Do Implicit Barriers Matter for Globalization?

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Abstract

Market liberalization may not result in global pricing or full market integration if implicit barriers are important. We use the conditional version of the Errunza and Losq (1985) model to estimate pricing of investable indices for 22 emerging markets and test this proposition. Our results show that local factors are priced and the implicit barriers are significantly associated with the integration measure. Specifically, better institutions, stronger corporate governance and more transparent markets would jointly contribute to a higher degree of integration by about 30 percent.

- *Key words*: International Asset Pricing, Emerging Markets, Market Integration, Liberalization, Globalization
- *JEL classification*: G15, F30, G30.

Understanding global capital market structure is of critical importance in the evolving financial environment. Given the economic impact of globalization, it is no surprise that academics, policy makers and practitioners have been debating the issue for over three decades. Market integration directly affects asset valuation, cost of capital, diversification gains, corporate governance, economic efficiency and indirectly, the well being of nations. Indeed, market integration is central to emerging market (EM) economics and finance.

Integration is a fundamental characteristic of world market structure which is co-determined with expected returns and hence must be endogenous to any model. Accordingly, based on fundamentals, theoretical international asset pricing models (IAPMs) define and endogenise the concept of market integration.[1] Based on the Errunza and Losq (1985, henceforth EL) IAPM, Carrieri, Errunza and Hogan (2007, henceforth CEH) construct an "Integration Index" that is determined by the spanning potential of global factors and substitute assets including cross-listings and country funds. This index exploits the model prediction that if markets are fully integrated, only the global systematic risk is priced whereas under complete segmentation, only the local market risk is priced. In addition to these two polar cases, the index also accounts for the continuum of intermediate market structures.

A number of empirical studies have also investigated EM asset valuation and the degree of market integration. Bekaert and Harvey (1995) combine the two polar specifications of full integration and complete segmentation to assess the time-varying probability that markets conform to one of the two regimes. More recently, Bekaert, Harvey, Lundblad, and Siegel (2008) use valuation ratios to develop a measure of market segmentation and relate it to regulations with respect to foreign capital flows and other non-regulatory factors. Pukthuanthong and Roll (2009) derive a simple measure, the R-squared from the regression of a country's index returns on common global factors, to investigate recent trends in global integration. These studies provide important insights regarding the degree of market integration and its variation over time.

[1] Theoretical literature includes Stulz (1981), Errunza and Losq (1985), Eun and Janakiramanan (1986), De Jong and de Roon (2005) and Chaieb and Errunza (2007).

Over the last two decades, many developing countries have gradually lifted foreign investment restrictions and there has been significant reduction in explicit barriers. However, the EMs have not attained the full integration status that one would expect on the basis of the IAPMs that take into account explicit barriers. Further, the issue of what drives integration has remained quite elusive, that is, which factors keep equity markets from being fully integrated once we account for legal and practical constraints. We expect that implicit barriers should play an important role in explaining departure from full integration and its cross-sectional and time variation. The answer is relevant for correctly modeling equity returns as well as for devising policies towards full financial integration.

Since all the previous studies have used **broad** market-wide index level data that include securities not available to foreign investors, we use investable market indices of S&P (IFCI) and MSCI (global investable) that take into account limits on foreign investor holdings, liquidity, size and float at the market and individual security level. Thus, it is the case that investable indices already account for explicit barriers in their construction but ignore implicit barriers such as the state of the local market, political risk, availability of timely and quality information, investor protection, market regulation etc. as suggested by Errunza (1977), Errunza and Losq (1987), Bekaert (1995) and Stulz (2005). As a result, analyzing investable securities is the best approach to study the link between integration and implicit barriers. While it complements previous research on market-wide measures of integration, our study provides new insights on a segment of the market that is most relevant for foreign institutional investors. Furthermore, our model, methodology and the focus on implicit barriers is quite distinct from the other studies.

The paper poses two key questions. First, if local risk is still important, what is the extent of departure from full integration. Second, can we relate this departure to measures of implicit barriers. We first examine local versus global pricing by estimating a conditional version of the Errunza and Losq (1985) model for 22 investable emerging market indices of S&P (IFCI) and MSCI (global investable). We find evidence that local risk factors are still priced despite removal of explicit barriers and market liberalization.[2]

[2] Studies by Bae, Chan and Ng (2004), Chari and Henry (2004) and Bae, Bailey and Mao (2006) provide some support to the argument that the investable indices are more integrated with the world than the non-

To capture the extent of departure from full integration, we use the Integration Index as in CEH and show that for our sample markets, the integration process is still underway. We then relate our integration measure to three broad determinants of implicit barriers, after controlling for other country characteristics. We consider barriers that are due to the institutional environment, those that depend on corporate governance and those related to the quality of information available to investors. The evidence clearly shows that these implicit barriers are significantly associated with the degree of integration. Specifically, we find that moving within the cross-section of countries from the 25th percentile to the 75th percentile, better institutions, stronger corporate governance and more transparent markets would jointly contribute to a higher degree of integration by about 30 percent.

Our findings also add to previous evidence on the role of implicit barriers on international investment. The literature on home bias stresses the role of implicit costs to international investment such as political or country risks, corporate governance, transparency and informational asymmetries.[3] Many of the studies in this literature focus mainly on firm-level characteristics that attract foreign investors. On the other hand, our study relates country-level characteristics to the structure of world capital markets. We take this approach for the following reasons. First, it is widely accepted that country level integration impacts all firms and has profound economy-wide welfare implications. Second, other studies have documented substantial cross-country differences in institutional and governance factors as well as financial accounting regimes. Third, there is evidence of important differences among countries in the level of integration as well as quantifiable variations over time. Finally, creating a sample of meaningful size with firm-level data matched across the S&P, Worldscope, I/B/E/S and our cross-listings set is challenging, if not impossible for a large number of emerging markets. Thus, cross-country analysis provides a reasonable approach to assess the link between capital market integration and institutional, governance and informational factors.[4]

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investable indices. On the other hand, Griffin (2002) finds that local factors are important for comovement in individual stocks, even in developed markets.

