Elements of Effective Insider Trading Laws: A Comparative Analysis

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Abstract

Literature on insider trading has increasingly shown that the unrestricted presence of illegal insiders is both harmful to investors and to the development of the market as a whole. Pervasive insider trading is responsible for increased bid-ask spreads, lower liquidity, concentrated share ownership, less accurate prices and even lower levels of analyst following. The damage is reduced upon the enactment of laws designed to limit insider trading. However, while the laws seek to limit the harm from insider trading, they do not seek to completely remove it, due largely to the often cited information benefits of insiders. The presence of insiders in the market can act to signal information that the market is unaware of or has mispriced resulting in more informed prices and better resource allocation. Given the established benefits of insider trading laws and the need to maintain a balance between the pro's and con's of insider trading, the question becomes what is the most effective structure for insider trading legislation.

At present the literature provides little evidence as to what makes for good insider trading laws. As a result, there have been a number of countries whose attempts to regulate insider trading have resulted in weak laws including the Netherlands criminal only sanctions and New Zealand's private enforcement system. Further, efforts to regulate insider trading in emerging markets have largely proven unenforceable for a variety of reasons. Given the cost of improper regulations on the market, such a hit and miss approach is not ideal.

This paper will seek to address the issue of what aspects of insider trading regulations result in an effective legal regime by examining variables that proxy the level of informed trading in the market against variables designed to capture quantifiable aspects of the laws within a country that may be important. This will employ the Madhaven et al. (1997) bid-ask spread decomposition model, to isolate the cost of informed trading and regress it against variables designed to measure the coverage of insider trading laws, the enforcement of the laws and the sanctions available. The aim of this study will be to examine these variables against a broad cross-section of countries to isolate the relative merits of various aspects of the laws countries have implemented to try and identify the most effective system of laws.

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Elements of Effective Insider Trading Laws

Introduction

As has been shown in other studies, insider trading laws can be effective in controlling the impact insiders have on a number of aspects relating to financial markets. Strong insider trading laws can increase liquidity and share ownership (Beny, 2005), alter the informational basis of insiders trades, reduce the abnormal returns insiders receive and reduce the volatility of share prices, the cost of capital (Bhattacharya and Dauok, 2002) and the bid-ask spread (Chung and Charoenwong, 1998). This only occurs however when the legal regime makes the cost of insider trading sufficiently high and/or the benefit low enough that the incentive for insiders to trade is significantly reduced. The benefits to the market of such laws however are high and include a stronger, more efficient capital market with lower risks of transacting, reduced transaction costs and more appeal to small and foreign investors. Given the well established benefits of efficiently functioning capital markets there should therefore be a desire to control insider behaviour.

While the harm from insider trading has been firmly established both theoretically and empirically, the benefits of insiders are equally well accepted. The response from regulators has been to attempt to balance between beneficial and harmful insider activity via regulation. However, while such laws have been implemented in the vast majority of financial markets (Bhattacharya and Dauok, 2002), the most effective combination of prohibited behaviours and punishments for reducing insider trading and by extension information asymmetry in the market has remained largely unexplored.

Studies have shown that the construction of the laws is important both generally and with respect to insider trading. The law and finance literature in particular has examined how the quality and coverage of institutional settings affects the development of financial markets. La Porta et al., (hereafter LLSV) in a series of papers showed that numerous aspects of financial market development were dependent on effective and enforceable investor protection regimes. These included access to equity and debt capital (1997), share ownership concentration (1998), corporate valuations (1999) and ease of access to new equity capital from the public (2003). Further, a paper by Johnson et al., (2000) showed that variables such as investor protection and quality of law enforcement were related to the extent of market declines during periods of financial crisis.

The evidence of the impact of insider trading laws on the market is much more limited but tells a similar tale, namely that stronger and enforced laws reduce the impact of insiders on the market. Beny (2005) establishes that stronger laws are associated with higher liquidity, wider share ownership and increased price accuracy. In particular Beny concludes that deterrents are the most important formal legal factor affecting these aspects of the market, although enforcement is also vital. Garfinkel

(1997) explores changes in the regulatory regime within the US following the enactment of tighter new laws. He concludes that significant changes in insider trading behaviour, including the timing around announcements, followed from the regulatory change, suggesting the impact from stronger laws is due to changes in insiders behaviour. While Bhattacharya and Daouk (2002) finds that reductions in the cost of capital require the laws to be enforced, which is supported by Beny (2005). Bushman Pitroski and Smith (2005), when looking at analyst following within countries, find a slightly different outcome, with only developing and emerging markets requiring actual enforcement. Developed markets were found to be given the benefit of the doubt. This finding however is likely due to the high overall ratings for developed markets in terms of the quality and independence of legal systems. The earlier chapters of this thesis also show that when insider trading laws were more likely to be enforced, and therefore arguably stronger, the market saw major improvements in a number of areas. The evidence does therefore suggest that the structure of the rules governing insider trading and the potential for enforcement are important in limiting insiders activities.

We seek to develop further the literature on the role that insider trading laws have in controlling insiders. In particular we seek to extend the work of Beny (2005) by exploring the specific elements of insider trading laws that result in a reduction in the level and harm from insider trading. Specifically we focus on the transaction costs of 1073 companies within 18 countries over the period September 2004 to August 2005 and their relationship to specific and quantifiable aspects of the insider trading regimes within those countries. In particular we look at the contribution of information asymmetry to trading costs by employing the Madhaven, Richards and Roomans (1997) decomposition model. We also utilise two additional variables, the average percentage spread and the average effective spread. The first proxies the cost of informed trading and the other two the trading costs in general. We average the cross-sectional values for each company belonging to a country to create a country measure of these variables. Against this we examine a number of variables designed to capture elements of the coverage of the laws, the sanctions that can be imposed, the overall strength of the laws and the strength of enforcement within the country.

We examine the impact of the laws on the transaction costs as they are directly affected by the prevalence of insiders. The spread is widely perceived as being made up of three components representing the various financial costs and risks facing a liquidity provider. The order-processing costs represent the ordinary costs of executing a trade while the inventory-holding component compensates the provider for the risk of holding an inventory position in that particular stock. The final cost component is information asymmetry, or the risk that the provider will trade against a better informed trader, a class that includes most notably insiders (Copeland and Galai (1983); Glosten and Milgrom, 1985). To compensate for loses from trading against better informed traders, liquidity providers widen the spreads such that the extra they make on each trade will over time balance out the

expected loses. Therefore the transaction costs are inherently linked to the level and harm from insider trading within the market via the information asymmetry component. Eleswarapu and Venkataraman (2003) take this one step further and point out that the legal environment will therefore affect the equity trading costs. Where the laws are weak or ineffective in limiting insiders, the risk to liquidity providers is therefore much greater resulting in wider spreads than would occur in markets where the laws were effective or enforced.

We find strong support for the hypothesis that the strength of insider trading laws positively affects the cost of transacting within a market. This is driven predominantly by specific aspects of both the scope of the laws and sanctions available. Particularly we find that laws that stop insiders from passing on confidential price-sensitive information and laws that allow for financial penalties above the potential level of the gain or lose avoided are most effective. Further we find that enforcement strength is also a key aspect of an insider trading regime. Countries that have enforced laws have lower trading costs than those that have not as per the findings of Bhattacharya and Dauok (2002). We also find that private enforcement has little effect on the level of information asymmetry within the market while public enforcement does seem capable of controlling insider trading. Our findings suggest that the laws do matter and that careful consideration needs to be given when constructing insider trading laws to incorporate those elements that will be most effective in controlling insider trading.

The paper is structured as follows. Section 2 provides more details on the sample employed and the variables constructed in this paper. Section 3 presents summary statistics for the variables collected and presents the findings of the regression analysis. Section 4 concludes the paper and discusses the implications of our findings.

Sample

To determine the important components of an insider trading regime we select 18 countries where data on specific aspects of their insider trading regime was available. We also required that the primary financial market within each country be either a limit order book ("LOB") or a dealer market. Other market structures have different pricing processes that make determining the components of the bid-ask spread problematic. Some markets however run several systems, usually employing LOBs and dealer markets for the more liquid stocks and other systems, such as auctions, to improve liquidity in smaller firms. Where this occurred shares trading under other systems were excluded from the sample. For each of these countries we then selected randomly 70 non-financial firms and collected intra-day transaction data for the period 1 September 2004 to 31 August 2005 from SIRCA. The transaction data contained details on all trades including the transaction price, volume, time of the trade (to the nearest minute) and the best quotes at the time of the trade as well as information on changes to the best bid

and ask price over the course of the trading day. To ensure sufficient data was available to allow for accurate estimation of the MRR model we remove any firms that had less than 1000 trades over the course of the sample period, the equivalent of approximately 4 trades per day.

