well as through its corporate disclosure policies".

Our findings also relate to the international cross-listing literature. Foerster and Karolyi (1999) and Miller (1999) document positive abnormal returns for non-US firms that announce the intention to list on a US exchange as American Depository Receipts (ADRs). Errunza and Miller (2000) find a substantial decline in a firm's cost of capital after cross-listing on a US exchange. One of the explanations for why cross-listing on a US stock exchange increases firm value is the improvement in the firm's information environment. This improvement in the information environment can come from various sources, such as increased enforcement by the Securities and Exchange Commission, a stricter litigation environment, and enhanced disclosure through the use of US GAAP.[26] However, it is also well documented that cross-listing valuation effects are associated with a number of other factors as well, such as capital market segmentation, and changes in liquidity. Market segmentation effects can stem from changes in ownership restrictions that might result from the cross-listing event [see Foerster and Karolyi (1999) and Domowitz, Glenn, and Madhavan (1997) and Miller (1999)]. Liquidity effects are associated with the reduction of trading costs through listing in a more "liquid" exchange and through intermarket competition as well as from order-flow migration [see Domowitz, Glenn, and Madhavan (1998)]. Therefore, while it is possible that the abnormal returns and the reduction in the cost of capital documented in the cross-listings literature are at least partially associated with improvements in the information environment it is hard to separate the effects of other factors (i.e., market segmentation and liquidity) from the effects of the improvements in the information environment. There are simply too many concurrent effects.

[26] See Coffee (2002).

Our results indicate the importance of the information environment in general, and enhanced disclosure through IAS adoption in particular, on firm value. Specifically, we document a more direct valuation effect of increased disclosure, through the voluntary adoption of IAS, without the confounding effects of market segmentation and liquidity discussed above. In addition, these results are obtained when only the level of disclosure changes while enforcement, monitoring and legal systems remain unchanged. Interestingly, we document a 0.88% cumulative abnormal return for the three-day period around the announcement of voluntary IAS adoption, lower than the 1.15% corresponding abnormal return documented in Miller (1999, Table 4) around the US cross-listing announcement for his full sample, but similar to his corresponding abnormal return for firms from developed markets (0.87%). We also document a reduction in annualized excess returns from 8.48% in the pre-announcement period to -2.08% in the post-announcement period compared to the reduction from 10.25% to -1.06% in the corresponding periods around cross-listings in Errunza and Miller (2000).[27]

*IVc: Cross-sectional analysis*

Table 6 presents correlations among the variables used in equation (1). The abnormal returns are negatively related to the efficiency of the judicial system (-0.33, p-value=0.02), and Tobin's q (-0.23, p-value=0.10), and positively related to sales growth (0.23, p-value=0.12).

[INSERT TABLE 6]

[27] Note that Errunza and Miller (2000) use monthly excess returns and a six year period around the cross-listing event.

The cross-sectional regression results are presented in table 7.[28] The dependent variable is the 2-day (0,1) abnormal return.[29] The first three columns test each hypothesis separately, column 4 combines hypotheses 2 and 3 while the last column tests all three hypotheses together. In all versions we control for firm size, the efficiency of the judicial system and anti-director rights. The table presents coefficient estimates with corresponding p-values shown underneath as well as the number of observations used in each version along with the F-statistic and adjusted $R^2$. The table includes two panels. Panel A uses the maximum number of observations available for each model, while panel B presents results keeping the number of observations constant across models at 44, which is the number of observations available in the full model (model 5) in panel A. Most models exhibit significant explanatory power as indicated by the F-test and have adjusted $R^2$s up to 21%. All tests of statistical significance are based on White (1980) standard errors. In the discussion below we only analyze the results in panel A as the results in panel B are very similar.

[INSERT TABLE 7]

Overall, we find evidence in support of the signaling and bonding hypotheses. The coefficient on TOBINS_Q is always negative, consistent with hypotheses 2 and 3, and ranges from -0.0088 to -0.0186. It is statistically significant at the 0.01 level in all versions of the model except in model 1. This finding indicates that firms with lower Tobin's q benefit more from the increased disclosure resulting from IAS adoption. This is

[28] Selection bias may be present in cross-sectional regression models through the relation between the degree of anticipation of the event and firm characteristics. Prabhala (1997) however, shows that under weak conditions the traditional linear regression (OLS approach) can be used for inferences and the t-statistics can be interpreted as lower bounds of the true significance levels of the parameter estimates.

