European Financial Management, Vol. 11, No. 3, 2005, 267–312

Do Insider Trading Laws Work?

Arturo Bris

Yale School of Management, European Corporate Governance Institute
e-mail: arturo.bris@yale.edu

Abstract

This paper presents the first comprehensive global study of insider trading laws and their first enforcement. In a sample of 4,541 acquisitions from 52 countries, I find that insider trading enforcement increases both the incidence, and the profitability of insider trading. The expected total insider trading gains increase. Consequently, laws that proscribe insider trading fail to eliminate insider profits. However, harsher laws work better at reducing the incidence of illegal insider trading.

Keywords: *insider trading*; *takeovers*; *market regulation*

JEL classification: *G*38, *G*34, *G*15

1. Introduction

Merger activity around the world has increased dramatically in the past decade. The market for corporate control has been running at a fever pitch, with the number of deals in 1999 up 163% over the 1990 figure of 10,051 announcements. International and cross-border transactions, which respectively accounted for 38% and 28% of the total acquisitions in 1999 continue to be fuelled by the globalisation of the world economy.[1] And with mergers running at this pace, many national regulators – the SEC and its counterparts abroad – are getting tougher on insider trading (IT hereafter), since high takeover activity generally spawns bouts of insider activity. Following the US Securities Exchange Act of 1934, most developed economies, as well as several emerging markets, have since passed and enforced laws that prohibit

I am grateful to K. Geert Rouwenhorst, Ekkehart Boehmer, Will Goetzmann, Yrjö Koskinen, Florencio López de Silanes, Matt Spiegel, Ivo Welch, Jeff Wurgler, and seminar participants at the CEPR European Summer Symposium in Financial Markets, the European Finance Association 2001 Meetings, Northwestern University, New York University, Yale Law School, and the World Bank, for fruitful discussions and helpful comments. Vanessa Janowski and Ning Zhu provided excellent research assistance.

[1] Source: Securities Data Corporation. There were 10,051 acquisitions in 1990, excluding LBO deals, spinoffs, recapitalisations, self-tender and exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest and privatisations. Out of the total number, 4,737 were international deals, and 2,666 were cross-border transactions. In 1999, there were 26,525 announcements (10,007 international, 7,370 cross-border). Worldwide mergers and acquisitions hit a record $2.2 trillion in the first nine months of 1999 (see *Business Week*, 18 October 1999).

undisclosed trading based on inside information. Eradicating IT has become one of the most important goals of market regulators, as the chairman of the United States Securities and Exchange Commission has recently indicated:

> Trading based on privileged access to information can demoralize investors and destabilize investment. It has utterly no place in any fair-minded, law-abiding economy. It's a chronic danger. It's all too evident in today's marketplace. And it's a crime. The American people see it, bluntly, as a form of cheating. They – along with the S.E.C. – have zero tolerance for the crime of insider trading. Let's state it clearly, and in the un-ambiguous terms that it deserves: Insider trading is legally forbidden. It's morally wrong. And it's economically dangerous.[2]

Nevertheless, there is overwhelming evidence showing that illegal stealth trading by corporate insiders persists. Meulbroek (1992) reports 183 cases of illegal insider trading episodes in the period 1979–1989, of which 145 were takeover-related. The median insider profit per episode was $24,673, and the median penalty was $21,000 during her sample period. Keown and Pinkerton (1981) and Meulbroek (1992) conclude that the stock price runups of target firms preceding takeover announcements are largely attributable to illegal trading on inside information. Yet, not all IT is illegal: Lakonishok and Lee (2000) document that in more than half of all companies listed on the NYSE, Amex, and Nasdaq exchanges during the 1975–1995 period, there was some insider activity in any given year.[3] Research is just beginning to show the extent of IT in other countries (see Pope *et al.* (1990) for the UK, and Eckbo and Smith (1998) for the analysis of the Norwegian market).

Our own paper explores the effectiveness of IT laws in a global context.[4] It analyses insiders' behaviour before tender offer announcements. We focus on acquisitions, because it is the event at which inside trading is generally thought to be most profitable. It is also the corporate event that led the SEC to adopt the Rule 14e-3. The power of our test comes from the international cross-section of regulatory regimes, and the enactment of laws at different times in different countries. As such, a similar study in one country would provide only weak results. The sample are 4,541 acquisitions in 52 different countries for the period from January 1990 to December 1999.

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[2] 'A question of integrity: promoting investor confidence by fighting insider trading', Remarks of Chairman Arthur Levitt to the 'S.E.C. Speaks' Conference, Washington, DC, 27 February 1998. Along the same lines, the European Directive on Insider Trading also declares its purpose in the preamble: 'Whereas, by benefiting certain investors as compared with others, insider dealing is likely to undermine that confidence and may therefore prejudice the smooth operation of the market; [. . .] Whereas the necessary measures should therefore be taken to combat insider dealing . . .' (Council Directive 89/592 Coordinating Regulations on Insider Trading)

[3] See also Finnerty (1976).

[4] The main assumption underlying the theoretical literature on IT regulation is that IT laws completely remove the possibility of trading by corporate insiders in regulated markets. Defendants of the IT prohibition argue that (i) by improving information disclosures, IT laws reduce agency costs and opportunistic managerial behavior (Shin, 1996), (ii) reduce information asymmetries among market participants and thus improve liquidity (Copeland and Galai, 1983; Leland, 1992), and (iii) enhance the confidence in the market and therefore increase the participation of ordinary investors in the stock exchange (Ausubel, 1990). Trading by corporate insiders with superior information, on the other hand, should be permitted because (i) it leads to more informationally efficient stock markets (Manne, 1966; Leland, 1992; Bernhardt *et al.*, 1995), and (ii) it is an effective way of compensating managers (Dye, 1984).

Naturally insider trading is not easy to estimate, because insiders are not particularly eager to report it. Thus, our paper spends a significant amount of care on the estimation of an insider trading proxy (see Section 5). Our measure of insider trading is based on public information, in particular abnormal volume and price movements, in the days prior to the tender offer announcement. Comparing our measure against the only published study that contains actual IT data (Cornell and Sirri, 1992), we find a 90% correlation between our estimate and their actual report of insider trading.

Our main finding is surprising. After some enforcement of IT laws, insiders appropriate a larger portion of the total takeover gains. The significance of this result is robust after controlling for liquidity, size, and country-specific and tender offer-specific variables. The increase in the profit measure is particularly strong in countries that have enforced their IT laws for the first time in the late 1990s. The cross-sectional analysis confirms an increase in IT profits after initial enforcement of IT regulation, but a negative relationship between the toughness of the law and IT profits after its enforcement. The USA is the country where insiders' profits are the lowest, *ceteris paribus*, but also where IT regulation is the toughest. The amount of profits realised by insiders is relatively higher in Eastern and Nordic Europe and in Canada, and lower in the UK. Therefore, our paper shows that, by making markets more efficient – because the market reaction at the announcement of an acquisition is larger – IT laws have the undesirable effect of creating more room for insiders' profits. Moreover, there is evidence – significant abnormal volume in the pre-tender offer days – that insiders take advantage of those opportunities.

An alternative measure of IT activity is the frequency of insider trading, i.e. the number of firms for which our estimate of insiders' profits is positive. Before IT regulation, we find evidence of insider trading in 30% of the acquisitions. It increases to 58% after the first enforcement of the law. We however find, in cross-sectional regressions, that IT episodes become more frequent when takeover laws are in place. Indeed we find that, after controlling for firm- and country-specific factors, IT laws cannot explain – at the country level – the frequency of acquisitions where the measure of IT profits is positive. This means that cases of undetected insider trading become, if not more frequent, at least more profitable when IT is prohibited.

Finally, we find that the toughness of the law matters. We measure the quality of IT laws using the index constructed by Beny (2005). In cross-sectional regressions, IT law quality and IT profits display a negative and significant relationship. This result explains why we observe profits realised by insiders to be the lowest in the USA. We conclude that laws that have prohibited IT, by probably creating more profit opportunities to insiders, have made insider trading more profitable. We thus suggest that legislative initiatives designed to eliminate IT should pay careful attention to detection mechanisms and penalties for those who violate the law.

The next section describes the testable implications derived from the economics of crime theory. Section 3 describes the data and their sources. In section 4, we analyse the price performance of target firms around tender offer announcements. In section 5, we briefly describe the differences in IT regulation across countries. In section 6, we describe our measure of IT profits and provide preliminary results. In section 7, we analyse the relationship between abnormal volume and price, and in section 8, we furnish some cross-sectional evidence on the relationship between IT profits and regulation. Section 9 concludes.

2. Theoretical Background

Initially one can formulate two alternative hypotheses. Since regulation makes illegal insider trading more costly – penalties, legal fees, loss of reputation – insider trading episodes, and the profits that insiders realize, should decrease after IT laws are in place.

The alternative hypothesis is that the cost of violating IT laws, as with any other prohibition, can be diffused. The pioneering work of Becker (1968) approaches crime from an economic perspective, where the optimal level of crime depends on the marginal cost (punishment) of the illegal activity and its marginal benefits. Ehrlich (1996), using the same framework, concludes that risk-preferrer offenders may shift the allocation of their working time towards more crime if the loss of potential income caused by the penalty increases. Miron and Zwiebel (1991) find that alcohol consumption fell during Prohibition to 60–70% of the pre-Prohibition levels.[5] However, prices tripled over the same period, which suggests that profits to distributors substantially increased. Regarding drug-law enforcement, both the theoretical and the empirical literature conclude that drug prohibition creates larger profits for suppliers.[6] The theoretical argument underlying those studies is that crime interdiction, by imposing a tax on suppliers, shifts the supply curve for criminal activity and therefore raises its price. However, prohibition decreases the demand for the illicit product, because of the legal penalties to consumers. The final effect on prices and profits depends on the elasticity of both curves. Moreover, the implicit assumption is that laws are ineffective insofar as not all violators can be prosecuted. Chaudhri and Geanakoplos (1998), for instance, argue that, because the demand for guns is relatively elastic, guns should be made illegal. Similarly, the demand for drugs is inelastic, and therefore drugs should be legalised. IT prohibition should be acknowledged as similar to prohibition of alcohol distribution, tobacco advertising, or pornography, in that the demand for IT (how much undisclosed informed trading the market and the regulator are willing to accept in order to enhance the efficiency of the markets) is independent of its legal status. Therefore the supply effect (the extent to which insiders are willing to engage in illegal activities) prevails, and three empirical predictions ensue: (1) insider trading episodes become less frequent after prohibition, but (2) they become more profitable, and (3) the frequency and profits of the criminal activity are negatively related to the severity of the law.

Finally, it is also possible that strict enforcement of the law could create monopoly profits for anyone finding a way to circumvent the law. Law enforcement discourages the marginally dishonest individuals, and those with the higher marginal cost if ever detected, from the illegal activity. After prosecution of others, only a few insiders are left, who make more profits than before. As with the economics-of-crime explanation, this argument requires that laws be ineffective in order to work. It implies that episodes of insider trading become less frequent but more profitable. Again, tougher laws discourage more individuals from engaging in insider trading, therefore reducing the number of violators and the profit amount.

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[5] The Eighteenth Amendment to the US Constitution (also known as 'Prohibition') was passed in 1917, and stated in its article 1 that 'after one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited'. It was rescinded by the 21st Amendment in December 1933. See also Miron (1999).

[6] See the empirical analyses of Cussen and Block (2000), and Niskanen (1992). On the theoretical side, see Miron and Zwiebel (1995), and Thorlund and Skott (1997).

The last two hypotheses provide similar empirical implications, and are consistent with the ideas in Manne (1966). In his seminal paper, Manne argues that, by prohibiting IT, stock prices become less efficient, and hence they deviate from their fundamental value. The gains from moving prices back to their fundamental value increase after IT prohibition. The issue is then who gets those gains. If prices move on the announcement of a public event, then uninformed shareholders can realize abnormal profits. If instead someone is able to acquire private information, prices will move in advance to the public announcement, and insiders (or informed outsiders) will indeed benefit from the prohibition.

3. Data

We collect an initial sample of takeover announcements that took place between 1 January 1990 and 31 December 1999. Our primary source is the Securities Data Corporation Mergers and Acquisitions Database. The analysis is restricted to publicly listed companies, and we exclude from the initial sample LBO deals, as well as spinoffs, recapitalisations, self-tender and exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest, and privatisations.