2.1 Dependent Variables

To explore the impact of various elements of insider trading laws on insider trading we examine the relationship between variables that measure or proxy the level of information asymmetry within the market. We principally rely on the decomposed cost of information asymmetry as a proportion of the total spread in our analysis. This variable has the advantage of directly measuring market estimates of the level of informed trading, of which insiders make a substantial component. However, as this is an estimated variable we employ two other measures of the cost of trading, average percentage spread and the average effective spread. As any reduction in the cost of information asymmetry in the spread should reduce the total spread as well, these variables should act as good robustness checks on the estimated variable.

The first and most direct measure of information asymmetry is the proportion of the cost of information asymmetry to the total spread. We calculate this by employing a bid-ask spread decomposition model. Specifically we apply a trade indicator model such as those developed in Glosten and Harris (1988), MRR and Huang and Stoll (1997). However, we reject the Huang and Stoll (1997) model as it explicitly models the inventory-holding cost, which as concluded in Ahn et al. (2002) is largely irrelevant in limit order book markets. Glosten and Harris (1988) and MRR decompose both the inventory-holding and order-processing components of the spread as one transitory price effect which is more suitable for the majority of the countries in our sample. A notable concern with the Glosten and Harris (1988) model is its assumption that continuations, i.e. buyer initiated trades followed by another buyer initiated trade, are equally as likely as reversals. Most MRR studies have found that continuations are more likely as a result of factors such as large trades being split into a number of smaller trades. Therefore we prefer the MRR model which uses the first order autocorrelation of the trade indicator variable to model surprise in the order flow.

MRR decomposes the bid-ask spread components by relating the changes in prices to the direction of the trade, either buyer or seller initiated, based on

$$p_t - p_{t-1} = \theta(x_t - \rho x_{t-1}) + \phi(x_t - x_{t-1}) + u_t \qquad (1)$$

where p_t is the transaction price at time t, x_t is a trade indicator that equals 1 for buyer initiated trades, -1 for seller initiated trades and 0 for trades at the midpoint for a trade at time t, θ is the per share cost of information asymmetry, ϕ is the per share compensation for inventory holding and order processing costs, ρ is the first-order autocorrelation of the expected trade direction conditional on the

previous trade and u_t captures the impact of price discreteness and new public market-wide information releases. Under this model the arrival of informed traders is announced by unexpected trades in a given direction and causes the market to adjust the fundamental value by θ. Larger price reactions as a result of surprises in the order flow occur where there is a greater likelihood of trading against an informed trader hence requiring larger compensation for the risk this poses[1].

As the data does not contain information on who initiated the trade, we calculate the trade indicator variable by comparing the quotes to the transaction price. If the price occurs above the midpoint of the quoted spread we identify the trade as buyer initiated while trades that occur below the midpoint are classed as seller initiated. Trades that occur at the midpoint are left undetermined. Unlike the Lee and Reedy (1991) classification method we do not introduce lags into the quotes used to determine the trade indicator for two reasons. Firstly, the data we have only provides information to the nearest minute leading to longer than recommended minimum lags. Second, the majority of the markets being examined are electronic markets where the risk of quotes and trades being recorded in the wrong order are dramatically lower (Sirri and Peterson, 2003).

We estimate this model by employing Generalised Methods of Moments (GMM) using the orthogonality conditions

$$E\begin{pmatrix} x_t x_{t-1} - x_t^2 \rho \\ u_t - \alpha \\ (u_t - \alpha) x_t \\ (u_t - \alpha) x_{t-1} \end{pmatrix} = 0 \qquad (2)$$

where α captures the drift in returns and u_t follows from (1). The orthogonality conditions applied are essentially OLS conditions with an additional condition to identify ρ. Since the error term in (1) is auto-correlated and possibly heteroskedastic, we control for these concerns by employing a Newey-West (1987) correction. In the estimation of the model we scale all price data by 100.

Based on the estimated parameter estimates for (6.1) we can then calculate the proportion of the spread made up of information asymmetry based on $\theta/(\theta+\phi)$ for each company. We use this value as the dependent variable rather than the cross-sectional estimates of θ as it offers an estimate of the importance of information asymmetry unaffected by the size of the spread itself. This is a more comparable measure as it accounts for differences in spreads as a result of differing price levels. We then accumulate and average the values of each countries companies to get a country average.

As was shown in the previous chapter of this thesis, the effects of marked changes in insider trading laws can be observed in changes to the proportion of the trading cost attributable to information asymmetry. Further this measure provides a relatively clear and direct method of

[1] More detail on this model can be found in the previous chapter.

observing the impact of legal structures as the values are based on the markets estimates of the threat of informed trading.

We also apply two other variables that measure the trading cost, firstly, the percentage spread, measured as $Percentage\ Spread = 100 * \frac{(ask - bid)}{(ask + bid)/2}$ and second, the percentage effective spread, measured as $Percentage\ Effective\ Spread = 200 * x_{it} * (p_{it} - mid_{it}) / mid_{it}$ where x_{it} is the trade indicator for company *i* at time *t*, p_{it} is the price and mid_{it} is the midpoint of the quoted ask and bid prices at time *t*. The percentage effective spread represents the cost of the traded spread as a percentage of the price which differs from the percentage spread in that traded spreads can occur both in and outside of the quoted spreads. These variables allow for observation of the impact of insider trading laws on the cost of trading while controlling for differences in spread relating to differences in the price level of securities. As for the proportion of information asymmetry in the spread, if insiders are less active in a stock then there should be less informed trading overall resulting in a reduced cost of information asymmetry in the spread.

We regress these variables against a number of insider trading law and control variables. As the proportion of the spread composed of information asymmetry costs can only take values between zero and one we use a doubly censored Tobit model to estimate the model. For the percentage spread and percentage effective spread we employ standard ordinary least squares regression.

2.2 Insider Trading Law Variables

To identify the aspects of the legal system that promote an effective insider trading regime, i.e. one that reduces the cost of information asymmetry in the market, we collect data on the specific structure of the laws in each country from Beny (2005). Beny identifies a number of variables that are potentially important in creating an effective legal regime which can be categorised into three broad areas, the scope of the laws, the sanctions available and the probability of enforcement.

In terms of the scope of the law Beny constructs two dummies variables *Tipping* and *Tippee*. *Tipping* is a dummy variable that equals 1 if the law prevents insiders from passing on non-public price sensitive information to outsiders with the intention of them trading on that information. Brudney (1979) notes that allowing insiders to pass information to outsiders without penalty is the equivalent of allowing them to sell the information where the remuneration they gain can be cash, information they can then trade upon or other things of value. *Tippee,* the flipside of *Tipping,* is a dummy variable that equals 1 if the recipient of non-public price sensitive information is forbidden from trading on this information and 0 otherwise. Preventing trading by related parties to insiders is desirable given the damage to investor confidence when those with an unfair informational advantage are allowed to trade.

However, while it is desirable to prevent it, the realities of enforcing such rules it may make it irrelevant in terms of reducing information asymmetry.

We sum these two dummies to create a general measure, *Scope*, that measures the breadth of the restrictions on insider trading. Laws that more broadly define prohibited insider trades should reduce the amount of information asymmetry in the market due to the lower probability of trading against a better informed party.

In examining the role of sanctions we explore two variables Beny identifies as being relevant, *Damages* and *Criminal. Damages* is a dummy variable that equals 1 if monetary penalties are potentially greater than the profit gained or loss avoided by an insider and 0 otherwise. Restrictions that simply require restitution will have little impact on preventing insider trading as they offer no downside to being caught. Given that insider trading is often hard to detect, financial penalties will need to be significantly greater than the potential gain to dissuade insiders from trading on their information (Polinsky and Shavell, 2000; Dooley, 1980). *Criminal* is a dummy variable that equals 1 if insider trading may be prosecuted as a criminal offence and 0 otherwise. Criminal charges offer the highest possible punishment given potential non-financial penalties such as prohibition from being a director, loss of reputation and incarceration. Where extremely large and therefore unworkable financial punishments are required to counteract low probabilities of detection, criminal sanctions may be the most efficient deterrent. However, in many countries the burden of proof required for a criminal sanction is significantly higher than that for civil proceedings. Given insider trading is often described as largely an inferential crime, proving the intention of the defendants to the required criminal burden may be unlikely, making criminal sanctions less effective (Beny, 2005).

