Elements of Effective Insider Trading Laws

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Abstract

While countries have been more than willing to regulate insider trading, it is an open question as to whether this has resulted in improvements for those markets. In particular, lawmakers have had to largely structure the legal regimes with little guidance as to what makes an effective insider trading law. We seek to address this by examining the aspects of a legal regime that result in reductions in information trading and trading costs. Employing a sample of 18 countries, we compare specific and quantifiable aspects of the legal regime with the measures of transactions costs in a sample of up to 70 randomly selected companies per market. We find that stronger laws result in reductions in the cost of informed trading. Particularly, we find that broader laws, laws that employ financial rather than criminal damages, and laws that are enforced by strong public regulators perform best. These results should help to enlighten regulator attempts to create strong and effective insider trading laws.

1. Introduction

The issue of whether or not insider trading should be regulated has been debated by academics for several decades. Arguments for and against insider trading regulations have mainly focused on the costs of insider trading (informed insiders can profit from uninformed outsiders) and its impact on informational efficiency (private information may not be reach the market if insiders are hindered in trading). The literature has more recently swung in favour of regulation based largely on studies of the impact of regulations. There have been several empirical studies suggesting that some form of insider trading regulation is desirable.

To provide an answer to the question of whether insider trading regulations matter, Bhattacharya and Daouk (2002) investigated the relationship between the existence and enforcement of insider trading laws and the cost of equity for all countries with financial markets. They find that although many countries have rules prohibiting insiders trading, it is only when these rules are enforced that they reduce the cost of equity. Beny (2005) extends the work of Bhattacharya and Daouk (2002) by considering different aspects of insider trading regulations and finds that: 1) stricter insider trading laws lead to more diffuse equity ownership, more accurate stock prices and increase market liquidity; and 2) sanctions that follow when breaking the rules have a more significant impact than the scope of the laws. While these studies address important issues regarding the efficacy of insider trading regulations, several important questions remain unanswered. First of all, are these regulations effective in reducing the amount of informational trading, and if so, what aspects of regulations are most effective? Second, do effective regulations decrease the direct costs (the bid-ask spread) investors incur when trading in financial markets? It is the aim of this paper to address these questions.

To address the first question we investigate the relationship between insider trading laws and the probability of informed trading (PIN) as defined by Easley et al. (1996, 1997a, 1997b). If insiders constitute a sizeable portion of informed trades, then we expect that laws that prohibit insiders to trade on private information should result in a reduction in the probability of informed trading. Indeed, Durnev and Nain (2007) investigate the effectiveness of insider trading regulations and find that the existence and enforcement of regulations both decrease the amount of informational trading. However, we extend their work by investigating which aspects of insider trading regulations deter insiders most.

To address the second question, we consider the relationship between insider trading laws and various measures related to the cost of trading (spread). Market microstructure theory suggests that the bid-ask spread increases when informational asymmetry in a market is larger (Glosten and Milgrom, 1985; Kyle, 1985) as the presence of superiorly informed traders introduces a risk of expropriation to less informed liquidity providers. When insider trading laws are lacking or are weak the trading of insiders may cause the bid-ask spread to widen. Indeed, Chung and Charoenwong (1998) show that spreads for a large sample of US firms are wider for companies with a greater extent of insider trading. In addition, Frijns, Gilbert and Tourani-Rad (2007) find that the bid-ask spread decreases significantly after a significant tightening in the insider trading regulations in New Zealand. Based on this theoretical and empirical evidence we investigate whether countries with specific elements in their insider trading regulations have a lower spread. To determine whether the relation between the spread and insider trading laws is driven by the reduction of insider trades, we also evaluate more specific measures that consider the cost of trading due to informational asymmetry.

In this paper we extend the work of Bhattacharya and Daouk (2002), Beny (2005) and Durnev and Nain (2007) in two important directions. Firstly, we go beyond simply looking at the general strength of insider trading laws, or their mere presence, to consider what aspects of the laws are important in creating an effective regime. That insider trading laws are considered important can be seen in the number of countries who have implemented laws, 87 out of 103 markets in 1998 (Bhattacharya and Daouk, 2002). However, the literature does little to advise policy makers on the best structure, sanctions and enforcement methods to use. Beny (2005) makes a good first attempt at this by looking at the outcomes of different legal variables, however the measures looked at in that paper do not measure the impact on insiders. Additionally while Durnev and Nain (2007) look at the impact on informational trading, arguably dominated by insiders, they only consider the overall strength of the laws for each market. We examine a number of variables in relation to the laws within a country including the scope of the laws, the sanctions available and the methods and success of enforcement. We start with the legal variables defined in Beny (2005) but go into more depth particularly in relation to the sanctions available.

Additionally we use a very different approach to examine the impacts on insiders. Firstly, we investigate the relationship between informed trading and laws by examining the probability of informed trading as defined by Easley et al. (1996, 1997a,

1997b). Given insiders make up a sizeable portion of informed traders, laws that impact on the freedom of insiders to trade on confidential information should result in a reduction in the probability of informed trading overall. In addition we also look at the impact on the trading costs within the country. Trading costs include a cost component designed to compensate liquidity providers for the losses they incur when trading against better informed parties such as insiders (Copeland and Galai, 1983; Glosten and Milgrom, 1985). In essence this measures both the probability of insider trading and the expected gains insiders making it a measure of the markets perception of insider prevalence and harm. We therefore examine the impact on trading costs in three ways; firstly, examining the overall impact on total spreads by looking at the percentage spreads; secondly, by examining the information asymmetry component of the spreads using Huang and Stoll (1996)'s realised spread measure; lastly, by decomposing the spreads to get the proportion of information asymmetry in the spread via the Madhaven, Richardson and Roomans (1996) bid-ask spread decomposition model. These measures provide a more robust framework for examining the impact of laws on insiders than the factors examined in Beny (2005). The relationship between laws and trading costs has also been determined by Eleswarapu and Venkataraman (2003), who established that 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 examine a sample of 1073 companies from 18 countries for the period September 2004 to August 2005. Using country level averages for each of the dependent variables, we find limited support for the hypothesis that the overall strength and scope of insider trading laws positively affects the cost of information asymmetry in the market and the prevalence of insiders. However, we find strong support for the importance of well constructed sanctions. In particular we find that strong financial penalties that ensure that insiders are guaranteed not to profit, and preferably face a significant financial penalty that scales with the size of their trading are most effective in controlling insiders. We do not however find any support for criminal sanctions regardless of the length of the potential jail term or whether they have been successfully enforced. Further we find that enforcement strength is also a key aspect of an insider trading regime. Countries that have enforced laws have less informed trading as measured by the PIN model. In addition a strong public regulator appears essential in controlling insider trading while private enforcement has no value in controlling insider trading. This supports previous findings by Beny (2005) and also anecdotal evidence on

private prosecutions of insiders in countries like New Zealand and the United States. 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.

Studies have shown that the construction of laws protecting investors from unscrupulous trading practises is important both generally and specifically with respect to insider trading. The law and finance literature in particular has examined how the quality 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. Providing a robust and accessible legal framework is vital in attracting international investment given the competition for capital amongst countries. Where investors can be taken advantage of via practises such as insider trading the result for the market is a reduction in investor confidence, an increase in the risk premiums associated with that market and ultimately a reduction in liquidity in the market. This is of particular concern for small markets in particular.

While the evidence on the impact of insider trading laws on the market is much more limited, it 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. Bhattacharya and Daouk (2002) finds that reductions in the cost of capital require the laws to be enforced. In a later paper (Bhattacharya and Daouk, 2005) they conclude that an inability to enforce results in a higher cost of capital than had a country not enacted insider trading laws at all. 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 rest of 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.

2. Sample

To analyse the importance of the various components of an insider trading regime, we selected 18 countries for which data on specific aspects of their insider trading regime was available and for which the primary financial market within each country is either a limit order book (LOB) or a dealer market (see Table 1 for an overview of the countries included in this study and their characteristics).[1] Some of these markets run several systems in parallel, usually employing LOBs and dealer markets for the more liquid stocks and other systems, such as auctions, for less liquid stocks. In these markets we randomly selected 70 stocks of non-financial firms trading on the primary market, for which we then collect intra-day data to construct our dependent variables. Data related to insider trading regulations were obtained from Bhattacharya and Daouk (2002), Beny (2005) and various other sources, and data on various control variables were collected. To ensure sufficient data was available for the estimation of the dependent variables 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). This reduced our final sample to 1,073 stocks or approximately 60 stocks per market.

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[1]We restrict the sample to these market types as models we employ require the specific price setting mechanisms found in these market types.

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 and the prevalence of informed trading. To construct these measures we collected intra-day (tick-by-tick) transaction data for the period 1 September 2004 to 31 August 2005 from SIRCA.[2] The transaction data contain detailed information about 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.

