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The Unanticipated Effects of Insider Trading Regulation

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Abstract

Using a sample of 2,827 firms from 21 countries we examine whether insider trading laws achieve the primary objective for which they are introduced – protecting uninformed investors from private information-based trading. We find that when control is concentrated in the hands of a large shareholder, insider trading regulation is less effective in reducing private information-based trading if investor protection is poor. We suggest that controlling shareholders who are banned from trading may resort to covert expropriation of firm resources, creating more information asymmetry and thereby encouraging private information trading by informed outsiders. Consistent with this, we find evidence that when the rights of controlling shareholders are high, insider trading restrictions are associated with greater earnings opacity.

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1. Introduction

There is a long standing debate in the finance, economics, and law literatures about the need for insider trading regulation. Its critics argue that allowing insiders to trade on material nonpublic information may be value-enhancing (Carlton and Fischel (1983), Dye (1984)). Its proponents, however, contend that insider trading subjects uninformed outsiders to an adverse selection problem, discourages investment, and damages corporate value (Manove (1989), Ausubel (1990), Fischer (1992)). Moreover, allowing insiders to trade at the expense of uninformed outsiders diminishes investor confidence and hurts the integrity of capital markets (Brudney (1979), Easterbrook (1985), Glosten (1989), Maug (1995, 1999)).

In keeping with this view, many countries have adopted insider trading regulations. A survey by Bhattacharya and Daouk (2002) finds that out of 103 countries that have stock markets, 87 have introduced insider trading rules. The principal goal of insider trading regulations appears to be to prevent informationally disadvantaged investors from being treated 'unfairly' by corporate insiders, who profit from information not available to the general public. In many of these countries, however, investor protection laws are poor and control rights are concentrated in the hands of one or a few large shareholders, who are, in effect, corporate insiders with easy access to nonpublic information. For these reasons, the amount of private information trading and the effectiveness of insider trading regulation in reducing private information trading may vary dramatically across countries.

This paper examines whether insider trading regulation achieves its principal goal of protecting uninformed investors and how its effectiveness varies depending on the concentration of control rights and protection of minority shareholders. Specifically, we ask the following questions. Do insider trading restrictions reduce private information trading? Does the presence of large shareholders with concentrated control rights and poor investor protection affect the amount of private information trading and the effectiveness of insider trading restrictions?

We assume that both insiders and informed outsiders (whom we sometimes refer to as market professionals) can trade on private information. However, whereas insiders have ready access to private

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information and are banned from trading in countries with strict insider trading regulation, informed outsiders must acquire information at a cost and are not restricted from trading. Throughout the paper, we focus on a particular group of insiders – controlling shareholders. Controlling shareholders are often involved in the running of a firm and have private information about the firm's operations and performance, which they can use to obtain trading profits. Moreover, it is shown that controlling shareholders can engage in expropriation of a firm's resources through transfer pricing, tunneling, special dividends or outright diversion (Shleifer and Vishny (1997), Johnson et al. (2000a)).

We suggest that controlling shareholders, in their capacity as insiders, face a trade-off between expropriation and insider trading. We identify conditions under which the actions of controlling shareholders can increase the incentive for certain outsiders to search for information from which they can profit. We argue that when control rights of the largest shareholders are high and protection of minority shareholders is poor, controlling shareholders who face trading restrictions may resort to other means of private benefits – expropriation. As suggested by Leuz, Nanda and Wysocki (2003), controlling shareholders are likely to increase opacity of the firms' operations and performance to hide evidence of expropriation and to protect their control benefits. In the presence of higher information asymmetry, market professionals may become more active in acquiring information and trading at the expense of the uninformed investors. Thus, we suggest that although insider trading restrictions reduce trading by controlling shareholders, imposing these restrictions when control concentration is high, without concomitantly improving the protection of minority shareholders, can make insider trading regulation ineffective in protecting the ordinary investors from trading by individuals with private information.

As in Manove (1989), Fishman and Hagerty (1992) and Shin (1996), our argument advances the commonly held view that insider traders and informed speculators appropriate some part of the returns to corporate investment at the expense of uninformed shareholders. Whether the information originates inside the firm or is generated by external observers of the firm, as long as it remains private, it lowers the trading profits of uninformed investors. Our argument is also related to previous literature suggesting

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that restrictions on insider trading impose costs on insiders for which they need to be compensated (Manne (1996), Carlton and Fischel (1983), Roulstone (2002)). Roulstone (2002) finds that firms that restrict insider trading pay a compensation premium to their executives and concludes that insider trading is an alternative form of compensation. In a similar vein, our paper suggests that controlling shareholders who are unable to trade on private information seek other forms of compensation, one of which may be unlawful expropriation of firm resources.

We test our predictions using a sample of 2,827 firms from 21 countries by examining firm-level measures of private information trading, control rights of the largest shareholder and earnings opacity, and country-level statistics on insider trading and investor protection regulations. We find that concentrated control rights are associated with more private information trading, and that insider trading restrictions, on average, reduce private information trading. However, the restrictions are less effective in reducing private information trading for firms with more concentrated control. Consistent with our hypothesis, the ineffectiveness of insider trading restrictions in the presence of high control rights is restricted to countries with poor investor protection. When investor protection is high, insider trading restrictions unambiguously reduce private information-based trading.

To test our conjecture that insider trading restrictions become ineffective because controlling shareholders substitute towards covert expropriation, we rely on the findings of Leuz, Nanda and Wysocki (2003) that controlling shareholders, who engage in expropriation, are likely to hide evidence of expropriation by manipulating financial statements. We find evidence of greater earnings opacity when strict insider trading restrictions are imposed on firms with concentrated control. This suggests that controlling shareholders have more to hide in the presence of insider trading restrictions and supports our conjecture that insiders are more likely to divert resources when banned from profitable trading.

If the primary objective of insider trading restrictions is to encourage the uninformed investors to participate in the market, then regulators need to be wary of the effect insider trading restrictions have on the activities of informed outsiders. When control rights are concentrated, the restrictions may simply

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transfer profits from the insider to the informed outsider, leaving uninformed investors no better-off, unless the regulator ensures a concomitant improvement in investor protection standards. Countries like South Korea, which score poorly on the investor protection index but have strict laws against insider trading, should move quickly towards stronger protection of minority shareholders that would make expropriation and manipulation of financial statements harder. Otherwise, the costs of introducing and enforcing insider trading restrictions may not be worthwhile.

Our paper is related to Beny (2002, 2003). Beny (2002) finds that more stringent insider trading laws are associated with greater ownership dispersion, more accurate stock prices, and more liquid equity markets. Beny (2003) investigates the corporate value implications of insider trading legislation and shows that stricter insider trading regulations are unambiguously associated with higher value in firms with dispersed ownership. She also finds evidence that, once potential endogeneity of ownership and valuation is controlled for, insider trading legislation is associated with higher corporate valuation among firms with concentrated control. Our paper differs from Beny (2002 and 2003) in that we focus primarily on the effects of insider trading restrictions on private information-based trading. We also provide additional insight into the effects insider trading restrictions have on the incentives of controlling shareholders and the trading behavior of informed outsiders. Finally, we suggest an association between the effectiveness of insider trading restrictions and investor protection, which has not been previously recognized.

The paper is arranged as follows. Section II presents our hypotheses. Section III describes the sample, variables, and empirical methodology. The empirical results and robustness checks appear in Section IV. Section V concludes.

2. Hypotheses

It is argued (Demsetz (1986) and Bhide (1993)) that large shareholders bear certain costs that diffuse shareholders do not. These costs of large shareholding arise from the active monitoring of firm management and from holding undiversified portfolios (Demsetz (1986)). Additionally, shareholders who exercise control over a firm through ownership of majority stock bear the risk of being held liable

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for the acts of the corporation. Bhide (1993) suggests that, in the U.S., strict disclosure requirements and insider trading rules have gradually discouraged active shareholding by closing avenues through which large shareholders can obtain compensation for the costs.

In other countries, however, concentrated shareholdings are common. In a study of 27 countries, La Porta, Lopez-de-Silanes, and Shleifer (1998b) find that most firms are controlled by a single large shareholder. How do large shareholders in these countries seek compensation for the costs they bear? Depending on the regulatory environment, they may be able to trade profitably on the stock market on the basis of insider information or they may obtain private benefits through various forms of expropriation. The notion that insider trading serves as a form of compensation has been explored in previous literature. Roulstone (2002) shows that firms that restrict insider trading pay a premium in total compensation relative to firms that do not restrict insider trading, after controlling for economic determinants of pay. In this paper, we suggest that controlling shareholders banned from insider trading will seek other forms of compensation, one of which may be unlawful diversion of firm resources.

We assume that a controlling shareholder benefits from the consumption of two costly goods: insider trading and diversion.[1] The cost of insider trading depends on the existence and enforcement of insider trading laws. The more strictly insider trading laws are enforced, the more likely it is that trading by insiders will be identified, the profits confiscated and a fine imposed. The cost of expropriating from minority shareholders can be thought of as the probability that the expropriation is detected and punished. This cost is increasing in the protection provided to minority shareholders, the enforcement of investor protection laws, and the amount of resources expropriated.

We assume there is a maximum cost (probability of being caught and punished for breaking the law) that the controlling shareholder is willing to bear. This could be a financial constraint on the size of expected monetary penalties that the controlling shareholder can afford or it could be a constraint on the

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[1] Both corporate governance scandals (e.g., those involving Enron, Worldcom, Adelphia in the U.S. and Pramalat in Europe) and insider trading scandals (e.g., the cases of Andrew Fastow, the former CFO of Enron and of Samuel Waksal, the founder and former CEO of ImClone Systems) have attracted significant attention in the popular press and in the finance and law literatures. With this in mind, we assume that diversion and insider trading constitute two main tangible sources of unlawful benefits for controlling shareholders.

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controlling shareholders' willingness to take on the risk of being charged with a criminal offence. This maximum cost serves as the constraint, subject to which the controlling shareholder maximizes payoff when choosing between how much to trade and how much to divert. The intuition behind the controlling shareholder's constrained choice is illustrated in Figures 1a and 1b.

A controlling shareholder's (insider's) objective function is increasing in the consumption of two goods: the amounts of insider trading, x, and funds diverted, y.[2] In Figure 1a, we first consider a country (country A), where insider trading restrictions are non-existent or poorly enforced and therefore, the cost of trading profitably on the basis of material non-public information is low. Assume that the protection of minority shareholders is non-existent or weak. In such a situation, the insider optimally chooses some amounts of insider trading, x_A, and expropriation, y_B.

Now consider another country (country B), where the protection of minority shareholders is weak but the rules against insider trading exist and are enforced.[3] In this country the cost of insider trading is high and thus the insider chooses a lower amount of insider trading, $x_B < x_A$. If insider trading and expropriation are partial substitutes, all else equal, the cost constrained controlling shareholder will choose more expropriation, $y_B > y_A$.

Previous work shows that when insiders engage in the diversion of firm resources they attempt to mask the resulting poor performance of the firm by manipulating the firm's financial reports (Leuz, Nanda, and Wysocki (2001)). In country B, where controlling shareholders choose to expropriate larger amounts, more time and effort is spent in hiding evidence of expropriation. The greater level of these activities in country B relative to country A decreases the quantity and quality of information available

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[2] In this paper we use the terms "controlling shareholder" and "insider" interchangeably. Although our theoretical arguments hold for any insider who wields sufficient control in the firm, our empirical tests focus on a subset of insiders – controlling shareholders.

