The World Price of Insider Trading

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ABSTRACT

The existence and the enforcement of insider trading laws in stock markets is a phenomenon of the 1990s. A study of the 103 countries that have stock markets reveals that insider trading laws exist in 87 of them, but enforcement – as evidenced by prosecutions – has taken place in only 38 of them. Before 1990, the respective numbers were 34 and 9. We find that the cost of equity in a country, after controlling for a number of other variables, does not change after the introduction of insider trading laws, but decreases significantly after the first prosecution.

An Insider (Primary or Secondary Insider) may not, by utilizing knowledge of Insider Information, acquire or dispose of Insider Securities for his or her own account or for the account of another person, or for another person.

Section 14 of the WpHG, Germany, 1994

Laws prohibiting insider trading came late to Germany. They had to come because the European Union required all its members to implement the European Community Insider Trading Directive (89/592/EEC of November 13, 1989). The lateness of Germany in establishing laws prohibiting insider trading, however, was not an exception. Posen (1991) notes that in the beginning of the 1990s insider trading was not illegal in most European countries.

The purpose of this paper is twofold. First, we carry out a comprehensive survey on the existence and the enforcement of insider trading laws around the world. Stamp and Welsh (1996, page x), in a study of insider trading laws in a small subset of developed countries, did not like what they found. We quote them: "in conclusion, it is clear that a number of jurisdictions are either not interested in, or are not prepared to devote the necessary resources to implementing their insider dealing legislation." We update their data set by obtaining information on insider trading laws in every country that has a stock market. To preclude any selection bias, we began the second part of the paper only after we had obtained information from *all* countries that have stock markets.

The second purpose of this paper is to ask whether the existence and enforcement of insider trading laws matter. To be precise, the research question is whether prohibitions against insider trading affect the cost of equity. This is an important question because, as a major purpose of stock markets is to make it easier for corporations to raise financing through equity, corporations would like to know if they have to pay an extra return in stock markets where insiders trade with impunity. If yes, it would be in the benefit of corporations to avoid paying this extra borrowing cost by having their equity traded in stock markets that limit insider trading, everything else constant. To put it in another way, if insider trading is found to increase

the cost of equity, corporations would pay stock exchanges a premium to limit insider trading, everything else being constant.

Scores of law, economics, and finance papers have argued the pros and cons of insider trading regulations. Bainbridge (2000), besides providing a comprehensive list of papers that have discussed insider trading, succinctly summarizes the arguments for and against allowing insider trading. Considering the richness and the complexity of issues involved in the debate on insider trading – historical, cultural, economic, legal – this paper, by choice, restricts its attention to one key economic aspect: the cost of equity.

Consider a stock market in which insiders trade with impunity. The liquidity providers in such a market would protect themselves by increasing their sell price and decreasing their buy price.[1] This increases the transaction cost, which in turn induces a stock trader to require an even higher return on equity.[2] A second, and a generally neglected reason, why the cost of equity would be higher in such a market is that controlling large shareholders could easily be tempted by management to make profits from stock tips rather than profits from hard-to-do monitoring.[3] Knowing this, shareholders would demand an even higher return on equity. It is important to note that the first reason predicts a higher cost of equity because of an implicit transaction tax inherent in high bid-ask spreads, whereas the second reason does not depend on such an illiquidity premium. Could the cost of equity be lower in a market where insiders trade freely? Manne (1966) first provided the argument why the cost of equity could be higher in markets that do not allow insider trading: no insider trading means less efficient markets, and less efficient markets mean that shareholders would demand an even higher return to compensate for the fact that they find it difficult to analyze firms.

The above paragraph lists the reasons how insider trading and the cost of equity can be linked through the suppliers of equity funds - the shareholders. Lombardo and Pagano (1999) argue that legal variables can also affect the demanders of equity funds – the firms – and, therefore, the relationship between these legal variables and the equilibrium cost of equity is difficult to interpret. For example, if a supply shock emanating from shareholders causes the cost of equity to fall, more firms will find hitherto negative

NPV projects become positive NPV projects, and more equity will be issued. This will decrease equity prices and raise the cost of equity (if you believe that the demand curve for equity is downward sloping) or it will increase equity prices and lower the cost of equity (if you do not believe that the demand curve for equity is downward sloping, but you believe that more equity means more diversification opportunities of firm-specific risk, and so a lower risk premium).

The debate about the effect of insider trading on the cost of equity will eventually have to be settled empirically. However, as Bainbridge (2000) notes, serious empirical research on insider trading is hindered by the subject's illegality. The only source of data concerning legal trades are the trading reports filed by corporate insiders, and it is unlikely that managers will willingly report their violations. Even if they do, it is improbable that managers are the only insiders. The only source of data concerning illegal trades is confidential, and if any researcher (for example, Meulbroek (1992)) obtains them, the study will suffer from a selection bias. It should also be mentioned here that because of availability of data, and because of a long evolution of common law on insider trading, nearly all empirical research on insider trading has been concentrated in the Unites States.[4]

Our comprehensive survey finds that 103 countries had stock markets at the end of 1998. Insider trading laws existed in 87 countries, but enforcement, as evidenced by prosecutions, had taken place in only 38 of them. Before 1990, the respective numbers were 34 and 9. This leads us to conclude that the existence and the enforcement of insider trading laws in stock markets is a phenomenon of the 1990s.

Do prohibitions against insider trading affect the cost of equity in a country? In this paper we measure the effect of insider trading laws on the cost of equity using four different approaches. Each of these approaches have their advantages and disadvantages, and these we discuss in other sections of this paper.

The first approach is simply descriptive statistics. We look at mean returns, turnover, and volatility, five years before the introduction of insider trading laws, and five years afterwards. We repeat this exercise around the date of the first prosecution. We find that mean returns decrease after the introduction of insider

trading laws, but this decrease is less than the decrease that is observed after the first prosecution. Turnover increases after insider trading enforcement, but does not change much after the introduction of insider trading laws. There is a small increase in volatility.

The second approach uses an international asset pricing factor model. It is a simplified version of Bekaert and Harvey (1995). Their empirical specification allows for partial integration of a country to the world equity markets. After controlling for a world factor, a local factor, a foreign exchange factor, a liquidity factor, and other variables like an indicator for liberalization, and an indicator for shareholder rights, we find that enforcement has a negative effect on the cost of equity that is significant both statistically and economically. On the other hand, insider trading laws have an insignificant effect.

The third approach is a simplified version of Bekaert and Harvey (2000), who use changes in dividend yields to measure changes in the cost of equity. After controlling for an indicator for liberalization, we find that insider trading laws have an insignificant effect on the cost of equity. On the other hand, enforcement has a negative and significant effect.

The fourth approach follows Erb, Harvey, and Viskanta (1996). They find that surveys of country risk forecasts are good predictors of the cross-section of expected equity returns. After controlling for other variables, like an indicator for liberalization, we find that insider trading laws have an insignificant effect on country credit ratings. On the other hand, enforcement has a positive and significant effect on country credit ratings.

To summarize, whichever approach we use, we find that insider trading enforcement is associated with a significant decrease in the cost of equity.[5] The numerical estimate of this decrease in the cost of equity ranges from a low of 0.3 percent (the credit rating approach) to a high of 7 percent (the international asset pricing model approach). More importantly, we find that the mere existence of insider trading regulations does not affect the cost of equity.

The paper is structured as follows. In Section I we describe our data. Section II gives descriptive

statistics of our findings from our comprehensive survey of stock markets around the world. Section III, which is the main section of this paper, tests the null hypothesis that the existence and enforcement of insider trading laws does not affect the cost of raising equity in a country. The four different approaches we use in our testing are four sub-sections in Section III. We conclude in Section IV. It is in this section that we lay out the limitations of our research, and argue that although we would like to stress our finding of a reduction in the cost of equity that is associated with the enforcement of insider trading laws, our point estimates should not be over-emphasized.

I. Data

We are interested in finding out whether the existence and enforcement of insider trading laws affect the cost of equity in a country. To this end, we collect primary and secondary data from different sources. The data could broadly be classified into three categories: data on the existence and the enforcement of insider trading in various stock markets of the world, stock market returns, and other variables that may affect the cost of equity in a country.

A. *Data on the Existence and the Enforcement of Insider Trading Laws*

The first thing we did was to count the number of countries that had stock markets. Assuming that every stock market had its own web site in this information age, we counted the number of web sites.[6] According to this criterion, there were 103 countries that had stock markets at the end of 1998, of which 22 are classified as developed markets, and 81 are classified as emerging markets. This list included all the 88 countries covered in the 1998 edition of the *International Encyclopedia of the Stock Market*, and it included all the 94 countries included in the 1998 edition of the *Handbook of World Stock, Derivative and Commodity Exchanges*. The 81 emerging markets we identify include all the 28 emerging markets that Morgan Stanley Capital International (MSCI) follows, as well as the 33 that the International Financial Corporation (IFC) of the World Bank tracks.[7] The first column in Table I gives a list of all the countries. We then sent e-mails, letters, and faxes to all the 103 stock markets, as well as to their national regulators.[8] The reason we

contacted two sources is because we wanted to cross-check the information that was provided. We asked in our letter if the stock market had insider trading laws and, if yes, from when. If they had insider trading laws, we asked if there had been a prosecution under these laws – successful or unsuccessful – and, if yes, when was the first prosecution. The reason we asked the second question is because Bhattacharya et al. (2000) had shown in the case of one emerging market that the existence of insider trading laws without their enforcement – as proxied by a prosecution – does not deter insiders. Wherever possible, and this was only possible for a small subset of developed countries, the answers were cross-checked against the findings of Posen (1991) and Stamp and Welsh (1996).

As consistent enforcement is economically more meaningful than just the first enforcement, the reader may be wondering why we focused only on obtaining data about the first prosecution. This is because it is extremely difficult to obtain data on any prosecution. In an earlier paper, which focused on insider trading in just one country, we could not get this data from the country's regulators even after a year of repeated requests. In this paper, as we were acutely sensitive of the fact that responses were more likely from countries that had enforced insider trading laws which would lead to a severe selection bias in our results, we had to obtain information from every country that had a stock market. So we simply asked the regulators about the first prosecution cases. After one year, and sometimes as many as five reminders, we obtained this information from *all* the 103 countries that had stock markets.

It is important to note that the first enforcement of a law, however perfunctory it might be, is an event of paramount importance. The first prosecution signals to the world that we have gone from a regime where there had been no prosecutions to a regime where there has been at least one prosecution; this implies that the probability of future prosecutions has had a discrete jump up.[9]

B. *Stock Market Returns*

Data on monthly equity indices of 22 developed countries were obtained from Morgan Stanley Capital International (MSCI). Though MSCI has data on monthly equity indices of emerging markets as

well, we chose to obtain these from the International Financial Corporation (IFC) of the World Bank, because the IFC covers more emerging markets – 33 – and their data begin earlier in most cases.[10] The first column in the Appendix gives a list of the countries for which we have MSCI/IFC data. All our data extend to December 1998. The second column in the Appendix gives us the sample period that was available for these 55 monthly stock market indices. These indices are value-weighted, and are calculated with dividend reimbursement. As noted by Harvey (1991), the returns computed on the basis of these indices are highly correlated with popular country indices. The MSCI value-weighted World Index was used as a proxy for the market portfolio.[11]

Descriptive statistics about the stock markets for 1997 were obtained from the 1998 edition of the *Handbook of World Stock, Derivative and Commodity Exchanges*. We obtained the following information about 94 countries: the year of establishment, the number of firms listed at year-end 1997, the market capitalization in USD at year-end 1997, and the volume of trade in USD in 1997. Data on the missing nine countries as well as cross-checks of the above data were obtained from the 103 stock market web sites.