We consider various measures to determine whether the relationships we find are robust. First, we want to evaluate whether specific elements of insider trading lead to a reduction in the amount of insider trading. We use the probability of informed trading measure developed by Easley et al. (1996, 1997a, 1997b). This variable indicates the prevalence of informed trades, which includes insider trades. If laws in a country are more effective than in others we would observe less insider trading, resulting in reduced informed trading and therefore a lower PIN. Second, we want to address the question whether specific elements of insider trading laws affect the cost of trading. To investigate this issue we consider the percentage spreads (absolute spread divided by the midpoint of the bid and ask price). In addition, we consider spread measures more directly related to the informational asymmetry components of the spread. We use the realised spread measure as a model-free measure of the informational asymmetry component and we also examine 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 harm of informed trading (of which insiders can make a substantial component).

The Probability of Informed Trading

We start by considering a measure for the amount of informed trading. The measure we consider is the probability of informed trading (PIN) as proposed by Easley

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[2]Securities Industry Research Centre of Asia-Pacific.

et al. (1996, 1997a, 1997b). This measure essentially considers the intraday order flow, where the imbalance in daily order flow is used as an indicator for the amount of informational trading. The PIN is then defined as the number of informed trades relative to the number of uninformed trades.

To formalize, consider a market that consists of a certain number of informed and uninformed traders. On each day, uninformed traders trade for liquidity purposes and arrive to the market with an arrival rate ε. Informed traders will only be active on days when they receive a private signal. Let α be the probability that a private information signal arrives to the market on a given day. On such a day informed traders will be active with an arrival rate of μ. The signal can be bad news with probability δ and good news with probability $(1 - \delta)$. When the signal is bad news buy orders arrive at a rate of ε and sell orders arrive at a rate of $\mu + \varepsilon$. When the signal is good news buy orders arrive at a rate of $\mu + \varepsilon$ and sell orders arrive at a rate of ε. Correspondingly, there is a probability of $(1 - \alpha)$ that no private news arrives, and on such a day buys and sells arrive at a rate of ε. The probability that a trade is executed by an informed trader is defined as

$$PIN = \frac{\alpha\mu}{\alpha\mu + 2\varepsilon}. \tag{1}$$

If we assume that the order arrivals follow Poisson processes, the probability of observing a certain number of buy and sell orders is given by

$$P[(B_t, S_t) | \theta] = \alpha(1-\delta)e^{-(\mu+2\varepsilon)}\frac{(\mu+\varepsilon)^B \varepsilon^S}{B!\,S!} \\ + \alpha\delta e^{-(\mu+2\varepsilon)}\frac{\varepsilon^B(\mu+\varepsilon)^S}{B!\,S!} + (1-\alpha)e^{-2\varepsilon}\frac{\varepsilon^{B+S}}{B!\,S!}, \tag{2}$$

where $\theta = (\alpha,\, \delta,\, \varepsilon,\, \mu)'$ is the vector of parameters. The first part on the right-hand side of the equation refers to probability of the day being a "good news" day, the second part refers to the probability of the day being a "bad news" day and the last part refers to a "no news" day.

Assuming that information events are random, i.e. events on different days occur independently of each other, the likelihood function can be expressed as the product of

each separate probability. The log likelihood function (excluding constants) can therefore be written as

$$L(\{(B_t, S_t)\}_{t=1}^T \mid \theta) = \sum_{t=1}^T (-2\varepsilon + M\,ln\,x + (B+S)\,ln(\mu+\varepsilon))$$
$$+ \sum_{t=1}^T ln(\alpha(1-\delta)e^{-\mu}x^{S-M} + \alpha\delta e^{-\mu}x^{B-M} + (1-\alpha)x^{B+S-M}),$$

(3)

where $M = \min(B, S) + \max(B, S)/2$ and $x = \dfrac{\varepsilon}{\mu+\varepsilon}$. The usage of M and x in the likelihood function improves the computational efficiency in estimating the parameters. For a detailed discussion on the PIN model we refer to Easley et al. (1996, 1997a, 1997b).

Spread Measures and Informational Asymmetry

The first measure we use to determine whether there is a relationship between insider trading regulations and trading costs is the percentage spread. The percentage spread is defined as the absolute spread divided by the midpoint of the bid-ask spread, i.e.

$$\%Spread_t = \frac{(a_t - b_t)}{(a_t + b_t)/2},$$

(4)

where a_t and b_t are the ask and bid prices, respectively.

To determine more directly whether the reduction in spread is attributable to a reduction in informational asymmetry, we also consider the effective and realised spread (see e.g. Huang and Stoll, 1996). Huang and Stoll argue that the effective spread, the difference between the price at which a trade occurs and the midpoint of the spread, can be simply decomposed to get the information asymmetry component by looking at the post trade price changes. A dealer only profits if the prices reverse after a trade, such that the price rises after they purchase and decrease after they sell. However, when trading against informed parties the opposite will be the case, the price will fall after a purchase and increase after a sell, meaning that the dealer does not realise the effective spread. Huang and Stoll therefore examine the difference between the effective spread and the realised spread to estimate the cost of informed trading. The effective spread (z_t) is estimated as

$$z_t = |p_t - (a_t + b_t)/2|, \tag{5}$$

where p_t is the price at which the current trade occurs and a_t and b_t are the respective ask and bid prices.

From this effective spread the authors subtract the realised spread, which is defined as

$$
\begin{aligned}
(\delta_t \,|\, b_t) &= [(p_{t+\tau} - p_t) \,|\, (p_t = b_t)], \\
(\delta_t \,|\, a_t) &= -[(p_{t+\tau} - p_t) \,|\, (p_t = a_t)],
\end{aligned}
\tag{6}
$$

For bid and ask quote, respectively, and where $p_{t+\tau}$ is the price of a trade at least τ minutes after the initial trade. In our case we use the lesser period employed in Huang and Stoll (1996) of 5 minutes, although we do not cap the period within which a trade must occurs. As noted in their paper 5-10 minutes resulted in similar results to simply greater than 5 minutes. We then divide the difference between the effective and realised spreads by the midpoint of the trade to get a percentage value that can be compared between different markets with different currencies and price levels.

The last spread measure we consider 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 the model proposed by Madhavan et al. (1997) as it has been used frequently when decomposing spreads in dealer markets and limit order book markets (see Ahn et al., 2002; Frijns et al., 2007 among others).

The Madhavan et al. (1997) model is based on the assumption that trading prices are affected by two cost components: an informational component that reflects the amount of informational asymmetry in the market and a real cost component that reflects the costs of inventory imbalances and order processing costs. If no private information is present in a market then trades do not provide any new information about the true value of an asset. In that case, the bid and ask price will not move and the transaction price will bounce between bid and ask. However, if traders with private information are present, their trades carry new information about the true value of the asset. Consequently, when, say, an informed buy order arrives, this signals that the true value of the asset is higher than the quoted prices, which will lead to an increase in both bid and ask quotes. By dynamically relating the order flow to transaction price returns,

we can therefore determine the informational amount of trading, which equals the information asymmetry component of the spread. Specifically, Madhavan et al. (1997) model transaction price returns as

$$p_t - p_{t-1} = \theta(x_t - \rho x_{t-1}) + \phi(x_t - x_{t-1}) + u_t, \tag{7}$$

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,[3] 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. The model is estimated by GMM, which is a more robust estimation procedure compared to OLS when observations are non-normally distributed.

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. We use the proportion of information asymmetry in the spread to make the value relative and therefore comparable regardless of the price level or spread size. To determine the proportion of information asymmetry we calculate $\theta/(\theta+\phi)$ 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. Further this measure provides a relatively clear and direct method of observing the impact of legal structures as the values are based on the markets estimates

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[3]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 Lee and Reedy (1991) we do not lag quotes to determine the trade indicator, because the majority of markets examined are electronic markets where the risk of quotes and trades being recorded in the wrong order are dramatically lower (see Sirri and Peterson, 2003).

of the threat of informed trading. We accumulate the individual company values to get a country average.

Estimation Issues

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 initially collect data on the specific structure of the laws in each country based on the definitions from Beny (2005). Given the age of the initial data collected by Stamp and Walsh (1996) and used by Beny, we recollect the legal variables for each country to ensure that any changes to insider trading laws are accurately reflected in the regressions that we run.

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 addition to these variables there is also a general measure of the strength of the insider laws, *IT Law* which is the sum of the four dummy variables, namely the two covering the scope of the law, *Tipping* and *Tippee,* and the two covering the sanctions available, *Criminal* and *Damages*. The two scope variables were combined into a dummy to cover the breadth of the laws, *Scope*, as were the two sanction variables, *Sanction.* We utilise these variables with the exception of *Tipping*, a prohibition on passing confidential information to others, and *Tippee*, a prohibition on trading by those who receive confidential information. We exclude these two variables as they have been almost universally accepted, with only India and Japan not prohibiting both. We do explore *Scope* to see if broader laws are more important.

In terms of sanctions we explore two variables, *Criminal*, which is a dummy that equals 1 if criminal sanctions are available, and *Damages*, which is a dummy that equals 1 if any financial penalties can be in excess of the gain made or loss avoided. As

noted above we also explore a variable that is the sum of these two sanction measures, *Sanction.* In addition we explore the issue of penalties in more depth than has been previously.