[3] See for example, Kang and Stulz (1997), Dahlquist and Robertsson (2001), Gelos and Wei (2005), Kho, Stulz and Warnock (2009), and Leuz, Lins, and Warnock (2009).

[4] Nevertheless, we acknowledge the limits of cross-country analysis as well reviewed and discussed in Bushman and Smith (2001).

The rest of the paper is organized as follows. Section I describes the model and the empirical methodology. Section II explains the notion of investability and the return data. Section III presents empirical results regarding the integration measure. Section IV investigates the role of implicit barriers across countries through the globalization process. Conclusion follows.

I. The Asset Pricing Model: Theory and Empirical Implementation

We implement the IAPM of Errunza and Losq (1985) which accounts for barriers to international investment. The model assumes a two-country world and two sets of securities. All securities traded in the foreign market (e.g. the U.S.) are eligible for investment by all investors. Securities traded in the domestic market (e.g. the emerging market) are ineligible and can be held only by domestic investors. Thus, foreign investors can invest only in foreign eligible stocks, while domestic investors can invest in their local ineligible stocks as well as foreign stocks.

The expected return on a security *i* that can only be held by domestic investors is given by:

$$E(R_i) = R_f + AMCov\left(R_i, R_W\right) + \left(A_u - A\right) M_I Cov\left(R_i, R_I \mid \underline{R_e}\right) \qquad (1)$$

where $E(R_i)$ is the expected return on the *ith* security in the *Ith* market that is accessible only to its nationals, R_f is the risk free rate, $A(A_u)$ is the aggregate risk aversion coefficient for all (*Ith*) market investors, $R_W(R_I)$ is the return on the World *(Ith)* market portfolio, $M(M_I)$ is the market value of the global *(Ith)* market portfolio, and $\underline{R_e}$ is the vector of returns on all securities that can be bought by all investors irrespective of their nationality. Thus, the expected return on the *ith* security commands a global risk premium and a super risk premium which is proportional to the conditional market risk. The authors also show that the eligible securities (e.g. the U.S. stocks) are priced as if the market was fully integrated and command a world market risk premium.

The EL model assumes prohibitive capital inflow controls and suggests that fully investable assets should be globally priced. Non-investability can arise from explicit and implicit barriers. Indeed, investors are reluctant to invest in assets that face implicit

barriers. Since investable indices largely ignore implicit barriers, they are not fully investable and hence, their expected excess return should command a global and a local risk premium. Specifically,

$$E(r_{IFCI}) = \delta_W \operatorname{cov}(r_{IFCI}, r_W) + \lambda_I \operatorname{var}(r_{IFCI} \mid \underline{r_{DP}}) \tag{2}$$

where r_{IFCI} is the excess return on the IFCI index, r_W is the excess return on the world market portfolio, δ_W and δ_I are respectively the world and the local price of risk and r_{DP} is the excess return on the diversification portfolio of the IFCI index, i.e. the portfolio of eligible securities that is most highly correlated with the IFCI index.[5] We further express $\operatorname{var}(r_{IFCI} \mid r_{DP}) = \operatorname{var}(r_{IFCI})(1-\rho^2{}_{IFCI,DP})$ where $\rho^2{}_{IFCI,DP}$ is the squared correlation coefficient between the diversification portfolio and the IFCI index return.

We estimate equation (2) in a conditional framework. Hence, for each country, we estimate the following system of equations,

$$\begin{aligned} r_{IFCI,t} &= \delta_{W,t-1} h_{IFCI,W,t} + \lambda_{I,t-1} h_{IFCI,t}\left(1 - \frac{h^2{}_{IFCI,DP,t}}{h_{IFCI,t} h_{DP,t}}\right) + \varepsilon_{IFCI,t} \\ r_{DP,t} &= \delta_{W,t-1} h_{DP,W,t} + \varepsilon_{DP,t} \\ r_{W,t} &= \delta_{W,t-1} h_{W,t} + \varepsilon_{W,t} \end{aligned} \tag{3}$$

where $h_{j,t}$ are the elements of H_t, the *3x3* conditional covariance matrix of the assets in the system. The first equation of the system (3) is a conditional version of equation (2) where $\operatorname{var}(r_{IFCI})(1-\rho^2{}_{IFCI,DP})$ is parameterized as $(h_{IFCI,t})(1-\frac{h^2{}_{IFCI,DP,t}}{h_{IFCI,t} h_{DP,t}})$ with $h_{IFCI,DP,t}$, the time-varying covariance, $h_{IFCI,t}$ and $h_{DP,t}$, the time-varying variances. We thus allow prices and quantities of risk to change through time as suggested in recent literature [see among others Harvey (1991) and De Santis and Gerard (1997)].

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[5] Note that the increasing convergence between IFCI and IFCG has led to the marginalization of the non-investable segment of most EMs and has contributed to the decision by both the S&P and MSCI to provide only the investable indices going forward. Hence, we use IFCI as a proxy for the EM index. If we were to use the IFCG index as a proxy for the broader EM market, the pricing equation would be, $E(r_{IFCI,t}) = \delta_W \operatorname{cov}(r_{IFCI,t}, r_{W,t}) + \lambda_I \operatorname{cov}(r_{IFCI,t}, r_{IFCG,t} \mid \underline{r_e})$ which reduces to eq. (2) under the assumption $\operatorname{cov}(r_{IFCI,t}, r_{IFCNI,t} \mid \underline{r_e}) \approx 0$ where r_{IFCNI} is the excess return on the IFC non-investable index.

Given that the model implies the prices of global and conditional market risks to be positive, we use a square function to model their dynamics as follows,

$$\delta_{W,t-1} = (\mathrm{k}'_{\mathrm{W}} \mathrm{Z}_{\mathrm{W,t\text{-}1}})^2$$

$$\lambda_{I,t-1} = (\mathrm{k}'_{\mathrm{I}} \mathrm{Z}_{\mathrm{I,t\text{-}1}})^2$$

where $Z_{W,t-1}$ and $Z_{I,t-1}$ are respectively the set of time-varying global and local information variables.[6] If investable indices are not fully integrated, we should reject the hypothesis that the k_I are jointly equal to zero.