There are 8,722 announcements that satisfy the above criteria. We exclude second or subsequent bids (2,538 announcements), since in those deals the pre-takeover period could be contaminated by the announcement of a prior acquisition.[7] We additionally exclude observations for which relevant information could not be found.[8] The final sample of takeovers comprises 4,451 announcements, corresponding to 52 different countries. Among them, 22 are developed economies, 25 are emerging markets, and five are developing countries. By region, we have observations from the two North American countries, nine in Latin America, six in Eastern Europe, 15 in Western Europe, the four countries from Nordic Europe, twelve from South-East Asia, one from the Middle East, one from Africa, and two from Oceania. US tender offers account for around 49% of the sample; UK tender offers, for another 11%. Table 1 displays some summary statistics for the initial sample, disaggregated by country. Around the world, only 6% of the acquisitions are hostile. This number is fairly uniform (5.90% for the USA, 8.18% for the UK).[9] Schwert (2000), using US data from 1975 to 1996, shows that 300 out of 2,346 acquisitions are classified as *hostile* by SDC. Additionally, Table 1 reports the average market value of the target firm in dollars. In EU countries, except Greece and the UK, the typical target firm is larger than average. Target firms in emerging markets are usually small in size. Finally, the success rate in the USA is 55.86%, which compares to an average 40.52% worldwide. We also report the year of enforcement and enactment of IT and takeover laws in each country. Data on IT laws is from Bhattacharya and Daouk (2002). We gather data on the year when a merger law is enacted for the 52 countries in our sample, from the *Worldwide Antitrust Merger Notification Requirements Report*, published by the law firm White & Case. The *Report* provides, besides calendar information on takeover laws, details regarding merger notification, fees, penalties, and relevant periods in all the countries in our sample. Out of the 52 countries in our sample,

[7] To take a conservative approach, I drop any bid ocurring within a window of four years relative to an initial announcement.

[8] Relevant information would be: name of the target firm and/or date of announcement, and stock prices around the announcement, as described below.

[9] Miller (2000) argues that the UK system inherently generates more hostile acquisitions because of the differences in company law.

Table 1

Description of the countries in the sample, insider trading laws, number of acquisitions per country, average market value, number of hostile acquisitions, and number of successful acquisitions

The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database. Only public companies are considered, and I exclude LBO deals, spinoffs, recapitalisations, self-tender and exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest, and privatisations. Second and subsequent bids that occur within a window of four years relative to an initial announcement are excluded. A bid is considered Hostile when the board officially rejects the offer but the acquiror persists with the takeover, or if the offer is a surprise to the target's board and the offer has not yet given a recommendation. A deal is successful when it has been either totally or partially completed. Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2000). Information on merger laws is from the White & Case Ltd. *Worldwide Antitrust Merger Notification Requirements Report*.

	Insider trading laws						
Country	Passed	First enforced	Merger laws passed	Number of acquisitions	Market value ($mil)	Hostile %	Successful %
Argentina	1991	1995	1980	21	2198.50	0.00	47.62
Australia	1991	1996	1974	344	203.36	9.01	23.55
Austria	1993	2000	1988	19	239.86	5.26	42.11
Belgium	1990	1994	1991	34	971.63	8.82	35.29
Bermuda	2000	2000	–	11	582.24	9.09	27.27
Brazil	1976	1978	1994	30	34.29	0.00	30.00
Canada	1966	1976	1985	718	182.65	8.08	27.44
Chile	1981	1996	1973	13	209.13	0.00	46.15
China	1993	2000	–	9	175.56	11.11	44.44
Colombia	1990	2000	1959	11	61.08	0.00	9.09
Cyprus	1999	2000	1989	2	31.68	0.00	50.00
Czechoslovaquia	1992	1993	1991	5	137.42	0.00	120.00
Denmark	1991	1996	1997	50	300.44	4.00	20.00
Ecuador	1993	2000	–	2	38.17	0.00	0.00
Finland	1989	1993	1992	37	1194.54	8.11	35.14
France	1967	1975	1986	262	1461.97	4.58	38.93
Germany	1994	1995	1957	202	2126.42	3.47	25.74

Greece	1988	1996	1991	25	460.88	0.00	40.00
Hong Kong	1991	1994	After 2000	154	218.63	3.90	18.83
Hungary	1994	1995	1996	8	70.27	0.00	25.00
India	1992	1998	1969	82	317.44	4.88	17.07
Indonesia	1991	1996	2000	30	894.03	0.00	13.33
Ireland	1990	2000	1991	35	114.36	14.29	17.14
Israel	1981	1989	1988	37	97.90	2.70	40.54
Italy	1991	1996	1990	71	3537.16	0.00	25.35
Japan	1988	1990	1947	165	1404.30	3.64	37.58
Latvia	2000	2000	1998	1	0.00	0.00	100.00
Luxembourg	1991	2000	1970	6	4707.38	16.67	16.67
Malaysia	1973	1996	After 2000	124	256.67	4.84	20.16
Mexico	1975	2000	1992	12	255.64	0.00	8.33
Netherlands	1989	1994	1997	72	1108.72	6.94	20.83
New Zealand	1988	2000	1986	42	141.70	7.14	33.33
Norway	1985	1990	1993	104	377.62	4.81	14.42
Peru	1991	1994	1991	12	242.45	8.33	25.00
Philipphines	1982	2000	–	43	41.94	4.65	27.91
Poland	1991	1993	1990	20	67.75	0.00	40.00
Portugal	1986	2000	1983	26	409.50	11.54	26.92
Romania	1995	2000	1996	1	307.75	0.00	100.00
Russia	1996	2000	1991	5	290.00	0.00	40.00
Singapore	1973	1978	After 2000	72	230.14	2.78	40.28
South Africa	1989	2000	1998	149	412.60	3.36	26.17
South Korea	1976	1988	1980	59	74.43	0.00	18.64
Spain	1994	1998	1989	69	1369.65	1.45	11.59
Sri Lanka	1987	1996	–	8	21.92	12.50	12.50

Table 1
Continued.

Country	Insider trading laws		Merger laws passed	Number of acquisitions	Market value ($mil)	Hostile %	Successful %
	Passed	First enforced					
Sweden	1971	1990	1993	134	621.85	6.72	18.66
Switzerland	1988	1995	1995	55	510.41	1.82	23.64
Taiwan	1988	1989	1991	4	514.13	0.00	0.00
Thailand	1984	1993	1999	67	89.75	7.46	32.84
Trinidad	1981	2000	–	1	60.09	0.00	0.00
Turkey	1981	1996	1994	15	70.80	13.33	33.33
UK	1980	1981	1973	953	915.80	8.18	21.62
USA	1934	1961	1976	4286	1293.64	5.90	55.86
Total				8717	995.33	6.01	40.53

only five of them – Ecuador, Peru, Philippines, Singapore, Sri Lanka, and Trinidad and Tobago – do not have a merger notification requirement as of December 2000.

In order to analyse the time-series behaviour of the market for corporate control, we plot in Figure 1 the number of acquisitions by year. The trend is increasing in the USA as well as in the rest of the countries. Interestingly, acquisitions of non-US firms have increased dramatically since 1997. Indeed, 60% of all non-US acquisitions in our sample happened in the last three years of the sample period.

To perform price analysis, we compile stock price information for the firms in our sample. CRSP provides daily prices, returns, and volume information for the target firms in the USA. We also obtain data on the number of shares outstanding, and industry classification codes. For non-US target, we gather stock price information from Datastream. To avoid exchange rate effects in the study, all stock prices and accounting variables are reported in dollars. These include dividend-adjusted daily returns, prices, and volume. For firms with several classes of shares trading, we pick either the only one with data available or the share class with control rights.[10]

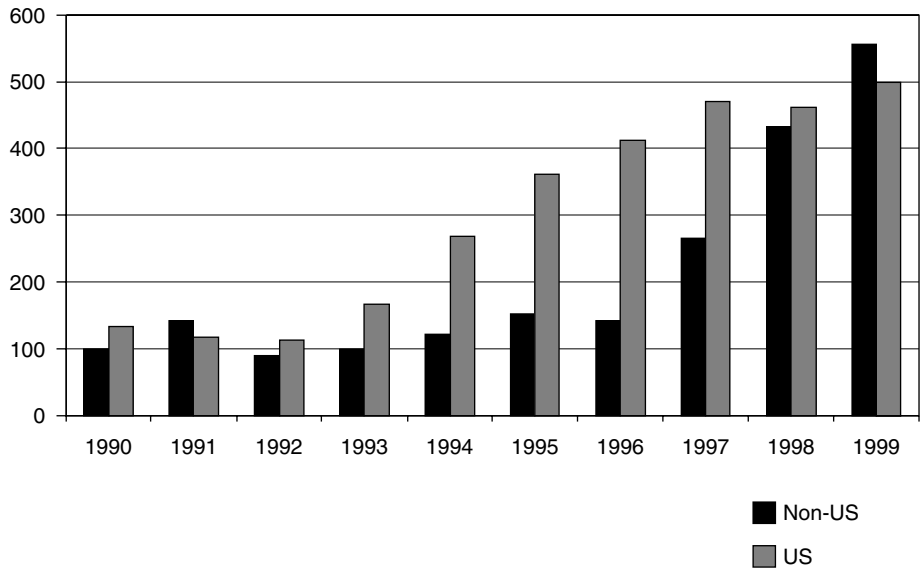

Fig. 1. Number of acquisitions by year and region

The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database. Only public companies are considered, and I exclude LBO deals, spinoffs, recapitalisations, self-tender and exchange offers, repurchases, minority stake purchases, acquisitions of remaining interest, and privatisations. Second and subsequent bids that occur within a window of four years relative to an initial announcement are excluded. Non-US data includes acquisitions from 52 countries.

[10] The share class with control rights may, as in Mexico and Sweden, be restricted to foreign investors. If all share classes have control rights, I select the first available in the Datastream list of codes.

Finally, when a domestic market index is needed, we use the value-weighted market index from CRSP for US acquisitions. For countries other than the USA the market index is the Datastream market data index, which is available for most of the countries in our sample.[11]

4. Stock Price Analysis

Reaction to the announcement

Abnormal returns are calculated for a window around the tender offer announcement for all the firms for which daily data are available. Market model regressions are performed in the following way:

$$R_{ijt} = \alpha_i + \beta_i R_{m_j t} + \epsilon_{it} \qquad t = -250, \ldots, -150$$

where R_{it} refers to the daily stock return for target firm i in country j, and $R_{m_j t}$ is the market return in country j. The residual ε_{it} defines the excess return for each firm and day. Days are, for the remainder of the paper, calendar days.[12]

We provide evidence on the stock price reaction to a tender offer in Table 2. One main concern when dealing with international data is the accuracy of the information regarding the announcement date. We perform two classes of tests. SDC reports the announcement date of the offer, as well as the original announcement date, which is defined as the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). We perform our estimation by using the original announcement date. Second, we check Lexis-Nexis for news with any reference to the target firm before the original announcement date in SDC, where the firm is confirmed (not rumoured) as a takeover target. Although we focus on news sources in English, we are able to identify 79 non-US announcements that precede the SDC reported date, and we use this date as our event date.

The last column in the table displays the ratio of the announcement return to the total tender offer return, that is,

$$\text{Announcement Effect} = \frac{\sum_{t=-1}^{+1} \epsilon_{it}}{\sum_{t=-100}^{+1} \epsilon_{it}}.$$

The results for the USA are consistent with the previous literature. We find a positive and significant cumulative abnormal return (two days around the announcement date) of 12.17%. Jensen and Ruback (1983) report an average of 7.72% for

[11] Total market calculations do not include all companies in a market. Instead the most important companies by market value are chosen – the precise number of constituents varies from market to market, according to the size of the market capitalisation, and changes to reflect current market conditions. For those countries for which the Datastream Market Index is not available, I use the CESI Index for Hungary, and the AKM Composite Index for Russia (USSR).

[12] While in the USA lack of data for a particular stock in a given day is not an issue, in emerging markets it is. Sometimes trading is suspended for a particular stock during a short period. Therefore, when the price information is missing for a given stock in a given day, one does not know whether it is due to non-trading or data unavailability (this is especially true in Datastream). A window of 30 trading days prior to the announcement of an acquisition may mean 6 weeks for one stock, and 3 months for other. I therefore use calendar days because I am interested in flows of information that happen during the same period of time.

Table 2

Price effects by geographical region

Cumulative Abnormal Returns around the announcement date of the tender offer, by geographical region of the target firm.
Cumulative abnormal daily returns are estimated from a market model regression in days $t = -250$ to $t = -150$ relative to the announcement date. Abnormal returns are then accumulated for different subperiods. The total sample includes all takeover announcement that take place between 1 January 1990, and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured).