As has been noted in the literature the pre-emptive ability of laws is a function of the penalties available and the likelihood of being caught. Therefore the exact nature and level of any fine or jail term is an important component of the sanctions available. In relation to this we explore three aspects of the financial damages that can be imposed on a successfully prosecuted insider. The first is *Disgorgement* which is a dummy variable if the insider is automatically fined the gain made or loss avoided such that there is no benefit from their trading. The second is *Fixed* damages which is both a dummy variable that equals 1 if there is a fixed fine either by itself or in conjunction with other potential financial penalties. The third is *Variable* damages where the court can set a pecuniary penalty that is multiple of the gain made or loss avoided, i.e. an insider maybe fined 3 times the gain made or loss avoided. Some systems involve a mixture of all three where the court can ensure that the gain made or loss avoided is repaid in addition to pecuniary penalties of a fixed fine or a multiple of the insiders gain which ever is greater. In addition to dummies for the *Fixed* and *Variable* financial penalties we also look at how the severity of the penalties impacts the market by using the maximum possible penalty for both the fixed fine, converted into US$, and the variable penalites. Addition we go beyond looking at the mere presence of criminal sanctions to consider the maximum jail sentence available under the law, *Criminal Max.*

The final element we examine is the importance of enforcement. For the rules to be effective in controlling insiders there must be a real threat of enforcement as indicated by Bushman et al. (2006), Beny (2005) and Bhattacharya and Daouk (2002,2006). 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 and update it for any countries that hadn't prosecuted by 1998, although we find no additions amongst the sample countries. 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. Additionally however, a failure to prosecute has been shown by Bhattacharya and Daouk (2006) to result in a cost of capital that is higher than for those countries who didn't regulate in the first place. It therefore appears that the public perception of the strength of insiders is intimately tied to the ability to prosecute insiders.

We also examine the impact of a successful criminal prosecution of insider trading. Although some have argued that criminal sanctions are ineffective due to the difficulty of proving to the higher burden of proof that insider trading occurred, it may be that where prosecution has occurred, given the significantly harsher nature of the penalty, that this may significantly reduce insider trading activities. Using information available from securities regulators and business papers we create a dummy that is equal to 1 if an insider case has been successfully prosecuted.

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 as per Beny (2005).

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) argues for private enforcement based on private contracting, although real world evidence suggests it is ineffective (Bainbridge, 2000). 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, although not all the variables tried were included in the regressions. Where variables didn't add to the predictive power of the regressions we excluded them. Firstly, we control for differences in liquidity on the basis that larger firms tend to be subject to less insider trading activity (Lakonishok and Lee, 2001). We measured this in several ways including the average number of trades per day, the natural logarithm of the average of the local currency market capitalisation over the sample period adjusted daily to US dollars and the average volume traded. In the end trades per day had the most predictive power and dominated the other liquidity variables, as such this is the only variable that is included in the regressions.

To examine the country level protection afforded to investors more generally we utilise the anti-self dealing measure devised by Djankov et al. (2007). Their measure based on legal rules for 2003 looks at how well the laws prevent self-dealing by directors via private enforcement measures. The authors argue that this measure does a better job than the previously advocated anti-director rights measure. As such we use this measure to control for general legal protections against expropriation.

We also examine a number of governance factors at the country level. These cover a variety of aspects of how the country is run and was taken from the Corporate Governance Matters Survey (2007) done for the World Bank. The survey uses a number of sources to rate countries in six areas; Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Of these only the Rule of Law didn't improve the regressions, thus was left out. This is possibly due to the inclusion of the LLSV factor which may account for the strength of

the judicial system in a country. Of the other five, Voice covers the ability of citizens to participate in the selection of the government and rights such as free speech. Political Stability looks at the perceived likelihood of political destabilisation by unconstitutional or violent means. Government effectiveness measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. Regulatory Quality measures the ability of the country to construct and implement sound laws designed to promote private sector development. And Control of Corruption measures how prevalent corruption is within the system. All of these play a role in determining how risky an investment within a country is and therefore need to be accounted for.

We also control for the effect of any price discreteness due to the imposition of minimum tick sizes by the market. 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. Although we find this, along with a dummy for the market system in place, do not add to the model and so are excluded from the regression results presented.

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.

3. Results

3.1 Summary Statistics.

Table 1 gives summary statistics of 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 terms of the specific components, virtually all countries prohibit both tipping and tippees from trading. Although interestingly Japan prohibited recipients of confidential information from trading, an action that is virtually impossible to detect, but did not stop insiders from passing on the

information initially. It is argued that if insiders are free to pass on information than may effectively 'sell' it rather than trade on it personally. Only India did not prohibit those who were passed confidential information from trading. As a result the averages by legal origin are similar for all three.

In terms of sanctions imposed on insiders, half the sample countries have both some form of financial penalty guaranteed to be greater than the gain made or lose avoided and criminal sanctions. Criminal penalties are common amongst the countries with insider trading being a criminal offence in 14 countries. 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. The difficulty of prosecuting is demonstrated however by the fact that only 7 countries have prosecuted insiders, half the countries with criminal sanctions compared with close to 80% for civil enforcement. Germanic law countries had the highest percentage with 3 out of the 4, while the French civil law countries failed to criminally prosecute at all. French Civil law countries seem to rely more heavily on financial damages with both the largest variable damages at 10 times for France and the highest average in US$ for fixed fines at 4.4 million. Germanic civil law countries on the other hand have only small fixed fines with an average of just $258,000. This would suggest a reliance on criminal penalties given the low level of damages is unlikely to be a significant deterrent. Automatic disgorgement is highest for common law countries at 60% of the countries, followed by French civil law and last with just one country Germanic civil law. There does seem to be differing emphasis's on how to punish insiders, with French Civil law countries opting for financial penalties while Germanic civil law countries prefer criminal sanctions, however even here these countries offer on average less jail time than common law countries.

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 sanctions are also relatively harsh.

Table 2 provides summary statistics on the cross-sectional variables employed in the paper. The market capitalisation in US$ shows the US had the largest market capitalisation followed by the United Kingdom and France with Greece and Singapore having the smallest market caps. The markets also demonstrate significantly different liquidity as demonstrated by the number of trades which ranged from 5469 for New Zealand to in excess of 300,000 for the United States, which is twice the average for the next largest markets the United Kingdom and France. 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 continuous insider trading law variables. What we observe is that the *Fixed* fines are positively correlated with variable fines, suggesting that countries do not replace one with the other but will often use both (as observed in Table 1) and that where they have stronger fixed fines they also have stronger variables fines. Fixed is however used as a substitute for longer jail sentences although the relationship is not particularly strong. Of note is the negative relationship, although weak, relationship between the strength of private enforcement and the variable and fixed damage levels. This suggests that insiders face lesser punishments in the presence of private enforcement. This is difficult to reconcile especially in relation to the positive relationship between public enforcement and the damages variables. A negative relationship suggests that regulators believe private enforcement increases the likelihood of prosecution and as such lower punishments. However, Beny (2005) in particular shows that private enforcement has little value in control insiders. Public regulators on the other hand were shown to be important. The positive relationship we show suggests that stronger sanctions are available with stronger regulators. One would expect a negative relationship as countries with weaker regulators attempt to correct for that by increasing the punishment given deterrence is a function of both the likelihood of prosecution and the likely punishment. We also find a positive relationship between the private and public variables. This indicates that stronger private enforcement is also found in countries with stronger public regulators.

3.2 Impact on Informed Trading

We start our examination of the impact of insider trading regulations by examining the question of what effect do laws, and specific elements of the laws, have on the prevalence of informed trading within a market. Given the basis of regulating insider trading is to prevent insiders trading when in possession of confidential information not yet available to the market, it is appropriate to gauge the efficacy of the rules by examining how prevalent insiders are. Durnev and Nain (2007) examine this issue by employing a measure of the overall strength of the insider trading regime against the volume-induced return autocorrelation observed. They argued that when prices and volume moved together it was evidence of informational trading. We employ a different model, namely the probability of informed trading model developed in Easley et al. (1996). This measure gives an estimate on the probability that a particular trade is executed by an informed trader, a group that includes insiders. Provided insiders make up a significant portion of the informed traders then any regulatory impact on their trading will flow through to the PIN estimate. Overall, based on the results in Tables 4 and 5 we find that laws can have a significant impact on the probability of informed trading within a market.

The base case findings confirm our expectations about the direction of the control variables although the variables are typically insignificant. As can be seen the measure for liquidity, *Trades per Day*, is negative with mixed significance indicating that more liquid firms have less informed trading generally. This fits with previous literature which has argued that in less liquid and smaller firms insiders make up a greater percentage of traders and as a result drive up trading costs. We find similar results when using log market capitalisation and volume although these proved to add little to the model in the presence of *Trades/Day*. We also find that *Anti-self Dealing* is negative although insignificant. This would indicate that stronger investor protection in general has a negative influence on trading costs and informed trading. As expected both French civil law and Germanic civil law countries do a poorer job in reducing the prevalence of insiders, although only the dummy for French civil law countries is significant. This supports the findings of both LLSV and Beny who have all found that these regimes offer weaker investor protector rules overall.