C. Other Variables That may Affect the Cost of Equity in a Country

Liquidity, as demonstrated by Amihud and Mendelson (1986), and Brennan and Subrahmanyam (1996), may affect the cost of equity. The measure of liquidity that we adopted was turnover, and this is defined as the volume of trade in the stock market divided by the market capitalization of the stock market. We could obtain monthly data on the volume of trade and market capitalization for 35 of the 55 countries from the vendor Datastream. The third and fourth column in the Appendix gives the sample period that was available for these 35 monthly market capitalization and volume time-series.

Bekaert and Harvey (2000) use changes in dividend yield to measure changes in the cost of equity. We obtained monthly data on the dividend yield for 38 of the 55 countries from the vendor Datastream. The dividend yield was on the Datastream constructed indices. The fifth column in the Appendix gives us the sample period that was available for these 38 monthly dividend yield time-series.

Bekaert and Harvey (1997) divide the sum of exports and imports with a country's gross domestic product to obtain a variable that proxies the level of integration of a country with the rest of the world. This is because the level of globalization does affect the cost of equity (see Stulz (1999a)). We use the same method. Monthly data on exports and imports for the 55 countries were obtained from the International Financial Statistics provided by the International Monetary Fund. For some countries the frequency of GDP was quarterly, and for some it was yearly. To obtain monthly GDP, we divided by 3 in the former case, and by 12 in the latter case. The sixth, seventh, and eighth column in the Appendix gives us the sample period that was available for these 55 GDP, exports, and imports time-series.

Monthly data on foreign exchange rates are obtained from the International Financial Statistics. The ninth column in the Appendix gives us the sample period that was available for these 55 monthly foreign exchange rate time-series.

As there has been some recent literature documenting that better legal institutions are associated with more efficient equity markets – see, for example, La Porta et al. (1997, 1998), Levine (1997), Demirguc-Kunt and Maksimovic (1998), and Lombardo and Pagano (1999) – we need to control for these other legal factors. We computed an index measuring shareholder rights by adding one when: (1) there is one share-one vote; (2) the country allows shareholders to mail their proxy vote to the firm; (3) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (4) cumulative voting or proportional representation of minorities in the board of directors is allowed; (5) an oppressed minorities mechanism is in place; and (6) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median). The index ranges from 0 to 6. This data are obtained from Table 2 in La Porta et al. (1998). The ninth column in Table I gives us this computed index value for the 49 countries they track.

Erb, Harvey, and Viskanta (1996) found that country credit ratings are a very good proxy for the ex-ante risk exposure, particularly of segmented emerging economies. Country credit ratings come from

Institutional Investor's semi-annual survey of bankers. The survey represents the responses of 75 to 100 bankers. Respondents rate the credit quality of each country on a scale of 0 to 100. They rate them once every six months. The data, with a few exceptions, begin on September 1979 and ends on September 1999. The data exist not only for the 55 countries for which we have stock market data – the tenth column in the Appendix gives us the sample period that was available for the 55 biannual country credit ratings time-series – but for 42 other countries as well. This data can be downloaded from Harvey's web site (http://www.duke.edu/ ~charvey).

Liberalization, as Stulz (1999b) points out, reduces cost of equity through two routes. It reduces required return because risk-sharing improves, and it reduces required return because corporate governance improves. Bekaert and Harvey (2000) and Henry (2000) empirically confirm that liberalization reduces the cost of equity. We obtain official liberalization dates from Table I in Bekaert and Harvey (2000). These are given in the tenth column in Table I. We control for the confounding effects of liberalization in all our tests.

II. Stock Markets and Insider Trading Regulations Around the World

A. Stock Markets Around the World

Table I gives descriptive statistics of the main stock markets in the 103 countries that have stock markets.

The stock markets exhibit a bewildering diversity. The ages of the stock markets range from a few months (1998, Tanzania) to hundreds of years (1585, Germany), with the median year of establishment being 1953. As expected, stock markets in the developed countries (median year of establishment is 1859) are older than stock markets in the emerging markets (median year of establishment is 1973). The number of listed firms on the main exchange ranged from 2 (1997, Macedonia) to 5,843 (1997, India), with the median number of listed firms being 128. As expected, stock markets in the developed countries (median number of listed firms is 249) list more firms than stock markets in the emerging economies (median number of listed firms is 85). Market capitalization of the stock markets ranged from 0.002 billion USD (1997, Guatemala)

to 8879.631 billion USD (1997, New York Stock Exchange), with the median being 14.8 billion USD. As expected, the size of the stock markets in the developed countries (median size is 292.692 billion USD) is bigger than the size of the stock markets in the emerging economies (median size is 3.968 billion USD). Dollar volume of trade ranged from 0.0003 billion USD (1998, Tanzania) to 5777.6 billion USD (1997, New York Stock Exchange), with the median dollar volume being 4.92 billion USD. As expected, there is more trade in the stock markets of the developed countries (median dollar volume is 179.3 billion USD) than in the stock markets of the emerging economies (median dollar volume is 0.777 billion USD). Turnover, which is defined as volume divided by market capitalization, ranged from 0.00127 (1998, Tanzania) to 30.99 (1997, Ecuador), with the median being 0.338. As expected, the liquidity of the stock markets in the developed countries (median turnover is 0.547) is bigger than the liquidity of the stock markets in the emerging economies (median turnover is 0.246).

B. The Existence and Enforcement of Insider Trading Laws around the World

The seventh and eighth columns in Table I give us information on the existence and enforcement of insider trading laws for every country that has a stock market. Insider trading laws were first established in the United States (1934). Until 1967, when France established these laws, the U.S. was the only country that had insider trading laws. The latest country to establish insider trading laws is Cyprus (1999). The median year of establishment of these laws is 1991. Developed countries (median year of establishment of insider trading laws is 1989) have had these laws on their books longer than emerging markets (median year of establishment of insider trading laws is 1992). Today, 100 percent of developed countries have insider trading laws on their books, but only 80 percent of emerging markets do. Before 1990, the respective numbers were 55 percent and 39 percent.

The enforcement of insider trading laws is difficult to measure. If we assume that a law is not enforced unless a charge is brought under it, a reasonable way to measure enforcement is to date the first prosecution, and assume that enforcement begins after that date. This is what we did. We found that the first

case under federal insider trading laws took place in the United States (1961).[12] Until 1990, only nine countries had brought any charges under these laws. The latest country to prosecute under insider trading laws is Oman (1999). The median year of the first prosecution is 1994. Though the median year for the first prosecution was the same for both developed countries and emerging economies, 82 percent of developed countries have prosecuted till today, but only 25 percent of emerging markets have prosecuted till today. Before 1990, the respective numbers were 23 percent and 7 percent.

Figure 1 graphically demonstrates the history of the existence and the enforcement of insider trading laws in the twentieth century. It plots the time series of the number of countries in the world, the number of countries with stock markets, the number of countries that have insider trading laws, and the number of countries that enforce their insider trading laws.[13] It is apparent from this graph that in the first third of this century, these laws did not exist anywhere; in the second third of this century, these laws existed in only one country (the United States); and in the last third of this century, existence and enforcement of insider trading laws accelerated. This acceleration was particularly pronounced in the 1990s.

Figure 1 also tells us that if we use the argument of revealed preferences of governments around the world, it seems that a consensus has been achieved among governments: insider trading laws are good for society. Since Bettis, Coles, and Lemmon (2000) find in their sample of U.S. firms that 92 percent of them have policies restricting insider trading, it could be argued that even firms agree that insider trading is undesirable. So the debate about the pros and cons of insider trading laws seems to have been settled. Every developed country today has these insider trading laws, and four out of five emerging market economies have it.

The enforcement of these laws, however, is a different issue. Only one in three countries have enforced these laws. Why? We quote Stamp and Welsh (1996, page ix) here: “In a number of common law jurisdictions...the burden of proof on the prosecution is onerous, making it difficult to secure a conviction. In other jurisdictions,...this problem is exacerbated by the legislatures’ attempt to provide an exhaustive

list...which can be exploited by the experienced insider dealer. On the other hand, in a number of other countries, ...there is no real political will to enforce the legislation."

Do the existence and the enforcement of insider trading laws in stock markets affect the cost of equity? We attempt to answer this question in the next section.

III. Does Insider Trading Increase the Cost of Equity?

We use two variables related to insider trading regulation. The first one is related to the existence of laws prohibiting insider trading in the country of interest ("IT laws"). The second variable relates to legal prosecution for insider trading in the country of interest ("IT enforcement"). These insider trading variables are coded as follows. The indicator variable "IT laws" changes from zero to one in the year after the insider trading laws are instituted. The indicator variable "IT enforcement" changes from zero to one in the year after the first prosecution is recorded. We use one variable related to liberalization. This variable is coded as follows. The indicator variable "liberalization" changes from zero to one in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000).

The effect of the insider trading variables on the cost of equity is measured using four different approaches.

A. Using Simple Descriptive Statistics

If equity markets are informationally efficient, and if insider trading laws affect the cost of equity, it follows that there will be an immediate impact on trading statistics on the day insider trading laws are changed. This is the approach that Henry (2000) used to study the effect of liberalization on the cost of equity, and this is the first approach we would like to use to study the effect of insider trading laws on the cost of equity.

An advantage of this event-study approach is that it directly tries to measure the discrete equity price change that is supposed to occur if there is a change in the cost of equity caused by a change in the insider trading laws. There are two disadvantages of the event-study approach. First, if there is an equity price

change, it is difficult to conclude that this came about because there was a change in the cost of equity or because there was a change in expected dividend growth. This, as Henry (2000) admits, makes interpretation difficult in the case of liberalization. In the case of insider trading laws, however, it could be argued that growth opportunities of a firm are not likely to change much if there is a change in insider trading laws. The second disadvantage is more severe. It is difficult to date the change in the insider trading law precisely.[14] This makes it impossible for us to conduct a classical event-study. Defining the year of introduction of insider trading laws as year t, we look at mean returns, turnover, and volatility, five years before the introduction of insider trading laws (year t-5 through year t-1), and five years afterwards (year t+1 through year t+5, or less if data were not available). We repeat this exercise around the date of the first prosecution.

Figure 2a plots the mean returns, volatility, and turnover five years before and five years after the year in which insider trading laws were introduced; Figure 2b plots the mean returns, volatility, and turnover five years before and five years after the year in which the first prosecution under these laws occurred.

