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Why are U.S. Stocks More Volatile?

Söhnke M. Bartram, Gregory Brown, and René M. Stulz*

ABSTRACT

U.S. stocks are more volatile than stocks of similar foreign firms. A firm's stock return volatility can be higher for reasons that contribute positively (good volatility) or negatively (bad volatility) to shareholder wealth and economic growth. We find that the volatility of U.S. firms is higher mostly because of good volatility. Specifically, stock volatility is higher in the U.S. because it increases with investor protection, stock market development, new patents, and firm-level investment in R&D. Each of these factors are related to better growth opportunities for firms and better ability to take advantage of these opportunities.

Keywords: Firm risk, volatility, idiosyncratic risk, R-squared.
JEL Codes: G12, G15

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Why is it that firms from some countries have higher stock return volatilities than firms from other countries? More specifically, why is it that U.S. firms have more volatile stock returns than similar firms from other countries? Commentators often attribute this high volatility to a casino mentality or to short-termism.[1] The finance literature offers additional reasons for why stock return volatility depends on country characteristics. In that literature, there exists both good volatility and bad volatility. A firm's stock return volatility can be higher in a country because institutions in that country make it advantageous for firms to take risks that lead to greater economic growth (e.g., Acemoglu and Ziliboti (1997) and Obstfeld (1994)). Alternatively, a firm's stock return volatility can be high because of country-specific forces, such as political risk, that impose risks on firms that they cannot shed. In the former case, volatility is good in that it results from conditions that enable firms to be more productive. In contrast, the bad volatility associated with the latter case can prevent growth and destabilize the economy.[2] Whether a country's stock return volatility is due to good or bad volatility is critically important in assessing policies that address stock return volatility since it is beneficial to reduce bad volatility but not good volatility. In this paper, after carefully documenting the higher volatility of U.S. firms, we show that this higher volatility is mostly due to good volatility.

We show that across 20,069 firms over the 1990 to 2006 period, the annualized average weekly volatility of U.S. firms is 25.7% higher than that of foreign firms of same industry, size, age, and market-to-book ratio. It is common to disaggregate volatility into systematic risk and idiosyncratic risk. Using a model for systematic risk from Bekaert, Hodrick and Zhang (2010) that makes the return of a stock depend on the return of its country's market, the world market, and Fama-French size and value factors for the region and the world, we find that almost all of the greater volatility of U.S. stocks is accounted for by greater idiosyncratic risk. Though investors can diversify idiosyncratic risk, it nevertheless plays an important role in all areas of finance. For example, idiosyncratic risk is important for the large numbers of

[1] See, for instance, "On Tyler Cowen's 'The Great Stagnation'" by Robert Teitelman in The Deal, February 7, 2011.

[2] For concerns about the potential destabilizing impact of stock return volatility, see, for instance, the chapter titled "Financial asset price volatility: A source of instability?" in the Global Financial Stability Report of the IMF, fall 2002.

investors who are imperfectly diversified. In asset pricing, there is increasing evidence that idiosyncratic risk is relevant for expected returns. In behavioral finance, theories emphasize the role of noise traders in pushing stock prices away from fundamentals, which makes them excessively volatile when noise traders are powerful because of limits to arbitrage. In corporate finance, agency problems in firms force insiders to co-invest with outside investors, so that firms in which agency problems are greater are expected to take less risk as more of it is born by insiders who cannot diversify it away. In the microstructure literature, idiosyncratic risk and illiquidity are closely related as market makers are more leery of taking positions in stocks with high idiosyncratic risk. In addition to the policy implications already mentioned, understanding why idiosyncratic risk differs across similar firms from different countries has implications throughout finance.

A large literature is available to help guide our investigation into why U.S. stocks have greater volatility. We organize that literature into five groups of papers:

i. Country risk. One theory is that greater country risk, in the form of a higher threat of expropriation and/or macroeconomic volatility, increases systematic risk (e.g., Acemoglu, et al. (2003)) and decreases the rewards to risk taking at the firm level. As a result, firms take fewer diversifiable risks in riskier countries. Bekaert and Harvey (1997) use country credit ratings as a proxy for political risk and do not find a consistent relation between stock market volatility and credit ratings for emerging countries. However, Johnson, McMillan, and Woodruff (2002) show for a sample of post-communist countries that weaker property rights lead to less entrepreneurial activity. An alternative theory is that country risk leads to more firm-specific shocks that firms cannot mitigate, thereby increasing idiosyncratic risk. Hence, while we would expect political risk to be associated with greater systematic risk, the relation between political risk and idiosyncratic risk is an empirical issue.

ii. Investor protection. With better protection of minority shareholders, corporate insiders consume fewer private benefits. As John, Litov, and Yeung (2008) show, insiders' claim on future private benefits is equivalent to a debt claim on the firm and hence leads them to take fewer risks. We would therefore expect idiosyncratic risk to increase as shareholder protection improves. Acharya, Amihud, and Litov (2008) show that better creditor protection can lead firms to take fewer risks, especially when managers are likely to lose their position in the event of a bankruptcy filing. In addition, with better investor protection, agency problems between insiders and outside providers of capital are better controlled, so that insiders do not have to co-invest as much and their wealth is less exposed to firm idiosyncratic risk, which leads firms to take more risks (Stulz (2005)). Disclosure is one dimension of investor protection. Prior literature argues that better disclosure leads stock prices to reflect more firm-specific information, which increases the importance of idiosyncratic shocks in explaining stock returns (e.g., Morck, Yeung, and Yu (2000)).

iii. Financial development and openness. With greater financial development, risk can be shared more efficiently among firm owners, which means that idiosyncratic risk becomes less of an issue in making investment decisions, and access to outside funding is less costly, so that firms can cope more efficiently with unexpected shocks by raising funds. Consequently, firms become more willing to invest in riskier projects as financial development improves (for empirical evidence and references to the large theoretical literature, see, for instance, Thesmar, and Thoenig (2004) and Michelacci and Schivardi (2008)). In light of the arguments of Acharya, Amihud, and Litov (2008) and others, these predictions might be more relevant for equity market development than credit market development. When credit is a more significant source of funding, we would expect creditors to have more influence on firm decisions and to limit risk taking by firms. Openness of the capital markets of a country leads to greater diversification opportunities for investors in that country, which makes it possible for firms to take more idiosyncratic risks (e.g., Obstfeld (1994)). Openness reduces the cost of capital for firms (e.g., Bekaert and Harvey (2000)), which increases firm valuations and makes growth opportunities profitable that otherwise would be left unexploited. Finally, openness enables better control of agency problems (e.g., Stulz (1999)).

iv. Disclosure and noise trading. LeRoy and Porter (1981) show that with market efficiency and constant discount rates, more information disclosure leads to less volatility. However, Jin and Myers (2007) develop a model in which more disclosure leads to more volatility because insiders' concerns about private benefits make stocks less volatile. Further, a considerable literature emphasizes the impact of limits to arbitrage and shows that noise traders can influence stock prices and make stock returns more volatile. The literature does not make clear predictions on how the impact of noise trading should differ across countries. There seem to be opposing forces at work. With more financial development, we expect trading to be cheaper and limits to arbitrage weaker, so that stock prices would be closer to fundamental values.[3] However, noise traders can trade more cheaply in countries with lower trading costs, so that they could be more influential when trading is cheap. As Teoh, Yang, and Zhang (2008) further argue, poor disclosure could make stock prices more volatile as there is more unresolved uncertainty about stock prices and hence more opportunities for investors to disagree. Finally, in open economies, there is often a concern that foreign investors are noise traders, perhaps because they herd, and make stock prices more volatile.

v. Innovation and growth opportunities. In corporate finance, it is generally assumed that there are more information asymmetries about growth opportunities than about assets in place (e.g., Myers and Majluf (1984)). This difference would suggest that firms with more growth opportunities will be more volatile and in particular have more idiosyncratic volatility. Firms acquire growth opportunities through R&D, so that firms that invest more in R&D are expected to be more volatile.[4] In addition, we would expect more idiosyncratic risk in countries with more innovation because innovation constantly creates winners and losers. Further, countries with more innovation are countries where technological revolutions

[3] Though Griffin, Kelly, and Nardari (2008) find that transaction costs are lower in more developed markets, they find no evidence that these markets are more efficient using common measures of efficiency.

[4] See Irvine and Pontiff (2009) and Comin and Philippon (2005) for papers that explain the increase in idiosyncratic risk by the increasing importance of R&D for American firms.

originate and such revolutions are associated with higher idiosyncratic volatility in their initial stages (Pastor and Veronesi (2009)). Countries with less corruption, less political risk, and better investor protection are expected to be more innovative.

To investigate the impact of country risk, we use the political risk index of the International Country Risk Guide (ICRG).[5] This index measures government quality as well as respect of property rights. It is computed so that a higher value corresponds to less risk and it is highly correlated with less frequently measured country governance indices such as those in Kaufman, Kraay, and Mastruzzi (2007). We find that countries with more political risk have more systematic risk. The evidence on the relation between political risk and idiosyncratic risk is ambiguous.

Our measures of investor protection are the revised anti-director rights index of Djankov et al. (DLLS, 2008), the creditor rights index of Djankov, McLiesh, and Shleifer (2007), and the disclosure index of Jin and Myers (2007). We find evidence that idiosyncratic risk increases with the anti-director index – but so does systematic risk. There is no relation between idiosyncratic risk and the creditor rights index. We also find a negative relation between the quality of disclosure and idiosyncratic risk. Our evidence is consistent with the prediction of LeRoy and Porter (1981) and evidence from the U.S. by Kelly (2007) and Teoh, Yang, and Zhang (2008) that firms with a worse information environment are more volatile, but it is inconsistent with the view in the R^2 literature that better disclosure is associated with higher idiosyncratic risk (see, for example, Jin and Myers (2007)). Though John, Litov, and Yeung (2008) find a positive relation between country-level cross-sectional volatility in the ratio of EBITDA to total assets and a measure of accounting disclosure requiring five years of data for each firm, their result is not inconsistent with our evidence because their measure of risk can increase with the volatility of the systematic component in a firm's EBITDA.[6]

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[5] The *ICR Guide* (ICRG) is published by The PRS Group, 6320 Fly Road, Suite 102, East Syracuse, NY 13057-0248, USA.

[6] To see this, suppose that a market model holds for EBITDA/Assets. If all firms have the same beta, the risk measure of John, Litov, and Yeung (2008) just measures the idiosyncratic risk in EBITDA/Assets. However, suppose alternatively that the betas differ and there is no idiosyncratic risk. In that case, their measure at the firm

We proxy for equity market development using two common measures: stock market turnover (e.g., Levine and Zervos (1998)) and the ratio of stock market capitalization to the size of the economy (e.g., Doidge, Karolyi, and Stulz (2007)). Idiosyncratic risk increases with turnover and stock market capitalization. There is no clear relation between stock market development and systematic risk. Idiosyncratic risk and systematic risk are negatively related to bond market development. For openness, we use a measure of capital account openness and a measure of equity market liberalization. Bekaert and Harvey (1997) find that stock market volatility falls following capital market liberalizations. We find further that capital account openness is strongly negatively related to idiosyncratic risk. There is no evidence that equity market liberalization is associated with higher idiosyncratic volatility, but there is a positive relation for systematic risk.

To investigate the role of innovation and growth opportunities, we use both country-level variables and firm-level variables. Young firms are often viewed as more innovative. We find that both idiosyncratic risk and systematic risk are higher for younger firms. We also find that both risk measures are strongly related to a firm's R&D share in investment (defined as the ratio of R&D to the sum of capital expenditures and R&D). In fact, in terms of economic significance, no country characteristic is more economically important than the R&D share. We would expect firms that have fewer assets in place and more growth opportunities to have a lower ratio of plant, property, and equipment to assets. We find a strong negative relation between the ratio of plant, property, and equipment to assets and risk. Since firms with higher market-to-book are firms with more growth opportunities, we would expect a positive relation between market-to-book and idiosyncratic volatility. We find a positive relation, but it is significant only for some estimation approaches. At the aggregate level, we find that countries with more patents per capita have more idiosyncratic risk (but not more systematic risk). Other firm characteristics are strongly related to idiosyncratic risk. In particular, idiosyncratic risk increases with leverage, but falls with asset size and debt maturity.

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level is the absolute value of the market model beta of the firm minus one times the standard deviation of the country's market factor in EBITDA.

A concern with our results is that differences in liquidity across countries could obscure or bias the relation between country characteristics and volatility. It could be that U.S. stocks are more volatile simply because U.S. stock markets are more liquid. We address this issue in several ways. First, as our returns data are weekly, we use screens for the fraction of weeks with zero local currency returns. We find that the greater volatility of U.S. stocks holds irrespective of the screen we set. Second, in our regressions, we control for the fraction of weeks with zero returns, so that liquidity is allowed to explain the risk measures. While there is a strong negative relation between systematic risk and the fraction of weeks without trading, the relation between idiosyncratic risk and the fraction of weeks without trading is relatively small. We conclude that our results are not caused by differences in liquidity across countries.

Following Morck, Yeung, and Yu (2000), the literature has paid considerable attention to R^2 as a way to assess the importance of idiosyncratic risk. Accordingly, we also show results for R^2. We find limited evidence of a consistent relation between R^2 and country characteristics. However, R^2 increases sharply with the anti-director index and decreases with disclosure. Since we find that idiosyncratic risk increases with the anti-director index and that idiosyncratic risk falls with disclosure, our results show that one should be extremely cautious in interpreting results from R^2 regressions on country characteristics. R^2 depends on systematic risk as well as idiosyncratic risk. In our regressions, R^2 increases with the anti-director index even though idiosyncratic risk also increases with that index because systematic risk increases with the anti-director index to a greater extent than does idiosyncratic risk. Similarly, R^2 decreases with disclosure because systematic risk is more strongly negatively related to disclosure than idiosyncratic risk is. There is no consistent relation between stock market development and R^2.