[29] Based on the results presented in table 3 the market does not seem to anticipate the announcement, as evidenced by the negative and insignificant abnormal return on day -1. We thus use the 2-day (0,1) abnormal return for the cross-sectional regressions which is significant at the 0.05 level as opposed to the 3-day (-1,0,1) abnormal return which is significant at the 0.10 level. Nevertheless, we have also run the analysis using the 3-day return window. Tobin's q remains negative and statistically significant, while sales growth remains positive, but no longer significant at conventional levels. This is expected as extending the event window can result in significant loss of power [Campbell, Lo and MacKinlay (1997), p.175-176].

consistent with the announcement of IAS adoption being a positive signal of firm value and also being more beneficial for firms with greater expropriation of firm resources by controlling shareholders. The fact that the coefficient on TOBINS_Q is negative and significant after controlling for the bonding effect, captured by SALES_GR, provides further support for the signaling hypothesis.[30]

The coefficient on SALES_GR is positive, consistent with hypothesis 3, and statistically significant in all versions at the 0.05 level or better. This indicates that firms with higher growth opportunities benefit more from IAS adoption. Better disclosure enables the firm to better exploit these growth opportunities and reduces the fraction of firm cash flows expropriated by controlling shareholders. The coefficient on SALES_GR ranges from 0.00419 to 0.0564.

With respect to hypothesis 4, neither of the variables capturing the information environment prior to the IAS announcement, FOLL or D_IAS, is statistically significant.[31] This evidence is consistent with the results of Botosan and Plumlee (2002), who find that increased disclosure reduces the cost of capital irrespective of the level of analyst following. In addition, in results not tabulated, we included in the model analyst forecast accuracy instead of following and also together with following in the full model (column 5). Accuracy is not significant, while the results on the other variables are similar to those reported.

The investor protection variables, EFFIC and ANTI_DIR, are negatively related to returns. However, only the efficiency of the judicial system variable is significant at the

[30] To mitigate possible concerns that the Tobin's q result can be explained by an omitted risk factor in the sense of Fama and French (1992) we estimate the cross-sectional regressions reported in table 7 using four random 2-day windows (-25:-24; -15:-14; +14:+15; +24:+25) away from the event. If Tobin's q proxies for other risk factors it should explain the cross-sectional variation in abnormal returns irrespective of the window around which returns are measured. However, Tobin's q is not significant in any of these models.

[31] We have also used the La Porta et al. (1998) Accounting Standards variable instead of D_IAS and the results are very similar to the ones reported. The two variables are highly correlated, with a correlation coefficient of -0.81, as shown in table 5.

0.05 level in column 3. The investor protection variables exhibit small variation across our sample firms reducing the power of the test thus making it difficult to draw strong inferences from these variables. Finally, firm size is negatively related to abnormal returns in all versions, but is statistically significant at the 0.04 level only when all variables are included in the regression. [32]

Table 8 presents the results when the dependent variable in equation (1) is the percentage change in Tobin's q ($\Delta TQ_{t+1}$). In the first column we run the model with Tobin's q and sales growth, controlling for size. The model in column 2 includes as additional control variables the investor protection variables, while column 3 presents the full model, corresponding to model 5, in table 7. The coefficient on Tobin's q is negative and statistically significant at the 0.01 level, whereas the coefficient of sales growth is positive and significant at the 0.10 level in all three models. The negative coefficient on Tobin's q indicates that the lower the level of Tobin's q prior to the announcement year the higher the increase in firm value the year after the announcement. In addition, the positive coefficient on sales growth indicates that the higher the growth opportunities the year prior to the announcement year, the higher the growth in firm value. These results reinforce our previous finding that firms with higher growth opportunities and lower valuations benefit more from the increased disclosure associated with IAS adoption.[33]

[INSERT TABLE 8]

The results of this paper corroborate the evidence found in the cross-listing literature regarding the valuation effects of the increased disclosure associated with the cross-listing decision. In the previous section we document significant valuation effects

[32] We have re-run the tests after eliminating outliers based on the studentized residual at the ± 2.5 level. Results do not change qualitatively. We also run the analysis excluding Turkey, the only emerging market in our sample, and qualitative results do not change.

[33] Results when the dependent variable is the percentage change in Tobin's q from the year before the adoption announcement to the year of the announcement are similar.

around the announcement of IAS adoption, both in the short-run and the long-run, and relate them to the valuation effects documented in the cross-listing literature. The results in this section corroborate the evidence in the event study, which suggests that increased disclosure increases firm value. By looking at announcements of IAS adoption we are able to measure the benefits of information disclosure in isolation and relate them to the signaling and bonding hypotheses. In general, the results of the cross-sectional analysis suggest that increased disclosure alone can be sufficient to bond controlling shareholders to less expropriation and can serve as a signal of firm value.

*IVd: Additional Robustness tests*

In order to examine whether the IAS announcements contain other information that can potentially confound the results we searched our 54 announcements looking for either concurrent earnings or US cross-listing announcements. We identified 5 announcements with earnings information and 2 with a US cross-listing announcement, neither of which involved SEC registration. Excluding these 7 observations does not qualitatively change the results. Specifically, the abnormal return on day 0 and day +1 is 0.59% (p-value 0.04) and 0.19% (p-value 0.54), respectively. We have also examined the sensitivity of the cross-sectional results by first, including in the models reported in table 7 (panel A), the level of unexpected earnings computed as the difference between actual earnings for the fiscal year ending before the announcement less the consensus analyst forecast deflated by beginning stock price. Results are qualitatively unchanged. This provides further assurance that the abnormal returns documented in the event study are not associated with earnings surprises. Finally, we have also examined the sensitivity of the cross-sectional analysis by excluding the two observations that

announced both a change in financial reporting standards and the intention to list in the US. Results again remain qualitatively unchanged.