[3] For example, South Korea scores the maximum possible (5) on the insider trading regulation index and a relatively low value (2) on the investor protection index.

to the general public in country B. We argue below that this higher degree of information asymmetry has implications for the trading strategies of another group – market professionals (informed outsiders).[4]

We assume that, as in Fishman and Hagerty (1992) and Shin (1996), insiders as well as market professionals trade on private information. As noted by Manove (1989), trading on non-public information is detrimental to uninformed shareholders regardless of whether the information originates within the firm and is used by insiders or is generated and used by professional observers of the firm. The difference between the two groups of informed traders is that insiders have costless access to information and are subject to insider trading restrictions, whereas market professionals acquire information at a cost and their trading is not subject to regulation. In country B, where insider trading restrictions are strict, the marginal profit for market professionals of acquiring costly information is higher than in country A. This is because first, in country B outsiders are more informationally disadvantaged due to the covert activities of controlling shareholders who are banned from insider trading. Second, the market professionals face lower competition from insiders. Due to the higher marginal benefit of information, the market professionals invest more in its acquisition and trade on the basis of that information at the expense of the uninformed small investors. Therefore, although insider trading restrictions in country B reduce the amount of trading by insiders, the restrictions can indirectly increase the amount of private information trading undertaken by informed outsiders.

We are not the first to recognize the effect insider trading restrictions may have on the trading strategies of informed outsiders. In Fishman and Hagerty (1992) and Shin (1996), insiders and market professionals compete for profits. Since insider trading rules restrict insiders but not market professionals, the competition faced by market professionals is lower in the presence of insider trading

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[4] By market professionals we refer to traders who may acquire information at a cost but are not insiders and owe no fiduciary duty to shareholders of the firm. Moreover, unlike analysts, the market professionals do not disseminate information to the public and trade for their own benefit.

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restrictions. Lower competition increases the marginal benefit for the market professional of acquiring information.[5]

We add to this line of thought by arguing that the effect of insider trading restrictions on the trading behavior of market professionals is more pronounced when control rights are high and investor protection is poor. When controlling shareholders are banned from trading, their main source of obtaining private benefits is expropriation. Arguably, the insider's ability to expropriate resources and successfully hide evidence of expropriation is increasing in the level of control and decreasing in the degree of legal protection provided to minority shareholders. That is, when control rights of the insider are high and protection of minority investors is low, insiders are able to make up for lost trading profits (caused by insider trading restrictions) by expropriating more and hiding their misdemeanor. This leads to greater information asymmetry and thus more trading by informed outsiders. We hypothesize that although insider trading restrictions reduce trading by controlling shareholders, the indirect effect these restrictions have on increasing trading by informed market professionals is greater when the control enjoyed by the large shareholder is higher, and weaker when legal protection of minority shareholders is strong.[6]

To highlight the importance of minority protection in our argument, we provide a scenario (depicted on Fig. 1b) which compares country A, described earlier as having weak investor protection laws and weak insider trading regulation, with country C, where investor protection and insider trading laws are both strict (e.g., the United States or the United Kingdom). Since country C has higher costs of expropriation, in addition to higher costs of insider trading, the controlling shareholder chooses lower amounts of both activities, $x_C < x_A$ and $y_C < y_A$. Thus, our earlier argument that insiders banned from

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[5] In a related paper, Bushman, Piotroski and Smith (2003) find that analysts are more likely to follow firms in countries with better enforcement of insider trading restrictions.

[6] We have hypothesized that when strict insider trading restrictions are imposed, covert expropriation by controlling shareholders increases information asymmetry and thus the incentives of the market professional to trade. It could be argued that the same information asymmetry also has a positive effect on an insider's own marginal benefit of trading. For the purpose of this paper, it does not matter whether informed outsiders, insiders or both increase their trading activity in response to the higher information asymmetry. As long as some group is trading on non-public information, the uninformed shareholders will suffer.

trading resort to relatively less costly expropriation is not applicable to country C. Moreover, since expropriation is lower in country C, the notion that insiders with high control manipulate financial statements, foster greater information asymmetry and thereby encourage market professionals to trade is less relevant than in country A. Therefore, in country C, where insider trading restrictions are accompanied by strong investor protection laws, we do not expect to see the aforementioned positive association between insider trading restrictions and private information trading conditional on high control rights.[7]

To summarize the discussions above, we expect that,

(i) Insider trading restrictions reduce private information trading by insiders.

(ii) Insider trading restrictions increase information-based trading by informed outsiders when control rights of the insider are high and investor protection is poor. That is, insider trading restrictions are less effective in reducing private information trading in the presence of concentrated control and poor investor protection.

(iii) In the presence of insider trading restrictions, insiders are more actively engaged in masking firm's performance, particularly when their control rights are high.

3. Sample and variables

This section describes our sample construction, defines the main variables, and outlines the empirical methodology.

The initial sample consists of 2,980 firms from 9 East Asian countries and 5,232 firms from 13 Western European countries. The data, taken from Claessens et al. (2002) for East Asian companies, and from Faccio and Lang (2002) for Western European companies, contain control and cash rights of the

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[7] We recognize the possibility that there may be a positive relation between the amounts of insider trading and expropriation. When insiders engage in expropriation of firm resources they expect firm value to suffer in the future because of it. This advance knowledge could encourage insiders to sell some of their holdings before firm value drops. That is, expropriation could create opportunities for insider trading. However, if insiders take this opportunity and sell, they may well attract the market's attention and increase the probability that unlawful activities within the firm are detected. Insiders who expect firm value to decline because of their expropriation have to balance the benefit of selling stock before prices fall against the probability that the selling draws unwanted attention to their illegal actions. The stricter the laws against insider trading and expropriation, the less likely it is that insiders take advantage of the trading opportunities created by their own stealing.

largest shareholder. All data for the East Asian firms and most of the data for the Western European firms (67%) are for 1996. The rest of the data span years from 1997 to 1999. We exclude financial firms because accounting data for these firms are not comparable with the rest of the sample.

3.1. Variables

To test the hypotheses outlined in the previous section, we construct the following measures: the amount of private information trading, control concentration, and earnings opacity at the firm level, and the strictness of insider trading and investor protection regulations at the country level.

To quantify the amount of private information trading, we use a measure developed by Llorente et al. (2002), which is based on stock return autocorrelation and trading volume. They consider an economy with risk averse investors and three types of assets: a riskless bond, a risky stock, and a non-traded asset. The stock's dividend, $D_t = F_t + G_t$, is correlated with the payoff of the non-traded asset. Since the return of the stock and the non-traded asset are correlated, as the holdings of the non-traded asset change, the investors want to adjust their stock positions to maintain an optimal risk exposure. Thus, the correlation between the stock and the non-traded asset creates the need for hedging trades.

There are two groups of investors. The first group observes both components of the stock's dividend, F_t and G_t, while the second group observes only F_t. Information asymmetry between the two groups is captured by the variance of the second dividend component, σ^2_G. This information asymmetry gives rise to trading on private information. Llorente et al. argue that when a subset of investors sells a stock for hedging reasons, the stock's price must decrease to attract other investors to buy. Since the expectation of future stock payoff remains the same, the decrease in the price causes a low return in the current period and a high expected return for the next period. When a subset of investors sells a stock on private information, the stock price decreases, reflecting the negative private information about its future payoff. Since this information is usually partially impounded into the price, the low return in the current period is followed by a low return in the next period, when the negative private information is further reflected in price.

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The authors argue that during periods of intense trading volume, hedging trades generate negatively autocorrelated returns, and private information trades generate positively autocorrelated returns. Their model suggests the following relation between returns and trading volume,

$$E[R_{i,t+1} \mid R_{i,t}, V_{i,t}] = C_1 R_{i,t} + C_2 R_{i,t} V_{i,t}, \tag{1}$$

where $R_{i,t}$ is the return for company i in period t, and $V_{i,t}$ is trading volume. They argue that C_2 is positive when trading on private information dominates stock i and negative when hedging trades dominate.

We define the amount of private information trading, *PRIVATE*, as the coefficient C_2 in the time-series regression,

$$R_{i,t+1}^c = A_i^c + C_{i,1}^c R_{i,t}^c + C_{i,2}^c R_{i,t}^c V_{i,t}^c + \varepsilon_{i,t}^c , \tag{2}$$

run for each firm i in country c using at least 30 days of trading data from January 2nd, 1997 through December 29th, 2000.[8] In (2), A is the intercept, C_1, C_2 are the regression coefficients, and ε is the error term.

Llorente et al. argue that C_2 in (2) increases as more information becomes available to insiders and less information is left for the general public. Since we are interested in examining how insider trading regulation affects trading on information not available to the general public, this measure is appropriate for our tests. Llorente et. al. verify that C_2 is positive (negative) for companies that are more (less) likely to suffer from information asymmetry – that is, firms with high (low) bid-ask spread, small (large) size, fewer (more) analysts following – indicating the dominance of private information (hedging) trades. In a supportive study, Grishchenko, Litov, and Mei (2003) show that C_2 is, on average, larger for firms that are located in countries where information asymmetry problems are more severe, such as countries with poor disclosure requirements or countries that score low on corporate governance characteristics.

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[8] We choose a forward-looking time period (relative to control concentration measure) to mitigate the endogeneity of ownership structure. We deliberately calculate *PRIVATE* around the Asian financial crisis in 1998 because this is the period when the controlling shareholders of Asian corporations actively engaged in diversion (Johnson et al. (2000b)). However, our main findings do not change if we compute *PRIVATE* using a later period, e.g., from 1999 to 2001.

Return $R_{i,t}$ is defined as,

$$R_{i,t} = \log\left(\frac{P_{i,t} + D_{i,t}}{P_{i,t-1}}\right), \tag{3}$$

where $P_{i,t}$ is the daily closing price, and $D_{i,t}$ is dividends per share. Trading volume, $V_{i,t}$, is calculated as de-trended volume,

$$V_{i,t} = \log\left(\frac{VOL_{i,t}}{N_{i,t}}\right) - \frac{1}{20}\sum_{j=1}^{20}\log\left(\frac{VOL_{i,t-i}}{N_{i,t-i}}\right), \tag{4}$$

where *VOL* is the number of shares traded, and *N* is the number of shares outstanding. We obtain daily closing prices, numbers of shares traded, and the number of shares outstanding from Datastream, and dividends per share from Worldscope.

The proxy for *PRIVATE*, C_2, can be contaminated by several data and econometric specification problems. In the robustness section, we address several of them, such as autocorrelated errors, differences in the measurement period, and the effect of firm-specific private information versus market-wide information.

We match ownership data with *PRIVATE* by company name. We manually check the sample of firms to track name changes due to mergers, restructuring, or bankruptcies. The remaining set of unmatched firms (less than 1% of the sample) is dropped. We exclude Ireland because it is represented by only two firms. The final *private information trading* sample contains 2,827 firms from 21 countries.

The measure of earnings opacity is based on Leuz, Nanda and Wysocki (2002) and Bhattacharya, Daouk, and Welker (2003). Leuz, Nanda, and Wysocki show that insiders, in an effort to protect their private control benefits, use earnings management to mask firm performance from outsiders. They propose various measures of earnings management, such as smoothing of reported operating earnings using accruals, the magnitude of accruals, small loss avoidance, and the correlation of accounting and operating cash flows. Since our study requires an earnings opacity measure at the firm-level and because of data restrictions, we choose the last measure, the correlation of accounting and operating cash flows.

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For every firm, we calculate earnings opacity, *OPACITY*, as -1 times the Spearman correlation between the changes in accruals and the changes in cash flow from operations, both scaled by lagged total assets. Accruals are defined as

$$ACCRUALS^c_{i,t} = (\Delta CA^c_{i,t} - \Delta CASH^c_{i,t}) - (\Delta CL^c_{i,t} - \Delta STD^c_{i,t} - \Delta TP^c_{i,t}) - DEP^c_{i,t}, \qquad (5)$$

where Δ stands for changes, *CA* is total current assets, *CASH* is cash and cash equivalents, *CL* is current liabilities, *STD* is short-term debt included in current liabilities, *TP* is income tax payable, and *DEP* is depreciation and amortization expense. Operating cash flows are determined by first calculating the accruals component of earnings and then subtracting it from earnings. The data period is from 1996 through 2001; thus each correlation coefficient is based on five data points. Large positive values for *OPACITY* indicate more earnings opacity.