Of the survey based variables we see that both *Corrupt* and *Gov Effect* are negative although insignificant, while *Reg Qual* and *Voice* are negative and significant. This indicates that countries where regulatory effects generally result in more sound

legislation that the prevalence of informed trading decreases. This is likely a result of the increased likelihood of prosecution in such markets given that laws will generally be more enforceable if they are well constructed. The negative relationship for *Voice* is likely due to the increased accountability in markets with stronger freedom of speech. The significant and positive relationship between political stability and the probability of informed trading is hard to explain given markets with greater political stability should be more likely to have strong enforcement mechanisms.

Table 4 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, with our sample the results are in the right direction, namely a negative relationship between the strength of the laws and the prevalence of informed traders, however the relationship is not significant. This maybe a result of the composition of our sample that is largely dominated by developed markets with little variation in the *IT Law* proxy. We also obtain a similar result for the *Scope* variable, a sub-index constructed by adding the two dummies *Tipping* and *Tippee* together, again most likely due to the lack of variation in the variable. Only two countries did not have rules that prohibited the passing of confidential information or prevented the recipient from trading on it, namely India and Japan. While both had relatively high probability of informed trading, the uniformity of the other countries in terms of the presence of these variables, makes it difficult to confirm the importance of broader laws definitively. The direction of both variables is however in the direction expected.

The results for the penalties employed reveal some intriguing findings. *Sanction* is a sub-index created by adding the dummies for *Criminal* and *Damages* together designed to measure the overall strength of the available sanctions. 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. As expected we find a negative relationship between *Sanctions* and the PIN values. Interestingly when we break the sanctions out into the components, *Damages*, a dummy that equals 1 if insiders are liable for fines in excess of their profit, and *Criminal*, a dummy that equals 1 if criminal sanctions are available for insider trading, it is the lesser sanction that drives a reduction in the probability of informed trading. Criminal sanctions, which revolve around incarceration and jail time along with non-judicial punishments that follow from a criminal record, are argued to be the more severe sanctions that can be imposed. However, the regressions indicate that criminal sanctions not only do not cause a significant reduction

in informed trading, but are nearly significantly positive. The presence of financial damages on the other hand results in a significant reduction in insider trading.

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 largely 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 some of the sample countries, then the laws efficacy is largely negated as there is no effective deterrent. In fact only 7 of the sample countries have criminal prosecuted an insider and of those only a couple appear to have done so regularly. *Damages,* on the other hand, 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 frequently. This is likely the reason behind significant changes in the composition of sanctions. Only 5 of our sample countries in this study had implemented financial penalties in excess of the gain made or loss avoided in Beny (2005). That has increased significantly in this paper with most countries running disgorgement of profits in addition to either a fixed fine or a fine based on a multiple of the gain made or loss avoided.

When we break the damages out further in Table 5 we find some interesting results. Firstly when we look at the three categories of damages, disgorgement of profits, a fixed level fine and a variable level fine we see that a fixed fine is of limited use. The regression coefficient is positive but insignificant while disgorgement is at least negative but still insignificant. What appears to drive the reduction in probability of informed trading observed in the results in Table 4 are variable damages. Given deterrence is argued as being a function of the probability of being caught multiplied by the potential sanctions. Disgorgement results in stripping an insider of their profitability, and arguably by itself is not a sufficient deterrent to insider trading due to the fact that not all insider trading is caught. Any regime offering only disgorgement would not make the expected cost of insider trading outweigh the benefits. However, disgorgement offers a guarantee that any caught insider will not benefit from their actions, where as a

fixed fine has the potential to be less than the profit made. Hence the strongest reaction appears to be for variable damages which guarantee disgorgement plus a significant penalty on top. Under such a regime there is no way that insiders can avoid losing more than they gained from the trading.

When the actual level of the sanctions available is examined the impact on the prevalence of insiders again shows that insiders are most deterred when the potential sanctions are greater. Larger variable damages result in a significant reduction in the prevalence of informed trading. This indicates that markets such as the UK where the maximum fine is unlimited and France where the maximum variable fine is ten times the gain made or loss avoided are likely to be more effective in controlling insiders. By contrast, the size of the fixed fine does result in a negative relationship with all three measures, however it is not significant in any of the regressions. This suggests that the level of the fine is of limited usefulness in controlling insiders. In fact it maybe counter productive as it may encourage insiders to trade heavily to ensure that the profits they earn outstrip any potential fine. This is particularly true for a country like Australia where there is only a fixed fine of $200,000 for individuals and no automatic disgorgement of profits. In this case it maybe possible to overcome the fine by trading heavily.

The last sanction variable we consider is the *Criminal Max* in terms of the number of years a prosecuted insider can be jailed for. In most countries this is not the actual jail time that an offender will serve but it does make a useful proxy for the severity of the criminal sanctions. Criminal penalties differ greatly between the sample countries from 1 year in Belgium to 10 years in Hong Kong. However, the coefficients indicate that longer potential sentences reduced the prevalence of informed trading. In fact we actually find that longer criminal sentences have a significantly positive impact on the prevalence of informed trading, the direct opposite outcome expected if criminal sanctions were effective. The results therefore suggest that criminal sanctions are not perceived as an effective deterrent by insiders, who by and large seem to discount these when trading.

The sanction results indicate that insiders main concern when trading is the potential losses they may face if they are caught. Fixed limit losses that may not cover the gains made appear to do little to limit the prevalence of their trading. Larger fines do have a limited impact but only in so much as it becomes harder to earn sufficient profits to cover any fine. Variable fines on the other hand represent a real risk of a loss and therefore appear to be a powerful tool for regulators. Against this, criminal sanctions

appear powerless to curb insider trading as evidenced by the increased informed trading. This also matches with the anecdotal evidence from those countries with criminal sanctions. Only the US and Australia appear to have had a significant number of criminal prosecutions, while most of the other countries who have criminally prosecuted have done so on only one or two occasions. In addition the Netherlands appears to have completely removed criminal sanctions after an earlier attempt to completely criminalise insider trading failed to secure prosecutions due to the burden of proof. In many cases the lack of a 'smoking gun', a direct connection between the information obtained and the trading, makes a criminal prosecution impossible to secure. Therefore, while being a significantly stronger sanction in that you are depriving an individual of their liberty, along with non-judicial punishments such as restrictions on board memberships etc, it is not seen as a credible threat. Even longer criminal sanctions are not able to correct this view held by insiders.

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 previously prosecuted an insider, as shown in Table 4 indicates that prior enforcement does affect the prevalence of insiders. 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. More recently Bhattachayra and Daouk (2007) have even shown that not enforcing insider trading laws results in worse outcomes than not introducing laws at all. While enforcement appears to be important, criminal enforcement like criminal sanctions is not. The coefficient is positive but insignificant indicating that not even a successful prosecution can convince insiders of the validity of criminal sanctions. Again this is likely a result of the difficulty in prosecution such that even a proven ability to prosecute an insider is not enough to convince insiders that it is a practical sanction.

Public 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 prevalence of informed 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.

3.3 Impact on Spreads.

When we examine the impact on the trading costs we find similar results, although the results are stronger for several of the variables. We observe a significant reduction in the percentage spread when we look at the impact of both stronger laws, *IT Law,* and the breadth of the laws, *Scope.* These are interesting findings and appear to indicate that the markets reaction to insider trading laws maybe stronger than the reaction of insiders. The results for both suggest that there is evidence of investor confidence being improved by stronger insider trading laws. When we look at the realised spreads and the decomposed proportion of information asymmetry in the total spread we observe that while stronger and broader insider trading laws have a negative impact on the information asymmetry component of the spreads, that this is insignificant. The fact that the perceived level of information asymmetry does not appear to have decreased enough to account for the total reduction in total spreads would suggest that legal regimes that are stronger and broader also have lower liquidity components. Ausbel (1990) amongst others argues that when insider trading is prevalent it causes insiders to lose confidence in the market and as a result to reduce their participation in the market, reducing liquidity and arguable increasing spreads as a result. Our finding in relation to the percentage spreads suggests that laws can convince not only liquidity providers to reduce the risk component associated with informed trading, but also encourages market confidence.

When we examine the sanction variables the results are similar to that for the prevalence of insiders. *Sanctions* is negative and significant which is driven by financial damages. We find that variable damages are most effective, while disgorgement is in the right direction and fixed fines cause no reduction in the spreads. Unlike the level of informed trading however, the total spreads appear to be reduced significantly by both larger fixed and variable fines. As noted above, fixed fines offer little disincentive

unless set so high that insiders are unable to trade sufficiently to cover any fine if they are caught. Whereas insiders did not see the level of fixed fines available as a threat to their profitability, it appears the markets hold a differing view. This is not however supported when we examine the information asymmetry component measures. Neither show the level of the fixed fine has a significant impact in reducing the information asymmetry costs associated with insider trading. However, it maybe that larger fixed fines do inspire confidence in market participants.