Announcement Effect is calculated as $\sum_{t=-1}^{t=+1} \varepsilon_{it} \Big/ \sum_{t=-100}^{t=+1} \varepsilon_{it}$, where the ϵ_{it}'s are abnormal returns calculated from a market model, where the parameters have been estimated on a window from $t = -250$ to $t = -150$ relative to the tender offer announcement. Market Returns are obtained from CRSP (Value Weighted) for the USA, and from Datastream for the USA. For non-US deals, the market return is the Datastream market index for the corresponding country, except for Hungary (CESI Index), and Russia (AKM Composite Index). The first p-value is the probability of a greater absolutre value for the Student's t-statistic. The second p-value is the probability of a greater absolute value for the sign statistic, where the sign statistic equals p-n/2, p = number of values greater than 0, n-number of non-zero values.

		(−100,−51)		(−50,−11)		(−10,−2)		(−1,+1)		(+2,+60)		(−100,+1)		Announcement effect	
Country	N	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	Ratio	p-values
Asia	414	0.00	(0.948,0.267)	3.86	(0.001,0.108)	6.27	(0.000,0.008)	6.54	(0.001,0.000)	−0.63	(0.759,0.031)	16.68	(0009,0.108)	39.21	(0.000,0.008)
Canada	355	−0.06	(0.372,0.754)	0.77	(0.747,0.753)	6.31	(0.016,0.000)	8.49	(0.000,0.000)	−0.72	(0.849,0.114)	15.50	(0.000,0.753)	54.78	(0.000,0.000)

Table 2
Continued.

		(−100,−51)		(−50,−11)		(−10,−2)		(−1,+1)		(+2,+60)		(−100,+1)		Announcement effect	
Country	N	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	Ratio	p-values
Eastern Europe	18	−0.04	(0.668,0.210)	5.97	(0.232,0.332)	11.20	(0.258,1.000)	2.21	(0.133,0.455)	0.23	(0.977,0.332)	19.34	(0.095,0.332)	11.44	(0.090,1.000)
Latin America	32	0.18	(0.117,0.728)	6.77	(0.091,0.728)	4.28	(0.182,0.296)	0.77	(0.654,1.000)	7.87	(0.157,0.014)	12.00	(0.728,0.728)	6.37	(0.018,0.296)
Northern Europe	100	0.10	(0.032,0.039)	−0.35	(0.846,0.627)	2.70	(0.051,0.771)	12.81	(0.000,0.000)	1.69	(0.430,0.771)	15.26	(0.018,0.627)	83.93	(0.000,0.771)
Oceania	126	0.03	(0.496,0.777)	4.48	(0.011,0.188)	6.26	(0.004,0.072)	8.39	(0.000,0.000)	2.35	(0.434,0.777)	19.16	(0.472,0.188)	43.78	(0.000,0.072)
South Africa	68	0.11	(0.431,0.875)	7.90	(0.274,0.430)	10.26	(0.008,0.268)	4.45	(0.029,0.636)	20.01	(0.009,0.038)	22.72	(0.054,0.430)	19.58	(0.027,0.268)
UK	290	−0.03	(0.438,0.205)	1.31	(0.227,1.000)	2.61	(0.009,0.048)	16.33	(0.000,0.000)	2.93	(0.047,0.187)	20.22	(0.000,1.000)	80.77	(0.000,0.048)
USA	2841	0.18	(0.176,0.749)	0.94	(0.000,0.001)	3.97	(0.000,0.000)	12.17	(0.000,0.000)	−0.03	(0.041,0.985)	17.27	(0.199,0.001)	70.49	(0.000,0.000)
Western Europe	329	0.00	(0.890,0.915)	0.72	(0.485,0.308)	2.98	(0.008,0.218)	3.08	(0.000,0.009)	1.03	(0.616,0.630)	6.78	(0.006,0.308)	45.39	(0.000,0.218)

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

successful offers and 9.76% for unsuccessful offers. The samples they survey include deals between 1962 and 1978. The announcement CAR is 21.36% in Sanders and Zdanowicz (1992), 10.38% in Mikkelson and Ruback (1985), and 23.5% in Huang and Walkling (1987). Regarding the total tender offer price effect, we find a significant 17.27% CAR from day $t = -100$ to day $t = +1$ relative to the announcement date, lower than the 31.77% CAR in Bradley *et al.* (1988).

For the UK, Frank and Harris (1989) report a 23.3% significant CAR in the announcement month of the tender offer, in line with the significant 16.33% we find for our sample of 330 UK tender offers. Danbolt (2004) reports abnormal returns of 0.84% in cross-border acquisitions of UK firms. Table 2 provides CARs for the remaining countries as well, grouped by geographical region.[13] Excluding the USA and the UK, the announcement effect of the tender offer relative to the total price effect is 38%. Consistent with Bhattacharya *et al.* (1999), the announcement effect of a tender offer is not significant in Latin America.[14] The relative Announcement Effect ranges from 6.37% in Latin America to 83.93% in Northern Europe. Finally, it is worth noting that comparisons across countries are difficult because of differences in regulation and takeover characteristics. However, in section 6 we analyse the price reaction to tender offers, depending upon a country's insider trading laws.

5. Insider Trading Laws

5.1 *Overview*

Insider trading laws have existed in the USA since the Section 10(b) of the Securities and Exchange Act of 1934, which prohibits an insider from trading on material inside, non-public, information. Bainbridge (2001) describes the US IT laws in detail, and Bhattacharya and Daouk (2002) survey the existence and enforcement of IT laws in 103 countries with stock markets at the end of 1998. They conclude that US-type regulation is the exception rather than the rule. US IT laws are strict in the sense that they affect not only corporate insiders but also what the Rule 14e-3 defines as *constructive insiders*, as well as outsiders who receive inside information from either true insiders or constructive insiders.[15] Punishment has also become tougher over the years: in 1988 the maximum criminal penalty was raised to $1 million, and the maximum prison sentence increased to ten years. Finally, Section 16b of the Securities

[13] See Campa and Hernando (2004), and Goergen and Renneboog (2004), who report cumulative abnormal returns around the announcement of acquisitions in Europe.

[14] Bhattacharya *et al.* (2000), using a data set of corporate news announcements from Mexico (mainly corporate restructurings and earnings announcements) conclude that nothing much happens to a firm's stock return on the announcement day of an event. Mexico represents an interesting market since, although laws preventing insider trading have existed since 1975, they have never been enforced. Therefore, as the authors suggest, undisclosed insider trading may be responsible for the market's early response to corporate news. Although the result in that paper is in dramatic contrast with the classical studies in the USA (see Mikkelson and Ruback, 1985), it cannot be automatically generalised to other emerging markets, and it is not presented in isolation for different corporate announcements.

[15] Constructive insiders are those with a relationship with the issuer that at least implies a duty to keep the disclosed information confidential.

Exchange Act requires insiders to relinquish to the corporation all profits from short-swing trades.[16] Even though strict IT laws are in place, there is plenty of evidence that corporate insiders still profit from private information, especially preceding takeover announcements (Meulbroek, 1992; Keown and Pinkerton, 1981).

Bhattacharya and Daouk (2002) report data showing that, although only 16 countries out of the 103 countries they survey lack IT laws, they have been ever enforced in just 35 countries and, in 26 of them, only after 1990. *Enforcement* means, in their work, as well as here, initial prosecution, regardless of whether it is successful. In emerging markets there have been prosecutions in 23.1% of the countries. Differences still persist across countries. For instance, the evidence is that Britain's tough criminal prohibitions of IT are less effective than those in the USA, because most UK cases are civil actions that encourage defendants to settle without going to trial: criminal prosecutions are reserved for the big scandals. The British Department of Trade secured convictions in just 14 cases in 10 years after 1980. The biggest fine was £25,000 in 1987.[17] The most recent sentence, in December 1996, was for 120 hours of community service (*Financial Times*, 16 May 1997). In Japan, under the current law, only officers of the listed company or shareholders with more than 10% of the outstanding shares are covered. The worst penalty a court can impose under the current civil procedure is the offenders return of trading profits to the shareholders of the listed company. This has happened only once in nearly 40 years.

Additionally, cultural differences can make insider trading a good practice: its concept retains a somewhat ambiguously honourable status in Japan, and it is usually associated with smart investment (*Los Angeles Times*, 24 February 1988). In Latin and Asian countries, insider trading scandals usually display linkages to political power: cases like the Triangle scandal in France, or the Telefónica case in Spain, are commonplace. The Triangle scandal involved insider purchases of Triangle shares shortly before the company was bought by Pechiney in 1989. The six French buyers named in the *Commision des Opérations de Bourse* report included a close and long-standing friend of the president of the Republic. In the Telefónica case, the Spanish stock market regulators cleared the chairman of the company, a close friend of the country's prime minister, of wrongdoing in an insider trading investigation after an undisclosed option purchase. The *Comisión Nacional del Mercado de Valores* concluded as follows: 'The relevant roles of the individuals under investigation [. . .] could well raise the suspicion that they were in a position to possess confidential information that was not known by the market. The existence of mere suspicions, however, is not a sufficient base on which to press charges' (*Financial Times*, 12 July 2000). The 1989 Recruit scandal in Japan involved several companies that allowed top government officials to purchase stock at below-market prices.

5.2 *Price reaction and IT laws*

In this section we analyse the stock price reaction to the tender offer announcement in relation to the existence and enforcement of IT laws. If information leakage prior to

[16] A short-swing trade is defined as a purchase (sale) and a subsequent sale (purchase) within a six-month period.

[17] Imposed on a senior manager at Morgan Grenfell who used inside knowledge to deal in shares ahead of a takeover bid.

tender offer announcements is due to insider trading, there ought to be less of it when insider trading is prohibited.

Bhattacharya and Daouk (2002) find that it is the first prosecution, not the passing of the law, that is relevant for investors. They find a significant reduction in the cost of capital for firms when IT laws are first enforced, but not significant change after the law is merely passed. We use the data on existence and enforcement from their work. In Table 3 we replicate the analysis of section 3, where we consider only those target firms in countries that have passed IT laws and have initially enforced them in the period 1990–99. Therefore, the USA and the UK are, among others, excluded for the analysis in this subsection. There are 28 (43) countries in the sample that have enforced (passed) laws in the nineties. We consider three different subperiods: before the existence of IT laws; after the passing, but before the first prosecution; and after the first prosecution. The passing and first-enforcement years are excluded from the analysis.

Focusing on announcement effects, we find that the cumulative abnormal return in the three days around the announcement date is not significant in the first subperiod. We avoid the problem of a reduced number of observations by reporting significance levels calculated using a non-parametric test. The announcement effect accounts for only 0.52% (insignificant, based on the non-parametric test) of the total stock price reaction to the tender offer. Consistent with the evidence in Bhattachayra and Daouk (2000), the passing of the law makes no difference in terms of CARs. Based on the sign test, in none of the periods is the CAR significant in the second subperiod – that is, after the laws are passed but before they are first enforced. Moreover, we do not find differences across subperiods before and after the mere passing of the law.

In the last two rows in Table 3 we compute the CARs before and after the first insider trading prosecution. With a sample of 613 acquisitions, the pattern of returns is similar to the one documented in the literature (Jensen and Ruback, 1983; Mikkelson and Ruback, 1985; Sanders and Zdanowicz, 1992). No evidence of abnormal returns is found in days $(-100, -51)$, while the CARs in days $(-50, -11)$, $(-10, -2)$, and $(-1, +1)$, are respectively 3.45%, 7.01%, and 8.36% (all significant at the 1% level). The total price reaction to the takeover increases from 6.35% (not significant) to 18.81% (significant at the 1% level), after the first enforcement of the law. Similarly, the announcement CAR (days -1 to $+1$) increases significantly from 2.49% (insignificant) to 8.36% (significant at the 1% level). This evidence is in line with the results in Bhattacharya *et al.* (1999) for Mexico alone, since Mexico is a country in which insider trading has never been prosecuted.

Figure 2 plots the CAR around the announcement date of the tender offer in the three subperiods. Regarding the market reaction to a tender offer, one can conclude that it is not the mere existence of insider trading regulation but its enforcement that makes the difference. Therefore, for the remainder of the article, we focus on the effects of law enforcement on insider trading profits.

To summarise, there is evidence that IT laws are associated with more efficient financial markets. We find that it is the enforcement of the law in particular which is linked to a larger announcement effect of acquisitions. In the next section we attempt to explain this pattern of returns by looking at profits realised by insiders before any public news of an impending takeover. If the difference in returns is due to insider trading, then we expect IT profits to decrease when new regulation is in place. However, if insiders are able to still profit from illegal trading, and they are able to realise those gains, the efficacy of IT laws should be put into question.