Again we create a variable that is the sum of the two sanction variables, *Sanction*, to measure the strength of the penalties an insider that is caught can face. Intuitively, legal regimes with more onerous the sanctions increase the cost to insiders and therefore reduce the incidences when it will be beneficial to trade on inside information (Polinksy and Shavell, 2000). We also create an index of the overall strength of the insider trading regime, *IT LAW*, by summing *Scope* and *Sanction*.

The final element we examine is the importance of the probability of enforcement. For the rules to be effective in controlling insiders there must be a real threat of enforcement. However, few reliable measures of actual enforcement are available on a per country basis. To proxy the enforceability of insider trading laws we examine three measures, past enforcement (*Enforced)* and two measures proposed in Beny (2005), the strength of public (*Public)* and private *(Private)* enforcement within the country. We use the data collected by Bhattacharya and Daouk (2002) to measure whether a country has prosecuted an insider prior to 1998, either successfully or unsuccessfully. Such actions should demonstrate a will to enforce insider trading and therefore effectively increase the probability of enforcement. The impact of enforcement on insiders has been shown in several papers where it was

associated with a reduction in the country cost of capital (Battacharya and Daouk, 2002) and an increase in analyst following (Bushman et al., 2005), both argued as indicating a reduction in the presence of insiders.

The measures of public and private enforcement strength are used to proxy the probability of an insider facing a prosecution. Where the ability of the public and private groups to enforce the laws is weak the possibility of a prosecution is significantly reduced. The measure of public enforcement strength proposed by Beny (2005) is constructed based on information collected from La Porta et al. (2003). In that paper, information is collected via a survey of domestic lawyers regarding various aspects of the market supervisors. The aspects most relevant to insider trading enforcement are the attributes of the supervisor and their investigative power. La Porte et al. (2003) examine the supervisor attributes to quantify the independence, authority and focus of the organisation which they achieve by looking at four attributes; the independence of the appointment process, the process for firing key members of the supervisor, how focussed on securities markets the supervisor is, and the ability to regulate the security markets without legislative or executive interference. They take the mean of the four variables to come up with a measure of the supervisor attributes. La Porta et al. (2003) also examines the investigative powers of the supervisor by creating an index based on their ability to command documents from relevant parties and subpoena the testimony of witnesses when investigating breaches of securities law. We take the mean of these two values to create an index of the public enforcement power of supervisors.

While the merits of public enforcement of securities law is well understood (the ability to investigate breaches including commanding documents and subpoenaing witnesses plus the ability to impose sanctions) the role of private enforcement is less well understood. La Porta et al. (2003) makes a case for private enforcement of securities law breaches being important from a private contracting perspective. If the law sets out the obligations of both parties and the burden of proof then the role of courts is simplified and private enforcement can be a cheap and effective method of dealing with breaches benefiting markets. However, anecdotal evidence from New Zealand where the law specified private enforcement for insider trading raises questions about the efficacy of such a system. In particular the difficulty and cost of collecting evidence proved to be a disincentive to private enforcement. Bainbridge (2000) notes that the evidence from the US shows most private enforcement efforts are attached to public efforts, with the public enforcer doing all the work. We examine the role of private enforcement of insider trading by employing the measure established in Beny (2005). *Private* is the product of the right to enforce, a dummy that equals 1 if a private right to prosecute exists and 0 otherwise, and a measure of the efficiency of the judiciary. Obviously the private right can only be enforced if individuals have good access to the courts and the process is reliable and efficient.

We use the Law and Order ratings from the International Country Risk Guide to measure of the efficiency of the judiciary.

2.3 Control Variables

To control for other determinants of the bid-ask spread and non-insider trading related causes of differences we include a number of control variables. Firstly, we control for differences in liquidity using several proxies. The first is the market capitalisation on the basis that larger firms typically are also more liquid firms. Also larger firms tend to be subject to less insider trading activity (Lakonishok and Lee, 2001). We calculate this as the natural logarithm of the average of the local currency market capitalisation over the sample period adjusted daily to US dollars. As an alternative we also test the regressions using the average trades per day for each company. We find that this measure generally leads to the same results as the market capitalisation and we therefore do not report it in the tables.

We also control for the effect of any price discreteness due to the imposition of minimum tick sizes by the market. The results of the price volatility analysis in the previous chapter shows that price discreteness can have a significant impact on the size of price movements and therefore needs to be controlled for, especially given the significant differences in the liquidity of the exchanges being examined. We do this by determining the averaging minimum tick that applies to the firm at the time a trade occurs and dividing that tick size by the price. We also include a dummy variable to control for potential differences as a result of differing market structures. However, due to significant correlation between this dummy and legal origin, all bar one of the French civil law countries are markets with dealers to one degree or another while all bar one of the German civil law countries are limit order books, the effects of this are largely subsumed by the legal origin variables and therefore added little to the regressions.

Finally, we controlled for the origin of the legal system in each country. These could be classed into three groups, common law countries, French civil law and German civil law countries. Research by La Porta et al. (1997, 1998, 2003) and Beny (2002) has found that the institutional setting and the quality of investor protection within a country is related to the legal origin of the laws within that country. As a general rule the studies have shown that common law provides the best investor protection while French civil law offers the least protection. As this also affects a number of other aspects such accounting disclosure quality it is important to control for in an attempt to isolate just the impact of insider trading laws on information asymmetry in the market.

3 Results

3.1 Summary Statistics.

Table 1 gives summary statistics on the insider trading law variables employed and the legal origin of each country. The sample contains 10 Common law countries with 4 each for the French and German civil law countries. It should also be noted that the countries represented in the French and German civil law sub-samples are for the most part large and well developed markets. In spite of the low numbers for these categories however the averages for the legal elements are similar to those observed in Beny (2005) although French civil law is consistently slightly higher in our study and German is slightly low. In terms of the specific components, virtually all countries prohibit both tipping and tippees from trading. Although interestingly Japan and South Africa both prohibited recipients of confidential information from trading, a category that is virtually impossible to detect, but did not stop insiders from passing on the information initially.

In terms of sanctions imposed on insiders, only three countries made insider trading both a criminal offence and allowed for penalties to be greater than the gain or lose avoided, France, Canada and the United States. Criminal penalties are the most common form of sanction with insider trading being a criminal offence in 14 countries, but only 5 allow for damages to be greater than the gain. Given the difficulty in proving breaches of insider trading laws and the higher burden of proof required which for criminal sanctions, it is an interesting finding that they are relied on to prevent insider trading so heavily. Overall we find just three countries with an IT law rating of 4, Canada, France and the United States with most countries rating a 3 and 6 scoring 2, Japan, Austria, Greece, South Africa, Malaysia and India.

In terms of the enforcement variables however the differences are much starker. The highest rate of past enforcement was again in French civil law countries where all the sample countries had enforced before 1998 followed by common law and German civil law countries at similar levels. However, civil law countries had significantly lower instances of private enforcement with just Taiwan allowing private prosecutions. The civil law countries also have much lower ratings for public enforcement power than common law countries, .72, .49 and .19, for common, French and German civil law countries respectively. Japan has the lowest public enforcement with a 0 rating while the US has the highest at 1. The results suggest that while virtually all countries (with the exception of 3) have enforced insider trading, the greatest probability of enforcement occurs in common law countries where there is also the highest sanctions.

Table 2 provides summary statistics on the cross-sectional variables employed in the paper. The market capitalisation in US$ shows that Belgium had the largest average followed by the US with Greece and Singapore having the smallest market caps. Of note is the relatively small capitalisation of the UK market at just US$859 million. This low value is likely responsible for the higher than expected percentage spread and effective spread values that we observe. The markets also demonstrate

significantly different liquidity as demonstrated by the trades per day which ranges from 21.6 for New Zealand to 1212.6 for the United States, which is twice the average for the next largest market France. India had the lowest relative minimum tick value at just .0005, largely due to high prices while Australia had the largest due to much lower prices. We also observe that the percentage spreads and effective spreads have similar mean and medians suggesting an even distribution of the values. The lowest values are shown in the US with .16 and .12 respectively while the country with the largest average percentage spreads is Singapore at 1.96% and the largest effective spreads occurred in Greece at 2.29%.