We follow De Santis and Gerard (1997) and adopt the diagonal representation of the multivariate GARCH model of Bollerslev, Engle, and Wooldridge (1988) which assumes that the variances in H_t depend only on past squared residuals and an autoregressive component, while the covariances depend on the past cross-product of residuals and an autoregressive component.[7] We also impose Ding and Engle (1994) condition which assumes the process to be covariance stationary. The advantage of this multivariate GARCH in mean parameterization is that it ensures positive definiteness of the covariance matrix H_t while reducing the number of parameters to be estimated. The dynamics of the conditional second moment H_t are specified as,

$$H_t = H_0 * (ii' - aa' - bb') + aa' * \varepsilon_{t-1}\varepsilon'_{t-1} + bb' * H_{t-1} \qquad (4)$$

where i is a ($3x1$) vector of ones, a and b are ($3x1$) vectors of unknown parameters and * denotes the Hadamard (element by element) matrix product.

From the EL model, the system of equations (3) has to hold at any point in time. To keep the dimensionality of the model reasonable, we test the model using one country at a time. Although such an approach implies that power is lost since the procedure does not impose the equality of global price of market risk across countries, it yields efficient estimates and, most importantly for our research question, it allows us to simultaneously price the global and local risk factors. We estimate the model by the quasi-maximum likelihood (QML) of Bollerslev and Wooldridge (1992). The estimation is performed using the BFGS (Shanno, 1985) algorithm for updating the Hessian.

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[6] The estimated measure of integration is robust to an exponential specification of the prices of risk.

[7] Because we use returns at the monthly frequency, the spillover in volatility may not be very strong, see for example De Santis and Gerard (1997). Also, CEH find little evidence that world level shocks impact conditional variances and covariances of the other assets. More importantly, they show that the integration index measure is robust to the modeling of volatility spillover.

II. Investability and Return Data

A. **Investability and Country Indices**

"Investability" refers to the ability of foreign investors to access markets and securities, i.e. the ease with which foreign institutional investors can buy or sell securities and repatriate proceeds. It should include considerations of openness (limits on foreign holdings), liquidity, size and float at the market and individual security level. Since neither the locally available performance indicators nor the initially available indices such as the IFC Global (IFCG) and the MSCI Emerging Market Global were designed from this perspective, a number of so called "Investable" indices were developed in 1990s by IFC, MSCI, and ING Barings. The investable indices are thus designed to measure returns that foreign investors would receive from investing in domestic stocks that are *legally and practically* available for foreign investment. For example, S&P/IFC determines stock's investability weight factor (IWF) based on several criteria. It first determines whether the market is open to foreign institutions with regards to the extent to which they can buy or sell shares on local exchanges and repatriate capital. It then investigates whether there are any corporate by-laws, corporate charters, or industry limitations on foreign ownership of the stock. It then applies two further screening criteria: size (at least $200 million in investable market cap based on current criteria) and liquidity (at least $100 million in annual trading).

In this paper, we use the S&P/IFC data.[8] While MSCI does not provide information on the non-investable portion since November 2001, the availability of both investable indices (IFCI) and broader market indices (IFCG) from S&P/IFC has some advantages. For example, characteristics such as market capitalization or number of firms for the two indices provide information on the extent of *de jure* liberalization in every country that we use later in the paper.

We include all emerging markets that have an investable index with returns data that starts no later than 1994 to have enough observations and degrees of freedom for the

[8] Discussions with S&P Index Services personnel suggest that at the end of July 2008 over 150 financial institutions were subscribing to their S&P/IFCI (or S&P/IFC) emerging markets database and that over $65 billion were benchmarked to their indices.

asset pricing estimation. We thus include Argentina, Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, South Africa, Taiwan, Thailand, and Turkey, or 22 out of the 30 emerging markets with an S&P/IFCI index. Our sample also represents 22 out of the 25 MSCI global investable market indices. Since in November 2001, S&P/IFC discontinued the IFCI indices of Colombia, Pakistan, and Jordan due to their small size or illiquidity and the returns on the S&P/IFCI indices for Israel starts in 1997, we use the IFCI indices from the S&P/IFC Emerging Markets Database for all countries except Colombia, Israel, Jordan, and Pakistan. For these countries, we use MSCI EM Free indices.[9] All returns are monthly, dividend-inclusive, denominated in USD, and in excess of the one-month Eurodollar deposit rate. Depending on the country, the sample period is from January 1989 or later to December 2006.

Panel A of Table I provides some basic statistics on the composition of the IFCI and IFCG. As of December 2006, at least half of the stocks in the IFCG indices are also included in the IFCI indices for all countries except China. The number of stocks included in each IFCI index varies from 6 stocks for Czech Republic to 242 stocks for Korea. These numbers range from 6 for the Czech Republic to 411 for China global indices. More than half of the market capitalization of the broad IFCG indices is investable for all countries but there are significant differences. In many countries almost the whole domestic market capitalization is investable, an indication that explicit barriers have been eliminated by 2006. On the other hand, there are a few countries like China, India, Philippines, Thailand where explicit barriers still exist on a significant portion of the domestic market as documented by the difference between market capitalizations of the investable (MCI) and the global (MCG) indices.