Table 3

Price reaction to the takeover and IT laws

Stock price reaction to the acquisition before and after the existence and enforcement of insider trading laws.
Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002). Cumulative abnormal daily returns are estimated from a market model regression in days $t = -250$ to $t = -150$ relative to the announcement date. Abnormal returns are then accumulated for different subperiods. The total sample includes all takeover announcement that take place between 1 January 1990, and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). Market Returns are obtained from CRSP (Value Weighted) for the USA, and from Datastream for the USA. For non-US deals, the market return is the Datastream market index for the corresponding country, except for Kenya (Nairobi Stock Exchange Index), Hungary (CESI Index), Russia (AKM Composite Index), and Zimbabwe (Zimbabwe Stock Exchange Index). Announcement Effect is calculated as $\sum_{t=-1}^{t=+1} \varepsilon_{it} \Big/ \sum_{t=-100}^{t=+1} \varepsilon_{it}$, where the ϵ_{it}'s are abnormal returns calculated from a market model, where the parameters have been estimated on a window from t = −250 to t = −150 relative to the tender offer announcement. Market Returns are obtained from CRSP (Value Weighted) for the USA, and from Datastream for the USA. For non-US deals, the market return is the Datastream market index for the corresponding country, except for Hungary (CESI Index), and Russia (AKM Composite Index).
The first p-value is the probability of a greater absolute value for the Student's t-statistic. The second p-value is the probability of a greater absolute value for the sign statistic, where the sign statistic equals p-$n/2$, p = number of values greater than 0, n-number of non-zero values. Tests of differences are based on a Wilcoxon rank-sum test.

		(−100,−51)		(−50,−11)		(−10,−2)		(−1,+1)		(+2,+60)		(−100,+1)		Announcement effect	
	N	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	%CAR	p-values	Ratio	p-values
Before IT laws existence	27	−0.20%	(0.002,0.009)	0.19%	(0.002,0.442)	−0.83%	(0.008,1.000)	1.37%	(0.014,1.000)	−2.08%	(0.021,0.248)	0.52%	(0.176,0.442)	260.99%	(0.005,1.000)
After IT laws existence but before first enforcement	103	0.01%	(0.000,1.000)	0.47%	(0.005,0.555)	3.37%	(0.034,0.431)	2.49%	(0.025,0.324)	−4.39%	(0.044,1.000)	6.35%	(0.075,0.555)	39.27%	(0.064,0.431)
p-value (H_0: difference = 0)		(0.0428)		(0.5817)		(0.4250)		(0.5621)		(0.8408)		(0.3996)		(0.1286)	

After IT laws existence but before first enforcement	103	0.01%	(0.000,1.000)	0.47%	(0.005,0.555)	3.37%	(0.034,0.431)	2.49%	(0.025,0.324)	−4.39%	(0.044,1.000)	6.35%	(0.075,0.555)	39.27%	(0.016,0.431)
After IT laws first enforcement	613	−0.01%	(0.776,1.000)	3.45%	(0.001,0.018)	7.01%	(0.000,0.000)	8.36%	(0.000,0.000)	0.74%	(0.604,0.935)	18.81%	(0.000,0.018)	44.44%	(0.000,0.000)
p- value (H_0: difference = 0)		(0.9791)		(0.3933)		(0.4488)		(0.0071)		(0.4642)		(0.0354)		(0.0197)	

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

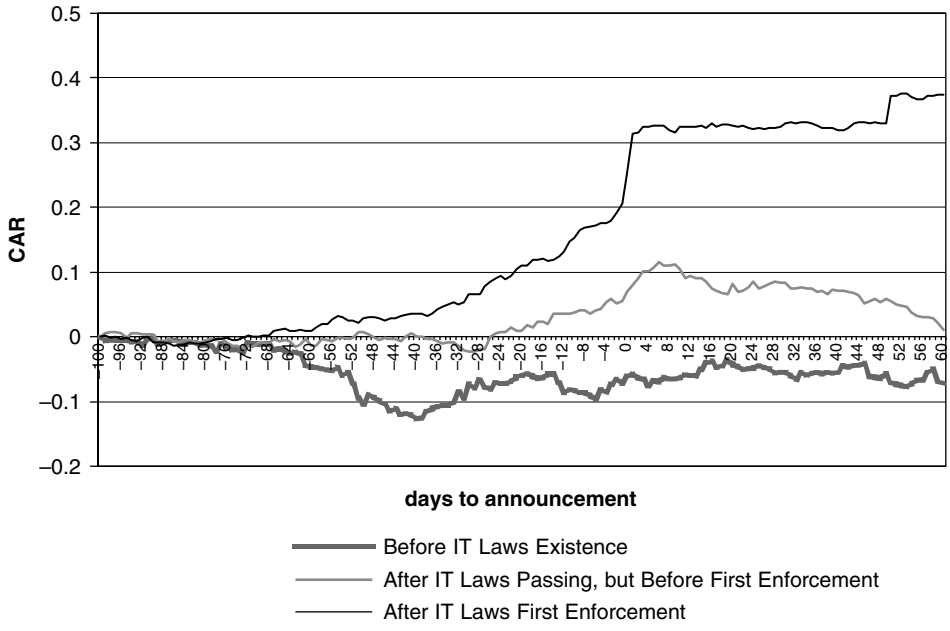

Fig. 2. Price reaction to the takeover and IT laws

Stock price reaction to the acquisition before and after the enforcement of insider trading laws. Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2000). Cumulative abnormal daily returns are estimated from a market model regression in days $t = -250$ to $t = -150$ relative to the announcement data. The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumored). Market Returns are obtained from CRSP (Value Weighted) for the USA, and from Datastream for the rest. For non-US deals, the market return is the Datastream market index for the corresponding country, except Hungary (CESI Index) and Russia (AKM Composite Index).

6. Measure of IT profits

6.1 *Abnormal volume and return*

Most studies that examine the evidence on insider trading profits in US markets have used the Official Summary of Security Transactions and Holdings as the main source of data (see Seyhun, 1986; Rozeff and Zaman, 1988). Others, like Meulbroek (1992), sample illegal insider trading cases from the SEC's Enforcement Division Information. Although this information is readily available for the USA, information on insider trading cases under investigation is hardly available elsewhere. Moreover, one ignores how many insider trading cases remain undetected, even in the USA. Given that many of the countries under our study lack any IT regulation during the

sample period, and in the absence or malfunctioning of the detection mechanisms, data on insider trading activities must rely on indirect measures.

The measure we use in this study is calculated under the assumption that insiders have imperfect knowledge about a forthcoming takeover attempt. Therefore, they buy at the current stock price and sell at the prevailing price after the announcement of the tender offer. Ideally, if an insider knows that a takeover is going to succeed for sure, he could still keep the shares until the completion of the acquisition. In a perfectly efficient market, and in the absence of bid revisions, the target price at the announcement date of the offer equals the bid price times the market probability of the bid's succeeding, plus the stock price of the target firm in case the bid fails, times the probability of failure. Additionally, assuming perfect information regarding the details of the acquisition implies that insiders can never lose money, since they are never going to purchase target shares when the current stock price is higher than the (known) future bid price, or when they know with certainty that the proposed acquisition is going to be rejected by the target shareholders.

For each tender offer in our sample, we estimate IT profits as follows:

$$\Pi_i = \frac{\sum_{t=-T}^{-5} \frac{B_i - P_{it}}{B_i - P_{i0}} Vol_{it}^*}{N_i} \times 100 \tag{1}$$

where

$$Vol_{it}^* = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{VOL}] & \text{if } Vol_{it} > \overline{Vol_i} + 2\sigma_{VOL} \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

We calculate $\overline{Vol_i}$, and σ_{VOL} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from date $t = -200$ to day $t = -100$ relative to the announcement date. B_i denotes the stock price at $t = 0$ (in dollars), which we assume equals the bid price times the expected probability of bid success, plus one minus the probability of success times the value of the firm if the acquisition fails; and P_{i0} is the average target stock price (in dollars) calculated over a window of 40 days from $t = -100$ to $t = -60$, relative to the announcement date. N_i is the total number of shares in the target firm. We calculate Π_i for two different horizons, $T = 60$ and $T = 30$. The calculation is truncated at $t = -5$ because we assume that public news regarding the acquisition may be public one week (five trading days) before the public announcement. This is a conservative approach. We use different subperiods for the calculation of average prices and volumes, without significant change in the results.

Note that IT profits Π_i can be expressed also as:

$$\begin{aligned} \Pi_i &= \sum_{t=-T}^{-5} \frac{Vol_{it}^*}{N_i} \frac{B_i - P_{it}}{B_i - P_{i0}} \times 100 \\ &= \sum_{t=-T}^{-5} ABVOL_{it} \times ABPR_{it} \times 100 \end{aligned} \tag{3}$$

that is, the product of the abnormal turnover times the abnormal price change from the current stock price to the bid price – normalised to the total takeover gains per share. In this sense, Π_i represents the percentage of the total takeover gains (relative to the stock price 60 days before the takeover announcement) that are captured by informed insiders. If, instead, news about an impending takeover is publicly available before the official

public announcement, one intuitively expects that buy orders push the stock price until it equals the expected bid price, thus canceling any profit from anticipated trading. $ABPR_{it}$ can be greater than one if the stock price falls below P_{i0} in the period $[-T, -5]$. If this is the case, obviously informed insiders buy stock from investors who sell at a completely wrong time, and the superabnormal return realised by insiders is an indication of the uninformed losses. Suppose, for instance, that the stock price is $P_{i0} = \$2$ before any tender offer decision has been taken. Further assume that an insider is able to buy at $P_{it} = \$1$ from an uninformed investor one week before the public announcement, and the market reaction to such an announcement drives the stock price up to $B_i = \$10$. Obviously the uninformed investor losses \$1 (that is, \$1–\$2), relative to a potential gain of \$8 (\$10–\$2). The insider illegally makes \$9. The ratio $B_i - P_{it}/B_i - P_{i0} = 1.125$ reflects the insider's profit relative to the uninformed maximum potential gain.

6.2 *Calibration with actual insider trading data* (Cornell and Sirri, 1992)

An illustrative example will help characterise the reliability of the IT profit measure. Cornell and Sirri (1992) analyse the behaviour of stock prices and volume around the announcement of the acquisition of Campbell Taggart by Anheuser-Busch. The acquisition was followed by criminal and civil litigation that tried to determine the flow of insider trading happening before the public announcement. The SEC investigation found that 38 insiders had bought a total of 265,000 shares (29% of Campbell Taggart's total volume in the period) in about one month, which were sold back only after the announcement of the acquisition. Cornell and Sirri (1992) report the whole sequence of insider trades, so it is possible to calibrate the performance of the IT profits estimate presented above.[18]

Relative to the total number of shares outstanding as of the day of the tender offer,[19] the actual average daily insider trading volume was 1.51%, from day $t = -30$ through day $t = -5$. The return on those trades[20] relative to the stock price before the announcement is calculated as $B_i - P_{it}/B_i - P_{i0}$ in (1). Multiplying the daily abnormal volume and the relative return of each trade yields 1.88%. We obtain that the estimated insider volume using (2) is 1.07%. That is, a simple measure based on public information is able to detect a 71.19% of the actual inside volume. The evidence in favour of our measure of abnormal volume is even stronger if one considers the period $t = -30$ to $t = -1$. In this case, the total insider turnover is 1.88%; we obtain 1.70% using $ABVOL$ (this means a 90.64% detection). Moreover, the correlation between actual and estimated insider trading volume is 0.9. Therefore, and depending on the estimation window, the error in the IT profit measure ranges from 9% to 28%. That is, in the absence of direct knowledge, we provide as good a proxy as can be created.

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[18] Friederich *et al.* (2002) use a similar procedure for trades in the London Stock Exchange.

[19] The number of outstanding shares at the time of the acquisition was 15.004 million, from CRSP.

[20] I use CRSP data to estimate the average stock price in days $t = -100$ to $t = -60$ (P_{0i} in the formula), as well as the mean and standard deviation of the trading volume from $t = -200$ to $t = -100$. The results are $P_{0i} = \$23.18$, $\overline{Vol_i} = 12,384$ shares, and $\sigma_{VOL} = 18{,}269$ shares.