The intuition behind this measure is as follows. Insiders can use their discretion to report accounting accruals that offset economic shocks to the firm's operating cash flow that would otherwise affect reported earnings. Depending on specific circumstances, either a positive or a negative cash flow shock can be viewed as undesirable by insiders who want to conceal the firm's actual performance. If discretionary accounting accruals are used to buffer ''undesirable'' cash flow, shocks result in a large negative correlation (positive values of *OPACITY* in our case) between accruals and operating cash flows. Leuz, Nanda and Wysocki, however, acknowledge that just demonstrating negative correlation between changes in accruals and changes in operating cash flow is not sufficient evidence of smoothing because the negative correlation is a natural outcome of what accounting accruals actually are. However, they argue that higher negative magnitudes of correlation are indicative of more earnings opacity.

The earnings opacity measure is constructed using accounting data from Worldscope. We match firm earnings opacity with the ownership data, drop unmatched companies, and manually inspect the remaining set of firms. We drop Portugal because it is represented by one firm. Our final *earnings opacity* sample consists of 2,191 firms from 21 countries. All financial and accounting variables are measured in U.S. dollars.

For the concentration of control, *CONT*, we use data from Claessens et al. (2002) and Faccio and Lang (2002) described above. Their data distinguish between control and cash flow rights by using information on firms' pyramid structures, cross-holdings, and dual-class shares and track the ultimate owner of a firm. A 10% cutoff point is used to determine whether the largest shareholder has effective control over intermediate and final corporations in the chain of control.

Beny (2002, 2003) constructs an index of insider trading regulation by aggregating individual components of countries' insider trading laws. The index is formed by adding one if (1) violation of the insider trading law is a criminal offense; (2) tippees are prohibited from trading on material non-public information;[9] (3) insiders are prohibited from tipping outsiders about material non-public information and/or encouraging them to trade on such information for personal gain; (4) monetary penalties are proportional to insiders' trading profits; (5) investors have a private right of action. We use this index as a measure of insider trading regulation, *INS_REG*.[10]

To construct a proxy for the enforcement of insider trading laws, we rely on country statistics collected by Bhattacharya and Daouk (2002), who document the year in which each country first enforced its insider trading laws by prosecuting a violator. Since our explanatory variables are measured in 1996, we define enforcement of insider trading laws, *INS_ENF*, as a dummy variable, which equals one if a country enforced insider trading laws at least once before or during 1996, and zero otherwise. In our regressions, we use *INS_REG* and *INS_ENF* separately as well as their product, which we call *INS*.

The insider trading laws enforcement variable can be a noisy measure because the lack of prosecution prior to 1996 could indicate that trading restrictions were strict enough to deter people from violating them. Thus, as a robustness check, we use the rule of law index (a measure of the law and

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[9] Tippees are individuals who receive information from insiders.

[10] The index does not capture laws that require insiders to disclose their trades as, for example, in the U.S. However, it is likely that countries that score high on *INS_REG* also tend to have stricter insider trading disclosure laws. In countries where public disclosure of trades is required, *PRIVATE* is expected to be lower because (i) insider information becomes incorporated in stock prices more quickly, and (ii) insiders may trade less, so as not to release their information and that, again, lowers *PRIVATE*.

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order tradition of the country) as a proxy for *INS_ENF*. Using this variable as a proxy for enforcement does not change our results.

The relation between ownership structure and private information trading can be driven by many factors. In our regressions we control for variables that can affect both ownership structure and the incidence of private information trading.

La Porta et al. (1998b) show that both cash flow rights and control rights are more concentrated in countries with a poor legal environment. According to Grishchenko, Litov, and Mei (2003), there is more trading based on private information in countries with a poor legal environment. In our regressions we control for this by including the efficiency of the judicial system, *JUDIC*, defined in La Porta et al. (1998a).

By construction, control rights and cash flow rights are correlated in our sample. Moreover, Beny (2003) shows that a greater cash flow ownership stake reduces the insider's incentives to trade on private information. Thus we control for cash flow ownership, *CASH*, obtained from Claessens et al. (2002) and Faccio and Lang (2002).

Coefficient C_2 in (2) can be influenced by liquidity. Pastor and Stambaugh (2003) show that the less liquid a stock is, the larger is the price impact of trades and the more negative C_2 is. On the other hand, using firm size as a measure of liquidity, Llorente et al. indicate that C_2 is negatively related to firm size. Moreover, according to Maug (2000), insider trading restrictions are most valuable when stock markets are sufficiently liquid because insider trading is more likely to occur in liquid markets. Finally, stocks of firms with lower ownership concentrations tend to be more liquid. For these reasons we follow the common practice of including the log of market capitalization in 1996, *MV*, to control for liquidity.

Coefficient C_2 can be estimated with greater precision for firms with more time-series observations. To control for this heterogeneity we include the log of the number of trading periods, *LNN*, as a control parameter.

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Industry dummies, *D*, are included in regressions to account for differences in asset structure, accounting practices, government regulation, and competitiveness, all of which may affect ownership structure and the incentive to pursue private information trading. We classify two-digit SIC industries into 12 groups as in Campbell (1996).

Controlling shareholders of firms with greater growth opportunities and a higher fraction of intangible assets may have more opportunities to trade on private information. Therefore, we control for firms' investment opportunities, *INV_OPP*, defined as growth in sales, and R&D expenditures over sales, *R&D*. These variables are calculated for 1996. Finally, we control for time dummies, *T*, because our ownership data come from different years 1996, 1997, 1998, and 1999.

To capture investor protection laws and their enforcement, we define the variable *PROT* as the product of anti-director index, taken from La Porta, et al. (1998a), and the rule of law. As a robustness check, we use the legality index, as in Durnev and Kim (2003), instead of investor protection variable. The legality index is constructed by combining investor and creditor protections, the efficiency of the judicial system, rule of law, absence of corruption, risk of expropriation, and risk of contract repudiation (see La Porta et al. (1998a) for definitions of these variables and Berkowitz, Pistor, and Richard (2003) for the methodology of creating the legality index). The main results remain unchanged.

Doidge, Karolyi and Stulz (2003) document that firms that issue ADRs receive higher valuation. Lang, Lins, and Miller (2003) suggest that cross listing enhances firm value through its effect on the firm's information environment. Jain (2003) shows that electronic trading, compared to floor trading, enhances liquidity and informativeness of stock markets. We do not control for ADRs or electronic trading because our sample includes only non-ADR stocks from exchanges with electronic trading systems.

The description of all variables and data sources appears in Table I.

3.2. Empirical setup

Our multivariate regressions are of the form,

$$PRIVATE_i^c = \alpha + \beta_1 CONT_i^c + \beta_2 INS^c + \gamma\, CONT_i^c \times INS^c + \sum_{k=1}^{K} \delta_k Z_{k,i}^c + \varepsilon_i^c, \tag{6}$$

where i indexes firms, c indexes countries, *PRIVATE* is the measure of private information trading; *CONT* is control concentration; *INS* is a measure of the strictness of insider trading laws, *CONT×INS* is the interaction term of control concentration with a measure of the strictness of insider trading laws; and *Z*'s are control variables.

We first estimate equation (6) for the entire sample. We predict that stricter insider trading laws are associated with less private information trading ($\beta_2 < 0$), and that insider trading laws are less effective in reducing private information trading for firms with high-control concentration ($\gamma > 0$). Next, we estimate the same equation for strong- and weak- investor protection subsamples. If insider trading restrictions become less effective in the presence of high control rights because controlling shareholders resort to other forms of expropriation, we expect the coefficient γ to be significant only in countries where the cost of expropriation is low, i.e., in the poor investor protection subsample. Finally, we use earnings opacity as the dependent variable in regression (6) to test whether controlling shareholders have greater incentive to engage in earnings opacity in the presence of insider trading restrictions.

We estimate these regressions using country-random effects to take into account the possibility that observations on individual firms in a given country can be correlated. For example, C_2 estimates may not be independent if the error terms in (2) are correlated across stocks. We check the validity of country-random effects specification with the Breusch and Pagan (1980) test. In almost all specifications, the test rejects the hypothesis that the variation of random effects is zero. By construction, *CONT* and *INS* are highly correlated with the interaction term, *CONT×INS*. Following Jaccard and Turissi (2003), we center the above variables (subtract the corresponding sample means from each observation) to reduce multicollinearity.

4. Results

4.1. Univariate results

Table II reports summary statistics, by country, for the primary variables. There is great variation in the average amount of private information trading. It is the highest in Philippines (*PRIVATE* = 0.044), Italy (0.041), and Portugal (0.032) and the lowest in South Korea (-0.040), Malaysia (-0.036), and Hong Kong (-0.027). Countries also differ substantially in the degree of insider trading regulation. Norway (*INS* = 1), Indonesia (2), and Philippines (0) have relatively lax insider trading laws, while South Korea (5), Taiwan (4), and France (4) have strict laws with at least one case of prosecution before or during 1996.

Table III reports correlation coefficients. The coefficients indicate that the amount of private information trading is larger for firms with greater concentration of control and lower for firms with more liquid stocks and for firms located in countries with stricter insider trading laws. Moreover, companies with greater private information trading have more opaque earnings. Given that our measure of private information trading is positively correlated with information asymmetry, the observed relation between private information trading and earnings opacity is consistent with Bhattacharya, Daouk, and Welker's (2003) result that earnings management is associated with greater information asymmetry and higher cost of capital.

In Figure 2a, we plot the average amount of private information trading, *PRIVATE,* against *INS*, the strictness of insider trading laws. The plot suggests a monotonically decreasing relation between private information trading and strictness of insider trading regulation. This result is consistent with Grishchenko, Litov, Mei (2003), who document that private information trading is prevalent in countries with lax insider trading enforcement. This suggests that a decline in trading by informed insiders offsets any increased activity of the market professionals. However, these graphs do not capture the interaction of control rights and insider trading restrictions, which we believe is an important determinant of trading by market professionals.

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In Figure 2b, we plot the average amount of information based trading, *PRIVATE*, against *CONT*, the control rights of the largest shareholder. The graph indicates that, with the exception of the 10-20% control level, higher control rights of the largest shareholder are associated with greater trading on private information. However, the non-monotonic relation points to the need to control for other factors before drawing inference about the relation between private-information trading and control rights. For this we turn to multivariate tests.

4.2. Multivariate tests

Specification 4.1 in Table IV presents the results of a simple OLS regression of private information trading on control concentration and strictness of insider trading laws, controlling for cash flow rights. Higher control concentration is associated with more private information trading, and stricter insider trading laws are associated with less private information trading. This finding is robust to the inclusion of country random-effects, a liquidity measure, log of the number of trading periods, industry dummies and time dummies (Specification 4.2).

Specification 4.3 includes the explanatory variable we are particularly interested in – the interaction term of control concentration with the strictness of insider trading laws. In this specification, we also find that higher control rights of the largest shareholder are associated with higher private information trading. This finding seems consistent with the idea that (i) greater control of the firm's operations gives shareholders access to information which they use to obtain trading profits for themselves; and (ii) controlling shareholders prefer opacity with respect to the firm's financial performance, creating information asymmetry and thus increasing the opportunities for private information-based trading.

Specification 4.3 also shows that stricter insider trading regulation is associated with less private information trading. However, the positive and significant coefficient on the interaction of control concentration with insider trading regulation indicates that insider trading regulation is less effective in reducing private information trading when control rights of the largest shareholder are higher.