The figures tell us that mean returns decrease after the introduction of insider trading laws, but the percentage decrease is less than the decrease that is observed after the first prosecution. Volatility increases slightly in both cases, which tells us that the welfare effects of insider trading laws are not unambiguous. Turnover increases in the case of insider trading enforcement, but not in the case of insider trading laws.

Table II provides formal confirmation of our observations in Figures 2a and 2b. We use the natural logarithm of the ratio of volume to market capitalization as a measure of liquidity. Call this variable "liq." Compute the monthly realized rate of equity return. Call this variable "rawret."

Using "liq" as the dependent variable, we run a panel time-series regression with country-fixed effects. We correct for country-specific heteroskedasticity and country-specific autocorrelation. The regressions use data from our 35 countries for which we have data for the "liq" variable.

Panel A of Table II presents the results from this panel time-series regression. In regression (1a), when "IT laws" is the independent variable, the coefficient on "IT laws" is positive and statistically

significant at the one percent level. In regression (2a), when "IT enforcement" is the independent variable, the coefficient on "IT enforcement" is positive and statistically significant at the one percent level. These conclusions do not change – see regressions (3a) and (4a) – if we add the "liberalization" indicator as a control variable. These results provide evidence in favor of a testable implication drawn from the theoretical models of Kyle (1985), Glosten and Milgrom (1985), and Bhattacharya and Spiegel (1991): the curbing of insider trading improves liquidity in a market. Judging by the coefficients, the effect of enforcement of insider trading laws on liquidity seems to be stronger than the effect of their mere existence.

Panel B of Table II presents the results from a similar panel time-series regression when "rawret" is the dependent variable. In regression (1b), when "IT laws" is the independent variable, the coefficient on "IT laws" is negative and statistically significant at the ten percent level. In regression (2b), when "IT enforcement" is the independent variable, the coefficient on "IT enforcement" is negative and statistically significant at the one percent level. When we add the "liberalization" indicator as a control variable – see regressions (3b) and (4b) – the coefficient on "IT laws" is no longer significant (p-value of 0.26), but the coefficient on "IT enforcement" remains significant at the five percent level. The magnitude of the coefficient on "IT enforcement" suggests a drop of seven percent in the annual cost of equity.

A conclusion we can draw from Table II is that the enforcement of insider trading laws affects the cost of equity indirectly through its positive effect on liquidity (seen in Panel A, 4a), and directly (seen in Panel B, 4b). This provides evidence in support of hypotheses we laid out in the beginning of this paper: lower insider trading reduces cost of equity indirectly by increasing liquidity, that is, it reduces the illiquidity premium; and lower insider trading reduces cost of equity directly by improving corporate governance.

A disadvantage of using ex-post average excess return to measure ex-ante risk premium is that we can be led to dramatically wrong conclusions with our short sample periods. For example, we can easily conclude from rising (falling) stock prices, that risk premiums are rising (falling), whereas it may be that the only reason that stock prices are rising (falling) is because ex-ante risk premiums are falling (rising).

B. Using an International Asset Pricing Model

The major determining feature of the cost of equity is risk. We, therefore, need to control for risk in order to measure the marginal impact of insider trading laws. What do we use for a risk measure? Solnik (1974a, 1974b) made a strong case for using the world market portfolio as the risk factor in the international capital asset pricing model (ICAPM). Though Harvey and Zhou (1993) fail to reject the ICAPM, more general models that allow time-variations (like Harvey (1991)) or multi-factors and time-variations (like Ferson and Harvey (1993)), reject some aspects of the ICAPM. The consensus seems to be that a country's beta with respect to the world market portfolio has some merit to explain expected returns for developed countries; the variance of return of the country's stock market does better in explaining expected returns for emerging markets (see Harvey (1995)).

We adopt a simplified version of Bekaert and Harvey (1995) as our international asset pricing model. Their empirical specification allows for partial integration of a country to the world equity markets. Their model is very appealing because it permits a country to evolve from a developing segmented market (where risk is measured by the country's variance) to a developed country which is integrated to world equity markets (where risk is measured by the sensitivity of a country's equity returns to movements in the world market portfolio). The special case of complete integration, where the world factor is the only factor, is nested in their model. This international asset pricing model is expressed as follows:

$$\left(r_{i,t} - r_{f,t}\right) = \alpha_0 + \phi_{i,t}\lambda_{\text{cov}} h_{i,w,t} + \left(1 - \phi_{i,t}\right)\lambda_{\text{var}} h_{i,t} + e_{i,t} \qquad (1)$$

where

$r_{i,t}$ is the dollar monthly return of the stock market index of country i at time t,

$r_{f,t}$ is the monthly return of the one month US T-Bill at time t,

α_0 is a constant that would be estimated,

$\phi_{i,t}$ is a measure of the level of integration of country i at time t, $0 \le \phi_{i,t} \le 1$,

λ_{cov} is the price of the covariance risk that would be estimated,

$h_{i,w,t}$ is the conditional covariance of the monthly return of the stock market index of country i with the monthly return of the world index at time t,

λ_{var} is the price of own country variance risk that would be estimated (which we are restricting to be the same across all countries),

$h_{i,t}$ is the conditional variance of the monthly return of the stock market index of country i at time t, and

$e_{i,t}$ is the residual error term.

The independent variables in model (1) – conditional covariance $h_{i,w,t}$ and conditional variance $h_{i,t}$ – are separately estimated pair-wise for each country i and world pair from the multivariate ARCH model specified below:

$$
\begin{aligned}
r_{i,t} &= c_1 + \varepsilon_{i,t}, \\
r_{w,t} &= c_2 + \varepsilon_{w,t}, \\
h_{i,t} &= b_1 + a_1\left(\tfrac{1}{2}\varepsilon^2_{i,t-1} + \tfrac{1}{3}\varepsilon^2_{i,t-2} + \tfrac{1}{6}\varepsilon^2_{i,t-3}\right), \\
h_{w,t} &= b_2 + a_2\left(\tfrac{1}{2}\varepsilon^2_{w,t-1} + \tfrac{1}{3}\varepsilon^2_{w,t-2} + \tfrac{1}{6}\varepsilon^2_{w,t-3}\right), \\
h_{i,w,t} &= b_3 + a_3\left(\tfrac{1}{2}\varepsilon_{i,t-1}\varepsilon_{w,t-1} + \tfrac{1}{3}\varepsilon_{i,t-2}\varepsilon_{w,t-2} + \tfrac{1}{6}\varepsilon_{i,t-3}\varepsilon_{w,t-3}\right), \\
\varepsilon_{i,t}, \varepsilon_{w,t} &\sim \mathbf{N}\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix} h_{i,t} & h_{i,w,t} \\ h_{i,w,t} & h_{w,t}\end{bmatrix}\right).
\end{aligned}
\tag{2}
$$

where

$r_{w,t}$ is the dollar monthly return of the stock market index of the world at time t,

$\epsilon_{i,t-j}$ is the innovation in monthly return of the stock market index of country i at time t-j, $j \in \{0,1,2,3\}$,

$\epsilon_{w,t-j}$ is the innovation in monthly return of the stock market index of the world at time t-j, $j \in \{0,1,2,3\}$,and

$h_{w,t}$ is the conditional variance of the monthly return of the stock market index of the world at time t.

Model (2) was first introduced by Bollerslev, Engle, and Wooldrige (1988). As in Engle, Lilien,

and Robins (1987), the weights of the lagged residual vectors are taken to be ½, 1/3, and 1/6, respectively. The constants a_2 , b_2 , and c_2 are constrained to be identical for all country-world pairs. Maximum likelihood is used to estimate model (2).[15]

The other independent variable in model (1) – $\phi_{i,t}$ – measures the level of integration of country i at time t. We define it as follows:

$$\phi_{i,t} = \frac{\exp\left(\alpha_1\left(\frac{exports_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)}{1 + \exp\left(\alpha_1\left(\frac{exports_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)} \tag{3}$$

The definition of $\phi_{i,t}$ implies that it is a function of the ratio of the sum of exports and imports to gross domestic product. It is designed to take values between zero and one. When its value is zero, the country is not integrated with world equity markets, and its equity is exposed only to local risk (own variance). When its value is one, the country is fully integrated with world equity markets, and its equity is exposed only to global risk (covariance with world factor). Bekaert and Harvey (1997) find that increases in this ratio are empirically associated with increased importance of world factor relative to local risk factors.[16]

Model (1) is estimated using non-linear least squares. The regressions use data from our 55 countries from December 1969 to December 1998 (some countries do not have data for the full time period). The results are given in Panel A of Table III.

Panel A of Table III tells us that covariance risk seems to have a positive price (λ_{cov} is positive) and is statistically significant at the five percent level. It also tells us that though own country variance risk has a positive price(λ_{var} is positive), the estimates are significant only at the six percent level.

If the insider trading variables have no incremental effect on the cost of equity, then those variables will be orthogonal to the residuals from the model in (1).[17] We therefore test the hypothesis that the insider

trading variables do not affect the cost of equity by regressing the residuals from model (1) on the insider trading variables.[18] We use a panel time-series regression with country-fixed effects. We correct for country-specific heteroskedasticity and country-specific autocorrelation. The result from this test is given in Panel B1 of Table III.

Panel B1 in Table III tells us that the coefficient on "IT laws" is statistically insignificant. On the other hand, Panel B1 in Table III tells us that the "IT enforcement" dummy has a negative effect on the cost of equity. It is significant at the five percent level.

At this point we investigate whether our finding – the enforcement of insider trading laws is associated with a decrease in the cost of equity – is robust to the inclusion of other factors. The other factors that we control for are liquidity, the liberalization indicator, a foreign exchange factor, and a variable measuring other shareholder rights.[19]

We regress the residuals from model (1) against the insider trading enforcement variable, liquidity, the liberalization indicator, and a foreign exchange factor. We do not include the variable measuring other shareholder rights because it does not change over time. Since we are using a panel regression with country-fixed effects, a variable that does not change over time will have a value of zero by definition. However, we will account for this variable in the next regression. Panel B2 of Table III tells us that the coefficient on the insider trading enforcement variable factor continues to remain negative and significant at the five percent level after we control for the above factors.

If we annualize the coefficient on the insider trading enforcement variable factor from panel B2 in Table III, which is minus 0.0056, we find that the enforcement of insider trading is associated with a seven percent reduction in the cost of equity. This might appear to be unrealistically large. However, we need to keep in mind that the majority of the countries in our sample are emerging markets, and these have yearly returns ranging from -18 percent to 28 percent. With this respect, our estimate of the impact of enforcing insider trading laws on the cost of equity does not seem extreme.[20] Nevertheless, there may be a few reasons

why our estimate of seven percent may be too high. First, many emerging markets had their first enforcement in the 1990s, and they also had negative equity returns in the late 1990s. However, when we controlled for this by truncating our sample period at 1995, our estimate of seven percent was reduced by only 50 basis points. Second, as governments probably enforce insider trading laws when the cost of equity becomes too high, there is an endogeneity problem. We do not correct for this.