6.3 *Results*

Table 4 reports the values of Π_i by geographical region depending on the nationality of the target firm. We also report the corresponding average daily abnormal turnover, calculated as

$$\frac{1}{N_j}\sum_{i=1}^{N_j}\frac{1}{T-5}\sum_{t=-T}^{-5}\frac{Vol_{it}^{*}}{N_i},$$

where N_j is the number of acquisitions in country (region) j. The table also shows the percentage of deals for which the abnormal volume (and possibly the IT profit measure) is positive. In the USA, IT profits are positive in 44.30% of the cases. Although Lakonishok and Lee (2000) find evidence of insider trading in half of their sample, Cao *et al*. (2005), and Arnold *et al*. (2000), confirming the theoretical predictions of Easley *et al*. (1998), document that informed trading before takeovers has migrated from stocks to options. In particular, Arnold *et al*. (2000) show that the average return on call options of takeover targets is fourteen times that of the return on stocks. Our results show that on average 0.863% of the total takeover gains in the USA are captured by insiders who purchase shares in the last 30 days preceding the public announcement (0.743% when they trade in the last 60 days).

In South Africa the IT profits are negative. Note that IT profits can be negative if insiders purchase shares at a price higher than the bid price, or if, after purchasing shares at a price lower than the expected bid price, the offer is rejected by incumbent shareholders and the stock price increase upon the bid announcement is very low. Note that, from Table 1, 74% of the acquisitions in South Africa fail. Profits in the UK are the lowest amongst those countries with significant results at the 10% level. IT profits are also low in the USA (0.863%), Western Europe (0.603%) and Oceania (0.758%). By countries – not reported in the Table – the largest IT profits occur in Canada (35.18%), Hong Kong (3.44%), and Norway (2.33%). Focusing on Norway, Eckbo and Smith (1998) study the performance of insider traders on the Oslo Stock Exchange and find that in their sample the average security has 96 insiders trading a total of 80 times in the period January 1985–December 1992. Although their work does not focus on takeovers, they conclude, using conditional estimates, that Norwegian insiders do not earn significant profits. We find positive and significant profits for insiders, even though IT laws have existed in Norway since 1985 but were not enforced until 1990.[21]

In Table 5 we consider only those targets in countries where IT laws have been newly enforced between January 1990 and December 1999. Focusing on the results for the last 25 days before the announcements, we find evidence that average IT profits (per firm) multiply by a factor of five for the overall sample after the first enforcement of IT regulation. The largest increase happens in Western Europe, where IT profits

[21] There is a potential reason for such a strange result in Norway. Out of the 104 acquisitions of Norwegian targets in our sample, in 31 of them the bidder owned a toehold prior to the public announcement. This is a large percentage compared to the 15.1% of US bidders who acquire a toehold (see Bris, 2000). Moreover, I find that in nine acquisitions there are shares acquired in the last 60 days before the public announcement. The percentage of shares acquired in those nine targets is 20.37 on average. In Norway, toehold acquisitions larger than 10% of a company's stock must be disclosed.

Table 4

Insider trading profits by geographical region

Profits from insider trading by geographical region.
Insider trading profits are calculated as:

$$\text{Profits} = \sum_{t=-T}^{-5} \frac{Vol_{it}^{*}}{N_i} \frac{B_i - P_{it}}{B_i - P_{i0}}$$

where

$$Vol_{it}^{*} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{if} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

We calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. B_i denotes the stock price at $t = 0$ (in dollars), and P_{i0} is the average target stock price (in dollars) calculated over a window of 40 days from $t = -100$ to $t = -60$ relative to the announcement date. N_i is the total number of shares in the target. We calculate IT profits for two different horizons, $T = 60$ and $T = 30$.
Abnormal volume is calculated as:

$$\text{Abnormal volume} = \frac{1}{\text{T} - 5} \sum_{t=-T}^{-5} \frac{Vol_{it}^{*}}{N_i}$$

The total sample includes all takeover announcements that took place between 1 January 1990, and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured).

		From day −30 to day −5					From day −60 to day −5				
Region	N	Profits (%)	p-value	Daily abnormal volume (%)	p-value	% Positive	Profits (%)	p-value	Daily abnormal volume (%)	p-value	% Positive
Asia	414	0.402***	(0.0000)	0.095***	(0.0000)	46.50%	0.814***	(0.0000)	0.069***	(0.0000)	52.14
Canada	355	13.647***	(0.0001)	0.069***	(0.0000)	40.76	35.188***	(0.0000)	0.711***	(0.0000)	46.94
Eastern Europe	18	−0.017	(0.6250)	0.009	(0.1250)	33.33	1.250	(0.2188)	0.021**	(0.0313)	45.46

Latin America	32	−0.016	(1.0000)	5.266**	(0.0156)	27.27	0.056	(0.5078)	5.267***	(0.0020)	42.86
Northern Europe	100	0.430***	(0.0003)	0.031***	(0.0000)	37.71	1.405***	(0.0000)	0.035***	(0.0000)	46.48
Oceania	126	0.411***	(0.0013)	0.039***	(0.0000)	44.07	0.758***	(0.0000)	0.027***	(0.0000)	53.85
South Africa	68	0.254**	(0.0414)	0.046***	(0.0000)	46.88	−0.225***	(0.0005)	0.043***	(0.0000)	57.90
UK	290	−0.284***	(0.0001)	0.021***	(0.0000)	38.28	0.037***	(0.0000)	0.019***	(0.0000)	48.37
USA	2841	0.863***	(0.0000)	0.045***	(0.0000)	38.51	0.743***	(0.0000)	0.044***	(0.0000)	44.30
Western Europe	329	0.326***	(0.0000)	0.064***	(0.0000)	44.44	0.603***	(0.0000)	0.052***	(0.0000)	49.71

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

Table 5

Insider trading profits and insider trading laws

Profits from insider trading before an after the enforcement of insider trading laws.
Insider trading profits are calculated as:

$$\text{Profits} = \sum_{t=-T}^{-5} \frac{Vol_{it}^{*}}{N_i} \frac{B_i - P_{it}}{B_i - P_{i0}}$$

where

$$Vol_{it}^{*} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

We calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. B_i denotes the stock price at $t = 0$ (in dollars), and P_{i0} is the average target stock price(in dollars) calculated over a window of 40 days from $t = -100$ to $t = -60$ relative to the announcement date. N_i is the total number of shares in the target firm. We calculate IT profits for two different horizons, $T = 60$ and $T = 30$.
Abnormal volume is calculated as:

$$\text{Abnormal volume} = \frac{1}{T-5} \sum_{t=-T}^{-5} \frac{Vol_{it}^{*}}{N_i Q_i}$$

The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002). Tests of difference are based on a Wilcoxon rank-sum test.

	Before IT laws first enforcement						After IT laws first enforcement						Difference	
		Profits		Daily abnormal volume				Profits		Daily abnormal volume				
	N	Ratio (%)	p-value	Percentage	p-value	%Positive	N	Ratio (%)	p-value	Percentage	p-value	%Positive	Profits (%)	Abnormal volume (%)
Total Sample	145	0.07**	(0.0294)	0.026**	(0.0294)	24.18	580	0.36***	(0.0000)	0.073***	(0.0000)	48.87	0.291*	0.047***

From day −30 to day −5													
Asia	54	0.09*	(0.0574)	0.041***	(0.0001)	32.35	276	0.08**	(0.0334)	0.068***	(0.0000)	44.36	−0.004	0.027*
Eastern Europe	0			0.000		0.00	14	−0.02	(0.6250)	0.012	(0.1250)	50.00		0.012
Western Europe	61	−0.07	(1.0000)	0.011***	(0.0005)	23.08	108	1.18***	(0.0096)	0.177***	(0.0000)	60.78	1.255**	0.166***
Latin America	2	0.00		0.000			17	−0.03	(1.0000)	0.004*	(0.0625)	60.00	−0.029	0.004
Northern Europe	10	0.23	(0.5000)	0.029	(0.5000)	40.00	85	0.48***	(0.0009)	0.033***	(0.0000)	39.62	0.246	0.004
Oceania	18	0.39	(0.6250)	0.028	(0.1250)	14.29	80	0.28***	(0.0075)	0.041***	(0.0000)	68.18	−0.119	0.013**

	Before IT laws first enforcement						After IT laws first enforcement						Difference	
		Profits		Daily abnormal volume				Profits		Daily abnormal volume				
	N	Ratio (%)	p-value	Percentage	p-value	%Positive	N	Ratio (%)	p-value	Percentage	p-value	%Positive	Profits (%)	Abnormal volume (%)
Total Sample	146	−0.02***	(0.0022)	0.023***	(0.0022)	30.30	581	1.06***	(0.0000)	0.062***	(0.0000)	58.41	1.078**	0.039***
From day −60 to day −5														
Asia	55	−0.40*	(0.0768)	0.024***	(0.0000)	34.29	276	0.75***	(0.0000)	0.059***	(0.0000)	54.05	1.150*	0.035**
Eastern Europe	0			0.000		0.00	14	1.61	(0.2188)	0.030**	(0.0313)	62.50		0.030
Western Europe	61	0.05	(0.1435)	0.026***	(0.0000)	37.50	108	1.87***	(0.0005)	0.132***	(0.0000)	66.07	1.816*	0.106***
Latin America	2	0.00		0.000			17	0.02	(0.4531)	0.004**	(0.0156)	71.43	0.023	0.004
Northern Europe	10	0.55	(0.5000)	0.026	(0.5000)	40.00	86	1.59***	(0.0000)	0.039***	(0.0000)	49.21	1.032	0.013
Oceania	18	0.58	(0.3750)	0.017*	(0.0625)	18.18	80	0.70***	(0.0001)	0.030***	(0.0000)	74.36	0.119	0.013***

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

change from −0.07% (non significant) pre-IT laws, to 1.18% (significant at the 1% level), followed by the Nordic countries (where IT profits double, although non-significantly). It is noteworthy that IT profits increase because abnormal volume increases: for all the countries that have enforced IT laws during the sample period, the abnormal volume almost triples (significantly at the 1% level) in the post-law period. Similar results are obtained for the last 55 days before announcement. In Western Europe, where we find a significant increase in IT profits, abnormal volume multiplies by 16 after the first enforcement of the law.

In terms of number of episodes of IT, we find evidence of positive abnormal volume in 24.18% (30.30%) of the observations before the enforcement of IT Laws, and 48.87% (58.41%) afterwards, in the 25 (55) days that precede the public announcement. This evidence implies that IT is more frequent, and insiders therefore capture a larger portion of the takeover gains, after the enforcement of IT regulation.

In Table 6 we analyse the change in IT profits depending on the year when the law was first enforced. It is possible that the merger wave of the late 1990s has caused insiders to take active interest in acquisitions. This effect can drive the results in Table 5, since most of the countries that have enforced IT laws have done so in the late 1990s. Therefore, an increase in the profit measure could be the consequence of a time trend, regardless of the legal status of insider trading. When splitting the sample in this way, we still find a significant increase (1.08% versus 0.61%) in IT profits after the first enforcement of the law, if only for countries that enforce IT regulation after 1995. Due to the lack of observations, results are not significant for the pre-1995 period. In any case, and using non-parametric statistics, we find no evidence of differences in IT profits before and after 1995.

Although this evidence might not be conclusive for some readers, we perform in the next section several robustness tests that try to rule out alternative explanations for the findings in this section.

6.4 *Robustness analysis*

6.4.1 *Shortcomings of the IT measure*. Trying to account for a possibly undetected illegal behaviour is obviously subject to a measurement error. Since we are assuming that insiders buy at a certain time $t < t_o$ and sell at t_o, where t_o is the date of the public announcement, we rule out the possibility of short-swing trades by insiders. Such a simplifying assumption has two effects: first, it overstates the actual profits made by insiders; second, and consequently, the calculated abnormal volume can also be greater than one. In the example in section 5.1, suppose that, after buying 10 shares at \$1 each one week before the acquisition, our insider sells them back one day later to another insider, and at the same purchase price. If there are 100 shares outstanding, and if 10 shares qualify as abnormal trade, the total IT profit measure will yield $\Pi_i = \frac{10}{100}\frac{10-1}{10-2} + \frac{10}{100}\frac{10-1}{10-2} = 22.5\%$, while the actual profit is $\frac{10}{100}\frac{1-1}{10-2} + \frac{10}{100}\frac{10-1}{10-2} = 11.25\%$. The IT profit measure is consistent however with the assumption that insiders have private information regarding the impending takeover. If our insider knows about a takeover happening one week after she purchases the stock, she will never sell one day later at no profit. Besides, the main focus here is not the interpretation of the absolute magnitude, but the comparison of two different regimes, before and after IT regulation. Therefore, while profits in both subperiods overstate the real magnitude of the problem, their difference does not.