To interpret these finding, we recall that there are two groups who can engage in private information trading – controlling shareholders and market professionals. Insider trading restrictions reduce the

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incentives of controlling shareholders to trade. This lower incentive is reflected in the significantly negative coefficient on *INS*. However, as we have argued, insider trading restrictions increase the incentives of informed outsiders to trade, particularly in the presence of high control rights. The positive and significant coefficient on the interaction of *INS* and *CONT* provides evidence in support of our argument.

These results continue to hold when we control for efficiency of the judicial system, firm investment opportunities and R&D expenditures (Specification 4.4). Consistent with prior studies, more liquid stocks experience significantly lower private information trading (see Llorente et al. (2002), Grischenko, Mei, and Litov (2003)).

Based on specification 4.3 in Table IV, the magnitudes of the coefficients indicate that when insider trading laws improve by one point (out of five), the amount of private information trading decreases by 0.0104, for the mean value of control concentration. However, for firms with the lowest control in our sample, zero percent (1st percentile), the amount of private information trading decreases by 0.0159, while it actually increases by 0.0048 for firms with 90 percent (99th percentile) control. This confirms our hypothesis that although stricter insider trading regulation reduces private information trading, the laws become less effective for high-control companies.

Although the results presented above support our arguments, we test whether our interpretation of the results is justified. We claim that controlling shareholders banned from trading can make up for lost profits by expropriating resources from the firm, provided they have sufficient control. Individuals involved in diverting firms' resources will attempt to mask the resulting poor performance of the firm, foster information asymmetry and thus, indirectly encourage trading by market professions. The increased activity of market professionals in the presence of insider trading restrictions and high control rights manifests itself in the positive coefficient on the interaction of control rights and insider trading restrictions.

If our interpretation is correct, the interaction of control rights with insider trading restrictions should be associated with higher private information trading only in countries where insiders find it

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relatively easy to resort to expropriation, that is, in countries with poor investor protection. Moreover, if the controlling shareholder hides evidence of expropriation, we expect greater earnings opacity when strict insider trading restrictions are imposed on firms with more concentrated control. We test the validity of our conjecture by splitting the sample into low- and high-investor protection countries and running our regressions for each subsample. The results are presented in Table V. Panel A (low-investor protection subsample) shows that the coefficient on insider trading restrictions is significantly negative, but the coefficient on the interaction of insider trading with control rights is significantly positive. This suggests that insider trading regulation is less effective in reducing private information trading when control rights are high. In contrast, in Panel B (high-investor protection subsample) the coefficient on insider trading restrictions is still negative and significant, but the interaction term is now insignificant. This implies that in countries where shareholder rights are well protected, insider trading regulation unambiguously reduces private information trading, but in countries where minority shareholder rights are not protected, private information trading may remain unchanged and even increase in the presence of insider trading restrictions.

It can be argued that our results are driven by the possibility that countries with high-investor protection standards are also the ones that enforce insider trading laws. That is, insider trading laws are more effective in countries with high-investor protection standards simply because these countries happen to be the ones that also enforce the existing insider trading rules. However, this alternative argument cannot explain away our findings because the coefficient on *INS* is negative and significant in both the high- and low-investor protection subsamples. This suggests that even in low-investor protection countries, the enforcement of insider trading regulation is sufficient to put a downward pressure on private information trading.

To investigate whether the quality of information provided to the public is actually lower when strict insider trading restrictions are imposed on firms with more concentrated control, we use the earnings opacity measure, *OPACITY*, as the dependent variable in (6). Panel C of Table V indicates that firms with high-control concentration have more opaque earnings. More importantly, consistent with our

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hypotheses, high control concentration is associated with even greater opacity in countries with stricter insider trading laws.

4.3. Robustness

Our results are robust to checks on endogeneity, regression specification, definition of main variables, and outliers. That is, the regression coefficients generate very similar patterns of signs and statistical significance to those reported.

The coefficients reported above can be biased because of endogeneity. Endogeneity could arise due to unobserved variables that are correlated with both ownership structure and the amount of private information trading. It may also arise due to reverse causality between control rights and private information trading. For example, in countries where higher profits can be obtained through private information trading, shareholders may choose to acquire greater control in order to have privileged access to nonpublic information. We address these potential endogeneity issues by using legal origin dummies, *ORIGIN*, defined in La Porta et al. (1998a), as instruments for the ownership variables. La Porta et al. (1998b) show that legal origin shapes firms' ownership structure. However, there is no a priori reason to believe that legal origin affects the amount of private information trading, other than through ownership structure and other variables we already control for.

Table VI repeats the regressions of Table IV using legal origin dummies as instruments for *CONT*, *CASH*, and *CONT×INS*, which are assumed to be endogenous. It is evident from the instrumental variable regressions that the results described earlier still hold, and become even stronger.[11] Greater control concentration is associated with more private information trading. Insider trading regulation reduces information trading, but is less successful in doing so when control rights of the largest shareholder are higher.

An interesting difference in the results of this specification is that the coefficient on cash flow rights is significantly negative, suggesting that when the largest shareholder has more cash flow rights, private

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[11] At the bottom of Table VI we report the results of Durbin-Hausman-Wu test of endogeneity. The test indicates that ownership variables are endogenous.

information trading is lower. This is consistent with the view that when cash flow rights are high, the return to large shareholders of monitoring the firm's operations is high, thus reducing their incentive to trade personally on nonpublic information or to create an opaque environment that fosters private information trading by other informed individuals.

Next, we demonstrate robustness to various factors that can affect our measure of private information trading. We define *PRIVATE* as the coefficient C_2 in the time-series regression in (2). First, since the estimated coefficient can be affected by autocorrelated errors, we repeat the regressions using an appropriate autoregressive structure, based on Breusch (1978) test. Second, it is likely that private information trading is affected more by information about firm-specific factors rather than information about market-wide factors. Therefore, we re-estimate (2) after deducting local stock markets' factors from returns and volume. Third, we estimate C_2 for only those stocks that have at least 300 daily return-volume observations. When we repeat the regressions in Tables IV and V with new measures of *PRIVATE*, the results remain qualitatively unchanged in all cases. We do not report them to save space.

In our main specification, strictness of insider trading laws is measured by the product of the insider trading index, *INS_REG*, and the insider trading law enforcement dummy variable, *INS_ENF*. However, since previous studies (Beny (2002) and Bhattacharya and Daouk (2002)) have used either the insider trading index or the insider trading enforcement variable, we check the robustness of our findings by including *INS_REG* and *INS_ENF* and their interaction terms with *CONT* separately. The results are presented in Table VII. The coefficient on *INS_REG* is significantly negative suggesting that stricter insider trading regulation is associated with lower private information trading. The coefficient on *INS_ENF* is negative but not significant. However, the coefficients on the interaction terms of *INS_REG* and *INS_ENF* with control rights are both positive and significant. These findings continue to suggest that when the control rights of large shareholders are higher, both insider trading regulation and its enforcement are less effective at reducing private information trading.

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Our results also hold if we repeat the analyses after dropping Japanese firms on the grounds that they comprise 29% of the sample. Finally, our findings are not affected if we winsorize all variables at the 1% and 99% levels to reduce the impact of outliers.

5. Conclusion

In the past decade, most stock markets around the world have introduced rules against insider trading. In many countries, these rules have been enforced with the prosecution of those violating the laws. The objective of insider trading restrictions is purportedly to improve the integrity and liquidity of stock markets by encouraging ordinary investors to participate. Insider trading restrictions are intended to reduce the adverse selection problem facing uninformed investors by limiting the incidence of private information trading.

This paper examines the effectiveness of insider trading restrictions in reducing private information trading. The empirical results indicate that in a world where both insiders and market professionals can trade on private information, insider trading restrictions become less effective if control rights of the largest shareholder are high and investor protection standards are weak. We hypothesize that controlling shareholders banned from insider trading may be able to make up for the loss in trading profits by expropriating the firm's resources if the protection given to minority shareholders against such expropriation is low. The opaque informational environment that often accompanies covert activities of controlling shareholders can, in turn, increase the information acquisition and trading activity of market professionals who trade at the expense of uninformed investors.

Using a sample of 2,827 firms from 21 countries, we find that when investor protection standards are high, insider trading restrictions unambiguously reduce the amount of private information trading. However, when investor protection is weak, concentrated control rights make insider trading restrictions less effective in reducing private information trading. In fact, for very high levels of control, insider trading restrictions may actually increase trading on private information. We also find that firms with concentrated control have more opaque earnings, especially in countries with stricter insider trading

regulation. This suggests that controlling shareholders have more to hide when they are banned from trading and supports our conjecture that controlling shareholders expropriate more in the presence of stricter insider trading laws.

Taken together, if a primary purpose of insider trading restrictions is to minimize losses of uninformed investors and restore their confidence in financial markets, the results above provide evidence that insider trading restrictions may become counterproductive when investor protection is poor and control rights are concentrated. Rather, insider trading restrictions may simply transfer trading profits from insiders to informed market professionals leaving uninformed investors no better-off than before. Since insider trading restrictions take time, effort and money to introduce and enforce, we suggest that if a regulator decides to introduce them in a country where control rights are concentrated, she should ensure that the investor protection standards are also high. Otherwise, the regulator will be paying all the costs of imposing the restrictions without necessarily seeing the benefits.

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Figure 1a: Insider Trading – Diversion Choice for an Insider when the Cost of Insider Trading Increases. This graph depicts an insider's indifference curves, insider trading-diversion cost constraints and the trading-diversion trade-off for a firm located in a country with low costs of insider trading and diversion (country A) and with high cost of insider trading and low cost of diversion (country B). The slopes of the straight lines M_1M_2 and M_1M_3 (cost constraints) are equal to the cost of insider trading relative to the cost of diversion. In country A, the insider chooses an amount of insider trading equal to x_A and an amount of funds diverted equal to y_A. In country B, the insider chooses lower amount of insider trading $x_B < x_A$ and higher amount of diversion $y_B > y_A$.