As argued before, we were not able to include the "shareholders' rights" variable because of country-fixed effects. However, we still would like to control for this variable. Therefore, we run the previous regression and add the "shareholders' rights" variable without demeaning it. This is not strictly speaking the correct way to do panel regressions with fixed effects. However, we argue that this is an approximate way to control for "shareholders' rights." Panel B3 of Table III tells us that the coefficient on the insider trading enforcement variable factor continues to remain negative and significant at the five percent level.

Interestingly, from both Panel B2 and Panel B3, the impact of liberalization on returns is observed to be economically more significant. This is consistent with the findings in Bekaert and Harvey (2000) and Henry (2000).

C. Using the Dividend-Yield

An approximate method to compute the cost of equity by backing it out from the classical constant growth dividend discount model is given in all finance textbooks. It turns out to be the sum of the forecast of the dividend yield and the forecast of the growth rate of dividends. Appendix A in Bekaert and Harvey (2000) explores in great detail the relationship between dividend yields and the cost of equity for more general models. The advantages of using dividend yields to measure cost of equity are many. Dividend yields are observable, stationary, and do not move much. A sharp change in cost of equity should lead to a sharp change in dividend yields. The disadvantage of using dividend yields is that changes in dividend yields may come about because of repurchases of stock, and may come about because of changes in growth opportunities. The first factor is not much of a problem in emerging markets because repurchases are minor.

The second factor, though a concern in the papers of Bekaert and Harvey (2000) and Henry (2000) who look at the effect of liberalization, may not be an issue in our paper. The reason is that changes in insider trading laws would only have, at most, a second-order effect on the growth opportunity of firms.

Define "k" as the cost of equity implied by the Gordon growth model. Assuming that the best forecast for future growth rates in dividends is the most current dividend growth rate, g, the cost of equity, k, is computed as the sum of the forecast of the dividend yield ((1+g) multiplied by current dividend yield) and the forecast of the growth rate of dividends, g. Using k as the dependent variable, we run a panel time-series regression with country-fixed effects. We correct for country-specific heteroskedasticity and country-specific autocorrelation. The regressions use data for the 38 countries for which we have dividend yield data from January 1973 to December 1998 (some countries do not have data for the full time period).

Table IV presents the results from this panel time-series regression. When "IT laws" is the independent variable, the coefficient on "IT laws" is negative and statistically insignificant. When "IT enforcement" is the independent variable, the coefficient on "IT enforcement" is negative and statistically significant at the five percent level. These conclusions do not change if we add the "liberalization" indicator as a control variable.

If we annualize the coefficient on the insider trading enforcement variable factor in Table IV, which is minus 0.0049, we find that the enforcement of insider trading is associated with a reduction in the cost of equity by about six percent per year. Note that we obtained a seven percent estimate when we used an explicit international asset pricing model in the previous section. As the previous methodology to estimate the cost of equity was different than the current methodology, we may conclude that our result is robust.

D. Using Country Credit Ratings

Erb, Harvey, and Viskanta (1996) found that country credit ratings are a very good proxy for ex-ante risk exposure, particularly of segmented emerging economies. Country credit ratings predict both expected returns and volatility. They argue that it might be better to use this risk measure since it is not directly

associated with the stock market. This approach has another advantage: as there are many more countries for which we have data on ratings than countries for which we have data on stock market returns, our sample size is roughly doubled from 55 to 97. The disadvantage of this approach is that it uses survey data as the independent variable, and survey data, where people do not put their money where their mouths are, may have their own biases.

We call the log of this country credit rating variable as "cr." Using "cr" as the dependent variable, we run a panel time-series regression with country-fixed effects. We correct for country-specific heteroskedasticity and country-specific autocorrelation. The regressions use data from our 97 countries from September 1979 to September 1998 (some countries do not have data for the full time period).

Table V presents the results from this panel time-series regression. When "IT laws" is the independent variable, the coefficient on "IT laws" is positive and statistically significant at the five percent level. When "IT enforcement" is the independent variable, the coefficient on "IT enforcement" is positive and statistically significant at the five percent level. When we add the "liberalization" indicator as a control variable, the coefficient on "IT laws" is no longer significant. On the other hand, the coefficient on "IT enforcement" continues to remain significant at the five percent level.

Table V also tells us that the enforcement of insider trading laws increases the log of a country's credit rating by 0.0257. As Exhibit 4 in Erb, Harvey, and Viskanta (1996) tells us that an increase of one in the log of a country's credit rating decreases the cost of equity by 10.47 percent, this implies that the enforcement of insider trading is associated with a reduction in the cost of equity by about 0.0257 X 10.4 percent , that is about 30 basis points per year. This may not seem large, but one must remember two points. First, country credit ratings, unlike country equity returns, do not move much. The standard deviation of country credit ratings for the typical country is only one and a half points. Second, the above computation assumes that insider trading enforcement affects the cost of equity only through credit ratings, which is a conservative assumption.

E. Robustness Checks

The tests we ran under our four different approaches to estimating the cost of equity were panel time-series regressions. As these tests assume that the returns or risk-adjusted returns or dividend yields or credit ratings across countries are independent draws, they may overstate the statistical significance of the estimated coefficient on the "IT enforcement" variable. The Fama-MacBeth (1973) procedure, on the other hand, does not require the assumption of independence. This procedure runs each regression cross-sectionally for each month, and then aggregates the individual coefficients across the months.[21] Significance of the aggregated coefficients is obtained by a simple t-test. A particular disadvantage of the Fama-Macbeth procedure in our case is that as we have a number of missing emerging market variables, especially in the early years, we cannot do cross-sectional regressions for those years. This reduction in power is particularly acute when we use dividend yields.

The results are given in Table VI, which is a useful summary of the main results of the paper. The column under "Panel regressions" reproduces the coefficient and p-value of the IT enforcement dummy from our previous tables. The column under "Fama-MacBeth regressions" gives the coefficient and p-value of the IT enforcement dummy from the corresponding Fama-MacBeth cross-sectional regressions. Notice that, with the exception of the dividend yield regressions, the p-values are broadly similar. The reason for the lack of significance of the coefficient in the dividend yield Fama-MacBeth regression is because we have less time periods with non-missing dividend yields data than we have for returns.

The second robustness check we carried out was to check for outliers in all our tests. Removing these did not affect our p-values significantly.

IV. Concluding Remarks

Though the debate about the pros and cons of allowing insider trading in stock markets has been quite contentious in the law, economics, and finance literature, it seems that from the point of view of actual practice, the debate seems to have been settled. In a comprehensive survey of insider trading regulations in

every country that had a stock market at the end of 1998, this paper finds that all of the 22 developed countries, and four out of five of the 81 emerging markets, had insider trading laws in their books.

The enforcement of these laws, however, has been spotty. We find that there has been a prosecution in only one out of three countries. Developed countries have a better record of prosecution than emerging markets (82 percent of developed countries, and 25 percent of emerging markets have had prosecutions.)

The paper then goes on to show that the easy part – the establishment of insider trading laws – is not associated with a reduction in the cost of equity. It is the difficult part – the enforcement of insider trading laws – that is associated with a reduction in the cost of equity in a country.

Two qualifications are in order. First, as governments probably enforce insider trading laws when the cost of equity becomes too high, there is an endogeneity problem. We do not correct for this. This implies that our estimates of the reduction in equity associated with an enforcement of insider trading laws may be too high. Second, though we find that there is a statistically and economically significant drop in the cost of equity after the first insider trading enforcement action, we are reluctant to attribute causality. The reason for our reluctance to attribute causality is our finding that the first insider trading enforcement action is also related to an increase in country credit ratings. As there is no reason to suspect that these two variables are directly linked, we believe that these two variables are correlated with an unobservable causal variable – the attractiveness of the stock market to outside investors. Though we controlled for liberalization and controlled for other shareholder rights that have been used in the literature, and still obtained significance for our insider trading enforcement variable, we would not like to overemphasize our point estimates.

Appendix
Description of Data Used

(1) Country	(2) Indices of Stock Markets (Monthly) (Sample Period)	(3) Market Capitalization of Main Exchange (Monthly) (Sample Period)	(4) Dollar Volume in Main Exchange (Monthly) (Sample Period)	(5) Dividend Yield (Monthly) (Sample Period)	(6) GDP of Country (Quarterly or Annual) (Sample Period)	(7) Exports of Country (Monthly) (Sample Period)	(8) Imports of Country (Monthly) (Sample Period)	(9) Exchange Rate (Monthly) (Sample Period)	(10) Country Credit Rating (Bi-annual) (Sample Period)
Developed Countries									
Australia	12/69-12/98	1/73-12/98	1/84-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Austria	12/69-12/98	1/73-12/98	8/86-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Belgium	12/69-12/98	1/73-12/98	1/86-12/98	1/73-12/98	69Y-98Y	1/93-12/98	1/93-12/98	12/69-12/98	9/79-9/98
Canada	12/69-12/98	1/73-12/98	1/73-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Denmark	12/69-12/98	1/73-12/98	4/88-12/98	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Finland	12/87-12/98	3/88-12/98	NA	3/88-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
France	12/69-12/98	1/73-12/98	6/88-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Germany	12/69-12/98	1/73-12/98	6/88-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Hong Kong	12/69-12/98	1/73-12/98	6/88-12/98	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Ireland	12/87-12/98	1/73-12/98	NA	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Italy	12/69-12/98	1/73-12/98	7/86-12/98	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Japan	12/69-12/98	1/73-12/98	1/90-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Luxembourg	12/87-12/98	1/73-12/98	NA	NA	69Y-98Y	1/71-12/98	1/71-12/98	12/69-12/98	9/91-9/98
Netherlands	12/69-12/98	1/73-12/98	2/86-12/98	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
New Zealand	12/87-12/98	1/88-12/98	1/90-12/98	1/88-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Norway	12/69-12/98	1/80-12/98	1/80-12/98	1/80-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Singapore	12/69-12/98	1/73-12/98	1/83-12/98	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Spain	12/69-12/98	3/87-12/98	2/90-12/98	3/87-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Sweden	12/69-12/98	1/82-12/98	1/82-12/98	1/82-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Switzerland	12/69-12/98	1/73-12/98	1/89-12/98	1/73-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
United Kingdom	12/69-12/98	1/70-12/98	10/86-12/98	1/70-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
United States	12/69-12/98	1/73-12/98	1/73-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Emerging Markets									
Argentina	12/75-12/98	1/88-12/98	8/93-12/98	8/93-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Brazil	12/75-12/98	7/94-12/98	NA	7/94-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Chile	12/75-12/98	7/89-12/98	7/89-12/98	7/89-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
China	12/92-12/98	8/91-12/98	8/91-12/98	3/94-12/98	79Y-98Y	1/77-12/98	1/77-12/98	12/69-12/98	9/79-9/98
Colombia	12/84-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Czech Republic	12/93-12/98	NA	NA	NA	93Y-98Y	1/93-12/98	1/93-12/98	1/93-12/98	3/93-9/98
Egypt	12/94-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	8/90-12/98	12/69-12/98	9/79-9/98
Greece	12/75-12/98	1/88-12/98	1/88-12/98	1/90-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Hungary	12/92-12/98	NA	NA	NA	70Y-98Y	1/76-12/98	1/76-12/98	12/69-12/98	9/79-9/98
India	12/75-12/98	1/90-12/98	1/95-12/98	1/90-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Indonesia	12/89-12/98	4/90-12/98	4/90-12/95	4/90-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Israel	12/96-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Jordan	12/78-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Malaysia	12/84-12/98	1/86-12/98	1/86-12/98	1/86-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Mexico	12/75-12/98	1/88-12/98	1/88-12/98	5/89-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Morocco	12/95-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Nigeria	12/84-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Pakistan	12/84-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Peru	12/92-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Philippines	12/84-12/98	9/87-12/98	1/90-12/98	11/88-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Poland	12/92-12/98	3/94-12/98	3/94-12/98	3/94-12/98	79Y-98Y	12/69-12/98	1/86-12/98	12/69-12/98	9/79-9/98
Portugal	1/86-12/98	1/90-12/98	1/90-12/98	1/90-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Russia	12/95-12/98	NA	NA	NA	90Y-98Y	1/92-12/98	1/92-12/98	6/92-12/98	9/92-9/98
Saudi Arabia	12/97-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Slovakia	12/95-12/98	NA	NA	NA	93Y-98Y	1/93-12/98	1/93-12/98	1/93-12/98	3/93-9/98
South Africa	12/92-12/98	1/73-12/98	1/90-12/98	1/73-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
South Korea	12/75-12/98	9/87-12/98	9/87-12/98	9/87-12/98	69Q4-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Sri Lanka	12/92-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/82-9/98
Taiwan	12/84-12/98	9/87-12/98	4/91-12/98	5/88-12/98	69Q4-98Q4	1/88-12/98	1/88-12/98	12/93-12/98	9/79-9/98
Thailand	12/75-12/98	1/87-12/98	1/87-12/98	1/87-12/98	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Turkey	12/86-12/98	1/88-12/98	1/88-12/98	6/89-12/98	87Q1-98Q4	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Venezuela	12/84-12/98	NA	NA	NA	69Y-98Y	12/69-12/98	12/69-12/98	12/69-12/98	9/79-9/98
Zimbabwe	12/75-12/98	NA	NA	NA	69Y-98Y	1/78-12/98	1/78-12/98	12/69-12/98	9/79-9/98