The paper proceeds as follows. In Section I, we describe our data and our matching procedure. In Section II, we show that foreign firms have less idiosyncratic risk than comparable U.S. firms, that this risk difference holds after adjusting for leverage, and that it is not simply the product of differences in liquidity. In Section III, we investigate why foreign firms have systematically lower idiosyncratic risk than U.S. firms. In Section IV, we compare R^2 at the firm level. We conclude in Section V.

I. Data

We construct our sample by collecting annual accounting data in U.S. dollars on all firms in the Worldscope database from 1990 through 2006. We require that lagged firm age, lagged market-to-book, and lagged book value of assets not be missing as we subsequently use these variables to match foreign firms to comparable U.S. firms. As we discuss in detail later, the Worldscope database includes only a subset of firms in each country, mostly larger ones. We drop firms that are missing data on total assets, market price at year-end, book value per share, shares outstanding, book value of long-term debt, and book value of short-term debt. We consider a firm's country to be the country of its primary listing; we exclude all secondary listings.[7] Further, we exclude non-primary issues, U.S. OTC Bulletin Board and "Pink Sheet" stocks, firms with missing country or firm identifiers, as well as real estate and other investment trusts.

We match the remaining firms to stock return data from Datastream.[8] To enter the sample, firms must have available returns data for at least 25 weeks in the observation year. We exclude country-years in which fewer than 10 firms have available data. This screen excludes Slovakia, Slovenia, and Zimbabwe from the entire sample. To address concerns about data errors in Datastream, we also implement a commonly used filter for reversals in the data that could be caused by incorrect stock prices, and we winsorize the top and bottom 0.1% of the final sample of stock returns.[9]

The resulting primary data set contains 197,299 firm-year observations representing 50 countries. Not surprisingly, the number of firms available increases steadily throughout the 1990s. For instance, while we have roughly 4,000 firms in 1991, the number of firms increases to approximately 22,000 towards the

[7] With this approach, a firm with a primary listing in London that has an American Depository Receipt (ADR) program is included in the sample as a U.K. firm and the ADR is ignored.

[8] We match firms based on common identifiers (Datastream code, Datastream Mnemonic, Sedols, Cusips, ISIN, etc.) as best available. We impose a number of filters because firms can have multiple share classes or listing locations. For example, we screen on the security type, use only primary listings, and require that the currency of the stock price be a legal tender in the firm's country of incorporation. We also manually verify matches in many cases, because firms can have multiple share classes or listing locations. Leading and trailing zeros in the return series are set to missing values.

[9] In particular, we set R_t and R_{t-1} to missing if $|R_t| > 200\%$ or $|R_{t-1}| > 200\%$ and $R_{t-1} + R_t < 50\%$. See Ince and Porter (2006) for a discussion of data errors in Datastream and possible solutions.

end of our sample period.[10] Not all countries are present each year. In particular, representation from developing economies is concentrated in the latter half of the sample. Panel A of Table I provides the list of countries for which we have observations and for each country gives the number of firm-years for that country. The U.S. has the largest number of firm-years, with roughly 55,000 firm-years. In contrast, several countries, such as the Czech Republic and Venezuela, have less than 200 firm-years.

[Insert Table I about here]

We calculate three primary measures of firm volatility each year using weekly (Friday-to-Friday) USD closing prices to calculate returns (though our primary results are essentially unchanged if we conduct all of our analysis using local currency returns). The first risk measure is simply the annualized standard deviation of weekly stock returns. Our other two risk measures are obtained by decomposing total risk into systematic risk and idiosyncratic risk. Such decomposition requires a model of systematic risk. One approach is to use the capital asset pricing model (CAPM). In an international setting, however, the CAPM can hold locally or globally.[11] It holds locally if the local market is segmented from the rest of the world, and globally if it is fully integrated. Rather than choosing a local or global CAPM a priori, a possible model for returns is one in which returns depend on both the local market portfolio and the world market portfolio. We choose this approach. It is well known that the CAPM does not capture all priced risks. The Fama-French SML and HML factors are widely used as determinants of expected returns. However, in an international setting, a problem with the use of these factors is that in many countries there are too few securities to construct meaningful local SML and HML portfolios. Following Bekaert, Hodrick, and Zhang (2010), we construct these factors regionally. Therefore, our model for returns regresses dollar returns each year on the world market portfolio, the local market portfolio, and the global and regional SMB and HML factors.

[10] There are two primary reasons for this trend. First, the total number of listings on Worldscope of all types increases from about 20,380 in 1991 to 35,322 in 2006. Second, the data availability (and liquidity) screens eliminate a significantly higher percentage of firms in early years than in later years. The proportion of U.S. versus non-U.S. firms affected by these screens is roughly constant over the sample period.

[11] See Karolyi and Stulz (2003) for a review of the international asset pricing literature.

Specifically, for each firm-year with sufficient data, we estimate

$$R_t = \alpha + \beta^L_{t-1} R^L_{t-1} + \beta^L_t R^L_t + \beta^L_{t+1} R^L_{t+1} + \beta^W R^W_t$$
$$+ \beta^{RHML} R^{RHML}_t + \beta^{WHML} R^{WHML}_t + \beta^{RSMB} R^{RSMB}_t + \beta^{WSMB} R^{WSMB}_t + \varepsilon_t \qquad (1)$$

where R_t is the firm's stock return in week t, R^L_t is the return on the local market index, R^W_t is the return on the world market index, R^{RHML}_t is the return on the regional HML portfolio, R^{WHML}_t is the return on the world HML portfolio, R^{RSMB}_t is the return on the regional SMB portfolio, R^{WSMB}_t is the return on the world SMB portfolio, and ε_t is an error term. Our estimate of idiosyncratic volatility is the (annualized) standard deviation of ε_t, σ. Our estimate of systematic risk is the square root of the difference between total return variance and σ^2. We also examine the R^2 statistic from the regressions.

Panel A of Table I shows the median estimates of our risk measures for each country as well as the median R^2. The last row of the table gives the median of the country medians (which we call the sample country median for simplicity), which is 39.1% for total risk. There is a wide range of country medians for total risk. Emerging markets are at each end of the spectrum, as Morocco has a median of 25.0% and Venezuela has a median of 55.9%. Only 11 countries have a higher median for total risk than the U.S. These 11 countries include emerging countries, but also Australia and Canada. While 28 countries have higher systematic risk than the U.S., only seven countries have higher idiosyncratic risk. This finding shows that idiosyncratic risk is high in the U.S. compared to the rest of the world even if we simply compare country medians. Finally, only one country has a lower median R^2 than the U.S. Surprisingly, that country is China.[12] However, comparisons of country medians do not adjust for differences in firms and industries across countries. Hence, these comparisons do not tell us how risk measures differ across countries for similar firms.

[12] It is paradoxical that China would have a lower R^2 than the U.S. since China motivated the Morck, Yeung, and Yu (2000) study, as one of the authors observed the surprisingly high synchronicity of Chinese stocks when visiting China. However, the bulk of our data for China comes from the years in our sample that are not present in the sample of the Morck, Yeung, and Yu (2000) study. Note that our sampling procedure excludes firms with less than one year of data, so that firms immediately after their IPO are not included in the sample and hence the result cannot be explained by firms in their first year after their IPO.

We collect data on a variety of firm characteristics from the Worldscope database. These include the firm's market-to-book ratio, its total assets, plant, property and equipment (PPE), research and development expenses (R&D), capital expenditures (CapEx), gross profit margin, and cash and short-term investments. We calculate ratios for most of these variables to make them comparable across companies. For R&D, we set missing values to zero. We measure firm age as the number of years between the listing date (or first date on Datastream) and the observation year plus one (so that we can take the natural logarithm). Accounting data are winsorized at the top and bottom 1% and for values more than five standard deviations from the median. Since we winsorize returns only at the 0.1% level, we replicate all our tables with returns winsorized at the 1%. Even though winsorizing returns at this level seems problematic in that it could bias the dependent variable downwards, we find that our conclusions are not affected. We reproduce these results in the Internet Appendix. Finally, we apply some limits to a few variables.[13] Variable definitions are summarized in the Appendix.

Panel A of Table I provides country medians for sample firm characteristics. Median age varies widely across countries. The median age of U.S. firms is two years higher than the sample country median. The median market-to-book for the U.S. is at the upper end of the country medians. Only two countries, China and the U.K., have higher medians. The lowest country median is Venezuela.

The use of the frequency of non-trading as a measure of market liquidity is well-established in the literature (see, for instance, Bekaert, Harvey, and Lundblad (2007) and Lesmond (2005)).[14] Since we have weekly returns, we use the fraction of weekly zero local currency returns to measure the extent of non-trading. Table I shows the median percentage of non-trading weeks for stocks in our sample for each country. As expected from the literature, non-trading varies substantially across countries. The U.S. percentage is below the country median. However, the median percentage of zero returns may appear surprisingly low in countries where one would not expect it to be low, like Peru. The explanation is that

[13] Specifically, we limit gross profit margin to be greater than or equal to -100% and set market-to-book to 20 when it is greater than 20 or when book value is less than or equal to zero.

[14] Trading volume data at the firm level cannot be used because reliable trading volume data at the firm level are not available for a large percentage of our firm-years. This is a well-known shortcoming of the international returns data available from Datastream.

our sample of firms in a country is neither a random sample nor a complete sample of the firms listed in a country.

Leverage tends to vary widely across countries. The U.S. median leverage is lower than the sample country median and most emerging markets have a higher median leverage than the U.S. The profitability of U.S. firms is at the upper end of the range across countries. The median cash holdings of U.S. firms of 9.4% is 1.1% higher than the median across countries. Lastly, U.S. firms have more long-term debt relative to short-term debt than firms in any country except New Zealand. We also use R&D expenditures to total assets as well as the R&D share in a firm's investment (R&D divided by the sum of R&D and capital expenditures). Since the medians of R&D and of the R&D share are essentially zero for each foreign country, we do not tabulate the results. These data show that there is wide variation in firm characteristics across countries in our sample. As a result, the risk measures could differ across countries simply because firms have different characteristics.

We now turn to the country variables (the Appendix gives detailed definitions and sources for all these variables). We measure the quality of political and legal institutions using the ICRG Political Risk index. This index measures the overall stability and quality of government institutions using 10 different qualitative measures. Higher values represent more stable and higher quality government institutions. This index is highly correlated with other common measures of political and legal quality such as the Kaufman, Kraay, and Mastruzzi (2007) rule of law index (correlation equals 0.896). We use the ICRG political risk index because it measures a variety of institutional characteristics and data are available for every year and country in our sample.

As a proxy for shareholder protection and corporate governance we use the anti-director rights index from DLLS.[15] Higher values are associated with better shareholder protection and governance. Spamann (2010) produces an anti-director index that differs from the DLLS index, but it is not available for several of the countries in our sample. We also use the index of creditor rights from Djankov, McLiesh, and

[15] We use the revised version discussed in DLLS (2008) and available on the website of Andrei Shleifer: http://www.economics.harvard.edu/faculty/shleifer/dataset. We thank the authors for making these data available.

Shleifer (2007); higher values represent better creditor rights.

We employ two proxies for equity market development that are frequently used in the literature. The first measure is the ratio of stock market capitalization to GDP. The second measure is the stock market turnover rate, which is total stock market volume as a percent of total shares outstanding. Though the latter measure is often used as a measure of equity market development, it is noteworthy that some of the highest values in our sample are from less economically developed countries. Our proxy for credit market development is the ratio of private bond market capitalization to GDP. We also use alternative measures of credit market development, and the results are consistent with those we present here.

We employ two variables that measure a country's financial openness. The first is a measure of capital account openness calculated by Ito and Chinn (2008) that is based on several measures of restrictions on cross-border financial transactions. Higher values of the capital account openness measure indicate fewer restrictions on cross-border financial flows. The second measure assesses equity market liberalization as in Bekaert, Harvey, and Lundblad (2005) by estimating the percentage of equity market value that is investable by foreign investors.

To measure the degree of innovation, we use the number of U.S. patents per person in each sample country each year. Previous research (e.g., Furman, Porter, and Stern (2001)) demonstrates that this measure provides explanatory power for national innovative capacity and the commercial viability of research and development investment. Finally, prior research documents that firm growth options and firm risk are positively related (e.g., Cao, Simin, and Zhao (2008)). Therefore, wealso examine the measure of country (global) growth options derived by Bekaert, et al (2007), which uses global price-to-earnings ratios applied to a given country's industry mix.[16] Unfortunately, this measure is not available for some of our sample countries. Consequently, we do not use it in our main analysis.

Panel B of Table I shows the median country characteristics for our sample. Not surprisingly, there is a wide range of GDP per capita values, and the U.S. is at the upper end of that range. The U.S. has less

[16] We thank the authors for making these data available.

political risk than the median country, but many countries have even less political risk than the U.S. Finland has the least political risk, and most developed countries have lower political risk than the U.S. While the U.S. has low creditor rights, it has the highest disclosure index. The U.S. has an anti-director rights index close to the median. The level of U.S. stock market development is high compared to other countries. However, showing the limitations of the turnover measure, some developing countries have higher turnover and market capitalization to GDP ratios than the U.S. Only one country (Denmark) has a higher ratio of bond market capitalization to GDP than the U.S. The U.S. is at the upper end of the openness measures. There is wide variation in the innovation measure (patents) across countries.

We require firms to be on Worldscope and to meet various sampling requirements. Panel B of Table I shows, for each country, the percentage of all listed firms that are in our sample (market coverage). This percentage varies widely. While it is 67% for U.S. firms, it is only 12% for Peru.[17] As a result, in some countries our sample includes only the most liquid firms. While we do not use it in our analysis, we also report for reference the volatility of the value-weighted Datastream market index.