Table 6

Insider trading profits and insider trading laws, by date of first enforcement

Profits from insider trading before and after the enforcement of insider trading laws.
Insider trading profits are calculated as:

$$\text{Profits} = \sum_{t=-T}^{-5} \frac{Vol_{it}^{*}}{N_i} \frac{B_i - P_{it}}{B_i - P_{i0}}$$

where

$$Vol_{it}^{*} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

We calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. B_i denotes the stock price at $t = 0$ (in dollars), and P_{i0} is the average target stock price(in dollars) calculated over a window of 40 days from $t = -100$ to $t = -60$ relative to the announcement date. N_i is the total number of shares in the target firm. We calculate IT profits for two different horizons, $T = 60$ and $T = 30$.
Abnormal volume is calculated as:

$$\text{Abnormal volume} = \frac{1}{T-5} \sum_{t=-T}^{-5} \frac{Vol_{it}^{*}}{N_i Q_i}$$

The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002). Tests of difference are based on a Wilcoxon rank-sum test.

Table 6
Continued.

	Before IT laws first enforcement						After IT laws first enforcement						Difference	
		Profits		Daily abnormal volume				Profits		Daily abnormal volume				
	N	Ratio (%)	p-value	Percentage	p-value	%Positive	N	Ratio (%)	p-value	Percentage	p-value	%Positive	Profits (%)	Abnormal volume (%)
From day −30 to day −5														
IT Laws first enforced before 1995	42	0.17*	(0.0654)	0.040***	(0.0010)	36.00	87	0.03	(0.1671)	0.023***	(0.0000)	22.41	−0.14	−0.02
IT Laws first enforced after 1995	43	0.06	(0.1796)	0.074***	(0.0001)	62.50	482	0.33***	(0.0000)	0.075***	(0.0000)	48.13	0.27*	0.00**
p-value, H_o: Difference = 0		(0.8785)		(0.1675)				(0.5062)		(0.0007)				
From day −60 to day −5														
IT Laws first enforced before 1995	43	0.10*	(0.0923)	0.023***	(0.0002)	38.46	87	−0.15**	(0.0227)	0.025***	(0.0000)	28.57	−0.25	0.00
IT Laws first enforced after 1995	43	0.61**	(0.0414)	0.067***	(0.0000)	68.18	483	1.08***	(0.0000)	0.065***	(0.0000)	57.41	0.47*	0.00**
p-value, H_o: Difference = 0		(0.4298)		(0.0125)				(0.1529)		(0.0000)				

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

The second pitfall of the measure in (1) lies in its statistical properties. Since Vol^*_{it} depends on the distribution of abnormal volume, the expectation of Vol^*_{it} is as follows:

$$E\left[Vol^*_{it}\right] = E[Vol_{it} - \overline{Vol_i} - 2\sigma_{VOL} | Vol_{it} > \overline{Vol_i} + 2\sigma_{VOL}] \quad (4)$$

Obviously (see Johnson *et al.*, 1994), $E\left[Vol^*_{it}\right]$ can depend on σ_{VOL}.[22] Therefore, if IT laws make volume more volatile, the profit measure will change even in the absence of any regulatory effect. In our sample, and considering only those countries with observations pre- and post-IT laws, the median standard deviation of volume is 4,167.22 shares before the enforcement of IT laws,[23] and 595.35 shares after the first prosecution. Therefore, even without any other effect of IT regulation on insiders' behaviour, we expect Π_i to decrease after the first enforcement of the law. Ajinkya and Jain (1989) argue that, since volume data are nonnormal, a better benchmark to calculate abnormal volume should be $\log(1 + Vol_{it})$. Our results are robust to changes in the benchmark.

Finally, a measure that is based on abnormal trades assumes that insiders will trade in large blocks. However, models *á la* Kyle (1985) suggest that insiders will dribble out their trades to avoid being detected. Here we focus on abnormal volume for several reasons. First, the existing detection mechanisms for insider trading consist of alerts triggered by abnormal volume and price movements.[24] Second, as the literature on detected illegal insider trading shows, insider trading episodes are associated with abnormal volume. Meulbroek (1990) examines the trading pattern before public announcements preceded by illegal insider trading and finds significant positive pre-announcement date average abnormal volume. Cornell and Sirri (1992) analyse insider trades in the Anheuser-Busch's 1982 tender offer for Campbell Taggart. They find that the trading volume in Campbell Taggart increased dramatically in the last ten days before the tender offer announcement. Moreover, out of the 586,000 shares traded in the last ten days that preceded the public announcement, 240,600 (41%) were undisclosed insider trades. These are only two examples of detected illegal insider trading in the USA, where, as Beny (2005) shows, insider trading regulation ranks first in terms of quality of enforcement. Finally, one important assumption in Kyle (1985) is that informed investors observed everything known to the less informed

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[22] For instance, if Vol_{it} is distributed normally, with mean $\overline{Vol_i}$ and standard deviation σ_{VOL}, then one obtains $E\left[Vol^*_{it}\right] = K\sigma_{VOL}$, where K is a positive constant. However, the expectation is not defined for any other distribution such that $\Pr\left[Vol_{it} > \overline{Vol_i} + 2\sigma_{VOL}\right] = 0$.

[23] Calculated over the period $t = -200$ to $t = -100$ days relative to the announcement date.

[24] The International Organization of Securities Commissions (IOSCO) states explicity in its recommendations to national regulators that detection mechanisms should be based on abnormal price or volume movements:

> If a security appears to increase suddenly in price or volume of trading, or both, such that manipulative activity is suspected, the investigator should perform some analysis of the market for the security and why the price or volume, or both, may be changing suddenly. The investigator should examine how the securities were introduced and traded in the market. If the security was previously issued and outstanding, as opposed to being a new issue, the investigation may include an analysis of the security's historical price movements.

(IOSCO, 'Investigating and prosecuting market manipulation', Report by the Technical Committee, May 2000. Available at http://www.iosco.org/docs-public-2000/2000-market_manipulation.html)

investors. Different trading patters arise if one assumes that private information takes the form of differential information (see, for instance, He and Wang, 1995).

6.4.2 *Alternative hypotheses*. In this section, we study whether the measure of IT profits defined in (1) measures legal, informed trading by outsiders, such as the bidder, institutions, and individual investors, driven by takeover rumours. Additionally, we check the reliability of the IT profit measure by estimating the abnormal volume in non-takeover related, normal days.

Insider trading prosecution cases often rely on circumstantial evidence (Spiegel and Subrahmanyam, 1995) based on alerts triggered by unusual price and volume movements. The New York Stock Exchange, for instance, screens trading through Stock Watch, a computerised system that automatically flags unusual volume or price changes in any listed stock. The estimate Π_i is a noisy measure of those unusual movements. It is hard to argue that trading that results in significant volume is due to illegal insider trading. In the USA, for instance, short-swing profits must be disgorged to the firm. Therefore one expects informed insiders either to refrain from publicly trading on their own company's stock when their company is known to be a takeover target, or to engage in illegal insider trading. Nevertheless, the profit calculation may include other evidence of legal trading that puts the previous results into question.

Toeholds. First, bidders usually acquire small stakes in the firms they target (toehold) preceding takeover announcements. An abnormal increase in trading volume could be an indication of an open market purchase by the bidder. The evidence for the USA and the UK shows that very few acquirors do purchase toeholds,[25] therefore our results cannot be explained solely by toeholds. Although the IT profit measure is positive in 1,976 acquisitions in the sample, in only 153 cases does the bidder acquire shares in the target in the six months that precede the tender offer announcement. The average toehold in our sample is 2.77%, and the percentage acquired by the bidder in the last six months before the tender offer is 0.51%.[26]

Informed outsiders. Second, if sophisticated outside investors are able to correctly predict takeover targets, they can benefit from their privileged knowledge by trading on the target's stock before any public announcement. The question is to what extent the results in the previous subsection are due to outsiders who, after IT regulation, become more confident about not getting 'ripped off' and trade more actively based on their own information. An intuitive test of that alternative explanation for larger abnormal volumes after IT regulation consists of analysing the profit measure depending on the severity of the law. One expects outsiders to become more confident the more severe the newly enforced law is regarding trading by insiders. A good measure of law quality is prosecution of tippees or, under US law, 'constructive insiders'. A law that prohibits insiders from trading, but that allows tippees to use inside information is very easy to circumvent. If Π_i measures trading by informed

[25] See Jarrell and Poulsen (1989), Betton and Eckbo (2000), Bradley *et al*. (1988), Jennings and Mazzeo (1993), and Bris (2000).

[26] If only the acquirors with positive toeholds are considered (563 cases), the average toehold is 27.18%, while the percentage acquired in the last six months is 15.71 on average for the 153 acquirors that do so.

outsiders, then it must be larger for those countries where tippees are prosecuted. We use the information in Beny (2005), who describes most IT laws in detail, and provides information regarding the legal status of tippees. We consider only countries with observations pre- and post-enforcement, and we calculate the daily abnormal volume in the days preceding the tender offer announcement. Results are in Table 7. Abnormal trading significantly increases after the first enforcement of the law, irrespective of the consideration given to tippees. Moreover, we do not find significant differences in volume after the enforcement of the law between the two groups of countries. Daily turnover is 0.074% when tippees are not prosecuted and 0.075% when tippees are prosecuted (both in the period $t = -30$ to $t = -5$). Contradicting the hypothesis that the results are driven by confident outsiders, we do find that cases of positive abnormal volume are more frequent the less severe the law is: abnormal volume is positive in 68.18% of the acquisitions when tippees are not liable and in only 57.41% when they are.

One potential indication of public information spread among outsiders is takeover rumours. Rumours, or information leaks preceding a takeover battle, may induce heavy trading. As with toeholds, very few acquisitions in our sample are initiated by rumours. The SDC Database defines a deal as rumoured when the press release issued by the acquiror mentions that the acquisition originally began as a rumour. We find evidence of takeover rumours in only 254 cases. But, from the results in Table 5, the abnormal profit measure is positive in 2,120 cases. Hence rumours cannot explain the evidence presented.

Speculation frenzies and lucky investors. Finally, abnormal volume may be driven by lucky investors who buy the target's stock at the right time, or by speculation frenzies. We analyse this possibility by estimating daily abnormal volume in two distinct subperiods. This helps support the claim that abnormal volume days are indeed driven by insiders. In Table 8 we show the daily abnormal volume in normal days – that is, days not related to the tender offer announcement. These include observations from day $t = -120$ to $t = -60$ and from $t = +100$ to $t = +200$. We compare the results to the daily abnormal volume obtained during pre-takeover days (days $t = -60$ to $t = -5$). Consistent with Table 5, we show that abnormal volume in the pre-takeover period increases from 0.023% to 0.062% (a factor of 2.70, significant at the 1% level) after the first enforcement of insider trading laws.[27] However, in normal days volume increases by a factor of only 1.52 (significant at the 10% level). Similarly, we confirm the usual patter of increasing volume surrounding corporate acquisitions, since the ratio of pre-takeover abnormal volume to normal-days abnormal volume is significantly larger than one. Before the first enforcement of IT regulation, abnormal volume increases from 0.011% in normal days to 0.023% in the pre-takeover period. The numbers are 0.017% and 0.062% respectively after the first enforcement.

In the post-enforcement period, cases of abnormal volume represent 58.41% of the acquisitions when calculated over the days that immediately precede the public announcement. We find that abnormal turnover is positive in only 18.67% of the cases in normal days. This represents an increase of 3.13 times in the abnormal volume. In the pre-enforcement period, although there is an increase in the

[27] Only countries with pre- and post-enforcement information are included in this table.

Table 7

Do outsiders trade more actively after IT regulation?

Daily abnormal volume before and after the enforcement of insider trading laws, and depending on whether tippees are prosecuted as insiders, or not. Daily abnormal volume is calculated as:

$$\text{Abnormal volume} = \frac{1}{\mathrm{T}-5}\sum_{t=-T}^{-5}\frac{Vol_{it}^{*}}{N_i Q_i}$$

where

$$Vol_{it}^{*} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

We calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. B_i denotes the stock price at $t = 0$ (in dollars), and P_{i0} is the average target stock price (in dollars) calculated over a window of 40 days from $t = -100$ to $t = -60$ relative to the announcement date. N_i is the total number of shares in the target firm. We calculate abnormal volume for two different horizons, $T = 60$ and $T = 30$.

The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumored). Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002). Tests of difference are based on a Wilcoxon rank-sum test.