## V. Conclusion

This paper investigates the valuation effects of the corporate decision to voluntarily adopt IAS, using a sample of international firms with identifiable adoption announcement dates. We find significantly positive abnormal returns at the IAS announcement and an economically significant reduction in the cost of capital in the two-year period after the announcement as compared to the two-year period before. The results are corroborated by evidence showing a statistically significant increase in the number of analysts issuing recommendations, a significant upgrade in the recommendations after the IAS announcement and a significant reduction in the implied cost of capital. We also find some evidence that analysts tend to positively revise their t+1 and t+2 cash flow forecasts. Overall, the evidence suggests that even though cash flow effects may be partially responsible for the documented increase in firm value, the primary factor behind this increase is the reduction in the cost of capital. These results provide strong evidence on the negative relation between disclosure and the cost of capital. consistent with the theoretical literature, in both finance and accounting, that links increased disclosure to firm value. Our findings also complement evidence in the cross-listing literature by providing support for the argument that the increased disclosure associated with cross-listings is an important driver in the documented positive listing abnormal returns, and the reduction in the cost of capital.

The paper also conducts a cross-sectional analysis relating the benefits of IAS adoption to two valuation measures. We first use the abnormal returns generated at the announcement of IAS adoption and second the growth in firm value as measured by the percentage change in Tobin's q around the announcement year. Specifically, we

examine the effects of signaling, bonding and the firms' information environment prior to IAS adoption on the magnitude of these two valuation measures. We find strong evidence that relatively undervalued firms and firms with higher growth opportunities experience higher abnormal returns and higher growth in firm value. These results are consistent with the IAS adoption announcement serving as a positive signal of firm value, which is more beneficial for firms with lower prior valuations. In addition, the results show that IAS adoption bonds controlling shareholders to less expropriation of firm resources. The reduction in expropriation is more beneficial to firms with higher growth opportunities. We do not find evidence to support a negative relation between the firm's information environment prior to the announcement and valuation effects.

It is important to note that the aforementioned results are obtained in a constant enforcement and litigation environment and without the confounding effects of other factors present in international cross-listings. Therefore our results highlight the beneficial effects of enhanced information disclosure on firm value in this uniquely clean environment. Our results however, only document the beneficial effects of increased disclosure for a sample of firms that voluntarily switched to IAS. One has to be cautious in generalizing this finding to mandatory disclosure as for some firms the costs of the higher disclosure requirements may outweigh the benefits.

Appendix: Implied cost of capital estimation

In order to estimate the implied cost of capital we use the following two models also used in Hail and Leuz (2006).

A: Claus and Thomas (2001):

$$P_t = bv_t + \sum_{\tau=1}^{T} \frac{(\hat{x}_{t+\tau} - r_{CT} \cdot bv_{t+\tau-1})}{(1+r_{CT})^{\tau}} + \frac{(\hat{x}_{t+T} - r_{CT} \cdot bv_{t+T-1})(1+g)}{(r_{CT}-g)(1+r_{CT})^{T}}$$

B: Ohlson and Juettner-Nauroth (2005), as adapted by Gode and Mohanram (2003):

$$P_t = (\hat{x}_{t+1} / r_{OJ}) \cdot (g_{st} + r_{OJ} \cdot \hat{d}_{t+1}\hat{x}_{t+1} - g_{lt}) / (r_{OJ} - g_{lt})$$

Where:

$P_t$= Price at time t

$bv_t$= Book value per share at the beginning of the fiscal year

$bv_{t+\tau}$= Expected future book value measured as: $bv_{t+\tau} = bv_{t+\tau-1} + \hat{x}_{t+\tau} - \hat{d}_{t+\tau}$

$\hat{x}_{t+\tau}$ = Expected earnings per share using analyst earnings forecasts or earnings forecasts derived from analyst long-term growth forecasts

$\hat{d}_{t+\tau}$ = Expected dividends per share derived from the dividend payout ratio times the earnings per share forecast $\hat{x}_{t+\tau}$

g, $g_{st}$, $g_{lt}$ = expected future growth in earnings

$r_{CT}$, $r_{OJ}$ = Implied cost of capital computed as the internal rate of return that solves the equation

We follow the methodology in Hail and Leuz (2006) and refer the reader to their appendix for more details. To compute the implied cost of capital for a particular firm in the sample, we require either a one-, two- and three-year head earnings forecasts or a one- and two-year ahead earnings forecasts along with a long-term growth forecast. All forecasts are measured as of month +10 after fiscal year end. The dividend payout ratio is set as a constant fraction of earnings. Long term growth variables, g and $g_{lt}$, are based on the assumption that the growth in abnormal earnings will equal the expected level of inflation based on historical inflation rates obtained from the IFS. The significant drop in the number of observations is due to the extensive data requirements for the estimation.