In focusing on "investable" indices, a natural concern arises regarding potential endogeneity bias. If investability accounts for implicit barriers, it might result in spurious correlation between the implicit barriers and the integration index measure. However, the proxies that we will use later in the paper (detailed in Section IV-A) are not included in

[9] Although each vendor uses a different hierarchical process in constructing their indices, their return behavior is very similar. The IFCI and MSCI Free return indices have greater than 96% correlation and the mean differences, volatility differences, and tracking errors are small. This exercise also confirms the reliability of these pre-constructed data in capturing the market's legal and practical restrictions across different vendors. Details available from the authors.

the construction of the IWF. For example, while a stock might be assigned an IWF of one when 100 percent of the security's market cap is legally and technically available for foreign ownership, the IWF for the same stock would have been much lower if some of our implicit barriers, such as institutional, informational or governance factors were considered. Clearly, adjusting for these factors would result in a benchmark investable index that is closer to the actual foreign institutional holdings. Furthermore, we observe a clear upward trend in the MCI/MCG converging to one for many emerging markets by the end of the sample. This is indication that explicit barriers had been reduced and eventually eliminated. On the other hand, there is little time variation in the implicit barrier proxies. Such proxies would have been binding had they been taken into consideration.

Panel A of Table I also reports summary return statistics of the investable indices. In general, the return behavior is similar to that of the broad IFCG indices reported in past studies (see for example, Harvey (1995), Bekaert and Harvey (1995)).

B. Eligible Set and the Diversification Portfolios

The eligible set includes the MSCI World index, 38 global industries as reported by Datastream, 16 closed-end country funds (CFs) and 65 cross-listings whether these are direct placements, American Depository Receipts (ADRs), or Global Depository Receipts (GDRs). The stocks cross-listed outside the US are either listed in the UK or Germany. To preserve the degrees of freedom in the regression, we only include for each country the first incepted country fund and the five earliest cross-listings when available.[10] In general we observe that countries from Latin America started cross-listing in mature markets earlier than countries in Asia. Some of the countries of our sample, e.g. Israel, Mexico, Chile, Brazil, and more recently China have a large number of cross-listings. Appendix A provides a detailed list of the eligible set and more information on the data sources. The monthly returns (adjusted for dividends) for CFs are obtained from the

[10] Of the available securities, we only use the listings with a minimum of three years of returns data regardless of whether they are still active or have been delisted, and that are relatively liquid, i.e. without many zero returns. If a company cross-listing has many zero returns we exclude it and use the next earliest listing. We also include all country funds regardless of whether they are open-ended or liquidated pre-December 2006. We do so because the first country fund has a stronger effect in spanning the investable index than the subsequent funds. In addition, since some countries have at most one cross-listing, including the country fund (whether active over the entire period or not) helps to further span the investable segment.

Center for Research in Security Prices (CRSP) database. The return data on ADRs are collected from CRSP, while return data on GDRs are compiled from Datastream.

To build the diversification portfolios, we follow CEH. We first regress the return of the country investable index on the returns of the 38 global industries along with the MSCI World index. We use a stepwise regression procedure with forward and backward threshold criteria that preserves those assets with the highest significant coefficients, and we obtain the diversification portfolio of global securities, R_G. We then regress the return of the country investable index on R_G, CF, and the cross-listings. We allow the weights assigned to previous securities to vary upon the availability of new overseas listings as in CEH. The fitted value from this regression is the return on the diversification portfolio R_{DP} that we use in the estimation of the system of equations (3). Note that we also use the diversification portfolio R_G for some robustness checks.

Panel B of Table I contains pairwise correlations between the world index, country j investable index, and the diversification portfolio of country j. Given our construction procedure, it is indeed the case that the highest correlation is in almost all cases between the investable index and the respective diversification portfolio, ranging from 0.91 to 0.17. As expected, the correlation between the country diversification portfolio and the world index is higher than the corresponding correlation between the country investable index and the world index. The return correlation between the diversification portfolios and the world index ranges from 0.26 for Pakistan to 0.70 for Poland. The return correlation between the investable index of a country and the world market index ranges from 0.11 for Jordan and Pakistan to 0.54 for Israel.

C. Global and Local Instrumental Variables

We follow previous research in selecting the data on the global and local instrumental variables [see Ferson and Harvey (1993), Bekaert and Harvey (1995) and Carrieri, Errunza and Majerbi (2006) among others]. The global instruments include the change in the US term premium measured by the yield difference between the 10-year T-bond and the 3-month T-bill, the world dividend yield in excess of the one-month Euro-dollar interest rate, and the US default premium measured by the yield difference between Moody's Baa and Aaa rated bonds. The local instruments include the lagged

local equity market return, the local dividend yield in excess of the one-month Euro-dollar interest rate, and the change in bilateral exchange rates \$/FC_j where *j* is the currency of country *j*. Since these instrumental variables have been widely used in other studies, we omit a detailed description of their properties. Panels C and D of Table I show some basic statistics as well as the pairwise correlations among the instruments. Notice that the correlations among the instrumental variables are small.

III. Empirical Results from the Asset Pricing Model

This section reports the results based on the asset pricing model of Section I. To capture the extent of globalization we use the EL integration index *(II),* a measure of integration based on the theoretical model of Section I. Specifically,

$$II = 1 - \frac{Var\left(r_{IFCI} \mid r_{DP}\right)}{Var\left(r_{IFCI}\right)} \tag{5}$$

By definition, the index lies between 0 and 1. We obtain the index from the time-varying second moments in the empirical estimation of model (3), therefore:

$$II_t = 1 - \frac{Var_{t-1}\left(r_{IFCI,t}\right)\left(1-\rho^2_{IFCI,DP,t}\right)}{Var_{t-1}\left(r_{IFCI,t}\right)} \tag{6}$$

If the investable index is perfectly spanned by the eligible set, the *II* will be equal to 1 and markets are fully integrated. In the other extreme case, when the return correlation between the investable index and its diversification portfolio is 0, the *II* will be 0.

Pukthuanthong and Roll (2009) propose a simple measure of global integration, the R-squared from the regression of a country's index returns on common global factors. As explained in their paper, the empirical implementation of our *II* and their measure would yield similar results.[11] Recently, Bekaert el al. (2008) propose a valuation-based measure. Specifically, they use industry weighted average of absolute earnings yield differences between the country's industry and the world's industry. Our measure is clearly distinct from all the others since it is based on the availability of substitute assets

[11] See also, Eiling and Gerard (2007) for a non-parametric measure.

that contribute to the pricing of local risk and thus has a direct theoretical foundation.[12] Furthermore, this measure is robust to the specification of the asset pricing model and of the variance-covariance matrix. For a subsample of countries included in this paper we estimate the integration indices based on the Chaieb and Errunza (2007) model that relaxes the PPP assumption of EL. The integration indices based on this more general model are very similar to those obtained with the EL model (results are available from the authors). Allowing for asymmetry in the variance-covariance matrix H_t a la Bekaert and Wu (2000) generates minor differences in the estimated *II* measures.