	Before IT laws first enforcement				After IT laws first enforcement				
		Daily abnormal volume				Daily abnormal volume			
	N	Percentage	p-value	%Positive	N	Percentage	p-value	%Positive	Abnormal volume (%)
From day −30 to day −5									
Tippees not prosecuted	42	0.040	(0.0010)	36.00	43	0.074	(0.0001)	62.50	0.034
Tippees prosecuted	87	0.023	(0.0000)	22.41	482	0.075	(0.0000)	48.13	0.052***
p-value, H_o: difference = 0		(0.3686)				(0.6594)			

From day −60 to day −5									
Tippees not prosecuted	43	0.023	(0.0002)	38.46	43	0.067	(0.0000)	68.18	0.044**
Tippees prosecuted	87	0.025	(0.0000)	28.57	483	0.065	(0.0000)	57.41	0.040***
p-value, H_o: difference = 0		(0.4308)				(0.3298)			

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

Table 8

Abnormal volume prior to tender offer announcement, and in normal days

The table shows the average daily abnormal volume for different subperiods relative to the tender offer announcement, and for countries that have enforced insider trading laws within the period 1985–2000.
Average daily abnormal volume is calculated as:

$$\text{Daily abnormal volume} = \frac{1}{T_2 - T_1} \sum_{t=T_1}^{T_2} \frac{Vol_{it}^*}{N_i}$$

where

$$Vol_{it}^* = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

I calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -220$ to day $t = -120$ relative to the announcement date. N_i is the total number of shares in the target firm. The abnormal volume for normal days is estimated for a window from $t = -120$ to $t = -60$ and from $t = +100$ to $t = +200$ relative to the tender offer announcement day. Pre-takeover days include observations from $t = -60$ to $t = -5$ relative to the announcement. I exclude from the estimation all tender offers that take place during the year when IT laws are enforced. The total sample includes all takeover announcements that took place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from Datastream. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002). P-values are based on a non-parametric sign test. P-values for the difference (ratio) are based on a Wilcoxon rank-sum test.

	Normal days				Pre-takeover days				Ratio pre-takeover/normal days			
	N	Abnormal volume	p-value	%Positive	N	Abnormal volume	p-value	%Positive	Volume	p-value for the difference	%Positive	p-value for the difference
Before IT laws enforcement	201	0.011%	(0.0000)	14.070	198	0.023	(0.0000)	30.300	2.05	(0.6104)	2.15	(0.2759)
After IT laws enforcement	667	0.017%	(0.0000)	18.672	660	0.062	(0.0000)	58.410	3.65	(0.0301)	3.13	(0.0001)
Ratio after/before IT laws		1.52		1.33		2.70		1.93				
p-value for the difference		(0.0575)		(0.0189)		(0.0000)		(0.0004)				

pre-announcement days, the difference is not significant. Therefore, our calculation of insider trading profits includes some trades by outsiders (either informed or not), which makes the ratio an imperfect indication of illegal insider trading. However, we show in Table 8 that the distortion induced by outside informed trades does not affect the main result.

Do insiders sell at the announcement? As a final robustness test, we study the insiders' behaviour at the announcement of the tender offer. The ratio Π_i is calculated under the assumption that insiders buy in the pre-announcement period and sell upon the public confirmation of the acquisition by the bidder. Consequently, we expect (i) heavy volume at the announcement, and (ii) a positive relationship between abnormal volume before the acquisition and at the announcement. Table 9 shows the abnormal turnover in the target firm at $t = 0$. It is calculated for the overall sample and depending on IT law enforcement. Not surprisingly, the largest abnormal volume happens in Canada (10.92% of the target shares abnormally traded in one day), where insider trading profits are also the largest. In the USA, with a sample of 3,001 acquisitions, abnormal volume is 4.32%.

When considering all the observations in the sample, we find that the abnormal volume is 0.025% before a country enforces IT regulation and increases to 3.99% after the first enforcement of the law. Since enforcement countries also have more liquid markets (the USA, the UK and Canada), one cannot conclude that this effect is solely due to a change in regulation. However, we also display the results for the subsample of countries with both pre- and post-enforcement data. The second row in Table 9 shows that the abnormal turnover at $t = 0$ is 0.0736% after the first enforcement of IT laws, and only 0.0022% before (this implies an increases of 33 times, significant at the 1% level). The largest volume is found in Western Europe, where 2.75% of all the shares available change hands the day the tender offer is announced.

7. Do Insiders' Trades Move Prices?

In this section we analyse the relationship between abnormal volume and prices in the pre-announcement period. The literature on the relationship between insider trades and stock prices is controversial. Chakravarty and McConnell (1999) find that trades by Ivan Boeksy, a confessed inside trader, before a particular acquisition, did not have a different effect on prices than trades by non-insiders. Cornell and Sirri (1992) conclude that insiders moved prices but, unlike the direct evidence in Chakravarty and McConnell (1999), they use the percentage of total volume attributable to insiders. Meulbroek (1992) also shows that returns are larger in days of insider trading.

This issue is of particular importance here, since the insider trading measure proposed in section 5 includes both a price and a volume component. If abnormal volume does not affect prices, then insider trading is more profitable. If, instead, the market recognizes a large trade as an indication of inside information, and prices react consequently, the profits to the insider could vanish. It is also interesting to analyse to what extent IT laws affect the relationship between price and volume.

Table 9

Abnormal volume at the announcement of the tender offer

The table shows the abnormal volume at the date of the tender offer announcements, for the total sample and by geographical region. Abnormal volume is calculated as Vol^*_{it}/N_i, where N_i is the number of shares outstanding at the time of the offer, and Vol^*_{it} is calculated as:

$$Vol^*_{it} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

I calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. The total sample includes all takeover announcement that take place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Volume data is obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002). P-values for the difference are based on a Wilcoxon rank-sum test.

	Before IT laws enforcement		After IT laws enforcement		
	Number of observations	Turnover t = 0 (%)	Number of observations	Turnover t = 0 (%)	Difference (p-value)
All countries	344	0.0250	4595	3.9913	(0.0000)
All countries with obs. pre- and post-IT laws enforcement	195	0.0022	640	0.0736	(0.0000)
Asia	100	0.0020	317	0.0310	(0.1026)
Canada			425	10.9220	
Eastern Europe	4	0.0000	16	0.0310	(0.5256)
Latin America	5	0.0010	29	0.0000	(0.1526)
Northern Europe	13	0.0100	107	0.2490	(0.5859)
Oceania	34	0.0010	84	0.0080	(0.2138)
South Africa	78	0.0040			
United Kingdom			340	0.0090	
United States			3001	4.3220	
Western Europe	110	0.0720	249	2.7510	(0.1519)

We estimate the following regression:

$$\begin{aligned} R_{it} = {} & \text{Firm Fixed Effects} + \text{Year Fixed Effects} \\ & + \alpha_0(1 - IT_i) + \alpha_1 IT_i \\ & + [\beta_0(1 - IT_i) + \beta_1 IT_i] R_{m_i t} \\ & + [\gamma_0(1 - IT_i) + \gamma_1 IT_i] ABVOL_{it} \\ & + [\delta_0(1 - IT_i) + \delta_1 IT_i] DUMVOL_{it} + \varepsilon_{it}, \qquad t = -60, \ldots, -5, \end{aligned} \tag{5}$$

where R_{it} is the daily return on the target firm, $R_{m_i t}$ is the market return in the country of nationality of firm i, and $IT_i = 1$ if insider trading laws have been enforced in the country before the year the tender offer i is announced.[28] Moreover, $ABVOL_{it} = Vol^*_{it}/N_i$, and $DUMVOL_{it} = 1$ if $ABVOL_{it} > 0$, and zero, otherwise. There are 169,069 firm-day observations, corresponding to 4,573 acquisitions. Table 10 shows the estimates for the total sample, as well as for the countries that have enforced the law during the sample period only.

The first two rows of Table 10 show the coefficients of the estimation for the total sample. While the number of abnormal trades does not affect prices before the first enforcement of IT laws, it does so after the enforcement. The abnormal volume dummy shows a positive and significant coefficient in both regimes, and not significantly different. Consistent with Bhattacharya *et al.* (1999), we document a larger reaction to volume after the enforcement of the law. The next panel considers only those countries that have enforced IT laws between 1985 and 1999. There are 29,130 firm-day observations in this case. In both subperiods there is evidence that prices react when trading volume is very large, but there are no significant differences. In fact, even though the coefficients for the abnormal volume are different (0.0145 before IT laws, 0.0177 afterwards), their difference is not significant.[29] The results for the after-IT law period are not different from those in the USA, where the coefficient of abnormal volume is 0.4392 (significant at the 1% level), and the coefficient of the abnormal volume dummy is 0.0128 (significant at the 1% level).

Bhattacharya and Daouk (2002) show empirically that in fact the cost of capital decreases after the first enforcement of IT laws. They propose several theoretical arguments for their finding, although they do not discriminate among the different explanations. First, IT laws reduce the adverse–selection problem faced by uninformed investors (Dennert, 1992; Amihud and Mendelson, 1986; Easley and O'Hara, 2004). Second, large shareholders have an incentive to exert monitoring effort to increase value rather than search for private benefits through insider trading (Beny, 2005). Finally, IT laws increase the supply of funds, increase the diversification opportunities, and therefore reduce a firm's risk premium-demand side explanations. If IT laws help reduce the adverse-selection problem faced by uninformed investors, or if they reduce the incentives for insiders to engage in stealth trading, then effective laws must have an impact on the relationship between the market reaction to a large trade and the price. We do not find evidence of such an effect. However, consistent with the finding in Table 5, where we show that IT profits have the largest increases in

[28] I again exclude observations corresponding to the year of enforcement.

[29] The standard deviation of the coefficients is respectively 0.122 and 0.0647, with zero correlation.

Table 10

Price sensitivity to abnormal volume

The table shows the results of the following regression:

$$R_{it} = \alpha_0(1 - IT_i) + \alpha_1 IT_i + [\beta_0(1 - IT_i) + \beta_1 IT_i]R_{mit} + [\gamma_0(1 - IT_i) + \gamma_1 IT_i]ABVOL_{it} + [\delta_0(1 - IT_i) + \delta_1 IT_i]DUMVOL_{it} + \varepsilon_{it}$$

Where $ABVOL_{it} = Vol^*_{it}/N_i$ is the abnormal volume,

$$Vol^*_{it} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

R_{mit} is the market return for the country of nationality of firm *i*. $DUMVOL_{it}$ is a dummy variable that takes value 1 whenever $Vol^*_{it} > 0$, and $IT_i = 1$ if the corresponding acquisition takes place after the first enforcement of IT laws in the home country, zero otherwise. The estimation is performed in a window from $t = -60$ to $t = -5$ relative to the tender offer announcement. The equation is estimated with year- and firm-fixed effects, and heteroskedasticity-consistent p-values are reported. The table presents results for the whole sample, and for the 28 countries that have enforced IT laws between 1990 and 1999. The total sample includes all takeover announcement that take place between 1 January 1990 and 31 December 1999, available in the Securities Data Corporation Mergers and Acquisitions database, for which stock price information is available. Stock prices are obtained from CRSP, for US announcements, and from Datastream, for non-US acquisitions. All stock prices are in dollars. For each acquisition, the announcement date is the date when the target company is first publicly disclosed as a possible takeover candidate (not rumoured). Data on existence and enforceability of insider trading laws is obtained from Bhattacharya and Daouk (2002).

				Intercept		Market return		Abnormal volume		Dummy: $ABVOL_{it} > 0$	
	R-squared	N	(%)	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Total sample	99.563	153,983	Prior to IT laws	−0.0039**	(0.0183)	0.5961***	(<0.0001)	0.1152	(0.7205)	0.0155**	(0.0449)
			After IT laws	−0.0034***	(<0.0001)	0.6201***	(<0.0001)	0.3029***	(<0.0001)	0.0144***	(<0.0001)
All countries with obs. pre- and post-IT laws enforcement	99.697	29,130	Prior to IT laws	−0.0037***	(<0.0001)	0.5946***	(<0.0001)	−0.0560	(0.8126)	0.0145***	(0.0001)
			After IT laws	−0.0032***	(<0.0001)	0.6169***	(<0.0001)	0.0499	(0.7637)	0.0177***	(<0.0001)
USA	99.869	111,317	Prior to IT laws								
			After IT laws	−0.0028***	(<0.0001)	0.6154***	(<0.0001)	0.4392***	(<0.0001)	0.0128***	(<0.0001)

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

Western Europe and Asia, Table 9 reports a larger impact of abnormal volume on prices in these two regions. Therefore, why IT laws reduce the cost of capital still remains an empirical question.