Table 3 shows the correlation coefficients matrix for the insider trading law variables. As expected the constructed indices *Scope, Sanction* and *IT Law* are all highly correlated with the elements that were used to create them i.e *IT Law* is highly correlated with *Scope* and *Sanction* while *Scope* is correlated with *Tipping and Tippee* and *Sanctions* with *Criminal* and *Damages.* We also find that there are strong correlations between *IT Law* and the private and public variables indicating that countries that can better enforce their laws are more likely to make the laws more restrictive. Likewise those countries that are better able to enforce their laws are more likely to have larger potential sanctions. This is counter-intuitive as the disincentive to insiders is likely to be a combination of the likelihood of being prosecuted and the penalty. If countries are less able to enforce the laws they should impose stronger sanctions to counter the weaker enforcement probability.

We also observe a strong positive correlation between public and private suggesting that countries with strong supervisors were more likely to both allow private prosecutions and have legal systems that made such prosecutions possible. We also find that public is strongly correlated with *Tipping*, indicating that countries that prevent insiders from passing on information are marked by independent supervisors with the ability to compel documents and witnesses. This may indicate a pragmatic response from countries as the tipping of outsiders is extremely difficult to detect and establish and weak supervisors would have little chance with respects to this type of offending.

3.2 MRR Parameter Estimates

Table 4 presents a summary of the country average parameter estimates from the MRR model. θ represents the per share cost of information based on the size of the market reaction to unexpected orders in a particular direction. Due to the greater chance of trading against an insider the market maker will react more to compensate the higher expected losses incurred from trading against informed traders. We observe a range of values for θ between .02 (United States) and .38 (Greece). In general the German civil law countries are lower than the common law countries with French civil law having the highest average, in large part due to Greece. ϕ measures the cost per share of transitory price effects such as inventory-holding and order processing. Again we find that the US has the lowest

observed value at .02 while the largest is the United Kingdom at 1.04, a result likely caused by the large percentage of smaller firms that seem to be in the UK sample as evidenced by the low market capitalisation. Again we find that the German civil law countries have the lowest average although the difference between them and common law is much larger than for θ. Again French civil law countries have the largest average, again related to the Greek companies.

ρ measures the first-order autocorrelation in the trade direction variable. MRR unlike Glosten and Harris (1988) argue that trade continuations (a buy (sell) followed by a buy (sell)) are not equally as likely as reversals (a buy (sell) followed by a sell (buy)). As large trades typically get broken into smaller orders for easier execution, MRR suggests continuations are more likely. If this contention is true, then if trades cannot occur at the midpoint, ρ would be greater than 0. In our observations, even taking into account the small percentage of trades that occur at the midpoint, ρ is significant and its inclusion in the model justified. The lowest ρ occurs in India at .15 while the largest is in Canada indicating that continuations are far more likely than reversals.

Only in terms of the proportion of the spread composed of information asymmetry costs do we find that common law countries have a lower average, in large part due to the UK, Singapore and Hong Kong which had significantly lower averages than was typically. For the most part the average proportions fell within the 40-55% range, with only the previous mentioned countries below that and Germany and Japan above it. With the exception of the UK, the reported proportions are close to the values reported in other studies where the countries had been studied. US studies have found the IA proportion lies between 35-50% (Stoll, 1989 (43%); MRR (35-51%); Affleck-Graves et al., 1994 (43%); Lin et al., 1995 (39.2%); Kim and Ogden, 1996 (50%)) while our results show 41%. Ahn et al. (2002) reports between 44-57% for the Tokyo Stock Exchange while we show 59% and Brockman and Chung (1999) find 33% for Hong Kong while we report 34%. Even the results for NZ at 52% are slightly lower than the 55% reported in the previous chapter though not significantly so.

3.3 Regression Analysis

The results of the regression analysis are presented in Tables 5-8 with the results for all three dependent variables presented together. The independent insider trading law variables are categorised together into those affecting the scope of the law, the sanctions of the law and the enforcement of the law. The first table presents the results for the overall strength of the law and the base case where no insider trading law variables are included. The base case allows us to see the impact of the controls and more importantly provides a basis for the log likelihood estimates to allow us to evaluate the importance of the inclusion of a variable.

The base case findings confirm our expectations about the direction of the control variables although the variables are typically insignificant. Log market capitalisation (*Log Mkt Cap*) is negative for all three dependent variables indicating that larger companies are associated with small spreads, most likely a result of the higher liquidity for larger companies. *Min Tick* is negative for both the total spread component measures, *%Spread* and *Effective*, indicating that smaller tick sizes result in smaller spreads. The values for the proportion of information asymmetry however are positive. This is likely a result of the fact that smaller relative minimum tick sizes are likely to result in increased liquidity as the trading costs are lower for those companies. As liquidity improves, the transitory component of spreads should be lower as a proportion of the total spread therefore increasing the contribution of asymmetric information. We also find the expected relationships between the spreads and the legal origin of the country, indicating that companies in both Germanic and French Civil law countries are associated with higher trading costs and a high cost of asymmetric information. These findings confirm other studies that have examined this issue (Eleswarapu and Venkataraman (2003)), although interesting we find that it is the German civil law countries that are most affected, not the French. This may well be a result of the sample composition although the averages for the law variables were similar to those found in Beny (2005).

Table 5 also presents the results for the *IT Law* variable which is a measure of the overall strength of the laws themselves within the country. As is shown, even with a very small sample the results indicate a negative and significant relationship, indicating that tougher laws are associated with less informed trading, and hence a reduced cost of trading as a result. This reduction in the cost of information asymmetry also results in lower total spreads as evidenced by the *%Spread* and *Effective* variables. The inclusion of *IT Law* also results in a significant improvement in the log likelihood results for all three models. In addition, there is a general increase in the R^2 values with a large increase for *Effective*. The findings therefore provide general support for the belief that strong insider trading laws do have an impact on the level and costs of informed trading in the market.

The evidence on the impact of the breadth of the laws is however less empathic in its support for the effect of stronger laws. *Scope* is a sub-index constructed by adding the two dummies *Tipping* and *Tippee* together. Only the proportion of information asymmetry costs in the spread is significantly affected by having broader laws. The percentage spread and the effective spread by contrast are both in the expected direction but insignificant. Further, the log likelihood estimates are not significant indicating that the introduction of this variable does not significantly improve the regression. When we examine the individual components of the *Scope* variable we can see that only the *Tipping* variable is important. *Tippee,* a dummy variable that equals 1 if those receiving confidential information from insiders are prohibited from trading or 0 otherwise, is insignificant in all cases and in the case of *%Spread* in the wrong direction. Further the log likelihood value for *%Spread* is also insignificant,

indicating the model is not improved by the addition of this variable. By contrast, *Tipping,* a dummy variable that equals 1 if insiders are prohibited from passing on confidential information to others or 0 otherwise, is significant for two of the three models it is included in and also results in improvements in the log likelihood values for those models. However, *%Spread* is both insignificant, although in the right direction, and the regression is not improved by the inclusion of *Tipping* although this maybe a result of the small sample size.

The finding that *Tipping* significantly affects the cost of trading is not overly surprising. Preventing an insider from passing on their information for someone else to trade upon is important so as to not simply have insiders sell their information for others to trade upon. Such a law should therefore provide some assurance to the market that the insiders information is not simply being used by a proxy, especially in light of laws in some countries making the insider responsible for the trading profits of a tippee. However, the insignificance of the *Tippee* variable is most likely due to the fact that banning these individuals from trading is practically unenforceable. While tracing the trading activities of an insider is possible largely due to the known association between themselves and the company, such an association is not known in the case of a tippee. This adds complications in terms of getting a prosecution and makes laws banning these people from trading largely ornamental.