Panel A of Table II reports summary statistics for the estimated integration indices of Eq. (6). The evidence shows that the extent of globalization is not uniform within this large sample of Emerging Markets. The average degree of integration is 0.63, however there are significant differences. The least integrated countries such as Jordan, Pakistan, or Peru have no country funds and/or very small number of cross-listings. On the other hand, most integrated countries such as Mexico, Israel and South Africa have country funds and many cross-listings. Note also that the impact of country funds and cross-listings is significant even for countries where the investable market capitalization is small such as Taiwan before 1995.

We can also draw interesting insights from the sub-period analysis. Contrary to a priori expectations, we do not observe a general increase across subperiods. Argentina, Brazil, Czech Republic, Korea, India, Poland, and Turkey have experienced large upward movements in the degree of integration. On the other hand, Malaysia and Pakistan register a decrease. Jordan is the lowest in both subsamples while China, Israel, Philippines, South Africa and Taiwan do not show much change in integration. Indeed Pakistan, Colombia and Jordan have been dropped from the sample of investable markets of the S&P/IFC in 2001 based on small size and low liquidity, while Malaysia imposed some capital flow restrictions over the period. Delisting of country fund does not cause a decrease in the index, unless the country has no cross-listings, see Argentina and Pakistan as two examples of the different impact of delisting.

[12] Our emphasis is on the tradeoff between risk and return and not on the type of information that enters stocks prices as in Morck, Yeung and Yu (2000). Hence, our measure is not a measure of stock price synchronicity although the way information is capitalized into prices would certainly affect ex-post returns and hence the estimated integration index. In the second stage, we relate the cross-sectional and time series variation in the integration index to informational variables.

We investigate the individual linear trend in each country's integration index. We regress the integration index of each country against a constant and a trend. The results are reported in Column 6 of Panel A of Table II. The coefficient on the trend is positive and significant for 13 countries. Pakistan shows a significant reversal while China and Malaysia have a negative trend though insignificant. We also run a joint test of increased integration with the pool of all countries. The coefficient on the time trend is positive and highly significant and indicates an upward trend in integration of about 1% per year. However, the R^2 of 4% shows that only a very small fraction of the variation in the level of integration is captured by a time trend.

Figure 1 plots the estimated integration indices. We present them as equally weighted averages at each point in time aggregated in three groups from the statistics of Panel A of Table II. The group at the bottom, the "Laggards", consists of seven countries that are below the overall median throughout the whole sample. The group at the top, the "Leaders", is composed of eight countries that are always above the median. The group in the middle that we call the "Movers" is comprised of seven countries that between the first and second sub-period moves from being below the median to be above the median. In this group we observe a remarkable increase from a level of integration of around 0.5 to 0.8. From the end of the Nineties, variation across the countries becomes more predominant than the time trend of the first decade. The plots also confirm that integration is not characterized by unimpeded and uniform advances. Despite a decrease in explicit barriers, integration has lagged behind for many emerging markets.

The pricing tests of the model offer further support to the partially segmented nature of these markets. Panel A of Table III contains the results of the joint hypothesis tests from the country-by-country estimation of the multivariate system (3). For each country we report robust Wald tests for the significance and time-variation in the prices of world market risk and conditional market risk. A number of interesting findings emerge from Panel A. First, the local risk factor (conditional market risk) is priced and time-varying for most of our indices. Specifically, the price of local market risk is significant in 16 out of 22 countries and time-varying in most instances. Furthermore, in all cases except for Colombia, the price of local risk is economically significant with an average estimate across countries of 1.2. Second, the price of world market risk is

significant in all cases and it is significantly time-varying in only 11 cases. The average estimate across countries of the price of world market risk of 3.1 is economically significant and is consistent with previous studies. The results overall indicate that for most of the countries both global and local risk are significant pricing factors, although the time-variation is not always confirmed.[13] It is also worth noting that a high level of market integration is not inconsistent with the significant pricing of local risk factor. What is important is the overall consistency between the relative contribution of the local risk premium and the level of integration, which we obtain (results available upon request).

Panel B of Table III reports some diagnostics tests on the estimated residuals. There is evidence that GARCH effects have been removed and the non-normality in the data is reduced although not eliminated. Furthermore, with the exception of Brazil, Philippines, and South Africa, there is no serial correlation in the squared standardized residuals. We also report the Engle-Ng test for asymmetry. The Engle-Ng tests indicate that, with the exception of seven cases, there is no evidence of negative asymmetry in the residuals while there is evidence on the presence of positive asymmetry only in eight cases. Hence there is no consistent evidence of asymmetric response of the conditional second moments to past innovations. We also report the pseudo R-squared (R^2) computed from our model. For each asset, the pseudo R^2 is the ratio between the explained sum of squares and the total sum of squares. Due to the cross-equation restrictions, there is no guarantee that the pseudo R^2 are positive for all assets.

The next section examines the determinants of the time and cross-sectional variation in the level of integration.

IV. Implicit Barriers and Financial Globalization

[13] In the cases where we fail to reject a constant price of local risk, the estimation generates extreme values for the local premia that are due to the non-linear specification for the prices of risk motivated by the theoretical model. Bekaert and Harvey (1997) also show that a non-linear model is not supported by the data and generates very volatile fitted values in the case of Mexico and Thailand. We should point out that the empirical model has four sources of time-variation. A more parsimonious choice of information variables for each country based on the data would anchor the estimation and help in finding stronger statistical support for the model. But our goal is to obtain results from choices that are not country-specific.