The spread results do show however that again criminal is completely unimportant in controlling insiders. While the variable *Criminal* is negative, it is insignificant, as it is also for realised spreads. Longer potential jail sentences also do little to make criminal sanctions a more effective deterrent as indicated by the positive coefficients, not only for total spreads but also for the information asymmetry components. Criminal enforcement again also fails to make criminal sanctions an effective deterrent although it is in the right direction. The results are even worse for the proportion of the spread made up of information asymmetry which has positive coefficients for both *Criminal* and *Criminal Enforcement*. Again, as per the impact on informed trading, we see that criminal sanctions are ineffective in controlling insiders. Even longer sentences and actual enforcement cannot convince either the market or insiders that criminal sanctions are an effective deterrent. Financial damages on the other hand do appear to be a compelling deterrent to insiders, especially for variable damages which result in insiders definitely facing financial losses when caught and convicted.

Enforcement is also important from the markets perspective which confirms previous findings by Bhattacharya and Daouk and also the PIN results. Interestingly, though the information asymmetry component measures both are negative but insignificantly so. This suggests that as per the general strength and scope of the laws that enforcement may improve confidence in the market. Although all three measures do agree that enforcement is most effective when done via a public watchdog as opposed to private enforcement. In fact only realised spreads have a negative coefficient for *Private* while the other two have positive values.

Overall the results for both the probability of informed trading as well as the spread measures are broadly consistent. It is financial damages and enforcement that are most effective in controlling the prevalence and harm from insiders. In particular, the more heavily that insiders are likely to be fined, and situations that assure the market that insiders will face a financial penalty greater than their profits, result in the greatest

reductions, while public watchdogs appear to act as a suitable deterrent to insiders. Of interest though is the fact that certain factors appear to result in a positive effect on the market in excess of the impact on either insiders trading or the information asymmetry costs they cause. Stronger overall laws, broader laws (despite difficulties in prosecution) and past enforcement appear to increase market confidence and as a result have a greater impact on overall spreads than they do on the part of the spreads most affected by insiders.

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 on the market. This study sought to provide answers to two questions, what are the specific elements of insider trading regulations which reduce informational trading and what impact do those elements have on trading costs.

We firstly examined the impact of specific regulatory features on the probability of informed trading 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 including the maximum level of the sanctions and the enforcement strength within the country. After controlling for other factors that could impact on informational trading, we found that reduced insider trading is predominantly driven by financial damanges and public enforcement. Given the frequency with which criminal sanctions are made available within the law, the find that criminal sanctions offered little disincentive to insiders irrespective of length of sanctions or if they have been implemented is concerning.

When we examine the second question, the impact of regulations on the trading costs, we find very similar results with a couple of notable exceptions. The results for the information asymmetry component of the spreads is broadly consistent with the PIN results. What is different is that enforcement, the overall strength of the laws and the breadth of the laws in terms of what was considered insider trading all had a greater impact on total spreads than on the informational component, suggesting some aspects

of insider trading laws can be important in inspiring greater market confidence in the market.

We have shown that there are some aspects of insider trading regulations that countries should seek to implement. In particular, we find that the criminal sanctions and weak financial damages of the Germanic civil law countries in the sample would appear to be less than ideal. As such we have provided some first evidence that may be useful to policy makers to help in determining what should and should not be included in an insider trading regime. This is however only first evidence and as such more work needs to be done, particularly in refining the variables to allow more firm conclusions to be drawn.

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Table 1: Summary of Insider Trading Law Variables by Country

Country	IT Law	Scope	Tippee	Tipping	Sanction	Criminal	Damages	Disgorge	Fixed (US$)	Variable	Criminal Max	Enforced	Criminal Enforced	Private	Public
Common Law Countries															
AUSTRALIA	3	2	1	1	1	1	0	0	148633	0	5	1	1	5	0,88
CANADA	3	2	1	1	1	1	0	1	825491	0	5	1	1	5,5	0,81
HONG KONG	4	2	1	1	2	1	1	1	0	3	10	1	0	0	0,75
INDIA	3	1	0	1	2	1	1	0	5668954	3	0	1	0	0	0,69
MALAYSIA	3	2	1	1	1	1	0	0	0	0	10	0	0	2,5	0,69
NEW ZEALAND	3	2	1	1	1	0	1	1	0	3	0	0	0	5,5	0,63
SINGAPORE	3	2	1	1	1	1	0	0	150331	0	7	1	0	4,5	0,75
SOUTH AFRICA	4	2	1	1	2	1	1	1	315333	3	10	0	0	2	0,38
UNITED KINGDOM	4	2	1	1	2	1	1	1	0	Unltd.	7	1	1	0	0,63
UNITED STATES	4	2	1	1	2	1	1	1	1000000	3	10	1	1	5	1
Common Law Averages	3,4	1,9	0,9	1	1,5	0,9	0,6	0,6	810874	1,67	6,4	0,7	0,4	3	0,721
French Civil Law Countries															
BELGIUM	4	2	1	1	2	1	1	0	42223	3	1	1	0	0	0,13
FRANCE	4	2	1	1	2	1	1	1	8444520	10	2	1	0	0	0,94
GREECE	3	2	1	1	1	0	1	1	8444520	5	0	1	0	0	0,38
NETHERLANDS	3	2	1	1	1	0	1	0	760007	0	0	1	0	0	0,5
French Civil Law Averages	3,5	2	1	1	1,5	0,5	1	0,5	4422817	4,5	0,75	1	0	0	0,4875
German Civil Law Countries															
AUSTRIA	3	2	1	1	1	1	0	0	912008	0	3	0	0	0	0,13
GERMANY	3	2	1	1	1	1	0	0	0	0	5	1	1	0	0,25
JAPAN	2	1	1	0	1	1	0	0	27239	0	3	1	1	0	0
TAIWAN	3	2	1	1	1	1	0	1	93229	0	7	1	1	3	0,38
German Civil Law Averages	2,75	1,75	1	0,75	1	1	0	0,25	258119	0	4,5	0,75	0,75	0,75	0,19

Note: *IT Law* is the sum of *Scope* and *Sanction*. *Scope* is a 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 created by adding *Damages* and *Criminal*. *Damages* is a dummy that equals 1 if potential financial penalties are greater than the gain or loss avoided and 0 otherwise. *Criminal* is a dummy that equals 1 if criminal sanctions are available and 0 otherwise. *Disgorge* is a dummy that equals 1 if financial penalties automatically cover the level of gain made or loss avoided. *Fixed* is the maximum fixed level fine available converted into US$. *Variable* is the maximum variable level fine available as a multiple of the gain made or loss avoided. *Criminal Max* is the maximum numbers of years an insider can be jailed for. *Enforced* is a dummy variable that equals 1 if insider trading had been prosecuted before 1998 and 0 otherwise. *Criminal Enforced* is a dummy variable that equals 1 if criminal sanctions have been successfully applied in an insider trading case. *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$)	Average Spread	Average Price	%Spread	Effective Spread	Average Volume
AUSTRALIA	Limit Order Book	34999	1010,86	751,24	0,0042	3,25	0,91	1,81	1907245
AUSTRIA	Limit Order Book	16426	1360,00	1148,45	0,3434	59,54	0,67	0,79	65867
BELGIUM	Affirmative Dealers	18681	3571,13	3015,65	0,2253	37,96	0,86	1,04	20627
CANADA	Limit Order Book	46276	1897,38	1566,27	0,0569	14,83	1,58	1,70	223314
FRANCE	Affirmative Dealers	124922	5980,30	5050,08	0,2564	43,56	0,79	0,90	962935
GERMANY	Affirmative Dealers	66389	4289,90	3622,61	0,0757	21,37	1,00	1,20	263100
GREECE	Limit Order Book	21597	251,36	212,26	0,0235	3,19	1,00	2,29	49165
HONG KONG	Limit Order Book	23366	7546,09	970,27	0,0271	4,28	1,49	1,46	12542806
INDIA	Limit Order Book	64026	31715,23	719,17	1,4491	305,60	0,54	0,62	48364
JAPAN	Limit Order Book	30282	182547,50	1657,45	36,1897	9352,50	0,41	0,42	567101
MALAYSIA	Limit Order Book	10855	969,06	256,71	0,0172	2,08	1,01	1,02	517670
NETHERLANDS	Affirmative Dealers	89655	1964,35	1658,80	0,0612	17,14	0,64	0,80	777253
NEW ZEALAND	Limit Order Book	5469	3173,32	2168,60	0,0316	4,50	0,92	1,00	232646
SINGAPORE	Limit Order Book	9399	408,73	245,78	0,0139	1,86	1,97	1,69	863202
SOUTH AFRICA	Limit Order Book	17995	7869,53	1240,76	14,3077	2675,52	1,47	1,55	371387
TAIWAN	Limit Order Book	30871	9296,78	288,91	0,0940	20,31	0,64	0,69	2504
UNITED KINGDOM	Affirmative Dealers	147051	3527,84	6483,67	2,8599	529,90	0,18	0,49	539113
UNITED STATES	Affirmative Dealers	321896	7260,75	7260,75	0,0443	35,06	0,16	0,12	1036896

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. *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. *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. *Average Volume* is the average of the number of shares traded per trade for each company, aggregated into a country level average.