The results for the penalties employed also reveal some intriguing findings. *Sanction* is a sub-index created by adding the dummies for *Criminal* and *Damages* together. The evidence for the importance of stronger sanctions is surprisingly mixed. Given that insider trading is a difficult crime to detect it is widely argued that you need stronger sanctions to act as an effective deterrent to insiders. We find a negative relationship for all the models although only in the equation for *Effective* is the effect of sanction significant. When the individual components are explored the reason for this becomes apparent. The coefficients for *Criminal*, the dummy variable that equals 1 when insider trading is a criminal offence and 0 otherwise, are insignificant for all three models and positive for two, *Prop* and *%Spread*. Further its inclusion in the regressions does not significantly improve the log likelihood estimates. *Damages*, a dummy that equals 1 if the financial penalties can exceed the profit gained or loss avoided and 0 otherwise, by contrast show strong evidence of having a negative effect on the costs of trading and information asymmetry. All three models show both negative and significant coefficients for *Damages* and the inclusion of this variable improves the log likelihood values in all three cases at the 1% level.

The finding that criminal damages are largely ineffective in reducing the level of insider trading is interesting given its popularity as a sanction but not totally surprising. Insider trading is a large inferential crime relying on evidence of trading in conjunction with confidential price sensitive information to create a circumstantial link between the trading and information and thus establish illegality. This works fine for civil proceedings where the burden of proof is merely that it was more

likely that they traded on the information than not. However, a criminal proceeding occurs at a much higher burden of proof that would be difficult to meet given the circumstantial nature of the evidence. If criminal sanctions are difficult to achieve and are not tied to effective financial penalties in excess of the profit gain or loss avoided, as is the case with many of the sample countries, then the laws efficacy is largely negated as there is no effective deterrent. *Damages,* on the other hand work, while not as extreme as the available penalties under a criminal prosecution are far more widely available due to the lower burden of proof and therefore act as a more realistic penalty that can be applied more widely. What is most interesting is that damages in excess of the trading gain or loss avoided are only available in five of the sample countries, most countries preferring to rely on criminal sanctions.

The results for the enforcement measures are, in contrast to those for the scope and sanction variables, largely as predicted based on prior evidence. *Enforced*, a dummy measuring if a country has previous prosecuted an insider, indicates that prior enforcement does affect the trading costs. As shown, all the dependent variables have a significant negative relationship with the measure of prior enforcement. Its inclusion also results in a significant improvement in the log likelihood estimates for all the variables. As argued by Bhattachayra and Daouk (2002), prior enforcement is required to convince the market that the laws are more than ornamental. A prior attempt to enforce the laws proves that the country possesses the political will to enforce insider trading.

Public also exhibits similar characteristics to *Enforced*. This is a measure based on LLSV(2003) that indicates the strength of the public enforcer based on their independence, focus and investigative abilities. In this case we observe that countries with stronger regulators observe a decrease in the cost of informed trading and in the overall cost of trading. By contrast, *Private* enforcement is not even uniformly in the correct direction. This finding regarding the respective merits of private and public enforcement supports that of Beny (2005) who also showed that public enforcement is important in the context of insider trading. The reason argued in that and other papers is that insider trading is realistically too complicated and costly for small investors to be able to enforce. Even the difficulties in establishing that insider trading has actually occurred are likely outside the ability of small investors to establish. For this reason in the US most private prosecutions have been largely restricted to piggy-backing on public prosecutions by the SEC Bainbridge (2000). The experience of New Zealand with regards to a private only enforcement regime certainly supports the ineffective nature of this type of system for controlling insider trading. It is therefore of little surprise that private enforcement does virtually nothing to reduce the incidence of insider trading.

3.4 Robustness Checks

To ensure the robustness of the results we undertook a number of steps. We tried adding and replacing several control variables to ensure that we accounted for the most significant factors. In addition to the control variables included in the regressions we also employed the average trades per day for each company to account for any liquidity effects. We found however that the log market capitalisation was a better measure of this although the results were largely unchanged when trades per day was employed. We also included and rejected a variable to control for dealer markets, this effect seems to have been accounted for in the legal origin variables. We also tried using Newey-West heteroskedasticity corrected t-statistics which resulted in no change to significance of the relationships between the variables.

Given the small size of the sample with just 18 observations, we also ran the data using all 1073 companies. While this doesn't effectively increase the number of observations it does increase the power of the tests and also allows for more rigorous robustness checking. The only significant changes due to the use of individual companies were that the significance for all the law variables with the exception of tippee and criminal was stronger. The general patterns were largely the same. Based on this sample we also explored the effect of potential outlier markets by excluding them completely. In particular we excluded the United Kingdom but also various combinations of Singapore, Hong Kong, Germany and Japan. Again we found few significant changes and no changes to the overall findings of the paper.

4 Conclusion

Despite the vast majority of countries regulating insider trading, little research has been done on the specific elements required to create an insider trading regime that effectively reduces the level of insider trading and information asymmetry. The lack of research comes however in spite of findings both with regards to insider trading and financial market development generally that the nature and quality of the institutional settings within which markets operate has a significant impact. This study takes a further step towards providing some understanding of the specific elements that insider trading laws require to effectively limit information asymmetry.

We examined three proxies for transaction costs for a sample of companies from 18 countries and related those to a number of variables measuring the scope of the laws,

sanctions the laws could impose and the enforcement strength within the country. After controlling for other factors that impact transaction costs we found that stronger legal regimes are associated with lower transaction costs and in particular a lower proportion cost contribution from information asymmetry. In particular we find that formal rules against insiders passing on material non-public information, so called tipping, and financial damages are most effective in controlling insider trading. *Damages* in particular were a surprise given the small percentage of the sample countries that used this type of sanction compared to criminal damages. We also found that past enforcement was important as was the strength of public enforcement while private enforcement played little role. The results allow some early conclusions about the direction that regulators should be headed in controlling insider trading, although significantly more research with better proxies is required. In particular regimes need to concentrate on laws that limit insiders from exploiting their information advantage, including passing on information for others, while ensuring that the laws are both enforceable, with strong regulators to ensure they are enforced, and with significant financial penalties. This seems to be the most effective combination of laws in limiting information asymmetry in the market, whether this is the most efficient combination in terms of allowing for better informed markets requires further research.

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Table 1: Summary of Insider Trading Law Variables by Country

Country	Market	Legal Origin	IT Law	Scope	Tippee	Tipping	Sanction	Criminal	Damages	Enforced	Private	Public
AUSTRALIA	Australian	Common	3	2	1	1	1	1	0	1	5	0.88
CANADA	Toronto	Common	4	2	1	1	2	1	1	1	5.5	0.81
HONG KONG	Hong Kong	Common	3	2	1	1	1	0	1	1	0	0.75
INDIA	Bombay	Common	2	1	0	1	1	1	0	1	0	0.69
MALAYSIA	Kuala Lumpar	Common	2	1	0	1	1	1	0	1	2.5	0.69
NEW ZEALAND	New Zealand	Common	3	2	1	1	1	0	1	0	5.5	0.63
SINGAPORE	Singapore	Common	3	2	1	1	1	1	0	1	4.5	0.75
SOUTH AFRICA	Johannesburg	Common	2	1	1	0	1	1	0	0	2	0.38
UNITED KINGDOM	London	Common	3	2	1	1	1	1	0	1	0	0.63
UNITED STATES	New York	Common	4	2	1	1	2	1	1	1	5	1
Common Law Averages			2.9	1.7	0.8	0.9	1.2	0.8	0.4	0.8	3	0.721
BELGIUM	Euronext Brussels	French	3	2	1	1	1	1	0	1	0	0.13
FRANCE	Euronext Paris	French	4	2	1	1	2	1	1	1	0	0.94
GREECE	Athens	French	2	2	1	1	0	0	0	1	0	0.38
NETHERLANDS	Euronext Amsterdam	French	3	2	1	1	1	1	0	1	0	0.5
French Civil Law Averages			3	2	1	1	1	0.75	0.25	1	0	0.4875
AUSTRIA	Vienna	German	2	2	1	1	0	0	0	0	0	0.13
GERMANY	XETRA	German	3	2	1	1	1	1	0	1	0	0.25
JAPAN	Tokyo	German	2	1	1	0	1	1	0	1	0	0
TAIWAN	Taiwan	German	3	2	1	1	1	1	0	1	3	0.38
German Civil Law Averages			2.5	1.75	1	0.75	0.75	0.75	0	0.75	0.75	0.19

Note: *IT Law* is an index created by adding *Scope* and *Sanction*. *Scope* is a sub-index created by adding *Tipping* and *Tippee*. *Tipping* is a dummy variable that equals 1 if an insider is prohibited from passing on confidential information and 0 otherwise. *Tippee* is a dummy variable that equals 1 if an outsider given confidential information by an insider is prohibited from trading and 0 otherwise. *Sanction* is a sub-index created by adding *Damages* and *Criminal*. *Damages* is a dummy variable that equals 1 if the potential financial penalties may be greater than the trading gain or loss avoided and 0 otherwise. *Criminal* is a dummy variable that equals 1 if criminal sanctions are available and 0 otherwise. *Enforced* is a dummy variable that equals 1 if insider trading had been prosecuted before 1998 and 0 otherwise. *Private* is the product of the right of private enforcement, a dummy that equals 1 where private prosecutions are allowed and 0 otherwise, and the law and order rating collected from International Country Risk Guide. *Public* is the mean of the supervisor attributes and investigative powers from La Porta et al. (2003).