As reported in the previous section, reduction in explicit barriers in conjunction with market liberalization has not resulted in global pricing of investable indices. Moreover, our integration measures indicate a stalling and in some cases a reversal of the process. What are then the causes, other than explicit barriers, that might represent hindrance to the globalization process?

The EL model provides a framework since it assumes that a subset of securities can only be held locally as a result of a prohibitive tax. Their theoretical model assumed the prohibitive tax to arise from stringent capital inflow controls imposed on foreign investors by many EMs during late 1970s and early 1980s. However, in their empirical test, EL did take into account the reluctance of investors to invest in markets that were technically open, but were perceived to be non-investable. The non-investability can arise from both explicit and implicit barriers including capital controls; foreign exchange controls; limits on repatriation and portfolio holdings; poor market regulation and corporate governance; political risk; imperfect, untimely or lack of information; misperceptions on the part of foreign investors etc.[14] To the extent that the launch of substitute assets or the removal of explicit barriers may not lead to full investability, the local premium would significantly contribute to the total risk premium.

Given the significant reduction in explicit barriers and floatations of CFs and cross-listings by emerging markets during our sample period, we expect implicit barriers to play an important role in explaining the degree of integration, its cross-sectional and time variation, and the departure from full integration. For example, information and monitoring costs may discourage foreign investors.[15] Alternatively, high ownership by corporate insiders and lack of investor protection may lead to poor foreign investor interest.[16] On the other hand, better information disclosure in an economy may help

[14] Note that the EL model is a limiting case of the more general Stulz (1981) model. Merton (1987) emphasizes the role of incomplete information and investor recognition on risk sharing and asset pricing.

[15] There is sizeable evidence on the role of information asymmetry in equity markets. Many papers show that local investors have an information advantage relative to foreign investors, see for example, Kang and Stulz (1997), Portes and Rey (2005), Choe, Kho, and Stulz (2005), and Dvorak (2005). There is also theoretical and empirical evidence that information asymmetry is priced in international equity markets based on market liquidity and adverse selection, see for example Chan, Menkveld, and Yang (2008).

[16] Leuz, Lins, and Warnock (2009) and Kho, Stulz, and Warnock (2009) find that US investors invest less in poorly governed firms, that is, firms with large block ownership by insiders. In addition, Ferreira and Matos (2008) find that institutional investors hold fewer shares of firms that are closely held.

investors' recognition and improve risk sharing and thus should be empirically related to differences in the degree of integration.

Past literature has touched on some of these issues. For example, Errunza (1977) emphasizes the importance of implicit barriers including state of the local market, political risk, availability of timely and quality information and market regulation for investments in emerging markets. Bekaert (1995) empirically relates a composite measure of implicit barriers to market integration. Nishiotis (2004) provides evidence that liquidity, credit ratings and inflation can explain the premium and discounts of EM closed-end funds. Stulz (2005) has suggested that the limits to financial globalization are likely due to state and corporate governance. Specifically, he identifies the twin agency problems related to expropriation by the state and by corporate insiders at the expense of outside investors as the primary hindrance to financial globalization.[17]

Hence, this section offers extensive evidence as to whether implicit barriers matter for globalization in emerging markets. We use the integration index measure presented in Section III as dependent variable and relate it to a number of implicit barriers.

A. Analysis of Implicit Barriers

We focus our analysis on three broad determinants of implicit barriers, those that are due to the institutional environment, those that depend on corporate governance and those related to the quality of information available to investors. Table IV contains some summary statistics for the explanatory variables. They are presented by country as averages over the sample years. More detailed explanation of all the variables and their sources is in Appendix B.

A.1. Institutional environment proxies

To capture the relevance of institutional environment, we use two variables. The first variable (POL) is the ratings provided by the Political Risk Services' International Country Risk Guide (ICRG) political risk index. These ratings are a composite of a number of elements such as government stability, investment climate, corruption, law and order tradition, bureaucratic quality (see for example, Erb, Harvey, and Viskanta (1996)

[17] For more insights on the differences in corporate governance and ownership across the world, see La Porta, Lopez-de-Silanes and Shleifer (1999) and Classens, Djankov and Lang (2000).

for detailed description of the ICRG political index). All these aspects capture the extent to which the governments respect private property rights and are very crucial for investors concerned about the transparency and fairness of the political and legal institutions of a country. A high number for this variable implies that the country scores very high with respect to these elements, and thus indicates low political risk. For our sample of emerging markets, the average rating is 0.66.

The second variable is the origin of the legal system of the country (CIVIL). La Porta et al. (1998) were the first to point out the importance of legal origin in explaining the economic and financial institutions in a country. It is well established that English common law has over the past centuries provided better protection of individual rights against the state and has showed more ability to adapt to the dynamic nature of the environment. We construct CIVIL as a dummy variable equal to one if the country is from civil legal origin and zero if the country is from English legal origin. More than two thirds of our sample countries are from civil legal origin. Since the English law origin would have a positive impact on integration process, we should expect a negative relation between CIVIL and our integration measure.

A.2. Governance environment proxies

Our next set of variables capture the corporate governance environment. We use country level proxies as well as firm-level proxies aggregated to the country level. The country-level proxies include two measures of investor protection, the anti-self-dealing index of Djankov et al. (2008) and their revised anti-director rights index. The anti-self-dealing index (ASD) focuses on private enforcement mechanisms such as disclosure, approval, and litigation that protect outsiders in the case of self-dealing transactions of insiders. This index ranges from 0 to 1. The average for our pool of countries is 0.49. Djankov et al. (2008) report a world average of 0.44 based on 72 countries that include less developed markets with very low scores such as Ecuador and Ukraine. The anti-director index (A-DIR) varies between 0 and 6, with a higher score for those countries that show better protection of minority shareholders based on the evaluation of six areas of investor protection. We interpret this variable as an indicator of the strength of the corporate law of a country. The average of the scores in our sample of countries is 3.5 while the world average is 3.4.