Amount of funds diverted

y_B

y_A

High cost of insider trading, Low cost of diversion

x_A

Amount of insider trading
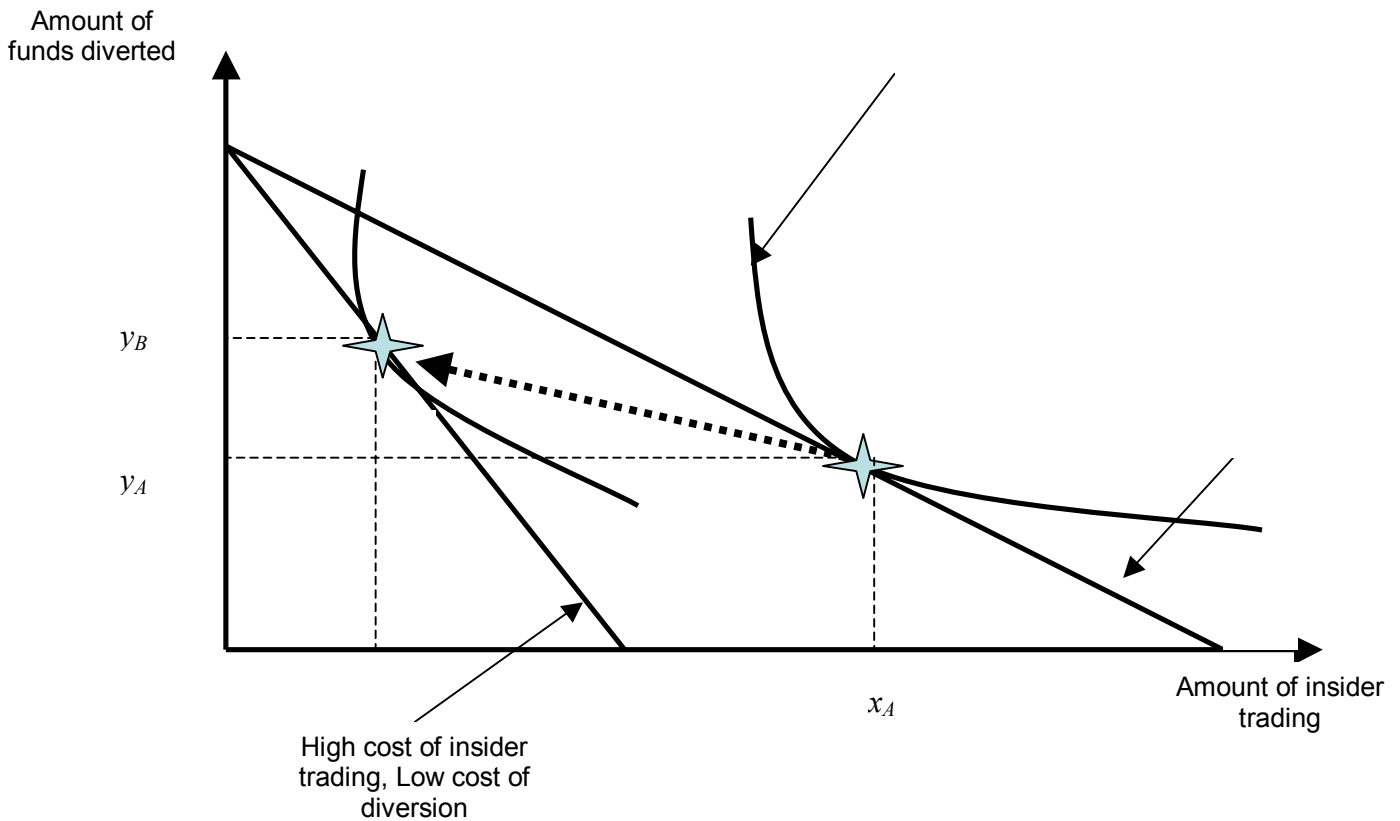
Figure 1b: Insider Trading – Diversion Choice for an Insider when Both Costs of Insider Trading and Diversion Increase. This graph depicts an insider's indifference curves, insider trading-diversion cost constraints and the trading-diversion trade-off for a firm located in a country with low costs of insider trading and diversion (country A) and with high costs of insider trading and diversion (country C). The slopes of the straight lines M_1M_2, M_1M_3 and M_4M_3 (cost constraints) are equal to the cost of insider trading relative to the cost of diversion. In country A, the insider chooses an amount of insider trading equal to x_A and an amount of funds diverted equal to y_A. In country C, the insider chooses lower amounts of insider trading $x_C < x_A$ and diversion $y_C < y_A$.
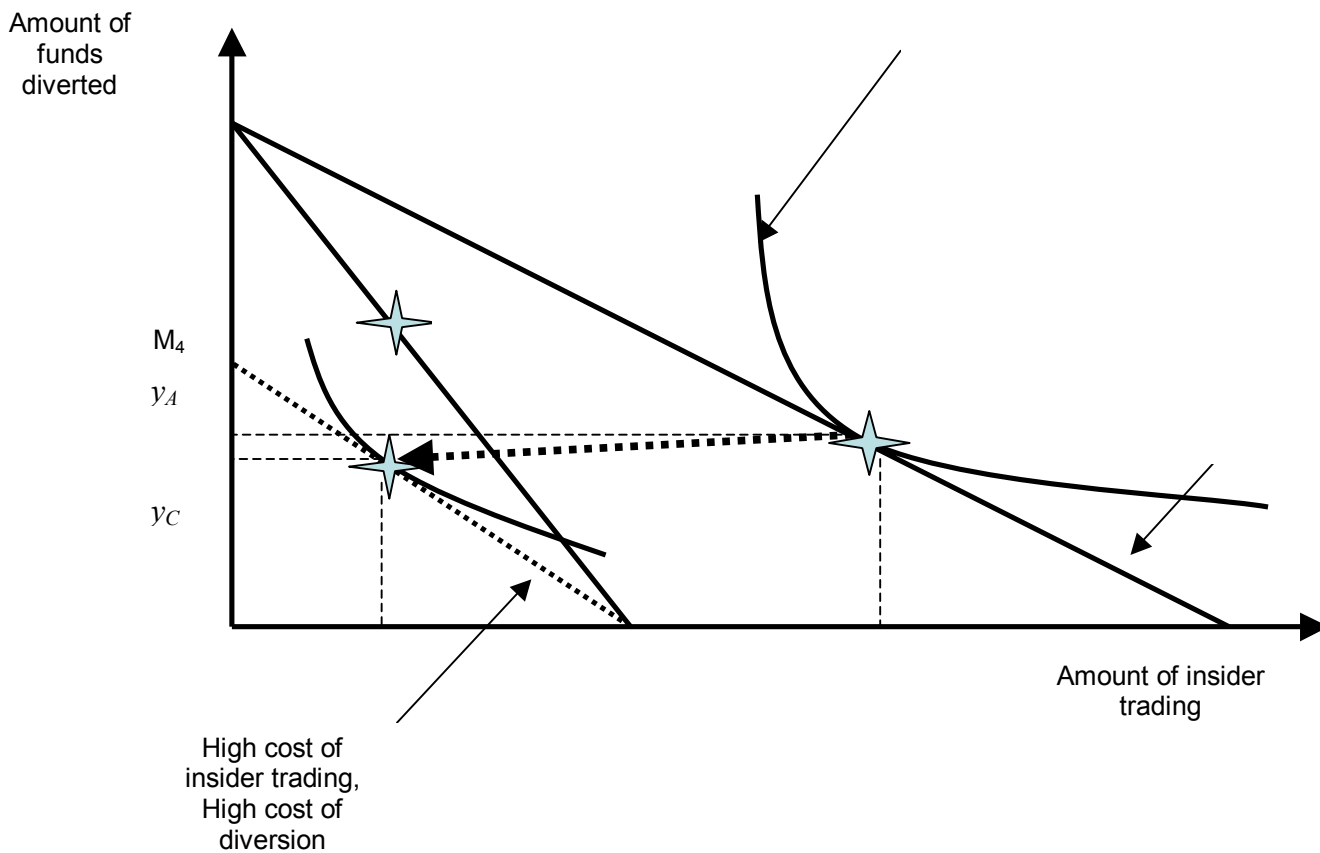
Table I
Variables, Definitions, and Sources

Main Variables	Notations	Definitions	Sources
Intensity of private information trading	PRIVATE	Intensity of private information trading, $PRIVATE$, is the coefficient C_2 in the time-series regression $R_{i,t+1}^c = A_i^c + C_{i,1}^c R_{i,t}^c + C_{i,2}^c R_{i,t}^c V_{i,t}^c + \varepsilon_{i,t}^c$, where i indexes firms, t time, and c country; A is intercept, C_1, C_2 are the regression coefficients, and ε is the error term. Return is defined as $R_{i,t} = \log((P_{i,t} + D_{i,t})/P_{i,t-1})$, where P is closing price, and D are dividends per share. Volume, V, is de-trended volume, $V_{i,t} = \log(VOL_{i,t}/N_{i,t}) - 1/20\sum_{j=1}^{20}\log(VOL_{i,t-j}/N_{i,t-1})$, where VOL is the number of shares traded and N the number of shares outstanding. This regression is run using daily data from January 2, 1997 through December 29, 2000. We drop firms that contain fewer than 30 trading days. Higher values of $PRIVATE$ mean greater amount of private information trading.	Datastream for closing price, number of shares outstanding, number of shares traded and Worldscope for dividends.
Control concentration	CONT	The share of control rights held by the largest shareholder. The data distinguish between control and cash flow rights using information on firms' pyramid structures, cross-holdings, and dual-class shares. To determine effective control a 10% cutoff point is used, above which it is assumed that the largest shareholder has effective control over the intermediate and final corporation. The data are for the end of 1996 for Eastern Asian countries, France, Germany, Switzerland, U.K.; 1997 for Portugal, Spain; 1998 for Norway, Sweden; 1999 for Austria, Belgium, Finland, Ireland.	Claessens et al. (2002) for Eastern Asian firms and Faccio and Lang (2002) for West European firms.
Insider trading regulation	INS_REG	An index formed by aggregating individual components of countries' insider trading laws. The index is constructed by adding 1 if: (1) violation of the insider trading law is a criminal offense; (2) tippees are prohibited from trading on material non-public information; (3) insiders are prohibited from tipping outsiders about material non-public information and/or encouraging them to trade on such information for personal gain; (4) monetary penalties are proportional to insiders' trading profits; (5) investors have a private right of action. Scale: 0 - 5. Lower scores indicate less strict insider trading regulation.	Beny (2002 and 2003).
Insider trading laws enforcement	INS_ENF	A dummy variable that is equal to 1 if a country's insider trading law has been enforced for the first time (i.e., at least once) by the end of 1996.	Bhattacharya and Daouk (2000).
Strictness of insider trading laws	INS	Product of INS_REG and INS_ENF. Scale: 0 - 5. Lower scores indicate less strict laws against insider trading.	
Earnings Opacity	OPACITY	Earnings opacity is a measure of earnings smoothing due to managerial motives. For each firm ,$OPACITY$ is defined as -1 times the time-series Spearman correlation coefficient between the changes in accruals and the changes in cash flow, both scaled by lagged total assets. It is based on annual data from 1997 through 2001. Accruals and cash flow are defined in (5) in the text. Higher values of $OPACITY$ indicate greater earnings opacity.	Worldscope.
Investor Protection Variables			
Efficiency of judicial system	JUDIC	Assessment of the efficiency and integrity of the legal environment as it affects business. Annual averages from 1980 through 1983. Scale: 0 - 10. Lower scores indicate lower efficiency levels.	La Porta et al. (1998a). Original source: Business International Corporation.

Variable		Definition	Source
Investor protection	*PROT*	The product of investor protection index and the rule of law. The investor protection index aggregates the shareholders' rights. It is formed by adding 1 when: (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10%; (6) shareholders have preemptive rights that can only be waved by a shareholders' vote. Scale: 0-6. The rule of law is the assessment of the law and order tradition of the country. It is calculated as the average of monthly values in 1996. The original data are transformed from 0-6 scale to 0-10 scale as in La Porta et al. (1998a). Higher values of *PROT* indicate better investor protection.	La Porta et al. (1998a) for investor protection index and International Country Risk Guide for the rule of law.
Legal origin	*ORIGIN*	Legal origin of the company law or commercial code of each country (English common law, French civil law, German civil law, and Scandinavian civil law).	La Porta et al. (1998a).
Control Variables			
Cash flow rights	*CASH*	The share of cash flow rights held by the largest shareholder as defined in Claessens et al. (2002) for Eastern Asian firms and in Faccio and Lang (2002) for Western European firms. The data distinguish between control and cash flow rights using information on firms' pyramid structures, cross-holdings, and dual-class shares. The data are for the end of 1996 for Eastern Asian countries, France, Germany, Switzerland, U.K.; 1997 for Portugal, Spain; 1998 for Norway, Sweden, and 1999 for Austria, Belgium, Finland, Ireland.	Claessens et al. (2002) for Eastern Asian firms and Faccio and Lang (2002) for Western European firms.
Liquidity	*LMV*	Logarithm of firm market value. Market value is the number of shares outstanding times closing price in the end of December 1996.	Worldscope.
Number of trading periods	*LNN*	Logarithm of the number of periods used to run the regression in (2) in the text to calculate *RIVATE*.	Datastream.
Firm size	*SIZE*	Logarithm of sales in 1996.	Worldscope.
Investment opportunities	*INV_OPP*	One-year 1995-to-1996 growth rate in net sales. This variable is winsorized at the 1% and 99% levels.	Worldscope.
Research and development expenditures	*R&D*	Research and development expenditures over sales in 1996.	Worldscope.
Industry dummies	*D*	Industries are grouped across two-digit SICs. They are: petroleum (SIC 13, 29), consumer durables (SIC 30, 36, 37, 50, 55, 57), basic industry (SIC 8, 10, 12, 14, 24, 26, 28, 33), food and tobacco (SIC 20, 21, 54), construction (SIC 15, 16, 17, 32), capital goods (SIC 34, 35, 38, 39), transportation (SIC 40, 41, 42, 44, 45, 47), textiles and trade (SIC 22, 23, 51, 53, 56, 59), services (SIC 7, 73, 75, 80, 82, 83, 87, 96), leisure (SIC 27, 58, 70, 79), unregulated utilities (SIC 48), and regulated utilities (SIC 49).	Campbell (1996).
Year dummies	*T*	Dummy variables for years 1996, 1997, 1998, and 1999.	