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**Figure 1: Cumulative abnormal returns around the announcement of IAS adoption**

The figure depicts cumulative abnormal returns from day -25 before to day +150 after the announcement of adoption of IAS. The firm daily abnormal returns are risk adjusted using the market model. The daily abnormal returns are averaged across all firms in the sample and then cumulated.

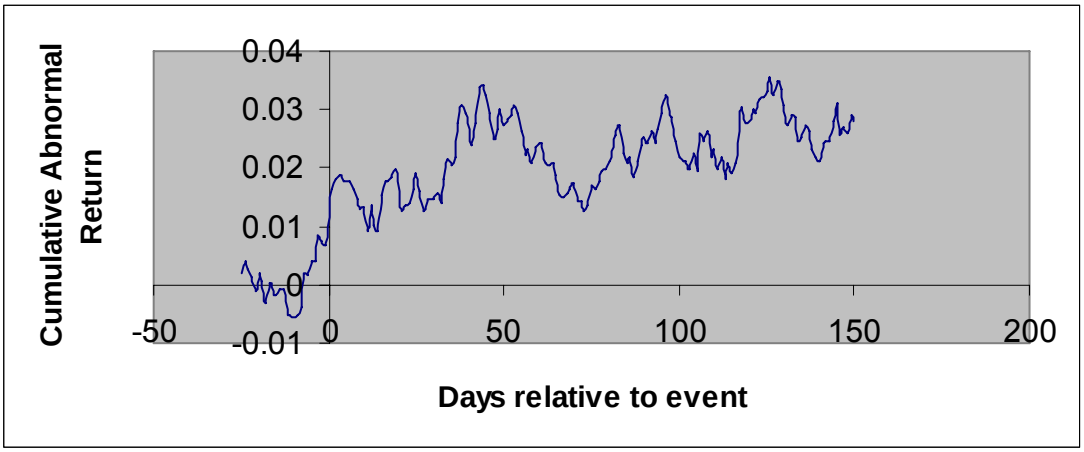

**Figure 2:**

**Annualized cumulative excess returns around the announcement of IAS adoption**

The figure plots the annualized cumulative difference in returns (excess returns) between the sample and control firms for four periods: The pre and post announcement periods (-104: -7, +7:+104) and the two revaluation periods (-6:-1, 0:+6), measured in weeks relative to the event.

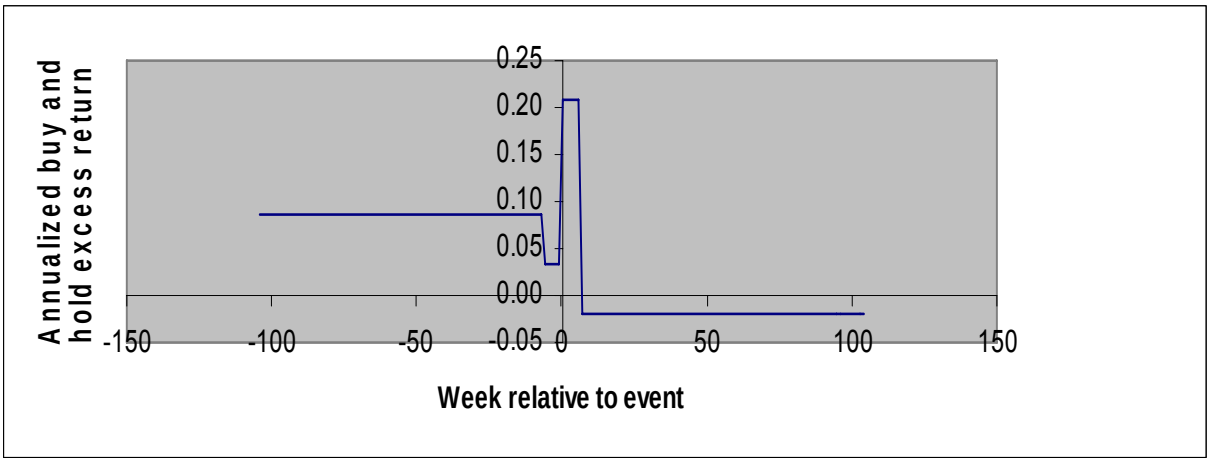

**Table 1: Event-study sample distribution**

Panel A: Country distribution

| Country | Number of Firms |
|---|---|
| Austria | 7 |
| Denmark | 4 |
| Germany | 20 |
| South Africa | 5 |
| Switzerland | 17 |
| Turkey | 1 |
| Total | 54 |