The firm-level proxies include two measures of ownership concentration, C-HELD and OWC. We collect data on ownership concentration from Worldscope. For each year, we construct the "closely held shares" variable (C-HELD), a value-weighted average of the shares held by insiders in each country. The average fraction of closely held shares over the period for our countries is 56%. As a comparison, this fraction was 15.68% for the U.S. in 2002 (Stulz, 2005). Taiwan and Korea have the lowest value-weighted ownership concentration at respectively 29% and 35%, while Czech Republic, Pakistan, and Turkey have the highest values at around 70%. We also use the average ownership of the three largest shareholders for the ten largest companies (OWC) from La Porta et al. (2006). For our countries, the average ownership concentration is 0.49. Also in this case, Korea and Taiwan have the lowest ownership concentration while Colombia, Mexico and Turkey show the highest.

A.3. Information environment proxies

The impact of the information environment is conveyed by six measures. To capture the transparency and the quality of information in global financial markets we collect firm-level data related to analysts following and construct two variables at the country level.[18] The first variable (AN-F) is the mean number of analysts following each firm listed in I/B/E/S for a country in a specific year, while the second measure (AN-D) is the diffusion of analysts, or the proportion of firms covered by I/B/E/S over the number of firms listed in the country in a given year.[19] For both of these variables, a high number indicates a large amount of information that is divulged in the economy through the analyst channel and hence should be linked to higher integration. For our group of countries, the analysts-per-firm variable has a mean of 4.91 while the corresponding number is 29% for the analysts-diffusion variable.[20]

[18] Some papers argue that analyst coverage helps propagate firm-specific information (e.g. Hong, Lim and Stein, 2000) while other papers show that analysts do not have significant private information (see for example Piotroski and Roulstone, 2004).

[19] Both these variables have been used in other papers, most notably by Bushman et al. (2005). That paper also discussed some of the limitations of such data and the related assumptions. Some of those concerns are more limited in our case since we focus on a period after 1990 when I/B/E/S substantially extended its coverage.

[20] In Bushman et al. (2005), the corresponding averages are 2.6 and 21% for the period 1987-2001. In firm-level studies, an individual firm in the cross-section can have zero number of analysts. Our data has record of no analysts at the country level only at the beginning of the sample period. We take this as indication of no coverage by I/B/E/S in early years. Thus we drop those observations from the beginning of our sample

Accounting practices are another important channel for dissemination of information in financial markets.[21] Thus we also include a measure of the disclosure practices in a country (ACC). This measure is an aggregation of the practices observed in the annual reports for the sample of domestic firms collected by the Center for International Financial Analysis and Research (CIFAR). The score attributed by CIFAR is based on the analysis of different categories up to a maximum value of 1.[22] We take the scores of the 1990 year to reduce potential endogeneity. ACC has an average of 0.58 with a standard deviation of 0.10 points. As an alternative variable, we use the intensity of financial disclosure of Bushman et al. (2004) that focuses on specific items of highly proprietary nature, such as R&D, capital expenditures, subsidiary data and accounting methods (DISC). Outside investors use such information in valuing the activity of the firm and in monitoring the activity of the managers.[23] The DISC measure has an average of 0.62 with a standard deviation of 0.21. As argued by Bushman and Smith (2001) analyst following and accounting practices could be either substitutes or complements. Since it is difficult ex ante to determine the net effect of the two forces, we use both to capture reduction in information asymmetry.

We also use the extent of cross-listing activity as a proxy for the quality of the information environment.[24] Albeit an indirect measure, cross-listing is associated with a reduction in informational costs and a higher transparency. When cross-listing in mature markets, firms from emerging markets agree to reconcile their financial statements with generally accepted accounting principles, meet the disclosure requirements of the host

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when we find no evidence of any analyst activity in the country rather than recording it with a zero value. However results are robust to adding a zero value to firms with no data on analyst activity.

[21] Healy and Palepu (2001) show that disclosure helps to reduce information asymmetry between the firm and its investors, as well as among investors. Ammer et al. (2008) find that U.S. investors prefer firms with characteristics associated with greater information transparency, such as stronger home-country accounting standards.

[22] See Hope (2003) for an extensive discussion of this index. An important limitation of the disclosure index is its focus on the quantity of information disclosed rather than its quality.

[23] Bushman et al. (2004) find that this disclosure measure is effective in capturing financial transparency.

[24] The extent of cross-listing activity could also proxy for the quality of the corporate governance environment. Based on the bonding hypothesis of Coffee (1999) and Stulz (1999), cross-listing could serve as a substitute mechanism for weak governance structure since it makes it harder for insiders to expropriate the minority shareholders. For evidence on the bonding hypothesis, see, Doidge, Karolyi, and Stulz (2004) and Hail and Leuz (2009).

country and abide to the regulations set forth by a credible authority.[25] Therefore, by partially acquiring the characteristics of the US information environment, the firms are likely to reduce the information asymmetry that has been shown to affect the portfolio composition of investors and discourage foreign investment.[26]

Using firm-level data we construct two proxies, CL-MC and CL-N, related to the cross-listing activity of the firms within each country. CL-MC is the ratio of the market capitalization of companies with an ADR program level II or III over the total country capitalization in a given year. This measure accounts for de-listings. The average of the ratio for our countries is 14 percent with large cross-country differences. Czech Republic, Jordan, Pakistan, Poland, Malaysia, and Thailand have no ADRs with level II or III, while for countries like Mexico, Israel and Argentina, CL-MC is in the range of 40 percent. A higher number is thus indicative of lower information asymmetry. The alternative measure (CL-N) uses data on cross-listings around the world.[27] CL-N is the ratio of the number of cross-listings over the total number of listed companies of each country in each year. The average percent share of listed companies is only 4%. This is smaller than the average share based on market capitalization, indicating that the largest companies from a country are those that elect to cross-list. As with our previous variable, there is substantial cross-country variation and the statistics broadly confirm the rankings. Pakistan is the only country with no cross-listings worldwide, while Mexico, Israel and Argentina are those with the highest ratio in excess of 10 percent.