Notes:

(1) Data on monthly stock market indices for the 22 developed countries were obtained from Morgan Stanley Capital Market International (MSCI). Data on monthly stock market indices for the 33 emerging markets were obtained from the International Financial Corporation (IFC). The sample periods are given in Column 2.
(2) Data on monthly market capitalization, dollar volume, and monthly dividend yields were obtained from Datastream. The sample periods are given in Columns 3,4, and 5.
(3) Data on quarterly/annual GDP, monthly exports, monthly imports, and monthly foreign exchange rates were from the International Financial Statistics of the International Monetary Fund. The statistics for Taiwan come from Datastream. The sample periods are given in Columns 6, 7, 8, and 9.
(4) Data on 55 bi-annual country credit ratings is obtained from the website of Harvey (http://www.duke.edu/~charvey). The sample periods are given in Column 10. Harvey has data on 42 more emerging markets, and we use these as well.

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Table I
Stock Markets Around the World

(1) Country	(2) Establishment of Main Exchange	(3) Company Listings in in Main Exchange (end-1997)	(4) Market Capitalization of Main Exchange (USD billion in end-1997)	(5) Dollar Volume in Main Exchange (USD billion in 1997)	(6) Turnover in Main Exchange	(7) IT Laws Existence	(8) IT Laws Enforcement	(9) Index of Shareholder Rights	(10) Official Liberalization Date
Developed Countries									
Australia	1859	1216	295	150	0.51	1991	1996	4	Before 12/69
Austria	1771	109	37.3	12.412	0.33	1993	No	2	Before 12/69
Belgium	1801	141	138.9	28.9	0.21	1990	1994	0	Before 12/69
Canada	1878	1420	568	304	0.54	1966	1976	4	Before 12/69
Denmark	1919	237	93.76	37.4	0.40	1991	1996	3	Before 12/69
Finland	1912	127	73.3	34.55	0.47	1989	1993	2	Before 12/69
France	1826	717	676.3	394.9	0.58	1967	1975	2	Before 12/69
Germany	1585	1461	825.2	1966.4	2.38	1994	1995	1	Before 12/69
Hong Kong	1891	658	413.3	489	1.18	1991	1994	5	Before 12/69
Ireland	1793	69	52.97	32.36	0.61	1990	No	3	Before 12/69
Italy	1808	209	344.67	193.89	0.56	1991	1996	0	Before 12/69
Japan	1878	1805	2160.58	834.45	0.39	1988	1990	4	Dec 80
Luxembourg	1929	62	33.89	0.56	0.02	1991	No		Before 12/69
Netherlands	1600's	434	468.896	256.581	0.55	1989	1994	2	Before 12/69
New Zealand	1870	146	29.889	9.29	0.31	1988	No	4	Jul 84
Norway	1819	196	66.5	46.27	0.70	1985	1990	3	Before 12/69
Singapore	1930	294	106.317	74.137	0.70	1973	1978	4	Before 12/69
Spain	1831	133	290.383	424.086	1.46	1994	1998	2	Jan 78
Sweden	1863	261	264.711	164.623	0.62	1971	1990	2	Before 12/69
Switzerland	1938	216	575.339	468.462	0.81	1988	1995	1	Before 12/69
United Kingdom	1773	2157	1996.225	833.194	0.42	1980	1981	4	Before 12/69
United States	1792	2691	8879.631	5777.6	0.65	1934	1961	5	Before 12/69
Emerging Markets									
Argentina	1854	107	59.2	37.8	0.64	1991	1995	4	Nov 89
Armenia	1993	59	0.0131	0.0028	0.21	1993	No		
Bahrain	1987	42	20.783	1.272	0.06	1990	No		
Bangladesh	1954	219	1.5	3.8	2.53	1995	1998		
Barbados	1987	18	1.14	0.0233	0.02	1987	No		
Bermuda	1971	33	47	0.0964	0.00	No	No		
Bolivia	1979	11	0.337	0.004	0.01	No	No		
Botswana	1989	12	0.613	0.0565	0.09	No	No		
Brazil	1890	536	255.4	191.1	0.75	1976	1978	4	May 91
Bulgaria	1991	285	0.388 (1998)	0.1268 (1998)	0.33	No	No		
Chile	1893	92	72	7.328	0.10	1981	1996	4	Jan 92
China	1990	383	111.4	166.7	1.50	1993	No		
Colombia	1928	318	16.2	1.67	0.10	1990	No	1	Feb 91
Costa Rica	1976	114	0.8199	0.018	0.02	1990	No		
Croatia	1918	82	4.265	0.2427	0.06	1995	No		
Cyprus	1996	49	2.7	0.35	0.13	1999	No		
Czech Republic	1871	300	14.36	21.54	1.50	1992	1993		
Ecuador	1969	128	2.02	62.6	30.99	1993	No	2	
Egypt	1890	650	20.9	7.12	0.34	1992	No	2	
El Salvador	1992	29	0.501	5.545	11.07	No	No		
Estonia	1996	22	1.09	1.52	1.39	1996	No		
Ghana	1989	21	1.135	0.1256	0.11	1993	No		
Greece	1876	207	33.8	20	0.59	1988	1996	2	Dec 87
Guatemala	1986	5	0.002	NA	NA	1996	No		
Honduras	1992	120	0.4477	0.348	0.78	1988	No		
Hungary	1864	49	15	33	2.20	1994	1995		
Iceland	1985	49	73.3	93.24	1.27	1989	No		
India	1875	5843	127.72	49.9	0.39	1992	1998	2	Nov 92
Indonesia	1912	282	29.05	21.87	0.75	1991	1996	2	Sep 89
Iran	1966	263	11.468	0.915	0.08	No	No		
Israel	1953	659	44.37	13.58	0.31	1981	1989	3	
Jamaica	1961	49	2.29	0.132	0.06	1993	No		
Jordan	1978	139	5.45	0.5	0.09	No	No	1	Dec 95
Kazakhstan	1997	13	1.335	0.002	0.00	1996	No		
Kenya	1954	50	1.9	0.1	0.05	1989	No	3	
Kuwait	1984	65	25.88	NA	NA	No	No		
Latvia	1993	50	0.338	0.083	0.25	No	No		
Lebanon	1920	113	2.904	0.639	0.22	1995	No		
Lithuania	1926	607	2.5	0.36	0.14	1996	No		
Macedonia	1996	2	0.0086	0.0252	2.93	1997	No		
Malawi	1996	3	NA	NA	NA	No	No		
Malaysia	1973	708	93.18	101.3	1.09	1973	1996	3	Dec 88
Malta	1992	8	5	0.0205	0.00	1990	No		
Mauritius	1988	45	0.224	0.018	0.08	1988	No		
Mexico	1894	155	156.2	52.8	0.34	1975	No	0	May 89
Moldova	1994	NA	NA	NA	NA	1995	No		
Mongolia	1991	433	0.054	0.015	0.28	1994	No		
Morocco	1929	49	12.23	3.33	0.27	1993	No		
Namibia	1992	33	31.85	0.185	0.01	No	No		
Nigeria	1960	182	3.67	0.147	0.04	1979	No	3	Aug 95
Oman	1988	119	8.738	4.196	0.48	1989	1999		
Pakistan	1947	781	13.1	11.469	0.88	1995	No	5	Feb 91
Palestine	1995	19	0.503	0.0252	0.05	No	No		
Panama	1990	21	2.246	0.055	0.02	1996	No		
Paraguay	1977	64	0.383	0.091	0.24	1999	No		