Panel B: Industry classification

| Industry Group | 2-digit SIC | Number of firms |
|---|---|---|
| Metal Mining | 10 | 3 |
| General Building Contractors | 15 | 1 |
| Food and Kindred Products | 20 | 3 |
| Printing and Publishing | 27 | 1 |
| Chemical and Allied Products | 28 | 3 |
| Stone, Clay, Glass and Concrete Products | 32 | 3 |
| Primary Metal Industries | 33 | 2 |
| Fabricated Metal Products | 34 | 1 |
| Industrial Machinery and Equipment | 35 | 4 |
| Electrical and Electronic Equipment | 36 | 2 |
| Transportation Equipment | 37 | 1 |
| Transportation by Air | 45 | 2 |
| Transportation Services | 47 | 2 |
| Electric Gas, and Sanitary Services | 49 | 6 |
| Wholesale Trade – Non durable Goods | 51 | 1 |
| General Merchandize Stores | 53 | 2 |
| Depository Institutions | 60 | 6 |
| Insurance Carriers | 63 | 3 |
| Real Estate | 65 | 1 |
| Hotels, Rooming Houses, Camps, and other lodging places | 70 | 1 |
| Conglomerates | 99 | 1 |
| Missing observations | | 5 |
| Total Number of Firms | | 54 |

**Table 2: Summary statistics**

AR, are cumulative risk adjusted returns computed around the announcement of IAS adoption (0,+1); SIZE is the value of total assets measured in US dollars (in thousands); TOBINS_Q is Tobin's q measured at the end of the fiscal year before the announcement; SALES_GR is average growth in sales for the two years prior to the announcement fiscal year; EFFIC, ANTI_DIR and ACC_STDS are the efficiency of the judicial system, anti-director rights and accounting standards variables, respectively, obtained from La Porta et al. (1998). FOL is analyst following measured as the number of analyst issuing a forecast during the fiscal year before the announcement. D_IAS is a dummy variable that takes the value of 1 if the country of origin is secretive and 0 otherwise, according to Gray's (1988) classification. ACCU is analyst forecast accuracy measured as the absolute value of the difference between actual earnings and the median analyst forecast deflated by beginning price and multiplied by -1.

| | N | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|
| **AR** | 54 | 0.0095 | 0.0287 | -0.059 | 0.087 |
| **SIZE (in US $ 000)** | 51 | 39,134,916 | 109,694,165 | 9360 | 593,589,760 |
| **TOBINS_Q** | 51 | 1.349 | 0.676 | 0.616 | 4.4917 |
| **SALES_GR** | 48 | 0.1414 | 0.239 | -0.317 | 1.158 |
| **EFFIC** | 54 | 0.908 | 0.132 | 0.40 | 1.00 |
| **ANTI_DIR** | 54 | 0.4654 | 0.2598 | 0.20 | 1.00 |
| **FOL** | 53 | 12.811 | 10.902 | 0 | 39 |
| **D_IAS** | 54 | 0.509 | 0.504 | 0 | 1 |
| **ACC_STDS** | 54 | 0.7002 | 0.0584 | 0.5667 | 0.7778 |
| **ACCU** | 46 | -0.0327 | 0.0546 | -0.2735 | 0 |

**Table 3: Abnormal returns around the announcement of IAS adoption**

Abnormal returns are risk adjusted returns estimated using the market model during the period -150 to -26 days relative to the announcement date. The national stock market index is used to proxy for the market portfolio.

| Event Day | Mean Abnormal Return | Percentage Non-negative | Cumulative Abnormal Return |
|---|---|---|---|
| -25 | 0.0019 | 56.60 | 0.0019 |
| -20 | 0.0029 | 50.00 | 0.0018 |
| -15 | -0.0003 | 47.17 | -0.0018 |
| -10 | -0.0004 | 47.06 | -0.0057 |
| -5 | 0.0025 | 50.00 | 0.0041 |
| -4 | -0.0002 | 52.83 | 0.0039 |
| -3 | 0.0045 | 56.86 | 0.0084 |
| -2 | -0.0007 | 45.10 | 0.0076 |
| -1 | -0.0008 | 45.28 | 0.0069 |
| 0 | 0.0065** | 59.26** | 0.0134 |
| 1 | 0.0030 | 50.00 | 0.0164 |
| 2 | 0.0017 | 51.85 | 0.0181 |
| 3 | 0.0006 | 49.06 | 0.0186 |
| 4 | -0.0008 | 52.94 | 0.0178 |
| 5 | -0.0001 | 47.06 | 0.0177 |
| 10 | 0.0005 | 47.17 | 0.0135 |
| 15 | 0.0061** | 72.22** | 0.0154 |
| 20 | -0.0048* | 39.62 | 0.0149 |
| 25 | 0.0025 | 52.94 | 0.0190 |

*, **: Significant at the 10% and 5% level, respectively
The significance indicator for the percentage non-negative column is based on the sign rank test. The significance of mean abnormal returns is based on a two-tail test.