Table 3: Insider Trading Law Variable Correlation Coefficients

	Fixed (US$)	Variable	Criminal Max	Private	Public
Fixed (US$)	1				
Variable	0.5363	1			
Criminal Max	-0.4757	-0.0968	1		
Private	-0.3358	-0.3291	0.2991	1	
Public	0.1977	0.2857	0.3024	0.5298	1

Note: *Fixed* is the maximum fixed level fine available converted into US$. *Variable* is the maximum variable level fine available as a multiple of the gain made or loss avoided. *Criminal Max* is the maximum numbers of years an insider can be jailed for. *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: PIN Model Regression Results

Intercept	0,2975	0,2665	0,2441	0,2627	0,2834	0,2816	0,3208
	0,0563	*0,0543*	*0,1796*	*0,0538*	*0,0539*	*0,0712*	*0,0518*
Corrupt	-0,0540	-0,0577	-0,0385	-0,0388	-0,0388	-0,0303	0,0394
	0,0398	*0,0361*	*0,0527*	*0,0379*	*0,0379*	*0,0407*	*0,0364*
Gov Effect	-0,0046	-0,0525	-0,0450	-0,0101	-0,0101	-0,0444	-0,0034
	0,0522	*0,0585*	*0,0599*	*0,0735*	*0,0735*	*0,0601*	*0,0467*
Pol Stab	0,1715	0,1945	0,0682	0,1188	0,1188	0,0977	0,0316
	0,0564	*0,0529*	*0,1348*	*0,0798*	*0,0798*	*0,0899*	*0,0941*
Voice	-0,0422	-0,0408	-0,0392	-0,0387	-0,0387	-0,0369	-0,0300
	0,0216	*0,0196*	*0,0211*	*0,0195*	*0,0195*	*0,0221*	*0,0204*
Anti-Self Dealing	-0,0075	-0,0322	-0,0070	-0,0248	-0,0248	-0,0026	-0,0125
	0,0617	*0,0608*	*0,0600*	*0,0621*	*0,0621*	*0,0617*	*0,0561*
French	0,0696	0,0585	0,0596	0,0574	0,0574	0,0634	0,0475
	0,0361	*0,0334*	*0,0364*	*0,0330*	*0,0330*	*0,0353*	*0,0345*
German	0,0144	-0,0192	0,0034	-0,0110	-0,0110	0,0032	0,0110
	0,0357	*0,0382*	*0,0361*	*0,0392*	*0,0392*	*0,0359*	*0,0319*
Trades/Day	-0,0001	-0,0001	0,0000	-0,0001	-0,0001	-0,0001	0,0000
	0,0000	*0,0000*	*0,0001*	*0,0001*	*0,0001*	*0,0001*	*0,0001*
Reg Qual	-0,2017	-0,1538	-0,1447	-0,1363	-0,1363	-0,1530	-0,0498
	0,0557	*0,0582*	*0,0663*	*0,0588*	*0,0588*	*0,0611*	*0,0997*
IT Law		-0,0401					
		0,0242					
Scope			-0,0202				
			0,1196				
Sanction				-0,0207			
				0,0077			
Criminal					0,0407		
					0,0277		
Damages						-0,0388	
						0,0021	
Enforced							-0,0693
							0,0309
Adjust R²	0,4788	0,6541	0,5015	0,5492	0,5492	0,5022	0,6661

Note:*PIN* is measured as $PIN = \dfrac{\alpha\mu}{\alpha\mu + 2\varepsilon}$. Corrupt measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development. *IT Law* is an index created by adding *Scope* and *Sanction*. *Scope* is a sub-index created by adding *Tipping* and *Tippee*. *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.

Table 5: PIN Regression Results for Penalty Variables

Intercept	0.2852	0.2865	0.2780	0.2475	0.2809	0.2758	0.2682
	0.1228	*0.0929*	*0.0415*	*0.0345*	*0.0592*	*0.0377*	*0.0670*
Corrupt	-0.0129	-0.0394	-0.0214	-0.0936	-0.0431	-0.0090	-0.0335
	0.0698	*0.0544*	*0.0405*	*0.0316*	*0.0498*	*0.0320*	*0.0397*
Gov Effect	-0.0932	-0.0439	-0.1438	-0.0010	-0.0365	-0.1155	-0.0478
	0.1672	*0.0620*	*0.0638*	*0.0373*	*0.0660*	*0.0466*	*0.0556*
Pol Stab	0.0602	0.0672	-0.0037	0.0312	0.0963	0.0809	0.0865
	0.1575	*0.1337*	*0.0718*	*0.0477*	*0.0757*	*0.0493*	*0.0720*
Voice	-0.0409	-0.0393	-0.0443	-0.0069	-0.0445	-0.0239	-0.0382
	0.0361	*0.0212*	*0.0159*	*0.0165*	*0.0273*	*0.0154*	*0.0206*
Anti-Self Dealing	-0.0470	-0.0073	-0.1165	-0.0058	-0.0056	-0.0303	-0.0039
	0.1570	*0.0602*	*0.0728*	*0.0363*	*0.0590*	*0.0422*	*0.0614*
French	0.0457	0.0597	-0.0065	0.1011	0.0693	0.0136	0.0640
	0.0650	*0.0360*	*0.0437*	*0.0248*	*0.0408*	*0.0310*	*0.0389*
German	0.0046	0.0032	-0.0129	-0.0070	0.0023	-0.0230	0.0085
	0.0456	*0.0362*	*0.0277*	*0.0214*	*0.0352*	*0.0265*	*0.0436*
Trades/Day	0.0000	0.0000	-0.0001	0.0000	0.0000	0.0000	0.0000
	0.0001	*0.0001*	*0.0001*	*0.0000*	*0.0001*	*0.0000*	*0.0001*
Reg Qual	-0.1390	-0.1447	-0.0756	-0.1630	-0.1565	-0.1497	-0.1491
	0.0893	*0.0654*	*0.0588*	*0.0361*	*0.0616*	*0.0404*	*0.0592*
D Fixed	0.0125						
	0.0527						
D Variable	-0.0134						
	0.0059						
D Disgorgement	-0.0044						
	0.0306						
Damages Fixed		-0.0090					
		0.0501					
Damages Variable			-0.0083				
			0.0043				
Criminal Max				0.0105			
				0.0036			
Criminal Enforced					0.00966		
					0.02886		
Public						-0.00836	
						0.00352	
Private							0.00564
							0.04517
Adjust R^2	0.50793	0.50185	0.71364	0.81461	0.50962	0.76414	0.5002

Note: *PIN* is measured as $PIN = \dfrac{\alpha\mu}{\alpha\mu + 2\varepsilon}$. *Corrupt* measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development *Disgorge* is a dummy variable that equals 1 if financial penalties automatically cover the level of gain made or loss avoided. *Fixed* is the maximum fixed level fine available converted into US$.

Variable is the maximum variable level fine available as a multiple of the gain made or loss avoided. *Criminal Max* is the maximum numbers of years an insider can be jailed for. *Criminal Enforced* is a dummy variable that equals 1 if criminal sanctions have been successfully applied in an insider trading case. *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 6: Percentage Spread Regression Results