The properties of the risk measures we use depend on the liquidity of stocks. Since the liquidity of stocks varies across firms in the sample, we report only results using sample firm-year observations for which the firm has less than 30% zero returns in the previous year (e.g., nonzero stock returns for at least 36 weeks if return data are available for all weeks in a year). This reduces the number of firms in our analysis by about 5% and the number of firm-years in our sample by about 20%.[18] We subsequently examine different cutoffs to see the effect on our results, but unless we indicate otherwise, our analysis is conducted using that cutoff. Further, in our regressions we control directly for the extent of non-trading as well as for the extent of stock market coverage.

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[17] The percentage is substantially lower than 100% for the U.S. because of our exclusion of OTC Bulletin Board and Pink Sheet listings (that can appear in the Datastream and Worldscope database) as well as secondary listings and investment trusts.

[18] In most cases we lose some, but not all, years for a given firm because of too many nonzero return observations, thus the percentage of firms lost is much less than the percent of firm-years lost.

II. Differences in Volatility Measures for Matched Firms

A comparison of the median or average risk measures across countries is a comparison of risk measures of different firms. In this paper, we want to compare similar firms across countries. In the first part of this section we describe our matching procedure and the matched sample. In the second part of the section we examine differences in volatility measures for the matched firms.

A. The Matching Procedure

To analyze comparable firms, we have to choose a metric that can be used to capture similarity. One approach often used in the literature is to compare firms along a single dimension, such as size or market-to-book, perhaps within an industry. An alternative approach that has become increasingly popular in recent years is to compare firms using an econometric model called propensity score matching. The benefit of this approach is that it makes it possible to compare firms along multiple dimensions in a quantifiable way. The results presented in our tables use this econometric approach. Specifically, we match to each foreign firm a similar U.S. firm. To identify matching U.S. firms we employ propensity score (*p*-score) matching using several characteristics.[19] In essence, the *p*-score provides a method for identifying a matching U.S. firm based on factors that we believe are inherent characteristics determining risk. The method involves two steps. First a logit regression is estimated with the independent variable equal to one if the firm is a U.S. firm and zero otherwise. Independent variables include any characteristics we wish to control for across firms. Predicted values from the estimation are used to match a U.S. firm whose chosen characteristics are statistically most similar to each non-U.S. firm.

In this comparison, we want to avoid using firm characteristics that may be determined at the same time as the risk measures, since if we were to do so there would be a concern that our risk measures and firm characteristics were simultaneously determined. We mitigate this problem in two ways. First, we use only lagged firm characteristics to match firms, so that we match firms on predetermined variables.

[19] For earlier uses of this approach in finance, see Lee and Wahal (2004), Drucker and Puri (2005), and Bartram, Brown, and Conrad (2011), among others.

Second, we match on variables that are likely to be exogenous firm characteristics. Specifically, we match U.S. firms (with replacement) to non-U.S. firms based on firm size (log of total assets measured in USD), the log of firm age, and the equity market-to-book ratio. We perform the matching each year, as firm characteristics change over time, and by industry, one year prior to the observation year.[20] As explained earlier, we restrict the sample in our primary analysis to firms that have less than 30% of non-trading weeks.

In determining a matching scheme based on propensity scores, we find matching U.S. firms with replacement since the sample of foreign firms is much larger. We also pick just one matching U.S. firm for each non-U.S. firm based on the "nearest neighbor" method.[21] Research in the statistical literature identifies potential shortcomings of the propensity score matching technique such as low power in small samples, a need for group overlap across characteristics of interest, and omitted variable bias. These concerns are mitigated by our large sample with substantial overlap across matching characteristics. While it is always possible that our documented differences in risk are affected by important omitted variables, our analysis is focused on identifying the firm and country characteristics that explain these differences. Consequently, we do not seek to include all possible determinants of firm risk in our matching process and instead analyze other factors in our subsequent regression analysis. Overall, the quality of our matches is very high. For all matches, the average and median differences in *p*-score are essentially zero (<0.001) with a standard deviation of 0.0068. The 5% to 95% range is -0.0034 to 0.0040.

Table II compares firm and country characteristics for the matched firms in our sample. In this table each observation is the average of available years for a foreign firm and its matching U.S. firm(s). Matching U.S. firms tend to be significantly larger and older. Since firm size and age are negatively associated with risk, this imperfect matching could lead to a bias toward finding that foreign firms are

[20] Industries are defined using the updated 17 industry portfolio classification system available on Ken French's web site. We thank Ken French for making these data available.

[21] Other options include using multiple U.S. firms for each foreign firm and using a caliper matching criterion whereby all characteristics of matching U.S. firms must be sufficiently close to those of the non-U.S. firm. Experiments with alternative matching methods suggest that these choices do not substantially affect our results, so we employ a fairly simple version of the propensity score matching method.

riskier. To mitigate the impact of imperfect matching, we also control for these characteristics in our regression analysis. As noted above, differences in *p*-scores are negligible and not statistically significant.

[Insert Table II about here]

We now turn to firm characteristics that are not used in the matching procedure. Differences in leverage are not economically significant. Evaluated at the means, the leverage of foreign firms is higher than the leverage of similar U.S. firms by only half of a percentage point. Foreign firms have a greater ratio of plant, property, and equipment to total assets than U.S. firms. Further, they invest roughly the same in capital expenditures but less in R&D than U.S. firms. The difference in R&D investment is economically large, as the average R&D investment rate of U.S. firms is almost three times higher than that of foreign firms. The median R&D share for foreign firms is zero, while it is 8.5% for matched U.S. firms. We see that foreign firms are also less profitable, hold less cash, and have debt of shorter maturity. For foreign firms, about 8.9% of returns are zero, which is almost twice the percentage of U.S. firms. This difference in the percentage of zero returns raises the concern that infrequent trading could play more of a role for foreign firms than for U.S. firms, which might lead to downward-biased measures of risk for foreign firms even though we impose the 30% threshold for non-trading weeks. It is well known that a determinant of illiquidity, the bid-ask spread, biases estimates of systematic risk downward and estimates of idiosyncratic risk upwards (see, for example, Han and Lesmond (2010)). Greater illiquidity of foreign stocks would therefore seem to bias our results towards finding less idiosyncratic risk in U.S. stocks than foreign stocks. However, in our subsequent analyses we address this issue in a number of ways to show that differences in illiquidity across countries do not explain our results.

Table II also compares country characteristics between foreign firms and matching U.S. firms. We compare averages and medians for foreign firms and their matched U.S. firms. On average, foreign firms have more political risk, better creditor rights protection, a lower anti-director rights index, worse disclosure, less open capital markets, less innovation, lower growth opportunities, and a less volatile stock market index. The results for medians are similar.

B. Comparing Risk Measures for Matched Firms

Panel A of Table III reports mean and median values for our volatility measures for foreign firms and their matching U.S. firms. The reported values are for firm averages, so that each foreign firm appears only once. Risk measures are calculated as the square root of average variances. U.S. firms have significantly higher total volatility (return standard deviation) than their matching foreign firms. The mean difference in total risk of -0.143 translates into the median U.S. firm having total risk that is 25.7% higher than its foreign counterpart. Foreign firms have higher systematic risk on average than U.S. firms, but the percentage difference is much smaller than for idiosyncratic risk, as it is only 9.0%. Foreign firms have lower idiosyncratic risk than U.S. firms, and the mean idiosyncratic volatility of U.S. firms is 32.1% higher than the mean idiosyncratic volatility of their matching foreign firms. The difference in systematic risk equates to only about 20% of the difference in total risk; consequently, almost all of the difference in total risk is attributable to the difference in idiosyncratic risk. To understand why U.S. stocks are more volatile, we therefore have to understand why they have more idiosyncratic risk. Thus, in the following we mostly focus on idiosyncratic risk. Finally, the results for R^2 show that average R^2 is higher for foreign firms than for U.S. firms by 17.4%. All differences are statistically significant at the 0.1% level.

[Insert Table III about here]

In the remainder of Panel A, we split the sample between firms in developed countries and firms in emerging markets.[22] We define a country as an emerging market if the country does not have a completely liberalized equity market using the measure of Edison and Warnock (2003). Firms from developed markets as well as firms from emerging markets have lower total risk than matching U.S. firms. In fact, levels of total risk are fairly similar for emerging and developed economies. It is important to note, however, that the U.S. firms matched to emerging market firms have lower total volatility than the U.S. firms matched to developed market firms, reflecting the fact that the characteristics of emerging market

[22] Firms in countries that change classifications (e.g., from developing to developed) during our sample period will appear in both classifications, but we calculate firm averages using separate periods so that no firm-years are used twice. This explains why the sum of observations for developed and developing countries is slightly more than for all countries.

firms differ from those of developed market firms. When we turn to systematic risk, developed market firms have lower systematic risk than U.S. firms, but emerging market firms have about the same systematic risk as matching U.S. firms. Idiosyncratic risk is lower for both developed market firms and emerging market firms compared to matching U.S. firms. Finally, the R^2 of developed and emerging market firms is higher than for their matching U.S. firms. These results confirm the findings of Morck, Yeung, and Yu (2000) when the R^2 comparison is made using comparable firms.

We see in the previous section that foreign firms seem to trade less than U.S. firms. This result raises the concern that U.S. firms might have higher risk measures not because they are riskier but simply because their risk is measured more accurately because they are more liquid. To evaluate whether infrequent trading can explain our results, we show in Panel B of Table III estimates of risk measures for firms with less than 10% zero returns, less than 30% zero returns, and no restriction on zero returns. Restrictions on zero returns affect the estimates of the risk measures. A stricter threshold for non-trading pulls the absolute value of the differences towards zero. When we limit our comparison to firms with less than 10% zero returns, the mean and median differences in systematic risk between foreign firms and matching U.S. firms are very small. However, for all our other comparisons, the mean and median differences are large, significant, and of same sign across the different thresholds. It is important to note that the economic significance of the difference in idiosyncratic risk between foreign firms and matching U.S. firms is still substantial when we impose the strictest threshold for non-trading. As we point out earlier, for the 30% threshold, the idiosyncratic risk of matching U.S. firms is 32.1% higher than the idiosyncratic risk of foreign firms. When we use the 10% threshold, the difference is 23.4%. Though most of our analysis focuses on the sample in which we use the 30% threshold, we also discuss results using the other thresholds.

In Figure 1, we show how the risk measures evolve over the sample period. Panel A shows the evolution of total risk. Total risk for U.S. firms has an inverted U-shape, peaking in 2002. The mean for foreign firms increases in the late 1990s as well, but does not keep increasing with the U.S. mean after 1998. The U.S. mean is higher than the foreign mean for almost all years in the sample. The patterns for systematic risk show that foreign firms have a spike in systematic risk in 1998, while the systematic risk of U.S. firms has an inverted U-shape similar to that observed for total risk. Panel C shows the means for idiosyncratic risk. The dynamics for idiosyncratic risk are similar to those for total risk, which is not surprising in light of the literature for the U.S. (see Campbell et al.(2001)). Guo and Savickas (2011) and Bekaert, Hodrick, and Zhang (2010) examine the time-series pattern of volatility across countries and also find them to be elevated in 2001 and 2002. Finally, we see in Panel D that the difference in average R^2 seems to be much smaller in the second half of the sample period.

[Insert Figure 1 about here]

Table IV shows the mean differences between the risk characteristics of foreign firms and the risk characteristics of U.S. firms by year. There are four years in which the total risk of foreign firms is actually significantly higher than the total risk of matching U.S. firms. However, both for the 1990s and for the 2000s, the average total risk of foreign firms is significantly lower than the total risk of their matching U.S. firms. The largest differences in total risk are in the early 2000s. Foreign firms actually have higher systematic risk than matching U.S. firms in the 1990s, but the opposite result holds in the 2000s. While the differences in total and systematic risk between foreign firms and U.S. matching firms fluctuate, foreign firms have significantly lower idiosyncratic risk than their matching U.S. firms every year except one. In 1997, which included the Asian financial crisis, the difference is not significantly different from zero. Finally, R^2 is significantly lower for U.S. firms in all years.

[Insert Table IV about here]

This section demonstrates that foreign firms consistently have lower idiosyncratic volatility than comparable U.S. firms. Further, the greater idiosyncratic volatility of foreign firms cannot be explained by differences in liquidity.

III. Why Do Foreign Firms Have Lower Idiosyncratic Volatility?

In this section, we investigate the determinants of the difference in risk measures between foreign and U.S. firms. In Section IV, we separately consider the determinants of R^2. Our primary focus in this section is the difference in idiosyncratic volatility. We first present our main results and then discuss a battery of robustness tests. We conclude with a brief examination of the determinants of systematic risk.

A. The Determinants of Idiosyncratic Volatility

In the regressions, we regress differences in risk measures between foreign firms and their matching U.S. firms on differences in country and firm characteristics. It is legitimate to be concerned that when the left-hand- and right-hand-side variables of these regressions are contemporaneous, these variables could be jointly determined, perhaps as a function of some omitted variables. This problem is mitigated by regressing a volatility measure at time t on firm and country characteristics at time t-1. A second important concern is that many country characteristics change little over time, and that the risk measures themselves are autocorrelated. A third important concern is that many country characteristics are highly correlated, so that a country characteristic could be related to a risk measure not because it affects the risk measure by itself, but because it is correlated with another country characteristic that affects that risk measure. Finally, the composition of the sample changes over time, and there are many more firms in the later years of the sample.