**Table 4: Long run excess returns**

Returns are cumulative buy-and-hold returns computed as,

$$CR_i = [\prod_{t=1}^{T}(1 + R_{it})] - 1$$

R, is the return on stock i in week t, and T is the number of weeks from the beginning to the end of the performance window. Excess returns are sample firm less control firm returns. Second row presents the respective p-values based on two-tail tests.

| **Weeks** | **Sample firms** | | **Control firms** | | **Return difference** | |
|---|---|---|---|---|---|---|
| | Cumulative | Annualized | Cumulative | Annualized | Cumulative | Annualized |
| *Cost of capital effect* | | | | | | |
| -104: -7 | 0.3805 | 0.2019 | 0.2205 | 0.1170 | 0.1599 | 0.0848 |
| | <0.01 | | <0.01 | | 0.10 | |
| 7:104 | 0.1314 | 0.0697 | 0.1707 | 0.0906 | -0.0393 | -0.0208 |
| | 0.05 | | 0.05 | | 0.72 | |
| Difference | -0.2491 | -0.1321 | -0.0498 | -0.0264 | -0.1993 | -0.1058 |
| | 0.04 | | 0.64 | | 0.13 | |
| *Revaluation effect* | | | | | | |
| -6, -1 | -0.0088 | -0.0763 | -0.0129 | -0.1118 | 0.0040 | 0.0347 |
| | 0.58 | | 0.39 | | 0.82 | |
| 0,6 | 0.0277 | 0.2058 | -0.0003 | 0.0022 | 0.0280 | 0.2080 |
| | 0.05 | | 0.98 | | 0.09 | |
| 1,6 | 0.0208 | 0.1803 | -0.0009 | 0.0078 | 0.0217 | 0.1881 |
| | 0.12 | | 0.94 | | 0.17 | |

## Table 5: Post - Announcement effects

**PANEL A: Recommendation revisions and change in analyst following**

Panel A presents the change in the number of analysts issuing a recommendation per firm (ΔFollowing/Firm) and the change in recommendation value per analyst (ΔRec / Analyst) during the 90- and 180-day period after the announcement of IAS adoption compared to the corresponding period before the announcement. Recommendations are coded on a scale of 1 to 5 with 1 representing strong buy and 5 representing strong sell recommendations.

| | **90 days after vs. 90 days before** | | | | **180 days after vs. 180 before** | | | |
|---|---|---|---|---|---|---|---|---|
| | **N** | **Mean** (p-value) | **% >0** (p-value) | **% < 0** (p-value) | **N** | **Mean** (p-value) | **% >0** (p-value) | **% < 0** (p-value) |
| ΔFollowing/Firm | 43 | 1.256*** 0.01 | 65.12 0.01 | | 44 | 1.160 0.11 | 0.59 0.15 | |
| ΔRec / Analyst | 43 | -0.442** 0.05 | | 53.49 0.07 | 106 | -0.358 0.02 | | 50 0.02 |

**PANEL B: Revisions in analyst cash flow forecasts**

Panel B presents the % change in cash flow forecasts for years t+1, t+2 or t+3, issued in the 90- and 180-day period around the announcement of IAS adoption, per analyst.

| | **90 days after vs. 90 days before** | | | **180 days after vs. 180 before** | | |
|---|---|---|---|---|---|---|
| | **N** | **Mean** (p-value) | **% >0** (p-value) | **N** | **Mean** (p-value) | **% >0** (p-value) |
| t+1 | 104 | 0.02 0.19 | 0.63 0.04 | 187 | 0.008 0.65 | 0.55 0.47 |
| t+2 | 100 | 0.035 0.02 | 0.65 0.01 | 143 | 0.009 0.51 | 0.59 0.28 |
| t+3 | 33 | 0.018 0.37 | 0.46 0.42 | 35 | 0.017 0.42 | 0.42 0.84 |

**Panel C: Changes in the implied cost of capital**

| **Average cost of capital** | **Year t-1** | **Year t** | **Year t+1** |
|---|---|---|---|
| Claus and Thomas model N=31 | 7.52% | 7.52% | 7.35% |
| Average difference with t-1 (p-value) | | 0.000 0.99 | -0.077 **0.01** |
| Ohlson and Juettner and Nauroth model N=30 | 8.48% | 7.57% | 6.99% |
| Average difference with t-1 (p-value) | | -0.0092 **0.07** | -0.065 **0.01** |

## TABLE 6: Correlations

This Table reports correlation coefficients for all the variables used in the cross-sectional analysis. Corresponding p-values appear below the correlation coefficients.