Peru	1951	293	17.38	4.295	0.25	1991	1994	3	
Philippines	1927	221	31.211	20.35	0.65	1982	No	4	June 91
Poland	1817	137	12.134	7.455	0.61	1991	1993		
Portugal	1825	159	39.3	20.14	0.51	1986	No	2	July 86
Romania	1882	84	0.633	0.26	0.41	1995	No		
Russia	1994	149	71.592	16.634	0.23	1996	No		
Saudi Arabia	1984	70	59.37	16.55	0.28	1990	No		
Slovakia	1991	14	5.29	2.37	0.45	1992	No		
Slovenia	1924	86	1.99	0.32	0.16	1994	1998		
South Africa	1887	615	211.599	38.71	0.18	1989	No	4	
South Korea	1956	776	41.88	95.73	2.29	1976	1988	3	Jan 92
Sri Lanka	1896	239	2.09	0.297	0.14	1987	1996	2	
Swaziland	1990	4	0.13	0.357	2.75	No	No		
Taiwan	1961	404	296.808	1290.92	4.35	1988	1989	3	Jan 91
Tanzania	1998	2	0.236	0.0003	0.00127	1994	No		
Thailand	1974	431	22.792	24.421	1.07	1984	1993	3	Sep 87
Trinidad and Tobago	1981	26	1.74	0.135	0.08	1981	No		
Tunisia	1969	304	2.3	0.2	0.09	1994	No		
Turkey	1866	258	61.095	58.104	0.95	1981	1996	2	Aug 89
Ukraine	1992	6	0.212	NA	NA	No	No		
Uruguay	1867	18	0.211	0.004	0.02	1996	No	2	
Uzbekistan	1994	63	0.041	0.028	0.68	No	No		
Venezuela	1840	159	14.6	3.923	0.27	1998	No	1	Jan 90
Yugoslavia	1894	21	0.048	NA	NA	1997	No		
Zambia	1994	10	0.502	0.008	0.02	1993	No		
Zimbabwe	1896	67	2.32	0.35	0.15	No	No	3	Jun 93
Descriptive Statistics:									
Median for Entire Sample	1953	128	14.8	4.92	0.34	1991	1994		
Median for Developed Countries	1859	249	292.6915	179.2565	0.55	1989	1993.5		
Median for Emerging Markets	1973	85	3.9675	0.777	0.25	1992	1995.5		
Range for Entire Sample	1585 to	2 to	0.002 to	0.0003 to	0.00127 to	1934 to	1961 to		
	1998	5843	8879.631	5777.6	30.99	1999	1999		
Range for Developed Countries	1585 to	62 to	29.889 to	0.56 to	0.0165 to	1934 to	1961 to		
	1938	2691	8879.631	5777.6	2.3829	1994	1998		
Range for Emerging Markets	1817 to	2 to	0.002 to	0.0003 to	0.00127 to	1973 to	1978 to		
	1998	5843	296.808	191.1	30.99	1999	1999		
Entire Sample(Today)						87 (84.5%)	38(36.9%)		
Developed Countries(Today)						22(100%)	18(81.8%)		
Emerging Markets (Today)						65(80.2%)	20(24.7%)		
Entire Sample(Pre 1990s)						34(43%)	9(11.4%)		
Developed Countries(Pre 1990s)						12(54.5%)	5(22.7%)		
Emerging Markets (Pre 1900s)						22(38.6%)	4(7%)		

Notes:

(1) Stock markets of 103 countries had web sites. We assumed this to be the universe of all countries that had stock markets. The list is given in Column 1.
(2) The numbers in Columns 2 and 3 are from *The Handbook of Stock, Derivative and Commodity Exchanges*, 1998 (International Financial Publications, London, U.K.). If not available, the source was the web site of the stock exchange.
(3) The numbers in Column 4 are from FIBV, International Federation of Stock Exchanges (http://www.fibv.com). Whenever they were not available, the source was *The Handbook of Stock, Derivative and Commodity Exchanges*, 1998 (International Financial Publications, London, U.K.). All local currency units were converted to USD by using the appropriate exchange rate on 12/31/97. This exchange rate came from the Currency Converter available in http://www.oanda.com/converter/classic.
(4) The numbers in Column 5 are from *The Handbook of Stock, Derivative and Commodity Exchanges*, 1998 (International Financial Publications. London, U.K.). They have been reconciled with the figures obtained from FIBV, International Federation of Stock Exchanges (http://www.fibv.com). All local currency units were converted to USD by using the appropriate exchange rate on 12/31/97. This exchange rate came from the Currency Converter available in http://www.oanda.com/converter/classic.
(5) Turnover in Column 6 is defined as Dollar Volume divided by Market Capitalization.
(6) The numbers in Columns 7 and 8 came from the answers given to two questions we sent to all the national regulators and officials of stock markets of the world in March 1999. The two questions were: 1) When (mm/yy), if at all, were insider trading laws established in your exchange? 2) If answer to 1) above is YES, when (mm/yy), if at all, was the first prosecution under these laws? Wherever possible, the answers were cross-checked with the following books in our law library: Posen, Norman, 1991, *International Securities Regulation* (Little, Brown and Company, Boston); and Stamp, Mark, and Carson Welsh eds., 1996, *International Insider Dealing* (FT Law and Tax, Biddles Limited, Guildford, U.K.).
(7) The index measuring shareholder rights in Column 9 is obtained by adding one when: (a) there is one share-one vote rule; (b) the country allows shareholders to mail their proxy vote to the firm; (c) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (d) cumulative voting or proportional representation of minorities in the board of directors is allowed; (e) an oppressed minorities mechanism is in place; and (f) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median). The index ranges from 0 to 6. This data is obtained from Table 2 in La Porta et al. (1998).
(8) The official liberalization dates in Column 10 come from Table I in Bekaert and Harvey (2000). We assume that all the developed countries were liberalized before our sample period, except for Japan (December 1980), New Zealand (July 1984) and Spain (January 1978). The liberalization dates of these three countries were identified by a Lexis/Nexis search as in Henry (2000).

Table II
Effect of Insider Trading Laws on Liquidity and Raw Returns

The panel regressions with country fixed-effects are based on monthly data. The first dependent variable is "liq," and it is the natural logarithm of the ratio of volume to market capitalization. The second dependent variable is "rawret." It is defined as follows. "Rawret" is raw returns, and is computed as continuously compounded returns. The first two independent variables are the insider trading variables. They are coded as follows. The indicator variable "IT laws" changes from zero to one in the year after the insider trading laws are instituted. The indicator variable "IT enforcement" changes from zero to one in the year after the first prosecution was recorded. The third independent variable is the liberalization variable. It is coded as follows. The indicator variable "liberalization" changes from zero to one in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). It is assumed to be one for all developed countries, except for the three noted in Table I. The equity data for developed countries are from Morgan Stanley Capital International, and the equity data for emerging markets are from International Financial Corporation. The p-values are in parentheses. We correct for country-specific heteroskedasticity and country-specific autocorrelation.

Panel A: Liquidity

Dependent Variable	Liq			
Independent Variables	(1a)	(2a)	(3a)	(4a)
IT laws	0.2568		0.2879	
	(0.0000)		(0.0000)	
IT enforcement		0.4276		0.4385
		(0.0000)		(0.0000)
Liberalization			-0.0104	0.0141
			(0.6785)	(0.5745)

Panel B: Raw Returns

Dependent Variable	Rawret			
Independent Variables	(1b)	(2b)	(3b)	(4b)
IT laws	-0.0043		-0.0027	
	(0.0805)		(0.2611)	
IT enforcement		-0.0082		-0.0063
		(0.0074)		(0.0345)
Liberalization			-0.0041	-0.0039
			(0.2405)	(0.2421)

Table III
Effect of Insider Trading Laws on the Cost of Equity
(Using an International Asset Pricing Model)

Panel A: Adjusting for Risk

The panel regressions are based on monthly data from 1969:12 through 1998:12. The p-values are in brackets. The international asset pricing model used is

$$\left(r_{i,t} - r_{f,t}\right) = \alpha_0 + \phi_{i,t}\lambda_{\text{cov}} h_{i,w,t} + \left(1-\phi_{i,t}\right)\lambda_{\text{var}} h_{i,t} + e_{i,t} \tag{A1}$$

where the measure of integration of country i at time t, $\Phi_{i,t}$, is defined as follows:

$$\phi_{i,t} = \frac{\exp\left(\alpha_1\left(\frac{exports_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)}{1+\exp\left(\alpha_1\left(\frac{exports_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)} \tag{A2}$$

and λ_{cov} is the price of the covariance risk with the world, and λ_{var} is the price of own country variance risk. The independent variables are the conditional covariances and variances, $h_{i,w,t}$ and $h_{i,t}$, respectively, and these are obtained from the multivariate ARCH model below:

$$\begin{aligned}
r_{i,t} &= c_1 + \varepsilon_{i,t},\\
r_{w,t} &= c_2 + \varepsilon_{w,t},\\
h_{i,t} &= b_1 + a_1\left(\tfrac{1}{2}\varepsilon^2_{i,t-1} + \tfrac{1}{3}\varepsilon^2_{i,t-2} + \tfrac{1}{6}\varepsilon^2_{i,t-3}\right),\\
h_{w,t} &= b_2 + a_2\left(\tfrac{1}{2}\varepsilon^2_{w,t-1} + \tfrac{1}{3}\varepsilon^2_{w,t-2} + \tfrac{1}{6}\varepsilon^2_{w,t-3}\right),\\
h_{i,w,t} &= b_3 + a_3\left(\tfrac{1}{2}\varepsilon_{i,t-1}\varepsilon_{w,t-1} + \tfrac{1}{3}\varepsilon_{i,t-2}\varepsilon_{w,t-2} + \tfrac{1}{6}\varepsilon_{i,t-3}\varepsilon_{w,t-3}\right),\\
\varepsilon_{i,t}, \varepsilon_{w,t} &\sim N\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix}h_{i,t} & h_{i,w,t}\\ h_{i,w,t} & h_{w,t}\end{bmatrix}\right).
\end{aligned} \tag{A3}$$

where
$\epsilon_{i,\,t-j}$ is the innovation in monthly return of the stock market index of country i at time t-j, $j \in \{0,1,2,3\}$, and $\epsilon_{w,\,t-j}$ is the innovation in monthly return of the stock market index of the world at time t-j, $j \in \{0,1,2\}$

Parameter	Coefficient	p-value
α_0	0.0011	0.5534
α_1	15.6094	0.0283
λ_{cov}	2.2157	0.0471
λ_{var}	2.3984	0.0615

Panel B: Effect on Residuals

The panel regressions with country-fixed effects are based on monthly data from 1969:12 through 1998:12. The dependent variable is the residual, e_{it}, from the international asset pricing model estimated in Panel A. The independent variables are as follows. The indicator variable "IT laws" for existence changed from zero to one in the year after the insider trading laws were instituted. The indicator variable "IT enforcement" for enforcement changed from zero to one in the year after the first prosecution was recorded. The indicator variable "liberalization" changes from zero to one in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). It is assumed to be one for all developed countries, except for the three noted in Table I. The liquidity variable is the natural logarithm of the ratio of volume to market capitalization. The shareholders' rights variable is computed from Table 2 in La Porta et al. (1998). The last independent variable is the foreign exchange variable. It is defined as $h_{i,ifx,\,t}$, which is the conditional covariance of the return of the stock market index with the depreciation of the i^{th} foreign currency with respect to the dollar at time t. We estimate this conditional covariance variable from the multivariate ARCH model below.

$$
\begin{aligned}
r_{i,t} &= f_1 + \varepsilon_{i,t}, \\
r_{ifx,t} &= f_2 + \varepsilon_{ifx,t}, \\
h_{i,t} &= e_1 + d_1\left(\tfrac{1}{2}\varepsilon^2_{i,t-1} + \tfrac{1}{3}\varepsilon^2_{i,t-2} + \tfrac{1}{6}\varepsilon^2_{i,t-3}\right), \\
h_{ifx,t} &= e_2 + d_2\left(\tfrac{1}{2}\varepsilon^2_{ifx,t-1} + \tfrac{1}{3}\varepsilon^2_{ifx,t-2} + \tfrac{1}{6}\varepsilon^2_{ifx,t-3}\right), \\
h_{i,ifx,t} &= e_3 + d_3\left(\tfrac{1}{2}\varepsilon_{i,t-1}\varepsilon_{ifx,t-1} + \tfrac{1}{3}\varepsilon_{i,t-2}\varepsilon_{ifx,t-2} + \tfrac{1}{6}\varepsilon_{i,t-3}\varepsilon_{ifx,t-3}\right), \\
\varepsilon_{i,t}, \varepsilon_{ifx,t} &\sim N\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix} h_{i,t} & h_{i,ifx,t} \\ h_{i,ifx,t} & h_{ifx,t}\end{bmatrix}\right).
\end{aligned}
\tag{A4}
$$

where

$\epsilon_{i,\,t-j}$ is the innovation in monthly return of the stock market index of country i at time t-j, $j \in \{0,1,2,3\}$, and $\epsilon_{ifx,\,t-j}$ is the innovation in monthly depreciation of the i^{th} foreign currency with respect to the dollar at time t-j, $j \in \{0,1,2,3\}$.