To address these concerns, we use four different approaches and include some control variables. Our main approach is to use Fama-MacBeth style regressions that include country and firm characteristics as explanatory variables. With these regressions, the fact that the number of firms is much larger towards the end of our sample period does not influence our results. We correct the standard errors with the Newey-West (1987) procedure to account for autocorrelation. The second approach is to estimate the Fama-McBeth style regressions using one characteristic at a time. This approach helps us better understand the extent to which multicollinearity among our country-level variables may affect our inferences. The third approach we use eliminates the serial correlation problem altogether, but at the cost of no longer making use of the changes in country and firm characteristics over time. With this third approach, we estimate a single cross-sectional regression where each firm enters the sample only once. For each firm, we calculate mean values of variables using the firm-years with data available for the dependent variable. The final approach uses panel regressions where we account for autocorrelation using the Yule-Walker method. This method has been recently used in research investigating the determinants of idiosyncratic volatility (Irvine and Pontiff (2009)). It is advantageous in our setting since we have a short timeseries and the method allows us to retain the first observations for each firm (unlike some alternative methods). It is comforting that our results are generally robust to the choice of estimation method in that, in general, the four approaches we use do not lead to inconsistent results, that is, significant coefficient estimates for a variable that have opposite signs.

The dependent variable in our regressions is the log difference in volatility measures between foreign firms and matching U.S. firms. We standardize the explanatory variables to have a mean of zero and a standard deviation of one (we standardize by year for Fama-MacBeth regressions.). The standardization allows us to interpret estimated coefficients for variables as the effect on volatility of a one standard deviation change in the variables under consideration. In addition to our hypothesized explanatory variables, we include the matching variables to account for possible bias from imperfect matching, the percent of zero weekly returns as a control for differences in liquidity, and each country's percentage of all listed companies that are represented in our sample each year (labeled as "Market Coverage") to control for a possible selection bias in the Worldscope and Datastream databases.

Table V shows the estimates for our regressions.[23] We first discuss the coefficients for the country characteristics. As discussed in the introduction, the theoretical predictions for the relation between political risk and idiosyncratic volatility are ambiguous. With the Fama-MacBeth regression that includes all the variables, political risk is not significant. It has a negative significant coefficient with two other regressions and a positive significant coefficient with another. Consequently, we do not find conclusive support for the view that firms in countries with less political risk have more idiosyncratic risk.

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[23] Sample sizes across the specifications vary because of differences in estimation method. In the first two columns we report the average number of observations for the cross-sectional regressions in the Fama-MacBeth regressions. (Similarly, for the Fama-MacBeth regressions, we report as R-squared the average R^2 of the cross-sectional regressions.) The actual number of observations used in these estimations is 93,184. The single cross-section sample size of 15,293 represents the number of unique firms in our sample. The results for the Yule-Walker panel regressions use all available firm-year observations.

[Insert Table V about here]

We turn next to the two investor protection variables, the creditor rights index and the anti-director index. The relation between idiosyncratic risk and creditor rights is insignificant in all the regressions with multiple country variables. The relation between idiosyncratic risk and the anti-director index is significant and positive in all but the single cross-sectional regression. This result is consistent with the theoretical predictions from the literature. When we use the Spamann (2010) version of the anti-director index, we have fewer countries, but the coefficient is positive as well and very similar in magnitude. We find that idiosyncratic volatility is increasing in stock market development but decreasing in bond market development. Capital account openness is strongly negatively related to idiosyncratic volatility. We use a separate measure of equity market liberalization. This measure is highly correlated with GDP per capita, so that we use the residual of a regression of that measure on GDP per capita. We find no consistent evidence of a positive relation between equity market liberalization and idiosyncratic volatility. Our country-level measure of innovativeness is patents per capita. This measure is also strongly correlated with GDP per capita, so we orthogonalize it as well. More innovative countries have firms with higher idiosyncratic volatility. Finally, disclosure tends to be negatively related to idiosyncratic risk. Because of our normalization, the absolute value of the coefficients in our regressions is a measure of the economic significance of a variable. In the Fama-MacBeth multiple regression, the statistically significant country variables that are the most economically significant are, in order of economic significance, disclosure, patents, and capital account openness.

Whereas it is reasonable to assume that country characteristics are exogenous with respect to future firm idiosyncratic volatility, such an assumption is not as reasonable for firm characteristics. Care should be taken, therefore, in interpreting the regression coefficients on firm characteristics. However, though we do not show the results, it is comforting that the coefficients on the country variables remain essentially the same if we do not include firm characteristics. The negative relation between idiosyncratic volatility and total assets, age, and profitability that has been documented for U.S. firms (see Pastor and Veronesi (2003)) holds in our sample. We further find that idiosyncratic volatility is negatively related to the ratio of plant, property, and equipment to total assets and debt maturity. Idiosyncratic volatility increases with R&D, leverage, and cash holdings. One would not expect higher cash holdings to cause greater idiosyncratic risk; rather, firms that have characteristics that make them riskier hold more cash. Consequently, possible explanations for the cash result are that cash holdings proxy for firm risk characteristics that are not controlled for in the regression, and that firms that expect greater future idiosyncratic risk hold more cash. Though market-to-book sometimes has a positive significant coefficient, it is quite small. This may be because our matching procedure works well for that variable. The percent zero returns is significant but has a relatively small negative coefficient. The selection variable, market coverage, is insignificant in two regressions and is negative and significant, but small in absolute value, in the other regressions.

For both country variables and firm-level variables, idiosyncratic risk increases with innovativeness. Idiosyncratic volatility increases with R&D share as predicted. The coefficient on R&D share is as economically significant as any country variable, and age is much more so. To better understand the importance of R&D share, it is useful to note that an increase in the difference in the R&D share between the U.S. firm and the foreign firm corresponds to an increase in the difference in idiosyncratic volatility of 0.045, or about 30% of the difference between the U.S. firm and the foreign firm.

Table V shows that idiosyncratic risk is related to country characteristics as well as firm characteristics. Idiosyncratic volatility increases with equity market development and innovation; it falls with bond market development and capital account openness. A country's equity market development and innovation could reflect that country's growth opportunities. In regression (1) of Table VI, we therefore estimate the regression in the first column of Table V but add country-level growth opportunities.[24] We

[24] We have repeated the robustness checks with our other regression methods, but the Fama-MacBeth style regressions with multiple country variables tend to have the weakest results, so we report these to be conservative.

find that this variable is not significant, and adding it to the regression does not meaningfully affect other results.[25]

Fernandes and Ferreira (2008) find that a cross-listing in the U.S. increases idiosyncratic volatility for firms from developed countries, but not from emerging markets. In regression (2) of Table VI, we allow country characteristics to have a different impact on idiosyncratic volatility for firms with a U.S. cross-listing. We would expect country variables to be less economically relevant for firms that have an ADR program as these firms are in effect "renting" U.S. institutions. We find some evidence in support of this hypothesis for the private bond market and patents. When we estimate the regressions with one country variable at a time, we also find that the impacts of turnover and disclosure are attenuated for ADR firms (not reported). However, we find that firms with cross-listings from countries with higher stock and bond market capitalization have higher idiosyncratic volatility, which is consistent with the results of Fernandes and Ferreira (2008).

[Insert Table VI about here]

As we saw in Table I, the extent of infrequent trading differs across countries. We therefore investigate whether these differences affect our results. Specification (3) in Table VI shows the regression estimated imposing a 10% threshold for zero returns. The results are fairly similar though the coefficients on stock market turnover and market capitalization become slightly larger, and both are significant at the 5% level. However, the significance of the private bond market variable slips to a *p*-value of 0.33. Regression (4) imposes no threshold. In this case, the results are even more similar to those presented in Table V.

To investigate the robustness of our results, we perform two more experiments. First, the analysis so far uses a sample that includes financial firms. Regression (5) excludes financial firms. The key results are the same. Second, throughout our analysis we have matched foreign firms to U.S. firms using industry,

[25] This result is not too surprising since we have other country and firm variables that measure growth opportunities (patents, R&D share, and the market-to-book ratio), our risk model includes local and world HML factors, and we match on market-to-book.

market-to-book, size, and age. In Regression (6) we consider a simpler matching procedure by matching only on industry and size. Doing so has no significant impact on our results (though the average adjusted R^2 is much lower). It is noteworthy that in that regression market-to-book has a significant positive coefficient, suggesting that the insignificant coefficient in regression (1) of Table V is explained by the fact that we use market-to-book in our matching procedure for that regression.

We also conduct a large number of other robustness checks for which we do not tabulate results here. For example, given that many of the country variables are correlated we try a variety of different combinations of country variables and are confident that our reported results provide a good characterization of the results of alternative specifications. Of particular concern is the fact that many of the country variables are significantly related to overall levels of economic development (GDP per capita). Simply including GDP per capita in the regressions is somewhat problematic for this reason. However, when we do this, we find that the coefficients on stock market turnover and stock market capitalization are larger and significant at the 1% level and the coefficient on the index of political risk becomes negative and significant at the 1% level (remember that the political risk index is higher for countries with less politicial risk). This is despite the fact that GDP per capita itself is not usually significant in these regressions. Other robustness checks include estimating regressions at the country level (with and without averages of firm-level variables), different weighting schemes for the estimation to account for changes in sample size, and alternative methods to account for endogenous variables and autocorrelated errors in the panel regression estimations. We also use various measures of leverage to calculate "unlevered" risk measures and find that the results still hold. This validation suggests that the results are driven by differences in fundamental business or asset risk versus differences simply in financial policies. We also estimate regressions for the 1997-2006 period only to make sure the results are not affected by the relatively small sample in earlier years. Such an approach lacks power for Fama-MacBeth regressions since we have only nine cross-sections. Nevertheless, we find the results to be largely consistent with the full-sample results, and we find the Yule-Walker results to be completely consistent except that the creditor rights variable acquires a positive significant coefficient. Finally, we separately estimate regressions using a world market model and a domestic market model. The results of these regressions are generally consistent with the results we report. Overall, we are confident that the tabulated results are robust and provide a conservative summary of a variety of alternative methods. Details of some of these tests are available in the Internet Appendix.

B. The Determinants of Systematic Risk

We now briefly discuss the determinants of systematic risk (the results for total risk, reproduced in the Internet Appendix, are typically similar to those for idiosyncratic risk). The results of our regression analysis are presented in Table VII and follow the same format as for idiosyncratic risk. Several of the relations between our explanatory variables and systematic risk are the same as those observed for idiosyncratic risk. This is not unexpected since previous research has documented similar time-series and cross-country patterns in risk measures (e.g., Campbell et al. (2001) and Bekaert, Hodrick, and Zhang (2010)). Nonetheless, there are important differences.

[Insert Table VII about here]

In the introduction, we point out that countries with more political risk are expected to have more systematic risk, while the relation for idiosyncratic risk is ambiguous. Consistent with this, we find that systematic risk tends to increase with political risk (the coefficient is negative because the political risk index increases as political risk decreases). The economic significance of political risk can be large. For example, in the regressions that use one country variable at a time, the only variable that has greater economic significance is leverage. Garmaise and Liu (2005) develop a model in which corruption leads to an increase in systematic risk because managers expropriate more in bad states of the world. They find that betas increase with corruption. The political risk index we use includes corruption as one of its components. Our result is therefore consistent with their model and their empirical evidence. There is no clear relation between creditor rights and systematic risk across the various regressions, but systematic risk increases sharply with the anti-director index. Though the relation between systematic risk and stock market development measures is ambiguous, there is a strong negative relation between bond market development and systematic risk. Systematic risk falls with capital account openness in all the regressions, but generally increases with equity market openness. The relation between patents and systematic risk is ambiguous, as it is negative for some regressions and positive for others. Systematic risk falls with the disclosure index.

The coefficients on the firm-level variables are generally of the same sign for the systematic risk regressions as for the idiosyncratic risk regressions. A key difference between the systematic risk regressions and the idiosyncratic volatility regressions is that the percent zero returns and the market coverage variables are much more economically significant in the systematic risk regressions, suggesting that liquidity and selection issues are more important for the estimation of systematic risk.

IV. Idiosyncratic Volatility, Systematic Risk, and R^2

Following Morck, Yeung, and Yu (2000), a large literature has developed that focuses on explaining why R^2 differs across countries or within countries. A firm's R^2 is simply the square of its systematic risk divided by the square of its total risk. As a result, there are two sources of variation in R^2: systematic risk and idiosyncratic risk. Consequently, R^2 can fall because systematic risk falls or because total risk increases for constant systematic risk. An increase in total risk not accompanied by an increase in systematic risk is an increase in idiosyncratic risk. It is well established that R^2 falls as a country's governance institutions improve. With our approach in this paper, we can contribute to this literature by examining whether these results hold when controlling for firm characteristics and what the R^2 results tell us about the relation between idiosyncratic risk and a country's institutions. Another way to put this is that we can address the question of whether firms with similar characteristics located in different countries still have R^2s that are related to country characteristics. The answer is yes, but not necessarily in the same way as reported by the country-level literature.

Table VIII reports results from our various regression methods with differences in the logistic transform of R^2 as the dependent variable. The R^2 literature focuses on averages of R^2 over a sample period at the country level. Here, we let R^2 change each year, and we also report results from estimations at the firm level. R^2 is usually negatively related to the political risk index (which would be highly correlated with measures of country governance used in the literature), stock market capitalization, patents, and disclosure; it is positively related to the anti-director index and equity market liberalization. The result on the anti-director index is surprising since the earlier literature (e.g., Morck, Yeung, and Yu (2000)) finds that stock return synchronicity is higher with poorer investor protection in developed economies. However, the result is driven here by the strong relation between systematic risk and the anti-director index. Though the literature finds a negative relation between disclosure and R^2 and interprets the result to mean that firms in high disclosure countries have high idiosyncratic risk, we find (as reported in Table V) a generally negative relation between idiosyncratic risk and disclosure. The reason we find the same result for R^2 as the literature is that systematic risk is even more strongly negatively related to disclosure than idiosyncratic risk (as reported in Table VII).