Table 2: Cross-Sectional Averages by Country of Origin

Country	Market System	Trades	Mkt Cap (local)	Mkt Cap (US$)	Relative Minimum Tick	Spread	Trades/ Day	Average Price	%Spread	Effective Spread
AUSTRALIA	Limit Order Book	34999	1010.86	751.24	0.0547	0.0042	130.51	3.25	0.9126	1.8131
AUSTRIA	Limit Order Book	16426	1360.00	1148.45	0.0009	0.3434	63.46	59.54	0.6690	0.7861
BELGIUM	Affirmative Dealers	17774	10757.45	9084.15	0.0013	0.2830	65.09	42.05	0.8601	1.0452
CANADA	Limit Order Book	46276	1897.38	1566.27	0.0065	0.0569	180.44	14.83	1.5804	1.7028
FRANCE	Affirmative Dealers	124922	5980.30	5050.08	0.0034	0.2564	486.77	43.56	0.7913	0.8986
GERMANY	Affirmative Dealers	66389	4289.90	3622.61	0.0021	0.0757	245.33	21.37	1.0040	1.2001
GREECE	Limit Order Book	21597	251.36	212.26	0.0100	0.0235	81.71	3.19	1.0008	2.2923
HONG KONG	Limit Order Book	23366	7546.09	970.27	0.0169	0.0271	91.53	4.28	1.4883	1.4591
INDIA	Limit Order Book	64026	31715.23	719.17	0.0005	1.4491	243.65	305.60	0.5409	0.6197
JAPAN	Limit Order Book	30282	182547.50	1657.45	0.0024	36.1897	117.47	9352.50	0.4079	0.4151
MALAYSIA	Limit Order Book	10855	969.06	256.71	0.0074	0.0172	42.41	2.08	1.0119	1.0155
NETHERLANDS	Affirmative Dealers	89655	1964.35	1658.80	0.0033	0.0612	330.67	17.14	0.6444	0.7950
NEW ZEALAND	Limit Order Book	5469	3173.32	2168.60	0.0067	0.0316	21.66	4.50	0.9167	1.0034
SINGAPORE	Limit Order Book	9399	408.73	245.78	0.0175	0.0139	35.82	1.86	1.9669	1.6919
SOUTH AFRICA	Limit Order Book	17995	7869.53	1240.76	0.0001	14.3077	68.39	2675.52	1.4668	1.5497
TAIWAN	Limit Order Book	30871	9296.78	288.91	0.0047	0.0940	118.63	20.31	0.6382	0.6866
UNITED KINGDOM	Affirmative Dealers	32094	472.24	859.34	0.0002	0.0293	120.42	248.70	1.2820	1.1175
UNITED STATES	Affirmative Dealers	321896	7260.75	7260.75	0.0031	0.0443	1212.61	35.06	0.1630	0.1155

Note: *Mkt Cap (Local)* is the average of the market capitalisation averaged over the sample period for all sample companies in that country. *Mkt Cap ($US)* is the market capitalisation averaged over the sample period adjusted daily for the US$ exchange rate averaged for all sample companies in that country. *Relative Minimum Tick* is measured as the minimum tick size divided by price for each trade, averaged over the sample period and then over all the sample companies in that country. *Spread* is measured as the ask price minus the bid price averaged over the sample period and then over all sample companies in that country. *Trades/Day* is measured as the total number of observed trades divided by the number of trading days averaged over all sample companies in that country. *Average Price* is the cross-sectional average price at which trades occurred averaged over all sample companies in that country. *% Spread* is measured as the cross-sectional average of the (ask price – bid price)/((ask + bid)/2) then averaged over all sample companies in that country. *Effective Spread* is measured as the cross-sectional average of $200 * x_{it} * (p_{it} - mid_{it}) / mid_{it}$ then averaged over all sample companies in that country where mid_{it} is the midpoint and x_{it} is the trade direction.

Table 3: Insider Trading Law Variable Correlation Coefficients

	IT Law	Sanction	Scope	Enforced	Public	Private	Tippee	Tipping	Criminal	Damages
IT Law	1									
Sanction	0.792	1								
Scope	0.695	0.111	1							
Enforced	0.204	0.183	0.118	1						
Public	0.601	0.57	0.307	0.145	1					
Private	0.508	0.489	0.252	-0.215	0.548	1				
Tippee	0.454	0.073	0.653	-0.143	-0.157	0.118	1			
Tipping	0.456	0.073	0.655	0.297	0.558	0.211	-0.145	1		
Criminal	0.181	0.511	-0.307	0.63	0.037	0.132	-0.2	-0.201	1	
Damages	0.71	0.646	0.395	-0.119	0.594	0.421	0.258	0.259	-0.326	1

Note: *IT Law* is an index created by adding *Scope* and *Sanction*. *Scope* is a sub-index created by adding *Tipping* and *Tippee*. *Tipping* is a dummy variable that equals 1 if an insider is prohibited from passing on confidential information and 0 otherwise. *Tippee* is a dummy variable that equals 1 if an outsider given confidential information by an insider is prohibited from trading and 0 otherwise. *Sanction* is a sub-index created by adding *Damages* and *Criminal*. *Damages* is a dummy variable that equals 1 if the potential financial penalties may be greater than the trading gain or loss avoided and 0 otherwise. *Criminal* is a dummy variable that equals 1 if criminal sanctions are available and 0 otherwise. *Enforced* is a dummy variable that equals 1 if insider trading had been prosecuted before 1998 and 0 otherwise. *Private* is the product of the right of private enforcement, a dummy that equals 1 where private prosecutions are allowed and 0 otherwise, and the law and order rating collected from International Country Risk Guide. *Public* is the mean of the supervisor attributes and investigative powers from La Porta et al. (2003).