8. Cross-sectional Evidence

In this section, we formulate a regression model for the determination of insiders' profits that takes into account firm- and country-specific factors. In a nutshell, the main result of this section is that, after controlling for firm, time, and country characteristics, the first enforcement of IT laws is associated with an increase in IT profits.

Our results above are based on firm-specific evidence. Because IT trading laws are enacted (enforced) at the country level, cross-sectional regressions at the firm level have the problem that observations are severely clustered within countries. To circumvent such a problem, we calculate the median IT profits, as well as the frequency of acquisitions where IT profits are positive, in each country and year, and use these variables as our dependent variables in the next regressions. We do not include in the sample country-year observations with no merger activity. We use medians to eliminate the effect of extreme observations. In most of the specifications we employ year-fixed effects and country-random effects. Country-random effects allow us to estimate the effect of IT laws quality, which is constant within a country, as described below.[30]

We additionally calculate the median standard deviation of trading volume and use it as a control in the regressions. As per the definition of the IT profit measure in (1), and as described in Section 5.4.4, there is by construction a direct relationship between IT profits and standard deviation of volume. For each firm we calculate standard deviation of trading volume using daily observations from $t = -200$ to $t = -100$ relative to the acquisition announcement.

We control for alternative regulatory changes and their effect on IT profits. In Bekaert and Harvey (2005), financial liberalisation is a way for countries to reduce financial imperfections. Financial liberalisation affects insider's behaviour because, as more sophisticated foreign investors are allowed to participate in equity markets, they require better corporate governance and therefore experience less insider dealing. We use the dates of official financial liberalisation provided in Bekaert and Harvey (2005). In median, countries pass IT regulation the same year they liberalise the equity markets. The extremes are the USA, where markets were liberalised in 1980, but where IT laws were passed in 1934, and first enforced in 1961; and Germany, were markets where liberalised in 1980, but where no IT laws existed until 1994. There are more important differences between liberalisation and enforcement of the law. In median, eight years pass between the date of financial liberalisation, and the first time IT laws are enforced. The USA is again in the extreme. Austria, on the other hand, liberalised its markets in 1980 but prosecuted its first case of insider trading in 2000. As with the IT dummy, we construct a liberalisation dummy that equals one if the

[30] We have also estimated the model with country-fixed effects rather than country-random effects whenever possible. Results are qualitatively equivalent, with the IT enforcement dummy significant at the 5% level. Country-random effects are used in La Porta *et al.* (2002).

acquisition happens after the year the country's financial markets are liberalised, and equals zero if before.

Additionally, we control for the existence of merger laws in the country. The reason is that countries can simultaneously introduce IT and takeover laws. Takeover rules usually require that the acquiror makes a public offer once she reaches an ownership threshold. Therefore, takeover laws interact with IT laws in their objective to prevent IT. Dates of enactment of takeover laws are shown in Table 1.

We test for the relationship between IT regulation and IT profits with the introduction of three variables in the regression. First, we use two dummies for IT laws existence and enforcement. A significant and positive coefficient implies that IT laws increase the market reaction to new corporate information, and hence the potential profits from illegal insider trading. This would support the idea that the more strictly a law is enforced, the more profitable it becomes to violate it. Second, we regress insider trading profits on the index of toughness of insider trading laws constructed by Beny (2005). She constructs an index that is the sum of five indicators. The first indicator takes value one if tippees are legally considered to be secondary insiders. Similarly, the second indicator equals one if an insider can be held liable not only for trading but also for tipping third parties. The third component equals one if monetary penalties are proportional to insiders' trading profits. The fourth component asks whether the law grants investors a private right of action, and the fifth indicator equals one if violation of IT laws is a criminal offense (zero, otherwise). The index equals five for the USA, Ireland, and South Korea, and equals one for Mexico, Norway, and Russia. When the quality index is used in the estimation, we restrict the sample to only those countries with existing IT laws.

Results from the estimation are displayed in Table 11. Since observations are time overlapped, we calculate Newey-West autocorrelation consistent *p*-values, to control for cross-correlation in residuals. We first consider the whole sample, and then restrict the analysis to only those countries that have first enacted IT trading laws in the period 1990–99. Because there are no observations pre-liberalisation in the subsample of countries with regulatory changes, the market liberalization dummy is not included in the second panel.

First we find that IT laws are positively related to the magnitude of IT profits (the coefficient is significant at the 10% level), but do not significantly determine the frequency of IT episodes. In economic terms, the first enforcement of IT laws increases the median profits realised by insiders 2.9% (2.2% after we control for the quality of IT laws). The magnitude of the coefficients is larger when we restrict the estimation to the countries that have enforced IT laws during the sample period, for which we have pre- and post-enforcement information. In this case, the first enforcement of IT laws increases IT profits by 3.6% (4.4% after controlling for the quality of IT laws). If any, it seems that IT laws make IT trading episodes less frequent – the sign of the coefficients is negative, although not significant.

We find that harsher laws prevent the profitability, not the incidence, of IT. For the overall sample the IT quality variable is significant at the 10% level. However, because there is less variation in laws quality for the subsample of countries with regulatory changes, the variable is not significant in this case. Moreover, we find that takeover laws positively affect both the magnitude and the frequency of IT events. This is evidence that takeover laws increase the frequency of acquisitions. However, our results show that the effect of IT laws still persists once we control for takeover laws. Table 11 reports similar results regarding the standard deviation of trading

Table 11

Cross-sectional regressions

Regression of median insider trading profits by country, and frequency of acquisitions with positive IT profits, on explanatory variables. Insider trading profits are calculated as:

$$\text{Profits} = \sum_{t=-60}^{-5} \frac{Vol_{it}^{*}}{N_i} \frac{B_i - P_{it}}{B_i - P_{i0}}$$

where

$$Vol_{it}^{*} = \begin{cases} Vol_{it} - [\overline{Vol_i} + 2\sigma_{vol}] & \text{if} \quad Vol_{it} > \overline{Vol_i} + 2\sigma_{vol} \\ 0 & \text{otherwise} \end{cases}$$

For each firm in the sample, we calculate $\overline{Vol_i}$ and σ_{vol} as the mean and standard deviation of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. B_i denotes the stock price at $t = 0$ (in dollars), and P_{i0} is the average target stock price (in dollars) calculated over a window of 40 days from $t = -100$ to $t = -60$ relative to the announcement date. N_i is the total number of shares in the target firm. Target firm average volume is calculated as the mean of the daily volume (number of shares traded), in target firm i from day $t = -200$ to day $t = -100$ relative to the announcement date. Target firm size is the market value of the firm in dollars. 'IT laws existence (enforcement)' is a dummy variable that takes value one when the acquisitions is announced in a year when the country of nationality of the target firm has existing (enforced) insider trading laws. Information about IT Laws is obtained from Bhattacharya and Daouk (2002). Information on merger laws is from the White & Case Ltd. *Worldwide Antitrust Merger Notification Requirements Report*, and the quality of IT laws index is from Beny (2005). We calculate by country-values as the median IT profits and standard deviation of trading volume. Frequency of IT episodes is the percentage of acquisitions where IT is positive. P-values are based on a Newey-West autocorrelation consistent covariance estimator.

	Median insider trading profits				Frequency of IT episodes			
Variable	Model I		Model II		Model IV		Model V	
IT laws enforcement before announcement	0.029*	(0.0607)	0.022*	(0.0738)	−0.118	(0.2547)	−0.096	(0.1993)
IT laws existence before announcement	−0.004	(0.8891)			0.120	(0.4827)		
Quality of IT regulation			−2.1E-03*	(0.0762)			−0.011	(0.7793)

Table 11
Continued.

Variable	Median insider trading profits				Frequency of IT episodes			
	Model I		Model II		Model IV		Model V	
Standard deviation of trading volume (−120,−60) × 1000	1.2E-03***	(<0.0001)	3.9E-04***	<.0001	5.0E-03**	(0.0180)	1.4E-05***	(0.0011)
Markets liberalized before announcement	0.043	(0.1551)	0.030	(0.4235)	−0.074	(0.7127)	0.179	(0.4385)
Existence of merger law in the country	0.064***	(0.0023)	0.022	(0.1814)	0.237*	(0.0923)	0.071	(0.4585)
Country-random effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Number of observations	370		294		370		294	
Adjusted R-squared	44.22%		44.08%		19.61%		15.28%	

Panel B: Countries with IT laws enforced between 1990 And 1999

Variable	Median insider trading profits				Frequency of IT episodes			
	Model I		Model II		Model IV		Model V	
IT laws enforcement before announcement	0.036*	(0.0799)	0.044**	(0.0454)	−0.113	(0.3900)	−0.103	(0.3390)
IT laws existence before announcement	−0.003	(0.9378)			0.294	(0.1787)		
Quality of IT regulation			−0.009*	(0.0895)			−0.032	(0.6390)
Standard deviation of trading volume (−120,−60) × 1000	1.3E-03***	(<0.0001)	5.3E-03	(0.3642)	5.5E-03**	(0.0211)	5.0E-03	(0.1271)
Existence of merger law in the country	0.078***	(0.0072)	0.035	(0.1361)	0.378**	(0.0283)	−0.030	(0.7861)
Country-random effects	Yes		Yes		Yes		Yes	
Year fixed effects	Yes		Yes		Yes		Yes	
Number of observations	162		88		162		88	
Adjusted R-squared	44.22%		44.08%		24.34%		19.61%	

*, **, and *** indicate that the coefficient is significantly different from zero at the 0.1, 0.05 and 0.01 levels or better, respectively.

volume. As predicted, there is a significant relationship between standard deviation of volume and IT profits. However, the standard deviation effect does not cancel the effect of regulation.

9. Conclusion

Insider trading regulators face a fundamental dilemma: by prohibiting insider trading, they make it more profitable. This study shows that, as new laws on insider dealing are enforced, the potential profits from insider trading rise. By gathering information on IT in 52 countries in the world and by analysing a firm's stock reaction before a tender offer announcement on a sample of 4,541 acquisitions, we find that the profits to insiders, calculated over the 55 days that precede a public announcement, increase after IT laws are enforced. We nevertheless report evidence showing that the toughness of the law matters. Therefore, the effect of IT laws on insider behaviour depends on the toughness of the penalty violators face if ever detected. Additionally, there is evidence that the market response to the announcement of a takeover increases with IT laws. The rationale for this result is that, by increasing the liquidity of the stock, IT laws facilitate information being impounded into stock prices.

One issue that this work raises for future research is the effect of insiders' behaviour on liquidity. In market microstructure, the usual argument is that IT laws enhance market liquidity because market participants face a lower risk of trading against an informed investor. On empirical grounds, Cornell and Sirri (1992) find instead that liquidity was larger on days where insiders where in the market, at least in the Campbell-Taggart episode. This article contributes to such contradiction by showing that IT law enforcement is associated with an increase in liquidity (as shown by Bhattacharya and Daouk, 2000) and more frequent trading by insiders. The theoretical literature on insider trading, except De Marzo *et al*. (1998), and Spiegel and Subrahmanyam (1995), does not consider the effects of IT laws where insider trading is prohibited but where insiders do trade. In this situation, we would observe two countervailing effects: uninformed investors would still face an adverse-selection problem, and therefore liquidity would reduce. However, since the optimal detection policy would then entail investigations following large volume or price movements (see De Marzo *et al*., 1998), uninformed investors would have an incentive to trade more heavily as a deterrent effect for insiders. Which effect dominates would depend on the efficacy of the law at detecting insiders, the severity of the punishment, and the transparency of markets.

One contribution here is that, instead of examining the relationship between detected IT profits and regulation, we estimate an indirect measure of insiders' profits that is based on unusual price and volume movements. This approach circumvents the difficulties of drawing any empirical conclusion from the sole use of detected insider trading, allowing us to analyse the behaviour of insiders with private information on corporate events in the absence of IT laws and thus of any detection technology.

This work yields a major implication for future research. IT regulation, if not accompanied by some other institutional response, fails to eliminate the advantages of inside information. The only way of reducing the potential benefits of breaking the law is to improve a firm's disclosure requirements, increase penalties, and improve the detection technology. And, 'even if detection were certain, one can imagine a situation where the monopoly profits were so high – in millions of pounds – that many would opt to break the law, grab the money, have plastic surgery and disappear' (*Financial*

Times, 26 February 1987). The interaction of these three mechanisms is what may make IT laws work. It is worse to have a regulation that fails to prosecute those who violate it (Mexico, Norway, Russia), than no law at all. The legal reform in countries that have started it – especially in Eastern European countries – should definitely take into account that laws that are not accompanied by good enforcement are useless at best.

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