[Insert Table VIII about here]

Turning to firm characteristics, we find that both the selection variable and the percent zero returns variable are highly significant, suggesting that liquidity and sample selection (usually ignored in other studies) are important determinants of synchronicity. In general, variables that are associated with increases in idiosyncratic risk are negatively related to R^2, but there are exceptions. The major exception is the R&D share of investment, which is positively related to R^2 even though it is strongly positively related to idiosyncratic risk. The reason, not surprisingly, is that it is also strongly positively related to systematic risk.

V. Conclusion

In this paper, we construct a large global data set of firms in 50 countries from 1990 to 2006. Using this data set, we show that the stock returns of foreign firms are less volatile than the stock returns of comparable U.S. firms. We then investigate why this is so. We find that this volatility difference is mostly attributable to foreign firms having lower idiosyncratic risk than comparable U.S. firms. The difference in idiosyncratic risk between foreign and comparable U.S. firms is related to both country and firm characteristics. High idiosyncratic risk can result from factors that decrease welfare as well as from factors that increase welfare. Put differently, there is good idiosyncratic volatility and bad idiosyncratic volatility. Idiosyncratic volatility that results from instability or from noise trading worsens welfare. Idiosyncratic volatility that is the product of greater risk taking and more entrepreneurship can improve welfare and increase economic growth. We find that the higher idiosyncratic volatility of the U.S. is associated with factors that we would expect to be associated with greater economic welfare. In particular, we find that idiosyncratic volatility increases with investor protection, with stock market development, and with innovation. We also find that firm-level variables that are associated with innovation and growth opportunities are associated with greater idiosyncratic volatility. U.S. firms have a significantly higher share of R&D in the sum of capital expenditures and more R&D than comparable firms in foreign countries. This higher R&D share contributes to the higher idiosyncratic volatility of U.S. firms.

It does not follow, however, that economic development and financial development are associated with greater volatility and that the U.S. therefore has more volatile stocks because of greater development. Some country characteristics that one would generally associate with higher economic and financial development are associated with lower volatility. In particular, we find that idiosyncratic volatility falls with capital account openness and with bond market development.

Stock return volatility always draws considerable attention, and passionate arguments are often made about the adverse impact of some groups of investors or some institutions on volatility. However, our research shows that it is not the case that high volatility for individual stocks in a country is bad or good by itself. If volatility is high, it is important to understand why. It can be high for reasons that are associated with greater economic welfare, for instance, greater incentives and ability of firms to take risks that lead to more innovation and growth. It can also be high for other reasons, such as political risk. Overall, volatility is high in the U.S. compared to the other countries for reasons that are associated with factors that contribute to economic growth.

Appendix: Variable Definitions

Variable	Definition
	Firm Characteristics
Total Assets	The sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property, plant, and equipment, and other assets.
Age	Difference between year of observation and year of first listing + 1.
Market-to-Book Value	Common Equity Market Price-Year End / Book Value Per Share.
p-score	Propensity score of being a non-U.S. firm, estimated each year by industry.
PPE / Total Assets	Total Property Plant & Equipment (Net) divided by Total Assets.
R&D Expense / Total Assets	Research and Development (R&D) Expenses as a percent of Total Assets. Values are set to zero for firms with missing values.
Capex / Total Assets	Capital Expenditures (Capex) as a percent of Total Assets. Values are set to zero for firms with missing values.
R&D Share	R&D Expenses as a percent of the sum of R&D Expenses and Capital Expenditures. Values are set to zero for firms with missing values for both variables.
Gross Profit Margin (3 year average)	Average of up to three years (as available) of Gross Income divided by Net Sales or Revenues, where Gross Income is the difference between sales or revenues and cost of goods sold and depreciation.
Cash / Total Assets	Cash and Short-Term Investments divided by (Total Assets – Cash and Short-Term Investments).
Debt Maturity	Total Long-Term Debt (due in more than one year) divided by Total Debt.
Percent Zero Returns	Percentage of available firm weekly local currency returns in a year that equal zero (excluding leading and trailing strings of zeros).
Total Debt	Book Value of Long-Term Debt plus Short-Term Debt including all interest-bearing and capitalized lease obligations.
Size	Year End Market Capitalization + Total Debt + Preferred Stock.
Preferred Stock	Book Value of preferred shares outstanding.
Leverage	(Total Debt + Preferred Stock) divided by Size.
Total Risk	Annualized standard deviation of weekly stock returns measured in U.S. dollars.
Systematic risk	Annualized square root of difference in weekly return variance and variance of residuals from regressions described below for Idiosyncratic Risk.
Idiosyncratic Risk	Annualized standard deviation of residuals from regressions with firm weekly returns as the dependent variable. Independent variables include world market returns, local market returns (including one lead and lag), as well as regional and world returns on size and book-to-market portfolios as in Bekaert, Hodrick, and Zhang (2010). See equation (1) in the main text.
R^2	R^2 from regressions described above for Idiosyncratic Risk.

Appendix: Variable Definitions (continued)

Country & Other Characteristics	
GDP Per Capita	GDP per capita on a purchasing power parity basis (thousands of USD). Data from the World Bank.
ICRG Political Risk Index	From PRS Group. Index measures the overall stability and quality of government institutions using 10 different qualitative measures such as internal and external conflict, corruption, law and order, and bureaucratic quality. Higher values represent more stable and higher quality government institutions.
Creditor Rights Index	From Djankov, McLiesh, and Shleifer (2007).
Anti-Director Rights Index	From Andrei Shleifer's website. Revised index as described in Djankov et al (2008).
Stock Market Turnover Ratio	Ratio of annual trading volume to shares outstanding. Data are from the World Bank.
Stock Market Capital / GDP	Ratio of end-of-year stock market capitalization to Nominal GDP. Data are from the World Bank.
Private Bond Market Capital / GDP	Private domestic debt securities issued by financial institutions and corporations as a share of GDP from World Bank Financial Development and Structure Database. Raw data are taken from the electronic version of the Bank of International Settlements' Quarterly Review: International Banking and Financial Market Developments by sector and country of issuer. See Beck, Demirguc-Kunt, and Levine (2000).
Disclosure Index	As defined in Jin and Myers (2007), additional data from Global Competitiveness Reports (1999, 2000).
Equity Market Liberalization	As in Bekaert, Harvey, and Lundblad (2005), the equity market liberalization intensity is measured as the percentage of the equity market that is investable for foreign investors.
Capital Account Openness	As in Ito and Chinn (2008), this index is based on measures of the presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and the requirement to surrender export proceeds. The index takes on higher values for countries that are more open to cross-border capital transactions.
Patents (per MM population)	Number of U.S. patents granted in the year of interest to citizens of the non-U.S. country dividend by the population (in millions).
Global Growth Opportunities	As described in Bekaert et al. (2007).
Domestic Market Index Volatility	Annualized standard deviation of weekly major market index returns as reported by Datastream.
Market Coverage	Percentage of all listed firms in a country that are in our sample. Data on the total number of listings comes from the World Federation of Exchanges (supplemented by data hand collected from individual exchange websites) and includes only local country listings.

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Figure 1. Risk measures over time. This figure plots various measures of risk estimated for non-U.S. firms and their matched U.S. firm counterparts. Panel A plots total risk, Panel B plots systematic risk, Panel C plots idiosyncratic risk, and Panel D plots R^2. Mean values of each group are plotted from 1991 to 2006. The number of sample countries increases consistently during the sample period. Risk measures in Panels B, C, and D are determined using equation (1) in the main text.

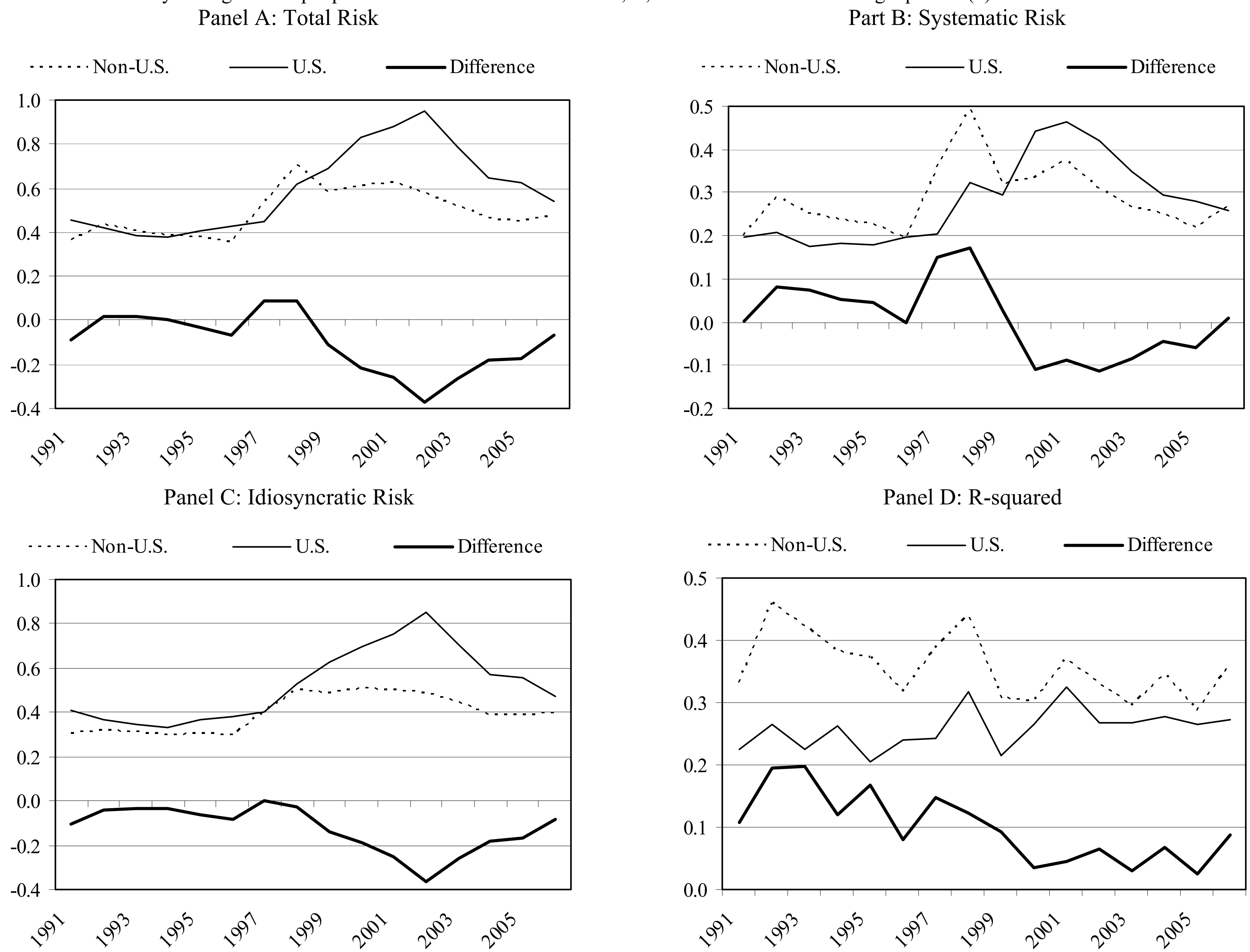

Table I
Summary Statistics by Country

This table reports country-level median values of variables for firm-year observations in our primary data set. Panel A reports values for firm-level variables, and Panel B reports values for country-level variables. Statistics are derived from data for 1991 to 2006 excluding firm-years with more than 30% of weekly stock returns equal to zero in the prior year. We also eliminate firms with missing data for total assets, market-to-book, and firm age in the prior year. Definitions of variables are provided in the Appendix.