Table II
Summary Statistics by Country

This table reports the summary statistics (averages) of main variables by country. Countries are sorted alphabetically. Variable *ORIGIN* is country's legal regime; *PRIVATE* is the amount of private information trading; "PRIVATE > 0" records the percentage of firms with positive coefficient C_2 in (2) in the text; *N* is the number of trading days used to calculate *PRIVATE*; "Firms, PRIVATE" records the number of firms in a country for which *PRIVATE* can be calculated; *OPACITY* is earnings opacity measure; "Firms, OPACITY" records the number of firms in a country for which *OPACITY* can be calculated; *CONT* is control concentration (in % terms); *OPACITY* is earnings opacity measure; "Firms, OPACITY" records the number of firms in a country for which *OPACITY* can be calculated; *CONT* is control concentration (in % terms); *CASH* are cash flow rights (in % terms); "INS_ENF, Year" is the year of the first documented case against insider trading; *INS* is the index of the strictness of insider trading laws; *MV* is market value in billions of U.S. dollars. Firms that belong to financial industries (SIC 60, 61, 62, 63, 65, 67) are excluded from the sample. We exclude Ireland from the *private information trading* sample and Portugal from the *earnings opacity* sample because they contain only two and one firms, respectively. Refer to Table I for definitions of variables.

Country	ORIGIN	PRIVATE, mean	PRIVATE > 0, %	N	Firms, PRIVATE	OPACITY, Mean	Firms, OPACITY	CONT	CASH	INS_REG	INS_ENF, Year	INS	MV
Austria	German	0.010	61.8	683	55	0.773	41	53.8	47.6	2	No cases	0	0.42
Belgium	French	0.017	60.6	780	33	0.778	27	38.3	34.2	3	1994	3	0.74
Finland	Scandinavian	0.028	76.3	476	76	0.720	20	32.5	28.8	3	1993	3	0.77
France	French	0.018	70.6	844	238	0.788	164	46.0	45.0	4	1975	4	1.18
Germany	German	0.009	59.1	755	242	0.793	290	45.8	39.7	3	1995	3	1.67
Hong Kong	English	-0.027	34.9	499	146	0.704	125	32.6	28.5	3	1994	3	0.72
Indonesia	French	0.024	65.8	463	76	0.790	39	35.5	27.1	2	1996	2	0.54
Ireland	English	-	-	-	-	0.652	27	21.5	18.4	5	No cases	0	0.47
Italy	French	0.041	81.2	838	85	0.825	76	50.2	41.0	3	1996	3	0.95
Japan	German	0.012	59.8	831	830	0.795	521	10.9	7.2	2	1990	2	2.12
Malaysia	English	-0.036	25.5	661	102	0.744	100	33.1	28.0	3	1996	3	1.07
Norway	Scandinavian	0.021	67.8	725	59	0.557	54	28.4	20.8	1	1990	1	0.67
Philippines	French	0.044	76.9	350	39	0.618	11	26.9	22.9	2	No cases	0	0.55
Portugal	French	0.032	83.8	734	37	-	-	41.2	39.5	4	No cases	0	0.26
Singapore	English	0.017	62.8	692	94	0.780	90	30.1	23.3	4	1978	4	0.89
South Korea	German	-0.040	22.8	893	136	0.660	94	22.0	19.1	5	1988	5	0.39
Spain	French	0.025	71.4	876	56	0.804	46	27.0	25.67	4	1998	0	1.51
Sweden	Scandinavian	0.031	78.2	854	87	0.704	53	25.7	18.3	3	1990	3	1.43
Switzerland	German	0.023	79.1	780	86	0.734	74	38.7	26.7	3	1995	3	2.81
Taiwan	German	-0.025	34.4	810	93	0.747	74	22.9	18.8	4	1989	4	0.85
Thailand	English	0.009	58.7	580	63	0.596	56	38.7	36.8	3	1993	3	0.45
UK	English	-0.014	37.6	757	194	0.646	209	17.2	15.9	3	1981	3	2.84
					Total: 2,827		Total: 2,191						
Average		0.010	60.4	709		0.724		32.7	27.9	3.1		2.4	1.06

Table III

Simple Correlation Coefficients between Main Variables

This table reports correlation coefficients between main variables. Numbers in parentheses are probability levels at which the hypothesis of zero correlation can be rejected. Coefficients significant at least at the 10% level (based on two-tailed test) are in bold face. Firms that belong to financial industries (SIC 60, 61, 62, 63, 65, and 67) are excluded from the sample. The sample size ranges from 2,191 to 2,827 firms depending on the pair of variables under consideration. We exclude Ireland from the *private information trading* sample and Portugal from the *earnings opacity* sample because they are represented by only two and one firms, respectively. Refer to Table I for definitions of variables. All financial and accounting variables are measured in U.S. dollars.

		R&D	INV_OPP	LNN	LMV	CASH	OPACITY	INS	INS_ENF	INS_REG	CONT
PRIVATE	Intensity of private information trading	-0.010 (0.59)	-0.024 (0.21)	**-0.079** (0.00)	**-0.145** (0.00)	**0.058** (0.00)	**0.053** (0.02)	**-0.160** (0.00)	**-0.086** (0.00)	**-0.126** (0.00)	**0.070** (0.00)
CONT	Control concentration	**-0.034** (0.07)	0.024 (0.21)	**-0.187** (0.00)	**-0.304** (0.00)	**0.931** (0.00)	0.011 (0.61)	**0.151** (0.00)	**-0.127** (0.00)	**0.276** (0.00)	
INS_REG	Insider trading regulation	0.000 (0.99)	**-0.059** (0.00)	**0.091** (0.00)	**-0.203** (0.00)	**0.307** (0.00)	-0.023 (0.61)	**0.714** (0.00)	**-0.033** (0.08)		
INS_ENF	Insider trading laws enforcement	0.013 (0.52)	0.019 (0.31)	**0.113** (0.00)	**0.084** (0.00)	**-0.139** (0.00)	-0.001 (0.95)	**0.641** (0.00)			
INS	Strictness of insider trading laws	0.008 (0.67)	**-0.045** (0.02)	**-0.107** (0.00)	**-0.110** (0.00)	**0.161** (0.00)	-0.016 (0.46)				
OPACITY	Earnings opacity	-0.002 (0.93)	-0.011 (0.61)	**0.793** (0.00)	**0.049** (0.02)	0.002 (0.94)					
CASH	Cash flow rights	-0.029 (0.13)	**0.037** (0.05)	**-0.174** (0.00)	**-0.303** (0.00)						
LMV	Liquidity	0.027 (0.17)	**0.061** (0.00)	**0.438** (0.00)							
LNN	Log of number of trading periods	0.028 (0.15)	**0.052** (0.01)								
INV_OPP	Investment opportunities	**0.132** (0.00)									

Figure 2a: Intensity of Private Information Trading, *PRIVATE*, Grouped by the Strictness of Insider Trading Laws, *INS*.

The height of each bar is the group average of the amount of private information trading. The groups are: INS 0-1 (Austria, Philippines, Portugal, Norway, Spain), INS = 2 (Indonesia, Japan); INS = 3 (Belgium, Finland, Germany, Hong Kong, Italy, Malaysia, Sweden, Switzerland, Thailand, U.K.); INS = 4 or 5 (France, Singapore, Taiwan, South Korea). Higher values for *PRIVATE* indicate higher amount of private information trading. The graph is based on the *private information trading* sample which consists of 2,827 firms from 21 countries. The percentage of observations in each group is listed at the top of each bar.

Figure 2b: Average Intensity of Private Information Trading, *PRIVATE*, Grouped by Control Concentration, *CONT*.