We correct for country-specific heteroskedasticity and country-specific autocorrelation.

Panel B1: Effect on Residuals (Risk adjusted)

Dependent Variable	Residual from Risk Adjustment Model	
Independent Variable	Coefficient	p-value
IT laws	-0.0021	0.4038
IT enforcement	-0.0082	0.0135

Panel B2: Effect on Residuals (Risk, Foreign Exchange Factor, Liquidity Factor, and Liberalization Adjusted)

Dependent Variable	Residual from Risk Adjustment Model	
Independent Variables	Coefficient	p-value
Foreign exchange, $h_{i,ifx,\,t}$	7.2922	0.0003
Liquidity	0.0047	0.0001
Liberalization	-0.0063	0.0987
IT enforcement	-0.0056	0.0361

Panel B3: Effect on Residuals (Risk, Foreign Exchange Factor, Liquidity Factor, Shareholder Rights, and Liberalizations Adjusted)

Dependent Variable	Residual from Risk Adjustment Model	
Independent Variables	Coefficient	p-value
Foreign exchange, $h_{i,ifx,\,t}$	7.2639	0.0003
Liquidity	0.0048	0.0000
Shareholders' rights	0.0003	0.3124
Liberalization	-0.0077	0.0587
IT enforcement	-0.0064	0.0218

Table IV
Effect of Insider Trading Laws on the Cost of Equity
(Using Dividend Yields)

The panel regressions with country-fixed effects are based on monthly data from 1973:01 through 1998:12. The dependent variable is k, the cost of equity. It is defined as follows. It is computed as the sum of the dividend yield forecast and the growth rate of the dividend. The independent variables are the insider trading and liberalization variables. They are coded as follows. The indicator variable "IT laws" changes from zero to one in the year after the insider trading laws are instituted. The indicator variable "IT enforcement" changes from zero to one in the year after the first prosecution was recorded. The indicator variable "liberalization" changes from zero to one in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). It is assumed to be one for all developed countries, except for the three countries noted in Table I. The equity data for developed countries are from Morgan Stanley Capital International, and the equity data for emerging markets are from International Financial Corporation. The p-values are in parentheses. We correct for country-specific heteroskedasticity and country-specific autocorrelation.

Dependent Variable	k, the cost of equity			
Independent Variables	(1)	(2)	(3)	(4)
IT laws	-0.0023		-0.0017	
	(0.2995)		(0.4489)	
IT enforcement		-0.0052		-0.0049
		(0.0449)		(0.0401)
Liberalization			-0.0024	-0.0019
			(0.5626)	(0.6224)

Table V
Effect of Insider Trading Laws on Country Credit Rating

The panel regressions with country-fixed effects are based on bi-annual data from 1979:2 through1998:2. The dependent variable is "cr," which represents the natural log of a country credit rating. Country credit ratings come from Institutional Investor's semi-annual survey of bankers. The survey represents the responses of 75 to 100 bankers. Respondents rate each country on a scale of 0 to 100. The independent variables are the insider trading and liberalization variables, which are coded as follows. The indicator variable "IT laws" for existence changed from zero to one in the year after the insider trading laws were instituted. The indicator variable "IT enforcement" for enforcement changed from zero to one in the year after the first prosecution was recorded. The indicator variable "liberalization" changes from zero to one in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). It is assumed to be one for all developed countries, except for the three countries noted in Table I. The p-values are in parentheses. We correct for country-specific heteroskedasticity and country-specific autocorrelation.

Dependent Variable	Cr			
Independent Variables	(1)	(2)	(3)	(4)
IT laws	0.0788		-0.0018	
	(0.0000)		(0.8967)	
IT enforcement		0.1056		0.0257
		(0.0000)		(0.0329)
Liberalization			0.0466	0.0408
			(0.0449)	(0.0730)

Table VI
Effect of Insider Trading Enforcement - A Summary

The column under "Panel regressions" reproduces the coefficient and p-value of the IT enforcement dummy from our previous tables. The column under "Fama-MacBeth regressions" gives the coefficient and p-value of the IT enforcement dummy from the corresponding Fama-MacBeth cross-sectional regressions. The Fama-MacBeth procedure runs each regression cross-sectionally for each month, and then aggregates the individual coefficients across the months. Significance of the aggregated coefficients is obtained by a simple t-test. The Fama-MacBeth regressions for our international asset pricing model are, however, slightly different. Here we use estimates – conditional covariances and conditional variances – and these are computed from (3). We use a linear model. We incorporate the "IT enforcement" dummy as well as all the other controls directly into the linear regression.

Dependent variable	Coefficient of the IT enforcement dummy (p-value)	
	Panel regressions	Fama-MacBeth regressions
Liquidity (Table II, Panel A)	0.4385 (0.0000)	0.5707 (0.0000)
Raw returns (Table II, Panel B)	-0.0063 (0.0345)	-0.0030 (0.1797)
Risk-adjusted return (Table III, Panel B3)	-0.0056 (0.0361)	-0.0053 (0.0287)
Adjusted dividend yield (Table IV)	-0.0049 (0.0401)	-0.0012 (0.5076)
Credit rating (Table V)	0.0257 (0.0329)	0.1686 (0.0000)

1 See Glosten and Milgrom (1985) and Kyle (1985) for formal models.

2 See Amihud and Mendelson (1986) for a formal model on why this should happen for riskless assets. Jacoby, Fowler, and Gottesman (2000), and Easley, Hvidkjaer, and O'Hara (2000) extend this to risky assets. Brennan and Subrahmanyam (1996) provide convincing empirical evidence.

3 See Maug (1999) for a model formalizing this perspective. Beny (1999) provides some empirical evidence.

4 The first prosecution for insider trading occurred in the United States under state law as early as 1903 (Oliver v. Oliver, 45 S.E. 232 Georgia, 1903).

5 There is also a fifth approach: estimating liquidity and cost of capital at the level of the firm. This approach has been used by Errunza and Miller (2000) and Jain (2001). Unfortunately, we did not have access to this data.

6 The Yahoo web site (http://dir.yahoo.com/Business_and_Economy/Finance_and_Investment/ Exchanges/ Stock_Exchanges) gives a comprehensive list of stock markets of the world. So does the web site of the International Federation of Stock Exchanges (http://www.fibv.com). The third source is a list compiled by Ken Loder of Seattle University (http://www2.jun.alaska.edu/~jfdja/common/markq.html).

7 Portugal is a developed country in the MSCI database, whereas it is an emerging market in the IFC database.

8 The e-mail and postal addresses of the stock markets, as well as their facsimile numbers, were obtained from their respective web sites. The e-mail and postal addresses of the national regulators, as well as their facsimile numbers, were obtained from the membership list of the International Organization of Securities Commissions (IOSCO) (http://www.iosco.org/iosco.html). Some countries did not have national regulators.

9 We had historical data on all prosecutions for only three countries. This allowed us to use a panel time series regression for these three countries to check the importance of the first prosecution. The regressions use adjusted dividend yields as proxies for the cost of capital, and these are the dependent variables. The regressions are conducted with country-fixed effects and corrections for cohort heteroskedasticity and cohort autocorrelation. First, the regression is run with respect to the first prosecution. The analysis is replicated for the second prosecution. The estimated impact of the first prosecution on the cost of equity for the three countries is a decrease of 2.9 percent (not statistically significant). The estimated impact using the second prosecution is also negative. However, the impact of the first prosecution is around 25 percent more than the impact of the second prosecution.

10 In a previous version of this paper, we ran all our tests using the MSCI database for both developed as well as emerging markets. As the results are similar, we do not report it in this paper.

11 The MSCI World Index is actually an index of only developed countries. It begins in December 1969. In principle, we should have used the MSCI All-Country World Index, but since this begins only from December 1987 and has a correlation of 0.996767 with the developed country index, it is better to use the developed country index in practice. The results in this paper are with respect to this developed country index. We ran all our tests using the AC World Index as well. As all the results are similar, we do not report them in this paper.

12 In 1961,the Securities and Exchange Commission of the Unites States had an enforcement action against Cady, Roberts and Company. The case involved tipping: an insider (the tipper), who does not trade, discloses information to an outsider (the tippee), who trades. The classic insider trading case, which set precedents for the common law in the U.S., was Texas Gulf Sulphur (1968). See Bainbridge (2000) for a lucid description on the evolution of common law on insider trading in the United States.

13 The data for the number of countries in the world were obtained from the 1999 CIA *World Factbook*. We

obtained the date of incorporation of a stock market from the 1998 *Handbook of Stock, Derivative and Commodity Exchanges* and, if not available there, the source was the web site of the stock exchange. Note that the number of countries with stock markets includes also the countries whose stock markets were temporarily closed due to some crisis. See Table IV of Jorion and Goetzmann (1999) for a list of such countries.

14 Nearly all the regulators gave us the year their insider trading law was passed and/or was enforced, and not the month. Also, as discussed before, it is not clear that the enforcement date of insider trading laws is the date of the first prosecution.

15 This type of ARCH estimation has some problems because of non-normalities in the data. Bekaert and Harvey (1995) use a semi-parametric ARCH model, which is basically a mixture of normal distributions.

16 The specification of the ratio Φ in Bekaert and Harvey (1997) has not just trade/GDP but also market capitalization/GDP.

17 Insider trading will affect the cost of equity through Φ if the foreign investor is marginal; insider trading will affect the cost of equity through λ_{var} if the domestic investor is marginal. In the former case, a correct specification of Φ should pick this up and we should not see any effect on residuals; in the latter case, as we have restricted λ_{var} to be the same for all countries, the effect will be seen on the residuals. As we do not know ex-ante which investor, foreign or domestic, is marginal, and as it is likely that our specification of Φ is not complete, we measure the effect of insider trading by its effect on the residuals.