Panel A: Firm-Level Characteristics

	Firm-year Obs.	Total Risk	Systematic Risk	Idiosyncratic Risk	R^2	Total Assets	Age	Market-to-Book	Percent Zero Returns	Leverage	Profit Margin	Cash/ Total Assets	Debt Maturity
Argentina	424	0.416	0.262	0.294	0.404	657.1	9	0.990	0.058	0.364	0.273	0.044	0.609
Australia	5,735	0.488	0.230	0.418	0.249	30.0	8	1.723	0.096	0.079	0.136	0.112	0.725
Austria	618	0.272	0.154	0.218	0.340	652.5	8	1.389	0.058	0.358	0.202	0.077	0.643
Belgium	1,126	0.269	0.148	0.218	0.322	326.1	10	1.430	0.058	0.242	0.072	0.083	0.592
Brazil	1,142	0.489	0.318	0.347	0.440	1043.0	8	0.880	0.058	0.388	0.278	0.084	0.594
Canada	7,347	0.451	0.218	0.385	0.246	101.7	10	1.739	0.075	0.127	0.214	0.069	0.789
Chile	784	0.293	0.182	0.226	0.382	526.3	9	1.552	0.077	0.246	0.304	0.038	0.712
China	6,191	0.378	0.160	0.338	0.184	182.1	7	2.130	0.058	0.207	0.211	0.138	0.090
Colombia	161	0.376	0.256	0.250	0.472	1253.5	7	0.934	0.094	0.295	0.333	0.061	0.601
Czech Republic	92	0.424	0.242	0.318	0.314	545.3	6	0.921	0.019	0.263	0.094	0.046	0.643
Denmark	1,167	0.284	0.150	0.233	0.275	292.5	12	1.356	0.115	0.325	0.200	0.109	0.599
Egypt	187	0.393	0.221	0.318	0.324	408.7	6	1.510	0.000	0.242	0.311	0.136	0.455
Finland	1,024	0.326	0.172	0.268	0.277	196.5	6	1.537	0.077	0.249	0.227	0.086	0.707
France	6,377	0.353	0.176	0.300	0.259	167.7	7	1.645	0.038	0.253	0.112	0.104	0.588
Germany	6,156	0.376	0.191	0.320	0.260	158.8	7	1.767	0.057	0.211	0.206	0.076	0.566
Greece	2,513	0.475	0.280	0.364	0.378	89.4	7	1.802	0.019	0.200	0.236	0.052	0.233
Hong Kong	5,396	0.466	0.240	0.389	0.253	190.0	9	0.962	0.096	0.220	0.208	0.154	0.423
Hungary	189	0.395	0.235	0.281	0.379	206.0	7	1.091	0.038	0.234	0.216	0.066	0.407
India	3,671	0.491	0.282	0.391	0.329	155.7	10	1.460	0.019	0.341	0.147	0.032	0.684
Indonesia	1,196	0.543	0.336	0.406	0.419	196.5	7	1.074	0.173	0.387	0.250	0.107	0.556
Ireland	481	0.291	0.166	0.233	0.313	431.7	15	1.956	0.000	0.267	0.232	0.118	0.776
Israel	635	0.367	0.248	0.256	0.475	713.3	8	1.451	0.000	0.382	0.276	0.108	0.606
Italy	2,417	0.311	0.177	0.241	0.348	588.0	9	1.427	0.019	0.326	0.348	0.089	0.507
Japan	36,118	0.380	0.232	0.288	0.392	396.2	12	1.331	0.057	0.301	0.218	0.162	0.441
Korea (Republic of)	6,510	0.535	0.303	0.419	0.333	209.7	12	0.655	0.019	0.515	0.157	0.094	0.388
Luxembourg	116	0.285	0.154	0.229	0.308	385.4	7	1.484	0.075	0.080	0.237	0.117	0.615
Malaysia	6,822	0.411	0.229	0.322	0.327	103.2	9	1.124	0.094	0.233	0.178	0.071	0.331
Mexico	673	0.365	0.217	0.269	0.392	1279.4	8	1.370	0.000	0.216	0.316	0.074	0.724
Morocco	129	0.250	0.157	0.183	0.399	530.0	9	1.947	0.096	0.059	0.181	0.083	0.027
Netherlands	1,633	0.297	0.162	0.242	0.312	397.4	16	1.867	0.038	0.243	0.207	0.052	0.646
New Zealand	527	0.286	0.170	0.227	0.361	105.3	8	1.690	0.115	0.217	0.146	0.022	0.874
Norway	1,043	0.404	0.231	0.322	0.312	234.8	7	1.733	0.077	0.261	0.210	0.138	0.815
Pakistan	628	0.448	0.264	0.336	0.355	134.1	8	1.350	0.058	0.366	0.166	0.079	0.432
Peru	322	0.390	0.191	0.318	0.236	161.2	8	1.042	0.000	0.235	0.264	0.028	0.457
Philippines	862	0.516	0.302	0.404	0.354	264.2	8	0.963	0.154	0.307	0.267	0.065	0.527
Poland	683	0.422	0.251	0.325	0.358	113.6	5	1.329	0.058	0.198	0.186	0.074	0.499
Portugal	500	0.290	0.164	0.235	0.353	391.5	8	1.269	0.058	0.463	0.059	0.034	0.587
Russian Federation	256	0.439	0.252	0.329	0.320	1356.2	6	0.811	0.000	0.210	0.289	0.041	0.469
Singapore	2,989	0.400	0.215	0.322	0.311	124.4	7	1.252	0.113	0.200	0.166	0.136	0.403
South Africa	1,774	0.391	0.232	0.310	0.337	274.7	10	1.685	0.094	0.121	0.218	0.106	0.627
Spain	1,314	0.282	0.166	0.221	0.361	824.2	9	1.651	0.038	0.279	0.229	0.049	0.494
Sri Lanka	187	0.375	0.254	0.249	0.495	141.6	11	1.084	0.122	0.434	0.199	0.083	0.404
Sweden	2,301	0.384	0.215	0.307	0.317	102.6	7	1.976	0.075	0.137	0.154	0.114	0.813
Switzerland	1,739	0.278	0.148	0.229	0.305	450.8	12	1.353	0.077	0.289	0.234	0.136	0.721
Taiwan	6,680	0.438	0.253	0.342	0.355	155.6	6	1.246	0.057	0.257	0.171	0.123	0.309
Thailand	2,968	0.437	0.243	0.343	0.304	94.3	9	1.187	0.077	0.352	0.223	0.050	0.369
Turkey	1,634	0.595	0.416	0.388	0.557	102.7	9	1.599	0.096	0.202	0.255	0.067	0.259
United Kingdom	8,731	0.339	0.178	0.283	0.279	221.6	13	2.168	0.094	0.140	0.297	0.095	0.683
United States	55,008	0.448	0.215	0.385	0.231	224.2	10	1.915	0.038	0.171	0.308	0.094	0.815
Venezuela	123	0.559	0.382	0.349	0.543	752.8	6	0.643	0.063	0.288	0.281	0.072	0.548
All countries		0.391	0.225	0.314	0.331	229.5	8	1.408	0.058	0.247	0.217	0.083	0.588

Table I

Summary Statistics by Country (continued)

Panel B: Country-Level Characteristics

	GDP/ Capita	ICRG Political	Creditor Rights	Anti-Director Rights	Stock Market Turnover	Market Cap/ GDP	Private Bond Mkt/GDP	Capital Account Openness	Patents/ Million Popul.	Equity Market Liberal.	Discl-osure	Global Growth Options	Market Coverage	Market Index Volatility
Argentina	5.5	71	1	2.0	0.121	0.296	0.076	-0.087	0.815	0.983	4.870	2.901	0.144	0.271
Australia	25.4	88	3	4.0	0.763	1.009	0.326	1.180	3.984	1.000	6.315	2.860	0.476	0.146
Austria	26.3	87	3	2.5	0.347	0.164	0.335	2.532	4.161	1.000	5.763	2.869	0.358	0.147
Belgium	24.6	83	2	3.0	0.229	0.759	0.418	2.262	4.238	1.000	5.948	2.930	0.368	0.161
Brazil	3.3	66	1	5.0	0.382	0.355	0.107	0.183	0.500	0.947	4.975	2.828	0.269	0.319
Canada	27.5	86	1	4.0	0.632	1.067	0.278	2.532	4.820	1.000	6.365	2.890	0.264	0.159
Chile	5.1	78	2	4.0	0.107	0.861	0.174	0.499	0.601	0.957	5.800	2.932	0.225	0.166
China	1.2	69	2	1.0	1.015	0.345	0.090	-1.131	0.360	0.582	3.773		0.919	0.251
Colombia	2.1	54	0	3.0	0.078	0.168	0.005	-1.131	0.178	0.000	4.435	2.913	0.083	0.200
Czech Republic	6.0	79	3	4.0	0.456	0.202	0.061	0.724	1.318	0.924	4.238		0.255	0.258
Denmark	32.5	87	3	4.0	0.672	0.556	1.082	2.532	4.568	1.000	6.213	3.040	0.412	0.168
Egypt	1.3	64	2	3.0	0.316	0.418	0.000	2.532	0.066	0.912	4.338	2.804	0.038	0.286
Finland	25.4	94	1	3.5	0.891	1.023	0.242	2.532	4.971	1.000	6.450	3.250	0.665	0.276
France	24.0	78	0	3.5	0.811	0.785	0.411	2.532	4.127	1.000	5.898	2.982	0.631	0.163
Germany	25.8	86	3	3.5	1.226	0.435	0.469	2.532	4.888	1.000	6.040	2.964	0.602	0.185
Greece	12.2	78	1	2.0	0.437	0.578	0.012	1.991	0.986	1.000	4.873	2.856	0.812	0.199
Hong Kong	24.2	78	4	5.0	0.503	3.674	0.175	2.532	4.483	1.000	5.818		0.542	0.176
Hungary	6.6	81	1	2.0	0.738	0.223	0.021	1.721	1.769	0.989	5.025		0.377	0.291
India	0.5	62	2	5.0	1.130	0.351	0.006	-1.131	0.227	0.566	4.778	2.925	0.385	0.253
Indonesia	1.0	52	2	4.0	0.428	0.269	0.017	1.180	0.064	0.874	4.173	2.832	0.318	0.273
Ireland	25.5	89	1	5.0	0.563	0.569	0.084	2.532	3.611	1.000	5.605	2.907	0.344	0.176
Israel	17.2	62	3	4.0	0.553	0.596	0.000	2.262	5.084	0.991	5.708	2.965	0.145	0.244
Italy	20.8	78	2	2.0	1.040	0.416	0.343	2.532	3.503	1.000	5.135	2.885	0.701	0.179
Japan	34.2	84	2	4.5	0.693	0.736	0.454	2.532	5.552	1.000	5.553	3.013	0.643	0.208
Korea (Republic of)	12.2	76	3	4.5	2.095	0.561	0.571	-0.087	4.445	0.945	4.748	2.948	0.778	0.311
Luxembourg	46.2	93	0	2.0	0.011	1.447	0.000	0.000	4.698	1.000	5.973		0.041	0.169
Malaysia	4.2	74	3	5.0	0.319	1.429	0.519	-0.087	1.267	0.924	5.145	2.922	0.738	0.127
Mexico	6.1	72	0	3.0	0.289	0.255	0.097	1.180	0.653	0.980	4.640	2.976	0.221	0.228
Morocco	1.4	72	1	2.0	0.096	0.383	0.000	-1.131	0.033	0.905		2.806	0.291	0.172
Netherlands	25.3	89	3	2.5	1.007	1.046	0.459	2.532	4.492	1.000	6.098	3.013	0.451	0.163
New Zealand	18.6	88	4	4.0	0.399	0.392	0.000	2.532	3.737	1.000	6.030	2.965	0.288	0.145
Norway	42.0	89	2	3.5	0.859	0.388	0.209	2.532	4.035	1.000	5.830	2.858	0.463	0.211
Pakistan	0.5	49	1	4.0	3.227	0.163	0.000	-1.131	0.012	0.000		2.783	0.048	0.281
Peru	2.2	63	0	3.5	0.089	0.244	0.037	2.532	0.111	0.845	4.615		0.122	0.160
Philippines	1.0	67	1	4.0	0.238	0.467	0.003	0.137	0.211	0.477	4.603	2.972	0.354	0.228
Poland	5.4	75	1	2.0	0.362	0.179	0.000	0.137	0.404	0.986	4.675		0.404	0.244
Portugal	11.3	86	1	2.5	0.521	0.373	0.238	2.532	0.769	1.000	5.118	2.889	0.292	0.168
Russian Federation	4.0	66	2	4.0	0.395	0.425	0.000	-0.087	0.804	0.646	3.793		0.146	0.304
Singapore	23.1	86	3	5.0	0.508	1.597	0.187	2.532	4.493	1.000	5.943	2.981	0.517	0.182
South Africa	3.4	69	3	5.0	0.400	1.625	0.116	-1.131	1.346	0.998	5.450	2.905	0.386	0.245
Spain	15.2	81	2	5.0	1.628	0.680	0.161	2.532	2.120	1.000	5.648	2.850	0.487	0.162
Sri Lanka	0.8	54	2	4.0	0.148	0.131	0.000	0.137	0.141	0.000		2.888	0.066	0.193
Sweden	28.4	90	1	3.5	1.104	1.098	0.424	2.532	5.046	1.000	6.315	2.994	0.828	0.199
Switzerland	37.7	89	1	3.0	0.929	2.182	0.410	2.532	5.253	1.000	5.713	3.047	0.372	0.152
Taiwan	13.0	77	2	3.0	1.752	1.074	0.265	0.000	0.000	1.000	5.415		1.000	
Thailand	2.5	69	2	4.0	0.743	0.643	0.126	-0.087	0.357	0.558	4.255	2.892	0.570	0.255
Turkey	3.5	64	2	3.0	1.546	0.277	0.000	-1.131	0.189	0.982	5.110	2.849	0.550	0.411
United Kingdom	25.0	85	4	5.0	0.777	1.342	0.162	2.532	4.213	1.000	6.348	2.994	0.268	0.151
United States	35.5	83	1	3.0	1.256	1.320	1.052	2.532	5.595	1.000	6.553	3.046	0.670	0.146
Venezuela	4.0	60	3	1.0	0.102	0.067	0.006	-0.049	0.806	0.616	3.725	2.836	0.117	0.322
All countries	12.2	78	2	3.5	0.537	0.512	0.1211	2.126	1.346	0.999	5.45	2.913	0.374	0.199

Table II

Matched Sample Tests

This table reports mean, median, and standard deviation (Std.Dev.) values for characteristics of non-U.S. firms and matched U.S. firms. Annual values for each non-U.S. firm (and its matched U.S. firm(s)) are averaged so that each non-U.S. firm appears only once. Variables are created using USD-denominated data. Firms with more than 30% of local currency stock returns equal to zero in the previous period are excluded. Matching is performed one year prior to the observation year by industry. The first part reports values for variables used in propensity score matching including the propensity scores. The second part reports values for the primary firm-level variables. The third part reports values for country-level variables. Not all variables are available for all firms. We do not report standard deviations for matched U.S. firms for the country variables with no time-series variation. For the firm-level variables, *p*-values from *t*-tests and Wilcoxon tests for differences in samples are reported in the last two columns. Variable definitions are provided in the Appendix.