AR, are cumulative risk adjusted returns computed around the announcement of IAS adoption (0,+1); SIZE is the natural logarithm of total assets; TOBINS_Q is Tobin's q measured at the end of the fiscal year before the announcement; SALES_GR is average growth in sales for the two years prior to the announcement fiscal year; EFFIC, ANTI_DIR and ACC_STDS are the efficiency of the judicial system, anti-director rights and accounting standards variables, respectively, obtained from La Porta et al. (1998). FOLL is the natural logarithm of analyst following measured as the number of analyst issuing a forecast during the fiscal year before the announcement. D_IAS is a dummy variable that takes the value of 1 if the country of origin is secretive and 0 otherwise, according to Gray's (1988) classification. ACCU is analyst forecast accuracy measured as the absolute value of the difference between actual earnings and the median analyst forecast deflated by beginning price and multiplied by -1.

| | **AR** | **SIZE** | **TOBINS_Q** | **SALES_GR** | **ACC_STDS** | **EFFIC** | **ANTI_DIR** | **D_IAS** | **FOLL** | **ACCU** |
|---|---|---|---|---|---|---|---|---|---|---|
| **AR** | 1.00<br>0.00 | -0.098<br>0.49 | -0.232<br>0.10 | 0.226<br>0.12 | -0.052<br>0.71 | -0.332<br>**0.02** | 0.049<br>0.73 | 0.059<br>0.68 | 0.054<br>0.71 | 0.165<br>0.27 |
| **SIZE** | | 1.00<br>0.00 | -0.172<br>0.23 | -0.068<br>0.65 | -0.056<br>0.69 | 0.024<br>0.86 | -0.272<br>**0.05** | 0.278<br>**0.05** | 0.546<br>**0.01** | 0.279<br>0.06 |
| **TOBINS_Q** | | | 1.00<br>0.00 | 0.048<br>0.75 | 0.088<br>0.54 | 0.148<br>0.30 | -0.02<br>0.89 | -0.063<br>0.66 | 0.190<br>0.19 | -0.188<br>0.22 |
| **SALES_GR** | | | | 1.00<br>0.00 | -0.132<br>0.37 | -0.430<br>**0.01** | -0.032<br>0.83 | 0.145<br>0.33 | 0.082<br>0.59 | -0.244<br>0.12 |
| **ACC_STDS** | | | | | 1.00<br>0.00 | 0.065<br>0.65 | 0.696<br>**0.01** | -0.81<br>**0.01** | -0.037<br>0.80 | 0.088<br>0.56 |
| **EFFIC** | | | | | | 1.00<br>0.00 | -0.200<br>0.15 | -0.154<br>0.27 | -0.045<br>0.75 | -0.218<br>0.14 |
| **ANTI_DIR** | | | | | | | 1.00<br>0.00 | -0.839<br>**0.01** | -0.233<br>0.11 | -0.050<br>0.74 |
| **D_IAS** | | | | | | | | 1.00<br>0.00 | 0.161<br>0.27 | 0.054<br>0.72 |
| **FOLL** | | | | | | | | | 1.00<br>0.00 | 0.338<br>**0.02** |
| **ACCU** | | | | | | | | | | 1.00<br>0.00 |

**TABLE 7: Cross-sectional tests**

This Table presents coefficient estimates from various versions of equation (1). p-values appear beneath the coefficient estimates.

$AR = a + \beta_1\ TOBINS\_Q + \beta_2\ SALES\_GR + \beta_3\ EFFIC + \beta_4\ ANT\_DIR + \beta_5\ D\_IAS + \beta_6\ FOLL + \beta_7\ SIZE + \varepsilon$

The dependent variable, AR, represents cumulative risk adjusted returns computed around the announcement of IAS adoption (0,+1); SIZE is the natural logarithm of total assets; TOBINS_Q is Tobin's q measured at the end of the fiscal year before the announcement; SALES_GR is average growth in sales for the two years prior to the announcement fiscal year; EFFIC, and ANTI_DIR are the efficiency of the judicial system, and anti-director rights, respectively, obtained from La Porta et al. (1998). FOLL is the natural logarithm of analyst following measured as the number of analyst issuing a forecast during the fiscal year before the announcement. D_IAS is a dummy variable that takes the value of 1 if the country of origin is secretive and 0 otherwise, according to Gray's (1988) classification. Panel A uses the maximum number of observations available for each model, while panel B presents results keeping the number of observations constant across models at 44.

**Panel A:**

| Variable | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **Intercept** | ? | 0.0985 | 0.0716 | 0.1071 | 0.0616 | 0.1314** |
| | | 0.05 | 0.11 | 0.05 | 0.17 | 0.04 |
| **TOBINS_Q** | ? | -0.0088 | | | -0.0137*** | -0.0186*** |
| | | 0.21 | | | 0.01 | <0.01 |
| **SALES_GR** | + | | 0.0419** | | 0.0564*** | 0.0540*** |
| | | | 0.05 | | <0.01 | 0.01 |
| **D_IAS** | + | | | 0.0024 | | -0.0151 |
| | | | | 0.43 | | 0.86 |
| **FOLL** | - | | | 0.0031 | | 0.0087 |
| | | | | 0.75 | | 0.96 |
| **EFFIC** | - | -0.0647* | -0.0391 | -0.0776** | -0.0114 | -0.0271 |
| | | 0.06 | 0.14 | 0.04 | 0.37 | 0.24 |
| **ANTI_DIR** | - | -0.0035 | -0.0088 | -0.0058 | -0.0059 | -0.0362 |
| | | 0.42 | 0.29 | 0.43 | 0.36 | 0.13 |
| **SIZE** | ? | -0.0010 | -0.0017 | -0.0021 | -0.0016 | -0.0047** |
| | | 0.42 | 0.29 | 0.24 | 0.25 | 0.04 |
| **N** | | 50 | 47 | 49 | 46 | 44 |
| **F** | | 1.92 | 2.22 | 1.56 | 2.729 | 2.620 |
| | | 0.12 | 0.08 | 0.19 | 0.03 | 0.03 |
| **Adj. $R^2$** | | 0.07 | 0.10 | 0.06 | 0.16 | 0.21 |