18 We do not include the insider trading variables in the model in (1) directly for the following reason. The insider trading variables are dummy variables that take on the value of zero or one. Including a dummy variable in a non-linear estimation is subject to computational problems as the convergence of the optimization becomes more difficult and the results more unstable. This is especially the case for our model,

which is large and complex. In any case, it should be noted that the two approaches are similar and should yield the same outcome for the test. Moreover, subsection E, under Section III, presents results from Fama-MacBeth linear regressions, where the insider trading dummies are directly included in the risk- adjustment model. Those results are very similar to the ones shown here.

19 As purchasing power parity is not observed in the data, standard models like Ferson and Harvey (1993) and Dumas and Solnik (1995) have a foreign exchange factor (FX factor). So does our model. However, because of convergence problems, our estimation is a two-step procedure. Therefore, unlike the standard models, in the first step we strip out the effects of the local variance factor and the world factor, and in the second step, to isolate the effect of insider trading, we strip out the effects of other factors like the FX factor. The FX factor that we use is the conditional covariance of the return of the stock market index of the country with the return a U.S. investor would get if she held the foreign currency. This conditional covariance is obtained by using the multivariate ARCH model we previously discussed in equation (3) – just replace the world portfolio (w) by the foreign exchange portfolio (ifx).

20 We attempted to measure the differential impact of insider trading laws on developed countries and emerging markets by using a dummy variable to denote an emerging market, and interacting this with the IT enforcement dummy. The coefficient of the IT enforcement dummy becomes statistically insignificant, whereas the coefficient of the interaction variable becomes statistically significant at the five percent level. We conclude that the reduction in the cost of capital that is associated with the enforcement of insider trading laws comes about mainly from emerging markets.

21 The Fama-MacBeth regressions for our international asset pricing model are, however, slightly different from the Fama-MacBeth regressions for the other three approaches. This is because, unlike in the other three approaches, we have to use estimates as independent variables. These estimates – the conditional covariances and conditional variances – are computed as before using (3). This is not a problem because, as these estimates are generated country by country, they do not suffer from the assumption of independence. In the

Fama-MacBeth procedure, our non-linear model (1) demands a reasonable convergence of the optimization problem for every time period separately. This is impossible here due to the relatively small number of country observations per period, and the effort and time required to ensure that the optimization has correctly converged to the right parameters. For these reasons, we use a linear model, more in the spirit of the model used in the original Fama and MacBeth (1973). The linear model will not explicitly allow for partial integration of a country to the world equity. Given that the model is now linear, we can incorporate the "IT enforcement" dummy as well as all the other controls directly into the regression, without resorting to a two-step procedure as before.

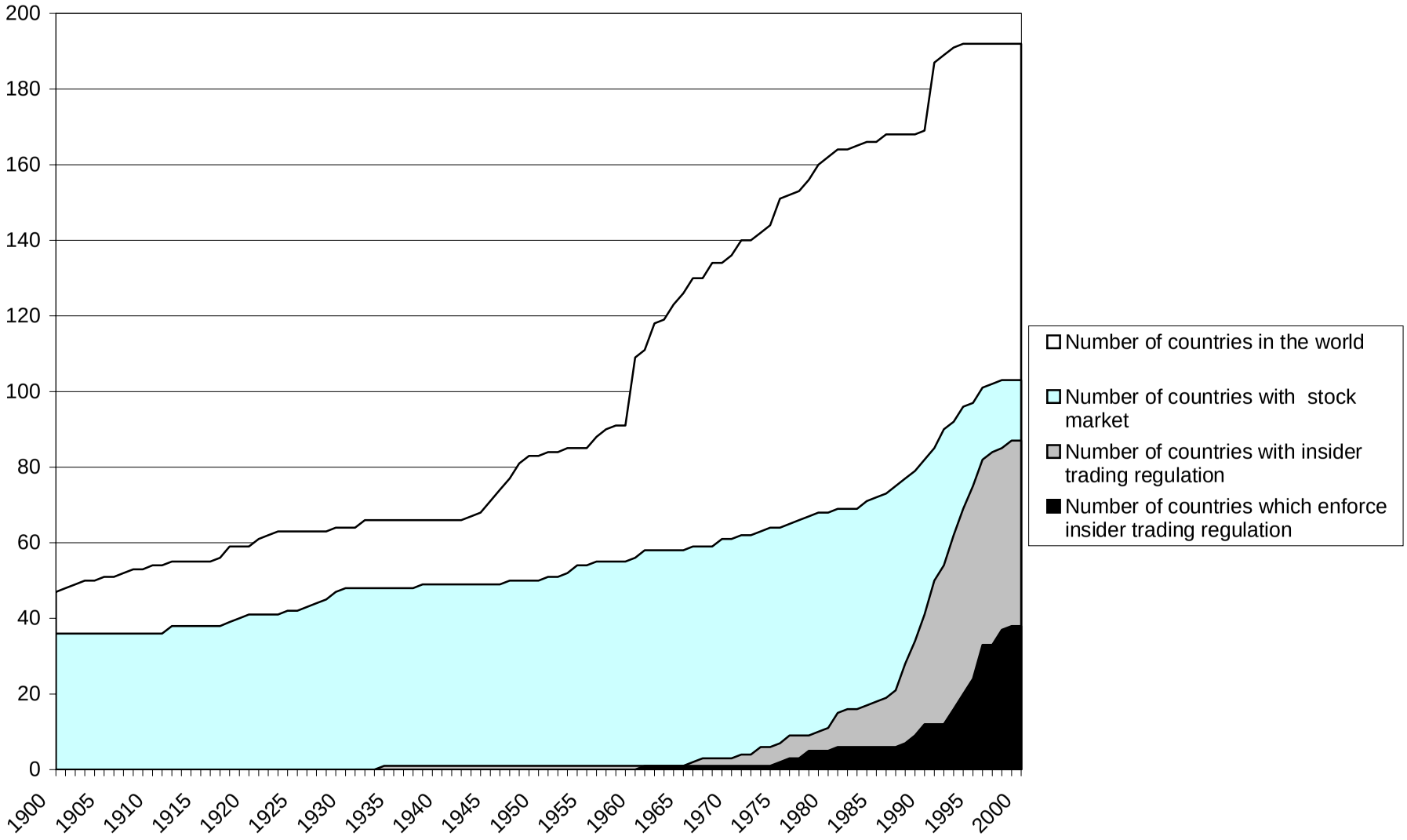

Figure 1. Insider trading regulations in the twentieth century.

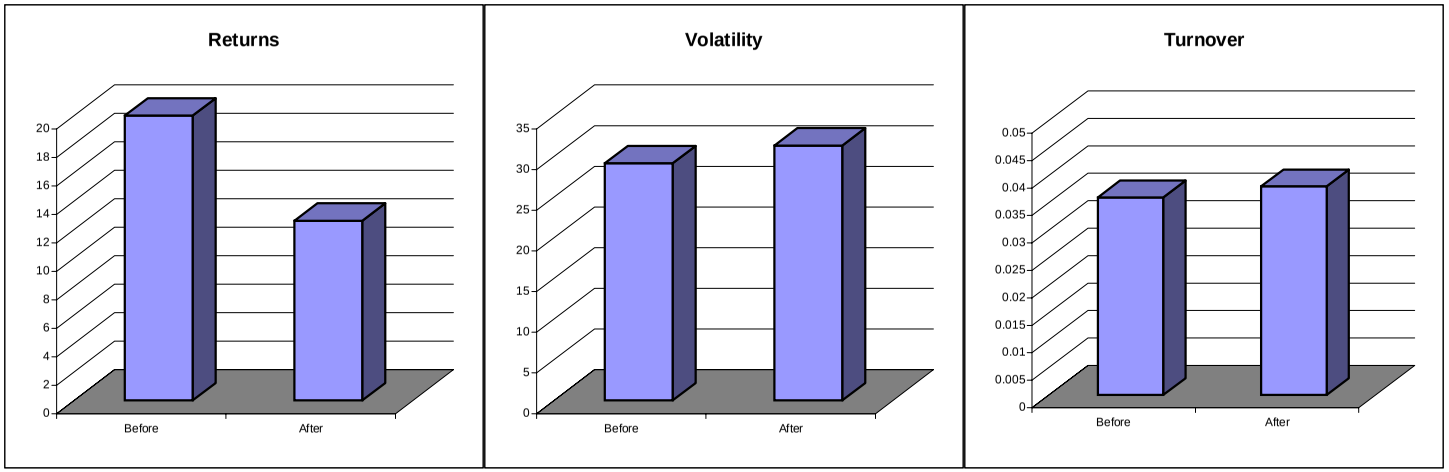

Figure 2a. Returns, volatility, and turnover five years before and five years after insider trading laws.

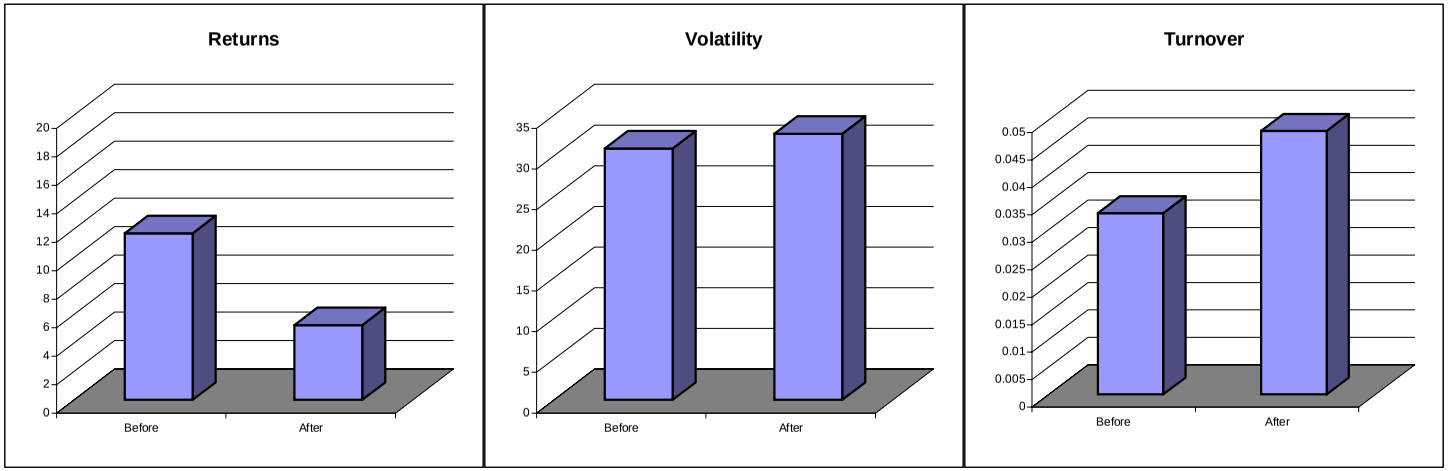

Figure 2b. Returns, volatility, and turnover five years before and five years after insider trading enforcement.