Table 4: Cross-Sectional MRR Parameter Estimates Averaged by Country of Origin

Country	Market		θ	S.E	φ	S.E	ρ	S.E	Proportion	S.E
AUSTRALIA	Australian	Common	0.2796	(0.0280)	0.2341	(0.0309)	0.4702	(0.0121)	0.5343	(0.0898)
CANADA	Toronto	Common	0.2805	(0.0278)	0.2946	(0.0318)	0.5227	(0.0109)	0.5258	(0.0258)
HONG KONG	Hong Kong	Common	0.2002	(0.0206)	0.3811	(0.0249)	0.2367	(0.0135)	0.3444	(0.0280)
INDIA	Bombay	Common	0.1420	(0.0072)	0.1256	(0.0077)	0.1575	(0.0070)	0.5508	(0.0077)
MALAYSIA	Kuala Lumpar	Common	0.1651	(0.0206)	0.1565	(0.0213)	0.3078	(0.0192)	0.5300	(0.0733)
NEW ZEALAND	New Zealand	Common	0.1367	(0.0229)	0.1360	(0.0240)	0.3727	(0.0201)	0.5213	(0.1260)
SINGAPORE	Singapore	Common	0.0772	(0.0267)	0.3015	(0.0326)	0.4352	(0.0192)	0.1886	(0.0917)
SOUTH AFRICA	Johannesburg	Common	0.1645	(0.0300)	0.2003	(0.0369)	0.3793	(0.0190)	0.5228	(0.1054)
UNITED KINGDOM	London	Common	0.1908	(0.0742)	1.0410	(0.1234)	0.2947	(0.0195)	0.1707	(0.0594)
UNITED STATES	New York	Common	0.0101	(0.0008)	0.0143	(0.0007)	0.2599	(0.0029)	0.4121	(0.1453)
Common Law Averages			0.1647	(0.0259)	0.2885	(0.0334)	0.3437	(0.0143)	0.4301	(0.0752)
BELGIUM	Euronext Brussels	French	0.1803	(0.0213)	0.2122	(0.0262)	0.4966	(0.0176)	0.4581	(0.0191)
FRANCE	Euronext Paris	French	0.1149	(0.0140)	0.2491	(0.0171)	0.5148	(0.0121)	0.4074	(0.0265)
GREECE	Athens	French	0.3803	(0.0361)	0.5458	(0.0471)	0.4950	(0.0114)	0.4698	(0.0035)
NETHERLANDS	Euronext Amsterdam	French	0.1156	(0.0138)	0.1774	(0.0155)	0.5090	(0.0092)	0.4420	(0.0606)
French Civil Law Averages			0.1978	(0.0213)	0.2961	(0.0265)	0.5038	(0.0126)	0.4443	(0.0274)
AUSTRIA	Vienna	German	0.1373	(0.0128)	0.1584	(0.0141)	0.3865	(0.0135)	0.4621	(0.0116)
GERMANY	XETRA	German	0.2597	(0.0250)	0.1900	(0.0255)	0.3173	(0.0148)	0.6102	(0.0391)
JAPAN	Tokyo	German	0.1030	(0.0070)	0.0694	(0.0064)	0.2174	(0.0109)	0.5867	(0.0483)
TAIWAN	Taiwan	German	0.1228	(0.0100)	0.1455	(0.0109)	0.2800	(0.0108)	0.4168	(0.0076)
German Civil Law Averages			0.1557	(0.0137)	0.1408	(0.0142)	0.3003	(0.0125)	0.5190	(0.0267)

Note: The table presents the mean value for each parameter estimate averaged over all the sample companies from that country. Standard errors are also reported and are HAC-corrected following Newey-West, 1987. We also report the proportion of the total spread represented by information asymmetry (*Proportion*) defined as $\theta/(\theta + \phi)$.

Table 5: Regression Results for the Base Case and IT LAW Variable

	Prop		% Spread		Effective		Prop		% Spread		Effective	
Constant	0.5094	**	0.0699	*	0.1898	*	0.5311	***	0.0672		0.3675	
	(0.1981)		*(0.0324)*		*(0.9288)*		*(0.1886)*		*(0.0420)*		*(0.7392)*	
Relative Minimum Tick	0.3047		-0.2073		-8.0920		1.6279		-0.0825		-18.9004	*
	(2.7090)		*(0.4433)*		*(12.7015)*		*(2.7358)*		*(0.6089)*		*(10.7240)*	
Log Mkt Cap	-0.0214		-0.0093		-0.1018		0.0111		-0.0059		-0.3670	
	(0.0335)		*(0.0055)*		*(0.1572)*		*(0.0393)*		*(0.0087)*		*(0.1539)*	
German	0.1296		0.0344		0.6740		0.1062		-0.0148		0.4831	
	(0.0762)		*(0.0125)*		*(0.3571)*		*(0.0741)*		*(0.0165)*		*(0.2906)*	
French	0.0541		0.0028		0.2630		0.0613		-0.0147		0.3212	
	(0.0748)		*(0.0122)*		*(0.3508)*		*(0.0712)*		*(0.0158)*		*(0.2790)*	
IT Law							-0.0726	**	-0.0174	*	-0.5928	**
							(0.0314)		*(0.0104)*		*(0.2015)*	
R^2	0.1608		0.1152		-0.0046		0.2446		0.1361		0.3679	
Log Likelihood	8.15		1104.61		-691.73		13.10	**	1114.37	***	-567.51	***

Note: *Prop* is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country . *%Spread* is defined as cross-sectional average of the (ask price – bid price)/((ask + bid)/2) then averaged over all sample companies in that country. *Effective Spread* is measured as the cross-sectional average of $200 * x_{it} * (p_{it} - mid_{it}) / mid_{it}$ then averaged over all sample companies in that country where mid_{it} is the midpoint and x_{it} is the trade direction. *Mkt Cap ($US)* is the market capitalisation averaged over the sample period adjusted daily for the US$ exchange rate averaged for all sample companies in that country. *Relative Minimum Tick* is measured as the minimum tick size divided by price for each trade, averaged over the sample period and then over all the sample companies in that country. *German* is a dummy variable that equals 1 if a countries legal origin is German Civil Law and 0 otherwise. *French* is a dummy variable that equals 1 if a countries legal origin is French Civil Law and 0 otherwise. *IT Law* is an index created by adding *Scope* and *Sanction*. *Prop* was regressed using a doubly censored Tobit model while *%Spread* and *Effective* were regressed with OLS.

Table 6: Regression Results for Scope of Law Variables

	Prop		% Spread		Effective		Prop		% Spread	Effective	Prop		% Spread		Effective	
Constant	0.6708	***	0.0767	**	0.5941		0.4903	***	0.0576	0.1641	0.6277	***	0.0275	**	0.6508	
	(0.1681)		*(0.0349)*		*(0.9440)*		*(0.1777)*		*(0.0436)*	*(0.9569)*	*(0.2047)*		*(0.0394)*		*(1.0013)*	
Relative Minimum Tick	3.3536		-0.0778	*	-15.7269		2.5485		-0.6979	-11.1306	0.8798		-0.0834		-10.3332	
	(2.3967)		*(0.4976)*		*(13.4579)*		*(2.6517)*		*(0.6498)*	*(14.2764)*	*(2.5955)*		*(0.4993)*		*(12.6978)*	
Log Mkt Cap	-0.0063		-0.0081		-0.1712		-0.0086		-0.0077	-0.1425	-0.0223		-0.0002		-0.0982	
	(0.0285)		*(0.0059)*		*(0.1600)*		*(0.0333)*		*(0.0082)*	*(0.1791)*	*(0.0318)*		*(0.0061)*		*(0.1554)*	
German	0.1615	***	0.0357	**	0.7539	*	0.1856	**	0.0034	0.7499	*	0.1149		0.0341	**	0.6166	
	(0.0623)		*(0.0129)*		*(0.3499)*		*(0.0733)*		*(0.0180)*	*(0.3944)*	*(0.0728)*		*(0.0140)*		*(0.3562)*	
French	0.1279	**	0.0059		0.4477		0.1028		0.0128	0.3289	0.0717		0.0045		0.3312	
	(0.0649)		*(0.0135)*		*(0.3644)*		*(0.0709)*		*(0.0174)*	*(0.3819)*	*(0.0719)*		*(0.0138)*		*(0.3516)*	
Scope	-0.2025	***	-0.0086		-0.5071											
	(0.0652)		*(0.0135)*		*(0.3663)*											
Tippee							-0.1332		0.0209	-0.2830						
							(0.1394)		*(0.0244)*	*(0.5351)*						
Tipping											-0.2090	**	-0.0340		-0.5190	**
											(0.0923)		*(0.0378)*		*(0.2515)*	
R^2	0.4534		0.2823		0.0616		0.3262		0.2282	0.0635	0.2478		0.1550		0.0197	
Log Likelihood	16.01	***	1091.79		-693.47		10.1349		947.65	-707.03	14.13	**	1047.35		-685.19	**

Note: *Prop* is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country . *%Spread* is defined as cross-sectional average of the (ask price – bid price)/((ask + bid)/2) then averaged over all sample companies in that country. *Effective Spread* is measured as the cross-sectional average of $200 * x_{it} * (p_{it} - mid_{it}) / mid_{it}$ then averaged over all sample companies in that country where mid_{it} is the midpoint and x_{it} is the trade direction. *Mkt Cap ($US)* is the market capitalisation averaged over the sample period adjusted daily for the US$ exchange rate averaged for all sample companies in that country. *Relative Minimum Tick* is measured as the minimum tick size divided by price for each trade, averaged over the sample period and then over all the sample companies in that country. *German* is a dummy variable that equals 1 if a countries legal origin is German Civil Law and 0 otherwise. *French* is a dummy variable that equals 1 if a countries legal origin is French Civil Law and 0 otherwise. *Scope* is a sub-index created by adding *Tipping* and *Tippee*. *Tipping* is a dummy variable that equals 1 if an insider is prohibited from passing on confidential information and 0 otherwise. *Tippee* is a dummy variable that equals 1 if an outsider given confidential information by an insider is prohibited from trading and 0 otherwise. *Prop* was regressed using a doubly censored Tobit model while *%Spread* and *Effective* were regressed with OLS.