**Panel B:**

| Variable | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| **Intercept** | ? | 0.1190 | 0.0538 | 0.1306 | 0.0711 |
| | | 0.03 | 0.20 | 0.04 | 0.11 |
| **TOBINS_Q** | ? | -0.0104 | | | -0.0132*** |
| | | 0.11 | | | 0.01 |
| **SALES_GR** | + | | 0.0438** | | 0.0553*** |
| | | | 0.04 | | <0.01 |
| **D_IAS** | + | | | -0.0119 | |
| | | | | 0.79 | |
| **FOLL** | - | | | 0.0034 | |
| | | | | 0.73 | |
| **EFFIC** | - | -0.0658** | -0.0384 | -0.0854** | -0.0190 |
| | | 0.05 | 0.15 | 0.03 | 0.29 |
| **ANTI_DIR** | - | -0.0123 | -0.0071 | -0.0298 | -0.0105 |
| | | 0.26 | 0.33 | 0.20 | 0.26 |
| **SIZE** | ? | -0.0018 | -0.0006 | -0.0019 | -0.0017 |
| | | 0.27 | 0.68 | 0.44 | 0.23 |
| **N** | | 44 | 44 | 44 | 44 |
| **F** | | 2.07 | 2.13 | 1.21 | 2.815 |
| | | 0.10 | 0.09 | 0.33 | 0.03 |
| **Adj. $R^2$** | | 0.09 | 0.10 | 0.02 | 0.17 |

*. **, *** : significant at the 10%, 5%, and 1% level respectively. For all variables p-values are from one-tail tests, except when the sign is not defined.
p- values are calculated using White (1980) standard errors.

**Table 8:**
**Cross-sectional analysis of the change in Tobin's q around the IAS announcement year**

This Table presents coefficient estimates of equation (1) when the dependent variable is the percentage change in Tobin's q. p-values appear beneath the coefficient estimates.

$\Delta TQ_{t+1} = a + \beta_1 \ TOBINS\_Q + \beta_2 \ SALES\_GR + \beta_3 \ EFFIC + \beta_4 \ ANT\_DIR + \beta_5 \ D\_IAS + \beta_6 \ FOLL + \beta_7 \ SIZE + \varepsilon$

SIZE is the natural logarithm of total assets; TOBINS_Q is Tobin's q measured at the end of the fiscal year before the announcement; SALES_GR is average growth in sales for the two years prior to the announcement fiscal year; EFFIC, and ANTI_DIR are the efficiency of the judicial system, and anti-director rights, respectively, obtained from La Porta et al. (1998). FOLL is the natural logarithm of analyst following measured as the number of analyst issuing a forecast during the fiscal year before the announcement. D_IAS is a dummy variable that takes the value of 1 if the country of origin is secretive and 0 otherwise, according to Gray's (1988) classification. The percentage change in Tobin's q is defined as:

$\Delta TQ_{t+1} = [TQ_{t+1} - TQ_{t-1}] / TQ_{t-1}$, where t is the announcement year.

| Variable | | 1 | 2 | 3 |
|---|---|---|---|---|
| **Intercept** | ? | 0.3726<br>0.31 | 0.1982<br>0.67 | -0.0142<br>0.98 |
| **TOBINS_Q** | ? | -0.2564***<br><0.01 | -0.2425***<br><0.01 | -0.2522***<br><0.01 |
| **SALES_GR** | + | 0.6597*<br>0.10 | 0.6142*<br>0.10 | 0.6174*<br>0.10 |
| **EFFIC** | - | | -0.0770<br>0.42 | 0.0788<br>0.57 |
| **ANTI_DIR** | - | | 0.1651<br>0.74 | 0.3458<br>0.80 |
| **D_IAS** | + | | | 0.0855<br>0.26 |
| **FOLL** | - | | | 0.0231<br>0.70 |
| **SIZE** | ? | -0.0072<br>0.53 | 0.0029<br>0.84 | -0.0037<br>0.82 |
| **N** | | 45 | 45 | 43 |
| **F** | | 7.746<br><0.01 | 4.703<br><0.01 | 3.101<br>0.01 |
| **Adj. $R^2$** | | 0.32 | 0.30 | 0.26 |

*. **, *** : significant at the 10%, 5%, and 1% level respectively. For all variables p-values are from one-tail tests, except when the sign is not defined.
p- values are calculated using White (1980) standard errors.