Intercept	1.4945	0.2909	0.9197	1.7792	0.8938	1.4729	1.4574
	0.7236	*0.6877*	*0.6548*	*0.6675*	*0.7339*	*0.7700*	*0.8211*
Corrupt	-0.0185	-0.5109	-0.4350	-0.9566	-0.9566	-0.0085	-0.0352
	0.5119	*0.4172*	*0.4651*	*0.7086*	*0.7086*	*0.5487*	*0.5606*
Gov Effect	-0.4887	-1.1299	-0.1342	-0.5532	-0.5532	-0.3361	-0.4764
	0.6710	*0.7649*	*0.5787*	*0.6011*	*0.6011*	*0.8431*	*0.7223*
Pol Stab	-0.4994	-0.2533	-0.8111	-1.0522	-1.0522	-0.4970	-0.5114
	0.7251	*0.5997*	*0.6169*	*0.7225*	*0.7225*	*0.7690*	*0.7794*
Voice	-0.4365	-0.4973	-0.6028	-0.4107	-0.4107	-0.4008	-0.4253
	0.2773	*0.2057*	*0.2419*	*0.2484*	*0.2484*	*0.3125*	*0.3077*
Anti-Self Dealing	-0.7538	-1.4042	-1.4442	1.3228	1.3228	-0.4649	-0.7430
	0.7937	*0.6306*	*0.7299*	*1.3921*	*1.3921*	*1.2009*	*0.8513*
French	0.3444	0.5336	0.6290	0.5871	0.5871	0.2460	0.3522
	0.4639	*0.3489*	*0.4056*	*0.6787*	*0.6787*	*0.5719*	*0.4987*
German	0.5515	1.1229	0.6901	0.7702	0.7702	0.4714	0.5504
	0.4598	*0.3967*	*0.3857*	*0.8661*	*0.8661*	*0.5424*	*0.4910*
Trades/Day	-0.0014	-0.0013	-0.0017	-0.0018	-0.0018	-0.0014	-0.0014
	0.0006	*0.0004*	*0.0005*	*0.0006*	*0.0006*	*0.0006*	*0.0007*
Reg Qual	-0.3877	-0.7958	-0.3898	-0.8456	-0.8456	-0.5130	-0.3830
	0.7170	*0.5489*	*0.5931*	*0.9575*	*0.9575*	*0.8462*	*0.7663*
IT Law		-0.6813					
		0.2455					
Scope			-0.7809				
			0.3606				
Sanction				-0.9854			
				0.5106			
Criminal					-0.0759		
					0.2251		
Damages						-0.8854	
						0.4511	
Enforced							-0.0412
							0.0131
Adjust R^2	0.2418	0.3723	0.3637	0.5537	0.1363	0.6963	0.6180

Note: *Percentage Spread* is measured as the absolute spread divided by the midpoint of quotes. Corrupt measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development. *IT Law* is an index created by adding *Scope* and *Sanction*. *Scope* is a sub-index created by adding *Tipping* and *Tippee*. *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.

Table 7: Percentage Spread Regression Results for Legal Penalty Variables

Intercept	1.4512	2.2693	1.5562	1.8740	1.6963	1.5129	1.4668
	0.9334	*0.8669*	*0.7498*	*0.7793*	*0.7355*	*0.7573*	*0.7609*
Corrupt	-0.1781	-0.3995	-0.0763	-0.0825	-0.2848	-0.1541	-0.1981
	0.8744	*0.5487*	*0.5425*	*0.5038*	*0.5580*	*0.5867*	*0.6382*
Gov Effect	-0.2238	-0.0043	-0.4060	-0.4538	-0.4702	-0.2866	-0.2104
	1.1021	*0.7171*	*0.6999*	*0.6571*	*0.6612*	*0.7876*	*0.8838*
Pol Stab	-0.0499	-0.7848	-0.2061	-0.3766	-0.2832	-0.5181	-0.5201
	2.5402	*0.7092*	*0.8459*	*0.7173*	*0.7403*	*0.7589*	*0.7617*
Voice	-0.5173	-0.5219	-0.3531	-0.4608	-0.5794	-0.4376	-0.4981
	0.7838	*0.2671*	*0.3071*	*0.2721*	*0.3018*	*0.2899*	*0.3141*
Anti-Self Dealing	-0.4920	-0.9608	-0.5170	-1.4469	-0.7343	-0.3956	-0.6373
	1.5438	*0.7591*	*0.8781*	*0.9782*	*0.7822*	*1.0448*	*0.8622*
French	0.3437	0.4555	0.3486	0.5418	0.3629	0.2453	0.1279
	0.8409	*0.4424*	*0.4777*	*0.4844*	*0.4573*	*0.5159*	*0.6401*
German	0.5893	0.7186	0.6314	0.9295	0.4283	0.5535	0.4223
	0.8401	*0.4471*	*0.4857*	*0.5546*	*0.4663*	*0.4807*	*0.5425*
Trades/Day	-0.0009	-0.0016	-0.0012	-0.0014	-0.0012	-0.0013	-0.0014
	0.0025	*0.0006*	*0.0007*	*0.0006*	*0.0006*	*0.0006*	*0.0006*
Reg Qual	-0.5742	-0.3718	-0.2492	-0.2975	-0.0140	-0.3983	-0.4117
	1.0728	*0.6734*	*0.7618*	*0.7057*	*0.7930*	*0.7499*	*0.7535*
D Fixed	0.1493						
	0.9710						
D Variable	-0.0283						
	0.0107						
D Disgorgement	-0.2307						
	0.9384						
Damages Fixed		-0.0040					
		0.0021					
Damages Variable			-0.0330				
			0.0145				
Criminal Max				0.0403			
				0.0346			
Criminal Enforced					-0.29444		
					0.264135		
Public						-0.32218	
						0.157094	
Private							0.037869
							0.072759
Adjust R²	0.553738	0.507766	0.408106	0.465666	0.458227	0.389812	0.385823

Note: *Percentage Spread* is measured as the absolute spread divided by the midpoint of quotes. Corrupt measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development *Disgorge* is a dummy variable that equals 1 if financial penalties automatically cover the level of gain made or loss avoided. *Fixed* is the maximum fixed level fine available converted into US$. *Variable* is the maximum variable level fine available as a multiple of the gain made or loss avoided. *Criminal Max* is the maximum numbers of years an insider can be jailed for. *Criminal Enforced* is a dummy variable that equals 1 if criminal sanctions have been successfully applied in an insider trading case. *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 8: Information Asymmetry Component Regression Results

	Proportion of Information Asymmetry				Realised Spreads			
Intercept	0.7575	0.7392	0.8029	0.7248	2.4011	2.5923	2.2349	2.5786
	0.1491	0.2051	0.1803	0.1660	0.7561	1.0351	0.9220	0.8387
Corrupt	-0.0813	-0.0738	-0.1101	-0.0774	-0.0320	-0.1102	-0.0736	-0.0530
	0.1055	0.1244	0.1244	0.1104	0.5348	0.6279	0.6365	0.5580
Gov Effect	0.0699	0.0452	0.1133	0.0097	-1.9833	-1.7261	-2.1424	-1.6562
	0.1383	0.2281	0.1685	0.1788	0.7011	1.1512	0.8618	0.9036
Pol Stab	0.2810	0.2925	0.2568	0.3053	1.8436	1.7240	1.9324	1.7118
	0.1494	0.1789	0.1640	0.1618	0.7577	0.9026	0.8388	0.8176
Voice	0.1542	0.1533	0.1599	0.1557	-0.0302	-0.0206	-0.0509	-0.0381
	0.0572	0.0614	0.0610	0.0598	0.2898	0.3096	0.3121	0.3020
Anti-Self Dealing	-0.2620	-0.2719	-0.2636	-0.3038	-0.9730	-0.8697	-0.9674	-0.7461
	0.1636	0.1881	0.1718	0.1859	0.8293	0.9492	0.8785	0.9393
French	0.2225	0.2254	0.2224	0.2342	0.3246	0.2945	0.3249	0.2613
	0.0956	0.1041	0.1004	0.1020	0.4847	0.5251	0.5133	0.5151
German	0.1402	0.1489	0.1401	0.1756	0.6186	0.5279	0.6189	0.4264
	0.0948	0.1183	0.0995	0.1168	0.4804	0.5971	0.5088	0.5901
Trades/Day	0.0000	-0.0399	-0.0186	-0.0275	-0.0007	-0.0006	-0.0007	-0.0007
	0.0001	0.0001	0.0001	0.0001	0.0006	0.0007	0.0007	0.0007
Reg Qual	-0.3225	-0.3163	-0.2952	-0.2720	0.5600	0.4951	0.4602	0.2854
	0.1478	0.1637	0.1641	0.1779	0.7491	0.8262	0.8395	0.8991
IT Law		-0.0104				-0.1082		
		0.0732				0.3695		
Scope			-0.0457				-0.1673	
			0.0899				0.4599	
Sanction				-0.0227				-0.2296
				0.0274				0.1079
Adjust R^2	0.4306	0.4650	0.4826	0.4874	0.4314	0.4709	0.4744	0.4919

Prop is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country. *Realised Spreads* is the country average of the realised spreads calculated as $RS_{i,t} = (|p_{i,t} - (a_{i,t} + b_{i,t})/2| - |(p_{t+\tau} - p_t)|)/((a_{i,t} + b_{i,t})/2)$. Corrupt measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development. *IT Law* is an index created by adding *Scope* and *Sanction*. *Scope* is a sub-index created by adding *Tipping* and *Tippee*. *Sanction* is a sub-index created by adding *Damages* and *Criminal*. *Sanction* is a sub-index created by adding *Damages* and *Criminal*.