The height of each bar is the group average of the amount of private information trading. Higher values for *PRIVATE* indicate higher amount of private information trading. The graph is based on the *private information trading* sample which consists of 2,827 firms from 21 countries. The percentage of observations in each group is listed at the top of each bar.
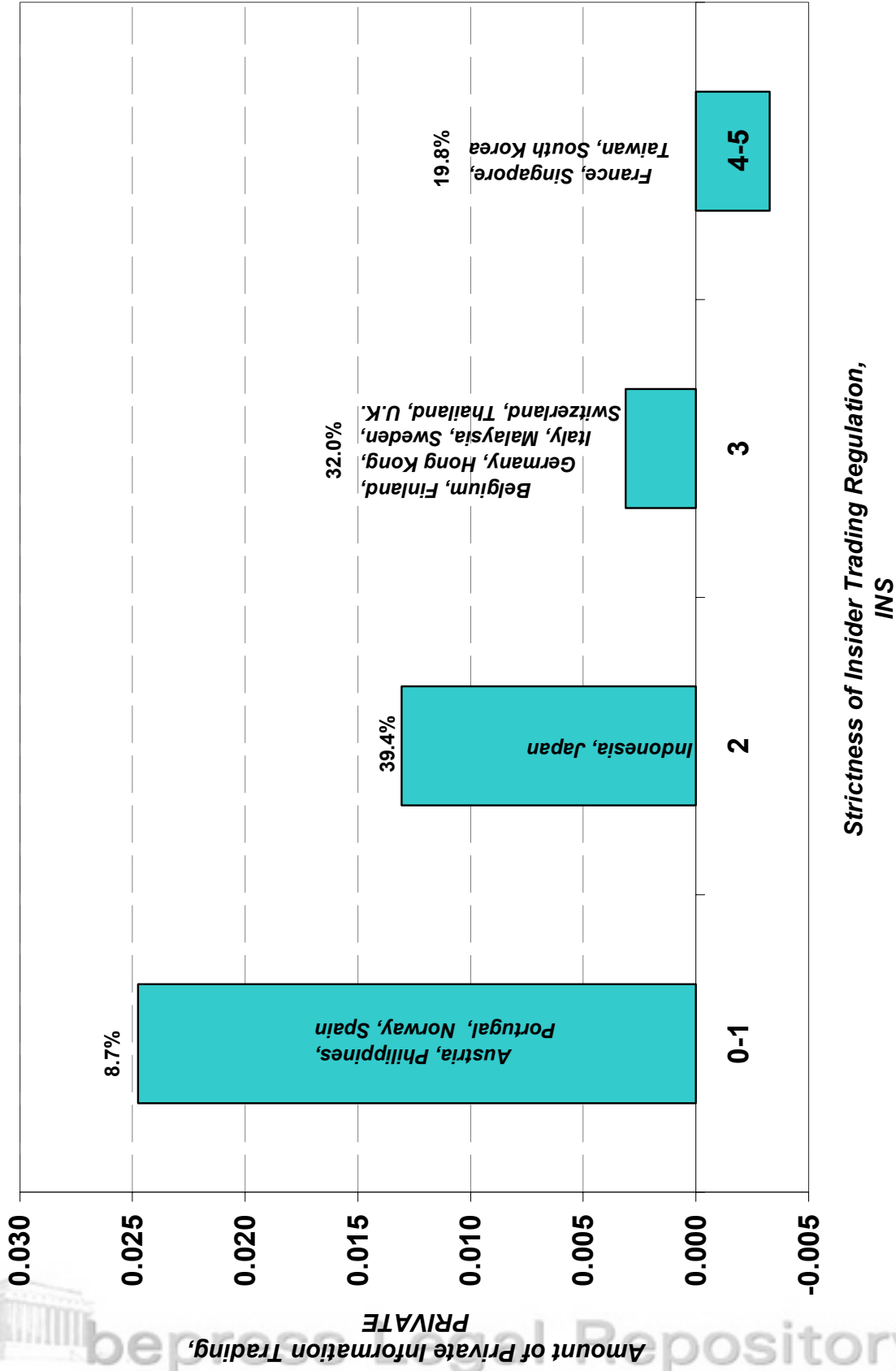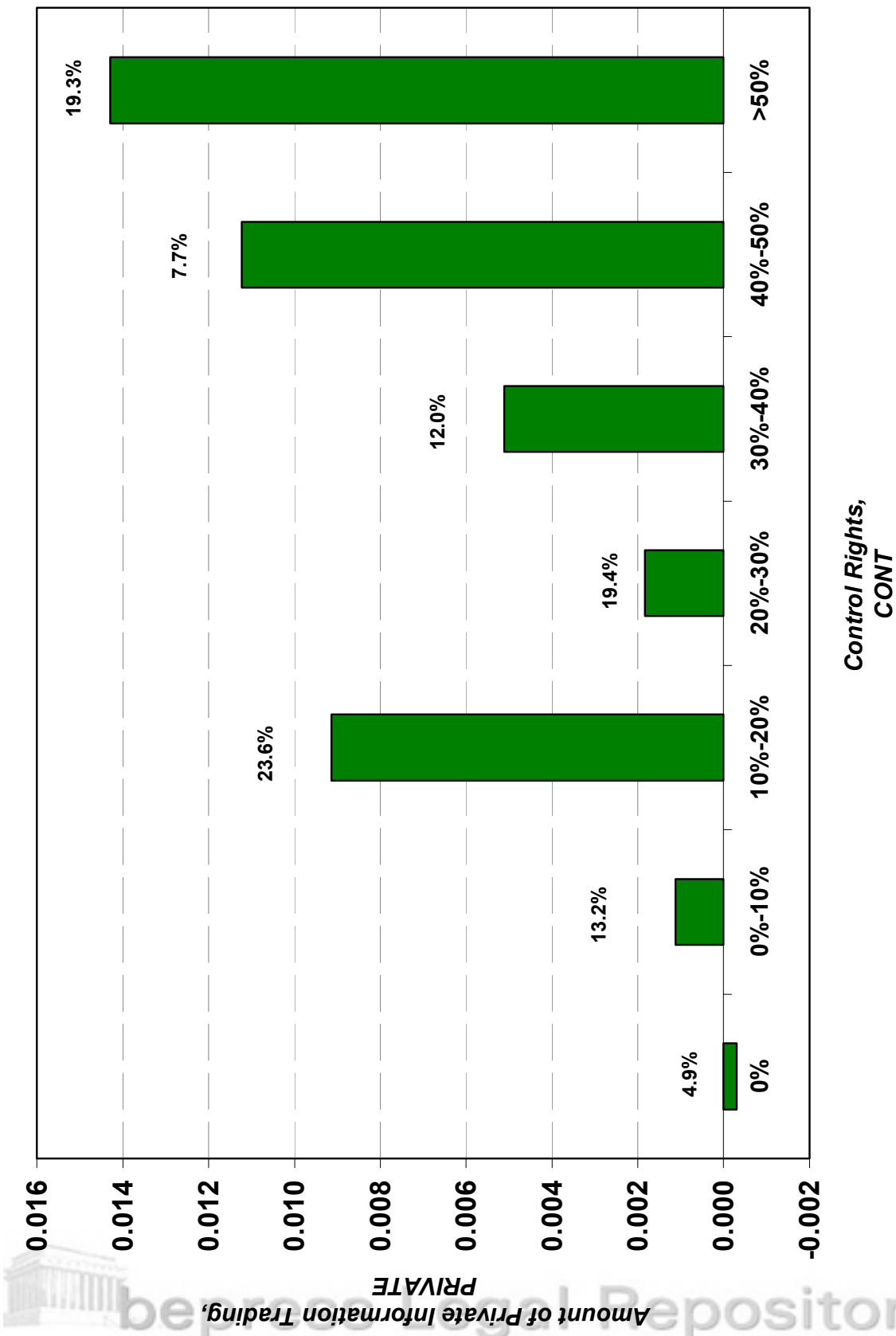
Table IV
Regressions of Intensity of Private Information Trading on Control Concentration, Strictness of Insider Trading Laws, Interaction Term, and Control Variables

This table reports the results of country-random effects regressions (specifications 4.2-4.4):

$$PRIVATE_i^c = \alpha + \beta_1 CONT_i^c + \beta_2 INS^c + \gamma CONT_i^c \times INS^c + \sum_{k=1}^{K} \delta_k Z_{k,i}^c + \varepsilon_i^c,$$

where c indexes countries and i indexes firms. Variable α is a constant (coefficient is not reported), E$[\varepsilon_i^c] = 0$, E$[\varepsilon_i^c \varepsilon_j^c] \neq 0$ $\forall$ i and j, and E is the expectation operator. Specification 4.1 is based on OLS regression. In all specifications the dependent variable is $PRIVATE$, the amount of private information trading. Variable $CONT$ is control concentration (it is centered around its mean in specifications 4.3 and 4.4); INS is the strictness of insider trading laws (it is centered around its mean in specifications 4.3 and 4.4); and $CONT \times INS$ is the interaction term of control concentration with the strictness of insider trading laws. Control variables, Z's, are: cash flow rights (specifications 4.1-4.4), $CASH$; liquidity, LMV (specifications 4.2-4.4); log of the number of trading periods, LNN (specifications 4.2-4.4); industry dummies, D (specifications 4.2-4.4, coefficients are not reported); time dummies, T (specifications 4.2-4.4, coefficients are not reported); efficiency of the judicial system, $JUDIC$ (specification 4.4), investment opportunities, INV_OPP (specification 4.4; it is winsorized at the 1% and 99% levels); and research and development expenditures, $R\&D$ (specification 4.4). All financial and accounting variables are measured in U.S. dollars. Numbers in parentheses are probability levels at which the null hypothesis of zero coefficient can be rejected. Coefficients significant at least at the 10% level (based on two-tailed test) are in boldface. Firms that belong to financial industries (SIC 60, 61, 62, 63, 65, 67) are excluded from the sample. We drop firms from the sample if their measure of private information trading is based on fewer than 30 trading days. We exclude Ireland from the *private information trading* sample because it is represented by only two firms. If all variables, except R&D expenditures, are available we set R&D expenditures to zero. At the bottom of the table we report the results of the Breusch-Pagan test that the variance of the random effects is zero. In specification 4.1 we report the F-statistics of overall significance instead of Wald test statistics. Refer to Table I for definitions of variables.

Dependent Variable		Intensity of Private Information Trading, PRIVATE			
Specification		4.1	4.2	4.3	4.4
Control concentration	CONT	**0.0326**	**0.0259**	**0.0267**	**0.0255**
		(0.02)	**(0.09)**	**(0.08)**	**(0.09)**
Strictness of insider trading laws	INS	**-0.00931**	**-0.0104**	**-0.0104**	**-0.0106**
		(0.00)	**(0.00)**	**(0.00)**	**(0.00)**
Interaction term of control concentration with strictness of insider trading laws	CONT×INS	-	-	**0.0203**	**0.0213**
				(0.00)	**(0.00)**
Cash flow rights	CASH	-0.00634	-0.00783	-0.00979	-0.00862
		(0.66)	(0.61)	(0.52)	(0.57)
Liquidity	LMV	-	**-0.00550**	**-0.00542**	**-0.00534**
			(0.00)	**(0.00)**	**(0.00)**
Log of number of trading periods	LNN	-	0.00453	0.00371	0.00373
			(0.19)	(0.28)	(0.29)
Industry dummies	D	no	yes	yes	yes
Time dummies	T	no	yes	yes	yes
Efficiency of judicial system	JUDIC	-	-	-	-0.000324
					(0.66)
Investment opportunities	INV_OPP	-	-	-	-0.00751
					(0.12)
Research and development expenditures	R&D	-	-	-	0.000116
					(0.97)
Wald test statistics of overall significance		**33.830**	**164.920**	**180.480**	**184.640**
		(0.00)	**(0.00)**	**(0.00)**	**(0.00)**
Regression R^2		0.035	0.059	0.064	0.066
Number of firms		2,827	2,642	2,642	2,637
Breusch-Pagan Test		-	**418.430**	**265.310**	**247.790**
			(0.00)	**(0.00)**	**(0.00)**

Table V

Regressions of Intensity of Private Information Trading (Run for High- and Low-Investor Protection Sub-samples) and Earnings Opacity on Control Concentration, Strictness of Insider Trading Laws, Interaction Term, and Control Variables

This table reports the results of country random-effects regressions:

$$PRIVATE_i^c \text{ or } OPACITY_i^c = \alpha + \beta_1 CONT_i^c + \beta_2 INS^c + \gamma CONT^c \times INS^c + \sum_{k=1}^{K} \delta_k Z_{k,i}^c + \varepsilon_i^c,$$

where c indexes countries and i indexes firms. Variable α is a constant (coefficient is not reported), $E[\varepsilon_j^c] = 0$, $E[\varepsilon_i^c \, \varepsilon_j^c] \neq 0 \; \forall \; i$ and j, and E is the expectation operator. The dependent variable is *PRIVATE*, the amount of private information trading (Panels A and B) or *OPACITY*, earnings opacity (Panel C). Variable *CONT* is control concentration (it is centered around its mean in all specifications); *INS* is the strictness of insider trading laws (it is centered around its mean in all specifications); and *CONT×INS* is the interaction term of control concentration with the strictness of insider trading laws. Control variables, *Z*'s, are: cash flow rights (in all specifications), *CASH*; liquidity, *LMV* (in all specifications); log of the number of trading periods, *LNN* (specifications 5.1-5.4); industry dummies, *D* (in all specifications, coefficients are not reported); time dummies, *T* (in all specifications, coefficients are not reported); efficiency of the judicial system, *JUDIC* (specifications 5.2, 5.4, and 5.6), investment opportunities, *INV_OPP* (specifications 5.2, 5.4, and 5.6; it is winsorized at the 1% and 99% levels); and research and development expenditures, *R&D* (specifications 5.2, 5.4, and 5.6). All financial and accounting variables are measured in U.S. dollars. In Panel A, the sample consists of firms from low-investor protection countries (*PROT* ≤ 33.3 (sample median)). In Panel B, the sample consists of firms from high-investor protection countries (*PROT* > 33.3 (sample median)). Numbers in parentheses are probability levels at which the null hypothesis of zero coefficient can be rejected. Coefficients significant at least at the 10% level (based on two-tailed test) are in boldface. Firms that belong to financial industries (SIC 60, 61, 62, 63, 65, 67) are excluded from the sample. We drop firms from the sample if they their measure of private information trading is based on fewer than 30 trading days. We exclude Ireland from the *private information trading* sample and Portugal from the *earnings opacity* sample because they are represented by only two and one firms, respectively. If all variables, except R&D expenditures, are available we set R&D expenditures to zero. At the bottom of the table we report the results if the Breusch-Pagan test that the variance of the random effects is zero. Refer to Table I for definitions of variables.