Table 7: Regression Results for Legal Sanction Variables

	Prop		% Spread		Effective		Prop		% Spread		Effective		Prop		% Spread		Effective	
Constant	0.5256	***	0.0759	**	-0.1322		0.4844	**	0.0691	*	0.2645	*	0.4835	**	0.0008		-0.4593	
	(0.2002)		*(0.0329)*		*(0.8325)*		*(0.1984)*		*(0.0365)*		*(0.9743)*		*(0.2141)*		*(0.0411)*		*(0.9284)*	
Relative Minimum Tick	0.2013		-0.2457		-10.1472		0.3071		-0.3547		-8.0848		0.3882		-0.0997		-10.1882	
	(2.7032)		*(0.4440)*		*(11.2431)*		*(2.6711)*		*(0.4917)*		*(13.1163)*		*(2.7148)*		*(0.5216)*		*(11.7701)*	
Log Mkt Cap	-0.0315		-0.0131	*	-0.3028	*	-0.0242		-0.0105		-0.1102		-0.0148		-0.0057		-0.2673	
	(0.0401)		*(0.0066)*		*(0.1668)*		*(0.0333)*		*(0.0061)*		*(0.1635)*		*(0.0395)*		*(0.0076)*		*(0.1713)*	
German	0.1452	*	0.0402	**	0.3636		0.1327	*	0.0310	**	0.6649	*	0.1188		0.0202		0.4017	
	(0.0832)		*(0.0137)*		*(0.3459)*		*(0.0752)*		*(0.0138)*		*(0.3693)*		*(0.0835)*		*(0.0160)*		*(0.3619)*	
French	0.0628		0.0060		0.0908		0.0574		0.0001		0.2531		0.0490		0.0072		0.1330	
	(0.0768)		*(0.0126)*		*(0.3195)*		*(0.0739)*		*(0.0136)*		*(0.3630)*		*(0.0764)*		*(0.0147)*		*(0.3314)*	
Sanction	-0.0326		-0.0121		-0.6473	*												
	(0.0717)		*(0.0118)*		*(0.2983)*													
Criminal							0.0499		0.0149		-0.1492							
							(0.0696)		*(0.0128)*		*(0.3417)*							
Damages													-0.1859	**	-0.0232	*	-0.6502	*
													(0.0827)		*(0.0139)*		*(0.3587)*	
R^2	0.1703		0.3181		0.2184		0.1841		0.2353		0.0713		0.1653		0.1477		0.1457	
Log Likelihood	12.25	**	1115.42	***	-624.42	***	8.40		1049.17		-708.98		16.20	***	1120.29	***	-648.30	***

Note: *Prop* is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country . *%Spread* is defined as cross-sectional average of the (ask price – bid price)/((ask + bid)/2) then averaged over all sample companies in that country. *Effective Spread* is measured as the cross-sectional average of $200 * x_{it} * (p_{it} - mid_{it}) / mid_{it}$ then averaged over all sample companies in that country where mid_{it} is the midpoint and x_{it} is the trade direction. *Mkt Cap ($US)* is the market capitalisation averaged over the sample period adjusted daily for the US$ exchange rate averaged for all sample companies in that country. *Relative Minimum Tick* is measured as the minimum tick size divided by price for each trade, averaged over the sample period and then over all the sample companies in that country. *German* is a dummy variable that equals 1 if a countries legal origin is German Civil Law and 0 otherwise. *French* is a dummy variable that equals 1 if a countries legal origin is French Civil Law and 0 otherwise. *Sanction* is a sub-index created by adding *Damages* and *Criminal*. *Damages* is a dummy variable that equals 1 if the potential financial penalties may be greater than the trading gain or loss avoided and 0 otherwise. *Criminal* is a dummy variable that equals 1 if criminal sanctions are available and 0 otherwise. *Prop* was regressed using a doubly censored Tobit model while *%Spread* and *Effective* were regressed with OLS.

Table 8: Regression Results for Enforcement Related Variables

	Prop		% Spread		Effective		Prop		% Spread		Effective		Prop		% Spread		Effective	
Constant	0.6117	***	0.0603		1.2503		0.5636	***	0.0705	*	0.6040	*	0.5086	***	0.0696	*	0.1929	*
	(0.2115)		*(0.0367)*		*(0.7908)*		*(0.1981)*		*(0.0348)*		*(0.8760)*		*(0.1960)*		*(0.0323)*		*(0.9575)*	
Relative Minimum Tick	0.7388		-0.2480		-12.5932		1.4148		-0.1942		-16.5782		-0.3846		-0.3974		-10.6984	
	(2.6448)		*(0.4592)*		*(9.8884)*		*(2.8119)*		*(0.4946)*		*(12.4355)*		*(2.9002)*		*(0.4782)*		*(14.1682)*	
Log Mkt Cap	-0.0277		-0.0087		-0.0364		-0.0106		-0.0092		-0.1845		-0.0259		-0.0105	*	-0.1186	*
	(0.0329)		*(0.0057)*		*(0.1229)*		*(0.0339)*		*(0.0060)*		*(0.1501)*		*(0.0339)*		*(0.0056)*		*(0.1658)*	
German	0.1300	**	0.0343	*	0.6782	*	0.0456		0.0334	*	0.0319	*	0.1487	*	0.0396	**	0.6019	**
	(0.0736)		*(0.0128)*		*(0.2751)*		*(0.1064)*		*(0.0187)*		*(0.4704)*		*(0.0813)*		*(0.0134)*		*(0.3974)*	
French	0.0773		0.0006		0.5027	*	0.0183		0.0024		0.0109		0.0831		0.0108		0.1534	
	(0.0751)		*(0.0130)*		*(0.2808)*		*(0.0795)*		*(0.0140)*		*(0.3516)*		*(0.0875)*		*(0.0144)*		*(0.4273)*	
Enforced	-0.1918	***	-0.0861	*	-0.9523	***												
	(0.0809)		*(0.0441)*		*(0.3026)*													
Public							-0.1729	**	-0.0274	**	-1.3214	*						
							(0.0778)		*(0.0128)*		*(0.6978)*							
Private													0.0108		0.0030		-0.0409	
													(0.0174)		*(0.0029)*		*(0.0849)*	
R^2	0.2168		0.2806		0.4039		0.2132		0.2585		0.1621		0.1784		0.3196		-0.0677	
Log Likelihood	14.77	**	1191.18	***	-551.80	***	13.73	**	1183.10	***	-643.09	***	10.04		1106.00		-708.07	

Note: *Prop* is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country . *%Spread* is defined as cross-sectional average of the (ask price – bid price)/((ask + bid)/2) then averaged over all sample companies in that country. *Effective Spread* is measured as the cross-sectional average of $200 * x_{it} * (p_{it} - mid_{it}) / mid_{it}$ then averaged over all sample companies in that country where mid_{it} is the midpoint and x_{it} is the trade direction. *Mkt Cap ($US)* is the market capitalisation averaged over the sample period adjusted daily for the US$ exchange rate averaged for all sample companies in that country. *Relative Minimum Tick* is measured as the minimum tick size divided by price for each trade, averaged over the sample period and then over all the sample companies in that country. *German* is a dummy variable that equals 1 if a countries legal origin is German Civil Law and 0 otherwise. *French* is a dummy variable that equals 1 if a countries legal origin is French Civil Law and 0 otherwise. *Enforced* is a dummy variable that equals 1 if insider trading had been prosecuted before 1998 and 0 otherwise. *Private* is the product of the right of private enforcement, a dummy that equals 1 where private prosecutions are allowed and 0 otherwise, and the law and order rating collected from International Country Risk Guide. *Public* is the mean of the supervisor attributes and investigative powers from La Porta et al. (2003). *Prop* was regressed using a doubly censored Tobit model while *%Spread* and *Effective* were regressed with OLS.