Table 9: Information Asymmetry Component Regression Results for Legal Penalty Variables

	Proportion of Informaion Asymmetry					Realised Spreads				
Intercept	0.76708	0.7855	0.4556	0.7877	0.6951	2.3490	2.4757	1.3190	3.0408	2.4670
	0.15674	0.1703	0.2462	0.2038	0.1169	0.7919	0.8716	1.4959	0.9628	0.8175
Corrupt	-0.0774	-0.0994	-0.1167	-0.0668	0.0342	-0.0530	-0.0801	-0.1403	-0.2750	-0.1540
	0.11044	0.11897	0.1248	0.1280	0.0926	0.5580	0.6089	0.7582	0.6046	0.6472
Gov Effect	0.00968	0.06523	-0.0385	0.0518	-0.1167	-1.6562	-1.9957	-2.3599	-2.3667	-1.7861
	0.17884	0.14631	0.2089	0.1659	0.1286	0.9036	0.7488	1.2694	0.7840	0.8988
Pol Stab	0.30527	0.28708	0.2986	0.2696	0.3783	1.7118	1.8597	1.9004	1.6022	1.7408
	0.16183	0.15832	0.1496	0.1663	0.1207	0.8176	0.8103	0.9091	0.7856	0.8440
Voice	0.1557	0.16458	0.2283	0.1505	0.1795	-0.0381	-0.0027	-0.2205	-0.1098	-0.0569
	0.05978	0.06491	0.0681	0.0629	0.0449	0.3020	0.3322	0.4140	0.2972	0.3141
Anti-Self Dealing	-0.3038	-0.2437	-0.1377	-0.2705	-0.0378	-0.7461	-0.9243	-0.5520	-1.1518	-1.2899
	0.18592	0.17777	0.2345	0.1778	0.1714	0.9393	0.9098	1.4244	0.8401	1.1982
French	0.23417	0.21574	0.2600	0.2262	0.0406	0.2613	0.3065	0.4615	0.4037	0.5168
	0.10196	0.10209	0.1090	0.1030	0.1019	0.5151	0.5225	0.6624	0.4867	0.7127
German	0.17555	0.14831	0.1295	0.1463	0.1017	0.4264	0.6403	0.5743	0.7479	0.6593
	0.11679	0.10176	0.0911	0.1041	0.0742	0.5901	0.5208	0.5534	0.4921	0.5188
Trades/Day	-0.0275	-0.0554	-0.0296	-0.0298	-0.2338	-0.0007	-0.0007	-0.0006	-0.0005	-0.0004
	0.00013	0.00014	0.0001	0.0001	0.0001	0.0007	0.0007	0.0008	0.0006	0.0009
Reg Qual	-0.272	-0.316	-0.1485	-0.3236	-0.4380	0.2854	0.5773	1.1645	0.5367	0.6821
	0.17795	0.15664	0.1635	0.1574	0.1219	0.8991	0.8017	0.9935	0.7437	0.8525
Criminal	0.0423					-0.0489				
	0.0740					0.3738				
Damages		-0.01837					-0.2296			
		0.0043					0.1184			
D Fixed			0.1335					0.4836		
			0.1107					0.6723		
D Variable			-0.1009					-0.3689		
			0.0425					0.1501		
D Disgorgement			-0.0763					-0.2520		
			0.0509					0.1309		
Damages Fixed				-0.0154					-0.0003	
				0.0653					0.0003	
Damages Variable					-0.0237					-0.0251
					0.0092					0.0116
Adjust R^2	0.48741	0.47733	0.5866	0.4678	0.7238	0.4919	0.4683	0.5074	0.5386	0.4757

Note: *Prop* is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country. *Realised Spreads* is the country average of the realised spreads calculated as $RS_{i,t} = (\left| p_{i,t} - (a_{i,t} + b_{i,t})/2 \right| - \left| (p_{t+\tau} - p_t) \right|)/((a_{i,t} + b_{i,t})/2)$. Corrupt measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development *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. *Disgorge* is a dummy variable that equals 1 if financial penalties automatically cover the level of gain made or loss avoided. *Fixed* is the maximum fixed level fine available converted into US$. *Variable* is the maximum variable level fine available as a multiple of the gain made or loss avoided. *Criminal Max* is the maximum numbers of years an insider can be jailed for. *Criminal Enforced* is a dummy variable that equals 1 if criminal sanctions have been successfully applied in an insider trading case. *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 10: Information Asymmetry Component Regression Results for Enforcement Variables

	Proportion of Information Asymmetry					Realised Spread				
Intercept	0.7355	0.7597	0.7705	0.8088	0.7568	2.7390	2.4013	2.3030	2.9202	2.4025
	0.1676	*0.1538*	*0.1617*	*0.1868*	*0.1598*	*0.7716*	*0.8084*	*0.8100*	*0.8943*	*0.8102*
Corrupt	-0.0714	-0.0295	-0.0586	-0.0948	-0.0766	-0.1839	-0.0272	-0.2024	-0.1680	-0.0407
	0.1145	*0.1304*	*0.1271*	*0.1139*	*0.1340*	*0.5269*	*0.6851*	*0.6369*	*0.5456*	*0.6796*
Gov Effect	0.0626	0.0082	0.0491	0.0904	0.0626	-1.8713	-1.9889	-1.8268	-1.7759	-1.9698
	0.1475	*0.1663*	*0.1567*	*0.1508*	*0.1856*	*0.6788*	*0.8737*	*0.7847*	*0.7220*	*0.9411*
Pol Stab	0.2739	0.3085	0.2752	0.2902	0.2805	1.9524	1.8461	1.8872	1.9360	1.8446
	0.1591	*0.1588*	*0.1590*	*0.1580*	*0.1599*	*0.7325*	*0.8344*	*0.7963*	*0.7564*	*0.8111*
Voice	0.1609	0.1706	0.1392	0.1516	0.1526	-0.1319	-0.0287	-0.0829	-0.0570	-0.0273
	0.0628	*0.0632*	*0.0727*	*0.0602*	*0.0660*	*0.2891*	*0.3319*	*0.3643*	*0.2884*	*0.3345*
Anti-Self Dealing	-0.2556	-0.2751	-0.2629	-0.2907	-0.2590	-1.0717	-0.9742	-0.9665	-1.2632	-0.9787
	0.1738	*0.1697*	*0.1732*	*0.1810*	*0.1810*	*0.8001*	*0.8917*	*0.8675*	*0.8664*	*0.9181*
French	-0.2271	0.1948	0.2034	0.2497	0.2169	-0.2539	0.3220	0.4685	0.5993	0.3351
	0.1018	*0.1058*	*0.1135*	*0.1139*	*0.1344*	*0.4686*	*0.5562*	*0.5684*	*0.5455*	*0.6816*
German	-0.1395	0.1544	0.1495	0.1808	0.1368	-0.6290	0.6200	0.5482	1.0291	0.6249
	0.1002	*0.0997*	*0.1034*	*0.1280*	*0.1139*	*0.4614*	*0.5240*	*0.5180*	*0.6128*	*0.5777*
Trades/Day	0.0000	-0.0266	-0.0184	-0.0599	-0.0389	0.0009	-0.0006	-0.0008	-0.0009	-0.0006
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0006*	*0.0007*	*0.0007*	*0.0007*	*0.0007*
Reg Qual	-0.3253	-0.3617	-0.3240	-0.3258	-0.3219	0.6029	0.5564	0.5714	0.5268	0.5588
	0.1565	*0.1618*	*0.1565*	*0.1553*	*0.1582*	*0.7202*	*0.8501*	*0.7838*	*0.7436*	*0.8023*
Enforced	-0.0244					-0.3747				
	0.0163					*0.2896*				
Criminal Max		0.0074					0.0007			
		0.0102					*0.0536*			
Criminal Enforced			0.0266					-0.2005		
			0.0715					*0.3582*		
Public				-0.0603					-0.6094	
				0.0220					*0.1572*	
Private					0.0010					-0.0018
					0.0153					*0.0775*
Adjust R^2	0.4748	0.5006	0.4739	0.4823	0.4638	0.5678	0.4645	0.4874	0.5391	0.4645

Note: *Prop* is measured as $\theta/(\theta + \phi)$ averaged over the sample companies for each country. *Realised Spreads* is the country average of the realised spreads calculated as $RS_{i,t} = (\left| p_{i,t} - (a_{i,t} + b_{i,t})/2 \right| - \left| (p_{t+\tau} - p_t) \right|)/((a_{i,t} + b_{i,t})/2)$. Corrupt measures how prevalent corruption is within the system. *Gov Effect* measures the quality of the public and civil service, the autonomy of civil servants and the quality of policy formation and implementation. *Pol Stab* measures the perceived likelihood of political destabilisation by unconstitutional or violent means. *Voice* measures the ability of citizens to participate in the selection of the government and rights such as free speech. *Anti-Self Dealing* measures the efficacy of private enforcement within a country to stop self dealing by directors. *French* is a dummy that equals 1 for French Civil Law Countries. *German* is a dummy variable that equals 1 for Germanic Civil Law countries. *Trades/Day* is the country level average of average number of trades per day for the sample countries. *Reg Qual* measures the ability of the country to construct and implement sound laws designed to promote private sector development. *Criminal Max* is the maximum numbers of years an insider can be jailed for. *Enforced* is a dummy variable that equals 1 if insider trading had been prosecuted before 1998 and 0 otherwise. *Criminal Enforced* is a dummy variable that equals 1 if criminal sanctions have been successfully applied in an insider trading case. *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).