Dependent Variable		Intensity of Private Information Trading, PRIVATE				Earnings Opacity, OPACITY	
Sample		Panel A: Low investor protection subsample, PROT ≤ 33.3 (sample median)		Panel B: High investor protection subsample, PROT > 33.3 (sample median)		Panel C	
Specification		5.1	5.2	5.3	5.4	5.5	5.6
Control rights	CONT	0.0189	0.01505	0.000787	-0.000293	**0.139**	0.132
		(0.25)	(0.36)	(0.98)	(0.99)	(0.10)	(0.14)
Strictness of insider trading laws	INS	**-0.0108**	**-0.0104**	**-0.0135**	**-0.00904**	0.00880	0.00822
		(0.00)	(0.00)	(0.01)	(0.01)	(0.30)	(0.35)
Interaction term of control concentration with strictness of insider trading laws	CONT×INS	**0.0237**	**0.0190**	-0.00662	-0.00855	**0.0473**	**0.0488**
		(0.00)	(0.00)	(0.62)	(0.52)	(0.10)	(0.09)
Cash flow rights	CASH	-0.00265	-0.00271	-0.0263	-0.0104	-0.108	-0.0947
		(0.25)	(0.87)	(0.39)	(0.73)	(0.23)	(0.29)
Liquidity	LMV	**-0.00485**	**-0.00499**	**-0.00543**	**-0.00517**	**0.0101**	**0.00899**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.04)
Log of number of trading periods	LNN	**-0.00891**	**-0.0144**	**0.00937**	**0.00958**	-	-
		(0.05)	(0.00)	(0.10)	(0.09)		
Industry dummies	D	yes	yes	yes	yes	yes	yes
Time dummies	T	yes	yes	yes	yes	yes	yes
Efficiency of judicial system	JUDIC	-	**0.00177**	-	**0.0317**	-	0.00663
			(0.07)		(0.00)		(0.18)
Investment opportunities	INV_OPP	-	**0.0164**	-	**-0.0288**	-	-0.0236
			(0.01)		(0.00)		(0.44)
Research and development expenditures	R&D	-	-0.0113	-	0.00139	-	0.000528
			(0.23)		(0.71)		(0.98)
Wald test statistics of overall significance		**246.260**	**208.330**	**68.200**	**104.050**	**37.980**	**41.230**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.137	0.150	0.046	0.069	0.018	0.019
Number of firms		1,210	1,206	1,432	1,431	2,155	2,151
Breusch-Pagan Test		**224.030**	**162.480**	**42.250**	**10.060**	**32.560**	**24.920**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Table VI

Two-stage Least Squares Regressions of Intensity of Private Information Trading on Control Concentration, Strictness of Insider Trading Laws, and Control Variables with Legal Origin Dummies as Instruments for Ownership Variables

This table reports the results of the following two-stage least squares regression:

$$PRIVATE_i^c = \alpha + \beta_1 CONT_i^c + \beta_2 INS^c + \gamma CONT_i^c \times INS^c + \sum_{k=1}^{K} \delta_k Z_{k,i}^c + \varepsilon_i \;,$$

where legal origin dummies, *ORIGIN*, are used as instruments for ownership variables. The ownership variables, which are assumed to be endogenous, are: control concentration, *CONT* (it is centered around its mean), cash flow rights, *CASH*, and the interaction of control concentration with the strictness of insider trading regulation, *CONT×INS* (specifications 6.3-6.4). In those regressions *c* indexes countries, *i* indexes firms, and α is a constant (coefficient is not reported). The rest of the variables are: *PRIVATE*, the amount of private information trading; *INS* is the strictness of insider trading regulation (it is centered around its mean in specifications 6.3 and 6.4); liquidity, *LMV* (specifications 6.2-6.4); log of the number of trading periods, *LNN* (specifications 6.2-6.4); industry dummies, *D* (specifications 6.2-6.4, coefficients are not reported); time dummies, *T* (specifications 6.2-6.4, coefficients are not reported); efficiency of the judicial system, *JUDIC* (specification 6.4), investment opportunities, *INV_OPP* (specification 6.4; it is winsorized at the 1% and 99% levels); and research and development expenditures, *R&D* (specification 6.4). All financial and accounting variables are measured in U.S. dollars. Numbers in parentheses are probability levels at which the null hypothesis of zero coefficient can be rejected. Coefficients significant at least at the 10% level (based on two-tailed test) are in boldface. Firms that belong to financial industries (SIC 60, 61, 62, 63, 65, 67) are excluded from the sample. We drop firms from the sample if they their measure of private information trading is based on fewer than 30 trading days. We exclude Ireland from the *private information trading* sample because it is represented by only two firms. If all variables, except R&D expenditures, are available we set R&D expenditures to zero. At the bottom of the table we report the results of the Durbin-Wu-Hausman test of endogeneity. To perform this test we first regress the endogenous variables (*CONT* and *CASH* in specifications 6.1-6.4, and also *CONT×INS* in specifications 6.3-6.4) on the set of exogenous variables, collect the fitted values of residuals, ε_{CONT}, ε_{CASH}, and $\varepsilon_{CONT×INS}$, and use them as additional variables in the base regression. High values of the F-test of their joint significance then indicates the endogeneity of *CONT*, *CASH*, and *CONT×INS*. Refer to Table I for definitions of variables.

Dependent Variable		Intensity of Private Information Trading, PRIVATE			
Specification		6.1	6.2	6.3	6.4
Control concentration	CONT	**1.430**	**0.777**	**0.973**	**0.936**
		(0.02)	(0.01)	(0.00)	(0.02)
Strictness of insider trading laws	INS	**-0.0113**	**-0.0137**	**-0.0116**	**-0.0115**
		(0.00)	(0.00)	(0.00)	(0.00)
Interaction term of control concentration with strictness of insider trading laws	CONT×INS	-	-	**0.153**	**0.147**
				(0.00)	(0.00)
Cash flow rights	CASH	**-1.255**	**-0.652**	**-0.887**	**-0.863**
		(0.00)	(0.02)	(0.01)	(0.00)
Liquidity	MV	-	**-0.00237**	-0.00247	**-0.00273**
			(0.08)	(0.12)	(0.10)
Log of number of trading periods	LNN	-	**0.0135**	0.00673	0.00723
			(0.01)	(0.29)	(0.25)
Industry dummies	D	no	yes	yes	yes
Time dummies	T	no	yes	yes	yes
Efficiency of judicial system	JUDIC	-	-	-	-0.00119
					(0.48)
Investment opportunities	INV_OPP	-	-	-	-0.00141
					(0.89)
Assets intangibility	R&D	-	-	-	0.00466
					(0.39)
F-test statistics of overall significance		**14.420**	**5.280**	**5.050**	**4.930**
		(0.00)	(0.00)	(0.00)	(0.00)
Number of firms		2,827	2,642	2,642	2,637
Durbin-Wu-Hausman test of endogeneity		**50.500**	**18.190**	**17.430**	**13.310**
		(0.00)	(0.00)	(0.00)	(0.00)

Table VII
Regressions of the Intensity of Private Information Trading on Control Concentration, Insider Trading Regulation, Insider Trading Laws Enforcement, Interaction Terms, and Control Variables

This table reports the results of country-random effects regressions (specifications 7.2-7.4):

$$PRIVATE_i^c = \alpha + \beta_1 CONT_i^c + \beta_2 INS\_REG^c + \beta_3 INS\_ENF^c + \gamma_1 CONT_i^c \times INS\_REG^c +$$

$$\gamma_2 CONT_i^c \times INS\_ENF^c + \sum_{k=1}^{K} \delta_k Z_{k,i}^c + \varepsilon_i^c \, ,$$

where c indexes countries and i indexes firms. Variable α is a constant (coefficient is not reported), $E[\varepsilon_i^c] = 0$, $E[\varepsilon_i^c \varepsilon_j^c] \neq 0 \; \forall \; i$ and j, and E is the expectation operator. Specification 7.1 is based on OLS regression. In all specifications the dependent variable is $PRIVATE$, the amount of private information trading. Variable $CONT$ is control concentration (it is centered around its mean in specifications 7.3 and 7.4); INS_REG is insider trading regulation (it is centered around its mean in specifications 7.3 and 7.4); INS_ENF is insider trading laws enforcement (it is centered around its mean in specifications 7.3 and 7.4); $CONT \times INS\_REG$ is the interaction term of control concentration with insider trading regulation; and $CONT \times INS\_ENF$ is the interaction term of control concentration with insider trading laws enforcement. Control variables, Z's, are: cash flow rights (specifications 7.1-7.4), $CASH$; liquidity, LMV (specifications 7.2-7.4); log of the number of trading periods, LNN (specifications 7.2-7.4); industry dummies, D (specifications 7.2-7.4, coefficients are not reported); time dummies, T (specifications 7.2-7.4, coefficients are not reported); efficiency of the judicial system, $JUDIC$ (specification 7.4), investment opportunities, INV_OPP (specification 7.4; it is winsorized at the 1% and 99% levels); and research and development expenditures, $R\&D$ (specification 7.4). All financial and accounting variables are measured in U.S. dollars. Numbers in parentheses are probability levels at which the null hypothesis of zero coefficient can be rejected. Coefficients significant at least at the 10% level (based on two-tailed test) are in boldface. Firms that belong to financial industries (SIC 60, 61, 62, 63, 65, 67) are excluded from the sample. We drop firms from the sample if they their measure of private information trading is based on fewer than 30 trading days. We exclude Ireland from the *private information trading* sample because it is represented by only two firms. If all variables, except R&D expenditures, are available we set R&D expenditures to zero. At the bottom of the table we report the results if Breusch-Pagan test that the variance of the random effects is zero. In specification 4.1 we report the F-statistics of overall significance instead of Wald test statistics. Refer to Table I for definitions of variables.

Dependent Variable		Intensity of Private Information Trading, PRIVATE			
	Specification	7.1	7.2	7.3	7.4
Control concentration	CONT	**0.0299**	**0.0273**	**0.0285**	**0.0270**
		(0.04)	(0.07)	(0.06)	(0.07)
Insider trading regulation	INS_REG	**-0.0105**	**-0.0126**	**-0.0114**	**-0.0120**
		(0.00)	(0.00)	(0.00)	(0.00)
Interaction term of control concentration with insider trading regulation	CONT×INS_REG	-	-	**0.0250**	**0.0276**
				(0.00)	(0.00)
Insider trading laws enforcement	INS_ENF	**-0.0188**	-0.000563	-0.00929	-0.00607
		(0.00)	(0.94)	(0.23)	(0.45)
Interaction term of control concentration with insider trading laws enforcement	CONT×INS_ENF	-	-	**0.0394**	**0.0371**
				(0.07)	(0.09)
Cash flow rights	CASH	-0.00121	-0.00569	-0.0106	-0.0102
		(0.93)	(0.71)	(0.49)	(0.51)
Liquidity	LMV	-	**-0.00564**	**-0.00555**	**-0.00547**
			(0.00)	(0.00)	(0.00)
Log of number of trading periods	LNN	-	0.00383	0.00310	0.00329
			(0.26)	(0.37)	(0.35)
Industry dummies	D	no	yes	yes	yes
Time dummies	T	no	yes	yes	yes
Efficiency of judicial system	JUDIC	-	-	-	-0.00101
					(0.20)
Investment opportunities	INV_OPP	-	-	-	-0.00639
					(0.19)
Research and development expenditures	R&D	-	-	-	0.000113
					(0.97)
Wald test statistics of overall significance		**24.560**	**174.000**	**220.920**	**194.260**
		(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.034	0.062	0.067	0.069
Number of firms		2,827	2,642	2,642	2,637
Breusch-Pagan Test		-	**355.480**	**226.000**	**204.180**
			(0.00)	(0.00)	(0.00)