	Non-U.S.			Matched U.S.			Differences		Tests	
Variable	Mean	Median	Std.Dev.	Mean	Median	Std.Dev.	Means	Medians	t-Test	Wilcoxon
Matching Characteristics										
Total Assets (log)	4.902	4.771	1.941	5.496	5.578	1.454	-0.594	-0.806	<0.001	<0.001
Age (log)	1.750	1.835	0.851	2.022	2.093	0.637	-0.271	-0.258	<0.001	<0.001
Market-to-Book	2.435	1.719	2.370	2.344	1.987	1.658	0.092	-0.268	<0.001	<0.001
P-score	0.778	0.812	0.138	0.778	0.812	0.137	0.000	0.000	0.927	0.868
Firm Characteristics										
Leverage	0.267	0.231	0.224	0.262	0.251	0.152	0.005	-0.020	0.005	<0.001
PPE / Total Assets	0.314	0.283	0.229	0.269	0.244	0.168	0.045	0.039	<0.001	<0.001
R&D Expense / Total Assets	0.011	0.000	0.046	0.031	0.005	0.062	-0.019	-0.005	<0.001	<0.001
CapEx / Total Assets	0.057	0.039	0.061	0.050	0.042	0.041	0.007	-0.002	<0.001	<0.001
R&D Share	0.104	0.000	0.212	0.178	0.085	0.218	-0.074	-0.085	<0.001	<0.001
Gross Profit Margin (3 yr ave.)	0.220	0.210	0.248	0.270	0.272	0.178	-0.050	-0.062	<0.001	<0.001
Cash / Total Assets	0.344	0.138	0.824	0.427	0.158	0.797	-0.083	-0.019	<0.001	<0.001
Debt Maturity	0.453	0.455	0.293	0.716	0.748	0.207	-0.263	-0.293	<0.001	<0.001
Percent Zero Returns	0.089	0.073	0.064	0.051	0.048	0.035	0.038	0.025	<0.001	<0.001
Country Characteristics										
ICRG Political Risk	78.621	82.200	8.570	82.083	82.143	1.362	-3.461	0.057		
Creditor Rights	2.277	2.000	0.994	1.000	1.000		1.277	1.000		
Anti-Director Rights Index	3.900	4.000	1.112	3.000	3.000		0.900	1.000		
Stock Market Turnover Ratio	0.922	0.806	0.526	1.475	1.505	0.205	-0.553	-0.699		
Stock Market Capital / GDP	1.010	0.798	0.743	1.307	1.316	0.100	-0.297	-0.518		
Private Bond Market Capital / GDP	0.295	0.279	0.185	1.076	1.103	0.086	-0.781	-0.824		
Disclosure	5.476	5.553	0.742	6.553	6.553		-1.076	-1.000		
Equity Market Liberalization	0.924	1.000	0.162	1.000	1.000		-0.076	0.000		
Capital Account Openness	1.434	2.352	1.373	2.532	2.532		-1.098	-0.180		
Patents / Million Population (log)	3.488	4.226	1.966	5.595	5.565	0.863	-2.107	-1.339		
Domestic Market Index Volatility (log)	-1.639	-1.630	0.279	-2.028	-2.032	0.188	0.389	0.402		
Global Growth Opportunities	2.947	2.949	0.100	3.057	3.100	0.083	-0.110	-0.151		

Table III
Matched Sample Tests of Risk Measures

This table reports mean, median, and standard deviation (Std.Dev.) values for risk characteristics of non-U.S. firms and matched U.S. firms. Annual values for each non-U.S. firm (and its matched U.S. firm(s)) are averaged so that each non-U.S. firm appears only once in each grouping. Variables are created using USD-denominated data. Matching is performed one year prior to the observation year by industry. *p*-values from *t*-tests and Wilcoxon tests for differences in samples are reported in the last two columns. Panel A reports values for all firms and segmented by stage of economic development. Panel B reports differences by different screens for trading activity (i.e., percent of local currency returns equal to zero). The sum of observations for developing and developed countries in Panel A exceeds the number of observations for all countries because some countries change from developing to developed during our sample. However, only data for the correct classification are used in calculating averages for the 461 firms that appear in both groupings.

Panel A: Differences in Risk Measures

		Non-U.S.			Matched U.S.			Differences		Tests	
Variable	N	Mean	Median	Std.Dev.	Mean	Median	Std.Dev.	Means	Medians	t-test	Wilcoxon
All Countries											
Total Risk	20,069	0.557	0.460	0.558	0.700	0.588	0.707	-0.143	-0.128	<0.001	<0.001
Systematic Risk	20,065	0.301	0.254	0.300	0.328	0.283	0.318	-0.027	-0.028	<0.001	<0.001
Idiosyncratic Risk	20,065	0.468	0.377	0.495	0.618	0.510	0.647	-0.150	-0.133	<0.001	<0.001
R^2	20,065	0.312	0.298	0.118	0.266	0.261	0.075	0.046	0.037	<0.001	<0.001
Developed Countries											
Total Risk	12,968	0.566	0.455	0.584	0.714	0.601	0.716	-0.148	-0.145	<0.001	<0.001
Systematic Risk	12,964	0.294	0.250	0.284	0.336	0.287	0.328	-0.042	-0.037	<0.001	<0.001
Idiosyncratic Risk	12,964	0.484	0.372	0.527	0.630	0.522	0.653	-0.146	-0.150	<0.001	<0.001
R^2	12,964	0.310	0.295	0.113	0.264	0.260	0.074	0.046	0.035	<0.001	<0.001
Developing Countries											
Total Risk	7,563	0.543	0.468	0.511	0.673	0.558	0.701	-0.130	-0.091	<0.001	<0.001
Systematic Risk	7,562	0.316	0.263	0.328	0.314	0.271	0.308	0.003	-0.008	0.336	0.003
Idiosyncratic Risk	7,562	0.442	0.381	0.429	0.596	0.484	0.644	-0.154	-0.103	<0.001	<0.001
R^2	7,562	0.321	0.307	0.129	0.269	0.263	0.077	0.051	0.044	<0.001	<0.001

Table III
Matched Sample Tests of Risk Measures (continued)

Panel B: Differences in Risk Measures by Zero Return Thresholds

		Non-U.S.			Matched U.S.			Differences		Tests	
Variable	N	Mean	Median	Std.Dev.	Mean	Median	Std.Dev.	Means	Medians	t-test	Wilcoxon
Total Risk											
No Zero Return Screen	21,316	0.570	0.467	0.581	0.769	0.657	0.749	-0.199	-0.189	<0.001	<0.001
<30% Zero Returns	20,069	0.557	0.460	0.558	0.700	0.588	0.707	-0.143	-0.128	<0.001	<0.001
<10% Zero Returns	17,487	0.537	0.449	0.540	0.630	0.520	0.656	-0.093	-0.071	<0.001	<0.001
Systematic Risk											
No Zero Return Screen	21,312	0.299	0.255	0.286	0.350	0.304	0.332	-0.051	-0.049	<0.001	<0.001
<30% Zero Returns	20,065	0.301	0.254	0.300	0.328	0.283	0.318	-0.027	-0.028	<0.001	<0.001
<10% Zero Returns	17,485	0.303	0.254	0.316	0.312	0.262	0.320	-0.009	-0.008	<0.001	<0.001
Idiosyncratic Risk											
No Zero Return Screen	21,312	0.484	0.385	0.524	0.684	0.575	0.682	-0.199	-0.191	<0.001	<0.001
<30% Zero Returns	20,065	0.468	0.377	0.495	0.618	0.510	0.647	-0.150	-0.133	<0.001	<0.001
<10% Zero Returns	17,485	0.444	0.362	0.471	0.548	0.445	0.590	-0.104	-0.083	<0.001	<0.001
R^2											
No Zero Return Screen	21,312	0.306	0.287	0.116	0.255	0.251	0.068	0.050	0.036	<0.001	<0.001
<30% Zero Returns	20,065	0.312	0.298	0.118	0.266	0.261	0.075	0.046	0.037	<0.001	<0.001
<10% Zero Returns	17,485	0.331	0.321	0.124	0.282	0.276	0.084	0.049	0.045	<0.001	<0.001

Table IV

Matched Sample Tests over Time

This table reports mean differences in risk characteristics of non-U.S. firms and matched U.S. firms by year and subperiod. Variables are created using USD denominated data. Firms with more than 30% of local currency stock returns equal to zero in the previous year are excluded. Matching is performed one year prior to the observation year by industry. *p*-values from *t*-tests for differences in means are also reported.

	Total Risk		Systematic Risk		Idiosyncratic Risk		R^2	
	Mean Diff	p-value	Mean Diff	p-value	Mean Diff	p-value	Mean Diff	p-value
1991	-0.090	<0.001	0.002	0.437	-0.105	<0.001	0.108	<0.001
1992	0.014	0.013	0.083	<0.001	-0.044	<0.001	0.196	<0.001
1993	0.015	0.006	0.076	<0.001	-0.033	<0.001	0.198	<0.001
1994	0.002	0.696	0.053	<0.001	-0.032	<0.001	0.119	<0.001
1995	-0.029	<0.001	0.046	<0.001	-0.062	<0.001	0.168	<0.001
1996	-0.070	<0.001	-0.002	0.277	-0.080	<0.001	0.080	<0.001
1997	0.086	<0.001	0.150	<0.001	0.001	0.881	0.147	<0.001
1998	0.085	<0.001	0.170	<0.001	-0.026	<0.001	0.122	<0.001
1999	-0.110	<0.001	0.026	<0.001	-0.141	<0.001	0.092	<0.001
2000	-0.218	<0.001	-0.109	<0.001	-0.189	<0.001	0.036	<0.001
2001	-0.256	<0.001	-0.089	<0.001	-0.249	<0.001	0.044	<0.001
2002	-0.374	<0.001	-0.112	<0.001	-0.365	<0.001	0.064	<0.001
2003	-0.269	<0.001	-0.083	<0.001	-0.261	<0.001	0.029	<0.001
2004	-0.182	<0.001	-0.045	<0.001	-0.185	<0.001	0.067	<0.001
2005	-0.176	<0.001	-0.059	<0.001	-0.168	<0.001	0.024	<0.001
2006	-0.065	<0.001	0.008	<0.001	-0.080	<0.001	0.087	<0.001
1991-1999	-0.008	0.003	0.081	<0.001	-0.063	<0.001	0.130	<0.001
2000-2006	-0.219	<0.001	-0.068	<0.001	-0.214	<0.001	0.052	<0.001

Table V
Idiosyncratic Risk Regressions

This table reports values from firm-level regressions with log-differences in idiosyncratic risk as the dependent variables. The first set of results is from Fama-MacBeth style regressions. Regressions are estimated at the firm-level annually with the independent variables listed in the first column. Using these estimated coefficients a second regression determines the relation over time (1992-2006), and these values are reported in the table with corresponding *p*-values. Standard errors are corrected with the Newey-West (1987) procedure. The second column reports summary results from many Fama-MacBeth style regressions where only one country variable is included in each regression. The firm-level results are average coefficients and *p*-values across the many regressions. The third set of results represents coefficient estimates from a single cross-sectional regression, where each firm enters the sample only once using average characteristics of each firm. The last set of results is from weighted least squares panel regressions estimated using the Yule-Walker method to account for autocorrelation. Estimation is done with weighting by the inverse of the annual number of firms to adjust for changing sample size. The regression includes year fixed effects (not reported). In all regressions the explanatory variables are lagged and standardized to mean zero and unit standard deviation so that the magnitude of coefficients represents the effect on risk of a one-standard deviation move in the explanatory variable. Risk variables are measured as log differences between non-U.S. firms and their matching U.S. firms. For Fama-MacBeth style regressions the values for Observations and Adjusted R^2 are the averages across the cross-sectional regressions. Variable definitions are provided in the Appendix.

	Fama-MacBeth All-Country Variables		Fama MacBeth One-Country Variable		Single Cross-Section		Panel with Yule-Walker	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
ICRG Political	-0.019	0.15	-0.062	<0.01	-0.034	<0.01	0.010	0.04
Creditor Rights	-0.001	0.78	0.016	0.01	0.002	0.66	0.001	0.78
Anti-Director Rights Index	0.025	0.09	0.024	0.05	0.000	0.95	0.018	<0.01
Stock Market Turnover	0.021	0.02	0.024	0.03	0.026	<0.01	0.009	0.01
Stock Market Capital (%GDP)	0.020	0.13	0.026	<0.01	0.043	<0.01	0.035	<0.01
Private Bond Market (%GDP)	-0.022	<0.01	-0.052	<0.01	-0.025	<0.01	-0.045	<0.01
Capital Account Openness	-0.031	0.01	-0.064	<0.01	-0.021	<0.01	-0.033	<0.01
Patents (log per million pop.)	0.033	<0.01	-0.003	0.76	0.024	<0.01	0.034	<0.01
Equity Market Liberalization	0.017	0.10	-0.006	0.58	-0.018	<0.01	0.000	0.93
Disclosure	-0.046	0.05	-0.057	<0.01	-0.008	0.44	-0.038	<0.01
PPE / Total Assets	-0.058	<0.01	-0.052	<0.01	-0.061	<0.01	-0.064	<0.01
Profitability (3-yr ave.)	-0.070	<0.01	-0.067	<0.01	-0.075	<0.01	-0.079	<0.01
Cash & STI (% Total Assets)	0.035	<0.01	0.035	<0.01	0.018	<0.01	0.028	<0.01
Debt Maturity	-0.035	<0.01	-0.043	<0.01	-0.027	<0.01	-0.044	<0.01
R&D Share	0.045	<0.01	0.040	<0.01	0.048	<0.01	0.050	<0.01
Percent Zero Returns	-0.017	0.03	-0.020	0.02	-0.017	<0.01	-0.014	<0.01
Total Assets (log)	-0.263	<0.01	-0.266	<0.01	-0.264	<0.01	-0.330	<0.01
Age (log)	-0.109	<0.01	-0.113	<0.01	-0.049	<0.01	-0.089	<0.01
Market-To-Book	0.003	0.61	0.003	0.58	0.011	0.02	0.017	<0.01
Leverage	0.202	<0.01	0.206	<0.01	0.152	<0.01	0.215	<0.01
Market Coverage	-0.001	0.93	-0.008	0.25	-0.014	0.02	-0.009	0.02
Intercept	-0.143	<0.01	-0.143	<0.01	-0.113	<0.01	-0.043	0.01
Adjusted R^2	0.406		0.380		0.412		0.387	
Observations	5,824		5,824		15,293		93,225	

Table VI

Robustness Tests for Idiosyncratic Risk Regressions

This table reports values from firm-level regressions with log-differences in idiosyncratic risk as the dependent variables. Specification (1) includes the country-level global growth opportunities (GGO) variable from Bekaert et al(2007). Specification (2) includes a dummy variable for firms with an ADR listing in the year of observation as well as interactions between the ADR dummy variable and country-level variables (denoted "*ADR"). Specification (3) is limited to firm-years with fewer than 10% zero returns. Specification (4) includes firms with no screen on the number of zero returns. Specification (5) excludes financial firms. Specification (6) is based on firm matching only by year, industry, and firm size. All results are from Fama-MacBeth style regressions. Regressions are estimated at the firm level annually with the independent variables listed in the first column. Using these estimated coefficients a second regression determines the relation over time (1992-2006), and these values are reported in the table with corresponding *p*-values (values reported as 0.00 are less than 0.005). Standard errors are corrected with the Newey-West (1987) procedure. In all regressions the explanatory variables are lagged and standardized to mean zero and unit standard deviation so that the magnitude of coefficients represents the effect on risk of a one-standard deviation move in the explanatory variable. Equity Market Liberalization and Patents are orthogonalized with respect to GDP per capita. Idiosyncratic risk is measured as the log difference between non-U.S. firms and the matching U.S. firms. The values for Observations and Adjusted R^2 are the averages across the cross-sectional regressions. Variable definitions are provided in the Appendix.

	(1)		(2)				(3)		(4)		(5)		(6)	
	Coef.	*p*-val	Coef.	*p*-val	*ADR	*p*-val	Coef.	*p*-val	Coef.	*p*-val	Coef.	*p*-val	Coef.	*p*-val
ICRG Political	-0.001	0.95	-0.019	0.17	-0.003	0.40	-0.015	0.16	-0.017	0.30	-0.015	0.26	-0.020	0.16
Creditor Rights	-0.007	0.26	-0.002	0.80	-0.008	0.40	0.009	0.17	-0.009	0.11	-0.004	0.33	-0.001	0.82
Anti-Director Rights Index	0.036	<0.01	0.026	0.08	-0.006	0.44	0.027	0.06	0.026	0.08	0.024	0.10	0.026	0.08
Stock Market Turnover	0.020	0.03	0.021	0.04	0.003	0.53	0.023	0.02	0.020	0.02	0.024	0.01	0.022	0.02
Stock Market Capital (%GDP)	-0.010	0.44	0.016	0.11	0.016	0.02	0.024	0.01	0.022	0.15	0.016	0.20	0.023	0.06
Private Bond Market (%GDP)	-0.013	0.07	-0.024	0.01	0.071	<0.01	-0.011	0.33	-0.029	<0.01	-0.022	0.01	-0.021	0.01
Capital Account Openness	-0.039	<0.01	-0.030	0.02	0.002	0.58	-0.039	<0.01	-0.025	0.05	-0.033	0.01	-0.029	0.02
Global Growth Opportunities	-0.005	0.53												
Patents (log per million pop.)	0.035	<0.01	0.036	<0.01	-0.015	0.01	0.039	<0.01	0.030	<0.01	0.033	<0.01	0.035	<0.01
Equity Market Liberalization	0.030	0.02	0.017	0.13	0.001	0.88	0.024	0.02	0.016	0.17	0.017	0.10	0.024	0.01
Disclosure	-0.050	0.04	-0.048	0.03	0.013	0.29	-0.039	0.07	-0.052	0.06	-0.041	0.10	-0.051	0.02
PPE / Total Assets	-0.056	<0.01	-0.057	<0.01			-0.052	<0.01	-0.063	<0.01	-0.048	<0.01	-0.051	<0.01
Profitability (3-yr ave.)	-0.068	<0.01	-0.069	<0.01			-0.057	<0.01	-0.064	<0.01	-0.064	<0.01	-0.056	<0.01
Cash & STI (% Total Assets)	0.034	<0.01	0.034	<0.01			0.044	<0.01	0.030	<0.01	0.037	<0.01	0.041	<0.01
Debt Maturity	-0.038	<0.01	-0.036	<0.01			-0.029	<0.01	-0.036	<0.01	-0.039	<0.01	-0.027	<0.01
R&D Share	0.044	<0.01	0.044	<0.01			0.044	<0.01	0.045	<0.01	0.044	<0.01	0.051	<0.01
Percent Zero Returns	-0.018	0.01	-0.016	0.03			-0.016	0.01	-0.048	<0.01	-0.016	0.02	-0.015	0.04
Total Assets (log)	-0.266	<0.01	-0.268	<0.01			-0.260	<0.01	-0.292	<0.01	-0.263	<0.01	-0.161	<0.01
Age (log)	-0.107	<0.01	-0.108	<0.01			-0.111	<0.01	-0.102	<0.01	-0.109	<0.01	-0.106	<0.01
Market-To-Book	0.006	0.38	0.004	0.53			0.002	0.67	0.002	0.66	0.004	0.55	0.020	0.01
Leverage	0.204	<0.01	0.203	<0.01			0.177	<0.01	0.213	<0.01	0.204	<0.01	0.206	<0.01
ADR Dummy			0.527	<0.01										
Market Coverage	-0.007	0.49	0.004	0.74	-0.005	0.54	-0.009	0.37	-0.003	0.80	-0.003	0.79	-0.009	0.47
Intercept	-0.156	<0.01	-0.171	<0.01			-0.109	<0.01	-0.177	<0.01	-0.148	<0.01	-0.141	<0.01
Adjusted R^2	0.409		0.409				0.404		0.381		0.408		0.294	
Observations	5195		5824				4251		6732		5610		5859	

Table VII

Systematic Risk Regressions

This table reports values from firm-level regressions with log-differences in systematic risk as the dependent variables. The first set of results is from Fama-MacBeth style regressions. Regressions are estimated at the firm level annually with the independent variables listed in the first column. Using these estimated coefficients a second regression determines the relation over time (1992-2006), and these values are reported in the table with corresponding *p*-values. Standard errors are corrected with the Newey-West (1987) procedure. The second column reports summary results from many Fama-MacBeth style regressions where only one country variable is included in each regression. The firm-level results are average coefficients and *p*-values across the many regressions. The third set of results represents coefficient estimates form a single cross-sectional regression where each firm enters the sample only once using average characteristics of each firm. The last set of results is from weighted least squares panel regressions estimated using the Yule-Walker method to account for autocorrelation. Estimation is done with weighting by the inverse of the annual number of firms to adjust for changing sample size. The regression includes year fixed effects (not reported). In all regressions the explanatory variables are lagged and standardized to mean zero and unit standard deviation so that the magnitude of coefficients represents the effect on risk of a one-standard deviation move in the explanatory variable. Risk variables are measured as log differences between non-U.S. firms and their matching U.S. firms. For Fama-MacBeth style regressions the values for Observations and Adjusted R^2 are the averages across the cross-sectional regressions. Variable definitions are provided in the Appendix.

	Fama-MacBeth All-Country Variables		Fama MacBeth One-Country Variable		Single Cross-Section		Panel with Yule-Walker	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
ICRG Political	-0.028	0.07	-0.113	<0.01	-0.053	<0.01	-0.017	0.02
Creditor Rights	0.018	0.37	0.022	0.02	-0.016	<0.01	-0.010	0.02
Anti-Director Rights Index	0.072	<0.01	0.061	<0.01	0.128	<0.01	0.115	<0.01
Stock Market Turnover	-0.003	0.85	0.015	0.19	0.066	<0.01	0.015	<0.01
Stock Market Capital (%GDP)	-0.012	0.39	0.022	0.17	-0.009	0.11	-0.009	0.06
Private Bond Market (%GDP)	-0.032	<0.01	-0.088	<0.01	-0.029	<0.01	-0.051	<0.01
Capital Account Openness	-0.060	0.01	-0.105	<0.01	0.026	<0.01	-0.016	0.01
Patents (log, per million pop.)	0.032	0.05	-0.033	0.05	-0.050	<0.01	-0.009	0.11
Equity Market Liberalization	0.086	<0.01	0.019	0.43	0.044	<0.01	0.039	<0.01
Disclosure	-0.098	0.08	-0.093	<0.01	-0.028	0.02	-0.060	<0.01
PPE / Total Assets	-0.059	<0.01	-0.049	<0.01	-0.054	<0.01	-0.063	<0.01
Profitability (3-yr ave.)	-0.067	<0.01	-0.062	<0.01	-0.072	<0.01	-0.079	<0.01
Cash & STI (% Total Assets)	0.045	<0.01	0.041	<0.01	0.035	<0.01	0.035	<0.01
Debt Maturity	-0.032	<0.01	-0.043	<0.01	-0.019	<0.01	-0.036	<0.01
R&D Share	0.069	<0.01	0.067	<0.01	0.071	<0.01	0.070	<0.01
Percent Zero Returns	-0.065	<0.01	-0.073	<0.01	-0.075	<0.01	-0.064	<0.01
Total Assets (log)	-0.103	<0.01	-0.109	<0.01	-0.128	<0.01	-0.151	<0.01
Age (log)	-0.087	<0.01	-0.093	<0.01	-0.034	<0.01	-0.078	<0.01
Market-To-Book	0.024	<0.01	0.023	0.01	0.025	<0.01	0.033	<0.01
Leverage	0.153	<0.01	0.162	<0.01	0.113	<0.01	0.158	<0.01
Market Coverage	0.068	0.01	0.048	0.03	0.021	<0.01	0.035	<0.01
Intercept	0.103	0.08	0.103	0.09	-0.004	0.28	0.410	<0.01
Adjusted R^2	0.256		0.189		0.232		0.187	
Observations	5,824		5,824		15,293		93,225	

Table VIII
R^2 Differences

This table reports values from firm-level regressions with log differences in R^2 as the dependent variables. The first set of results is from Fama-MacBeth style regressions. Regressions are estimated at the firm level annually with the independent variables listed in the first column. Using these estimated coefficients a second regression determines the relation over time (1992-2006); these values are reported in the table with corresponding *p*-values. Standard errors are corrected with the Newey-West (1987) procedure. The second column reports summary results from many Fama-MacBeth style regressions where only one country variable is included in each regression. The firm-level results are average coefficients and *p*-values across the many regressions. The third set of results represents coefficient estimates form a single cross-sectional regression where each firm enters the sample only once using average characteristics of each firm. The last set of results is from weighted least squares panel regressions estimated using the Yule-Walker method to account for autocorrelation. Estimation is done with weighting by the inverse of the annual number of firms to adjust for changing sample size. The regression includes year fixed effects (not reported). In all regressions the explanatory variables are lagged and standardized to mean zero and unit standard deviation so the magnitude of coefficients represents the effect on risk of a one-standard deviation move in the explanatory variable. Risk variables are measured as log differences between non-U.S. firms and their matching U.S. firms. For Fama-MacBeth style regressions the values for Observations and Adjusted R^2 are the averages across the cross-sectional regressions. Variable definitions are provided in the Appendix.

	Fama-MacBeth All-Country Variables		Fama MacBeth One-Country Variable		Single Cross-Section		Panel with Yule-Walker	
	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value	Coef.	*p*-value
ICRG Political	-0.010	0.44	-0.056	<0.01	-0.021	0.01	-0.031	<0.01
Creditor Rights	0.021	0.30	0.006	0.49	-0.020	<0.01	-0.011	<0.01
Anti-Director Rights Index	0.052	0.01	0.040	<0.01	0.141	<0.01	0.106	<0.01
Stock Market Turnover	-0.026	0.03	-0.010	0.18	0.044	<0.01	0.005	0.23
Stock Market Capital (%GDP)	-0.036	0.01	-0.004	0.72	-0.057	<0.01	-0.050	<0.01
Private Bond Market (%GDP)	-0.011	0.18	-0.040	0.01	-0.004	0.46	-0.007	0.16
Capital Account Openness	-0.032	0.07	-0.046	0.03	0.052	<0.01	0.018	<0.01
Patents (log, per million pop.)	-0.001	0.96	-0.033	0.01	-0.082	<0.01	-0.044	<0.01
Equity Market Liberalization	0.076	<0.01	0.027	0.16	0.068	<0.01	0.043	<0.01
Disclosure	-0.057	0.14	-0.040	0.06	-0.022	0.02	-0.022	<0.01
PPE / Total Assets	-0.001	0.80	0.003	0.50	0.008	0.02	-0.001	0.77
Profitability (3-yr ave.)	0.003	0.44	0.006	0.22	0.004	0.29	0.000	0.80
Cash & STI (% Total Assets)	0.011	0.01	0.008	0.14	0.019	<0.01	0.008	<0.01
Debt Maturity	0.004	0.32	0.000	0.66	0.009	0.01	0.010	<0.01
R&D Share	0.026	<0.01	0.030	<0.01	0.026	<0.01	0.023	<0.01
Percent Zero Returns	-0.053	<0.01	-0.058	<0.01	-0.063	<0.01	-0.055	<0.01
Total Assets (log)	0.177	<0.01	0.173	<0.01	0.150	<0.01	0.200	<0.01
Age (log)	0.024	<0.01	0.022	<0.01	0.017	<0.01	0.012	<0.01
Market-To-Book	0.022	<0.01	0.022	<0.01	0.016	<0.01	0.018	<0.01
Leverage	-0.054	<0.01	-0.048	<0.01	-0.043	<0.01	-0.063	<0.01
Market Coverage	0.076	<0.01	0.061	<0.01	0.039	<0.01	0.048	<0.01
Intercept	0.272	<0.01	0.272	<0.01	0.120	<0.01	0.506	<0.01
Adjusted R^2	0.260		0.202		0.365		0.201	
Observations	5,824		5,824		15,293		93,225	