One concern is that the inclusion of cross-listed stock returns in the eligible set to construct the diversification portfolio might result in an upward bias in the relation between the integration index and the market cap or the number of cross-listings. However, the bias will not be severe because the increase in cross-listings will not contribute to the spanning of the investable index beyond the very first few country funds

[25] Non-US firms listing on major US exchanges are subject to the Securities Act of 1933 and the Securities Exchange Act of 1934. They must file Form 20-F with the SEC, which provides reconciliation with US GAAP.

[26] Ahearne et al. (2004) use a similar measure as proxy for the reduction in information asymmetries. Lang, Lins and Miller (2003) and Bailey, Karolyi, and Salva (2006) provide evidence on the link between cross-listing and the change in the firms' information environment. Kang and Stulz (1997) find that Japanese firms with ADRs have higher foreign ownership, although this was true even before the start of the program.

[27] We thank Sergei Sarkissian for sharing his database on world-wide cross-listings. Note that these data do not account for de-listings.

or ADRs.[28] In other words, it is conceivable that increase in the cross-listing activity will help lower information asymmetry in a country overall but will have no significant impact on the returns of the diversification portfolio and thus our integration indices.

A few of our independent variables are constructed at the country level from firm-level data. Our data collection uncovers large differences in availability of firm-level data for each country both in the Worldscope dataset (used to construct the closely held variable, C-HELD) and in the I/B/E/S dataset (used for the analyst variables, AN-F and AN-D). As Table I reveals, there are also large variation in availability of investable firms within the S&P/IFC dataset. Thus we should point out that creating a sample of meaningful size with firm-level data matched across the S&P, Worldscope, I/B/E/S and our cross-listings set would be challenging, if not impossible for a large number of emerging markets. This observation offers further support to the country-level approach of this study.

Since economic and market development factors have been linked in the past to different integration measures, we want to make sure that our implicit barriers provide additional information in explaining what is associated with the globalization process. Thus in our analysis, we include three control variables: trade to GDP (TR/GDP) as a measure of economic openness, the market capitalization to GDP (MC/GDP) to control for financial development and the value traded to GDP (VT/GDP) to account for the level of liquidity in financial markets.

Table V reports correlations among the variables using averages for the countries computed from the time-series. In general the sign of the correlations indicate that across countries better institutions are related to a more transparent information environment and to a corporate environment that fosters diffused ownership and protection of minority shareholders. We also observe that MC/GDP is highly correlated with the CIVIL dummy (-0.42), the anti-self dealing index (0.52), and the accounting measure (0.70). It is noteworthy that these high correlations are in line with previous studies that provide evidence on the association between the legal origin, the degree of investor protection, and the stock market development; see for example Djankov et al. (2008).

[28] Refer also to Bekaert and Harvey (2000, figure 1, p. 578) for a similar finding.

Moreover, as expected, some of the variables proxying for the same type of information show high correlations with each other. For example, the correlation between two measures of ownership concentration (C-HELD and OWC is 0.49), two indices of investors protection (A-DIR and ASD is 0.40), two analysts variables (AN-F and AN-D is 0.57), two accounting indices (DISC and ACC is 0.5) and the two cross-listing proxies (CL-MC and CL-N is 0.71) are quite high. Note that variables such as CIVIL, ASD, A-DIR, OWC, ACC and DISC have no time-variation. It is not surprising that we also find an overlap among the variables related to the different environments, as indicated by the general level of correlations. The three dimensions are related, hence it should be noted that some of the proxies for a specific dimension might also capture aspects of another dimension.

B. Main Results

We first look at the level of the implicit barrier proxies using simple averages from the data reported in Table IV and confirm their relative ranking for the country grouping of Figure 1. The "Leaders" show lower implicit barriers than the "Laggards" in both cross-sectional and time dimension. In this section, we provide a formal test for the relationship between integration and the implicit barriers. Given the annual frequency of most of the independent variables, we time-aggregate the monthly integration measures for each country and then pool the cross-section and time series for panel estimation.

B.1. Baseline model

Before we relate our integration measure to proxies for implicit barriers, we want to verify the relation between the estimated integration indices and the explicit barriers. Hence, we run a baseline model with only a trend and a *de jure* measure of explicit barriers. We use the intensity of capital controls (ICC). This measure is equal to one minus the fraction of market capitalization of the investable indices over the country's total market capitalization. When this measure is zero, the market capitalization of the investable indices is equal to that of the market-wide indices, indicating the lack of regulatory barriers to foreign investment. With IFC data on the investable and non-investable segments of the market, we extend this measure that was first used by Bekaert (1995) and Edison and Warnock (2003) by accounting for additional changes in

investability of our sample countries. We report the results for the baseline model in Table VI. The coefficient on ICC is negative and insignificant. This result is not surprising given that our integration measures are computed with respect to the investable stocks, a segment of securities for which explicit barriers have been taken into account. We use alternative measures of *de jure* openness, namely capital account restrictions and equity restrictions from Schindler (2009) and obtain similar results. Hence explicit barriers are not related to our integration indices as they have been already accounted for in the construction of the test assets. Conversely, based on a broad market-wide dataset and a different methodology, Bekaert et al. (2008) find the *de jure* measures of financial openness to be consistently significant. We next examine whether our integration measures are associated with proxies for implicit barriers.

B.2. Implicit variables and globalization

We estimate the following regression equation as well as restricted versions to separately evaluate the relationship between each environment and the integration index:

$$II_{it} = a_0 + b_0 \times trend + b_1 \times \text{institutional environment proxies}_{it} + b_2 \times \text{governance environment proxies}_{it} + b_3 \times \text{information environment proxies}_{it} + cX_{it} + \varepsilon_{it} \quad (7)$$

where X_{it} is the set of three control variables discussed earlier. We cluster standard errors by country and period because some of the regressors such as analyst following or closely held exhibit both time and country effects while some other regressors vary only by country.[29] An alternative approach to investigate the role of implicit barriers would be to use some of our proxies such as C-HELD or AN-F as information variables in our asset pricing estimation. Specifically, we could adopt a similar framework to Bekaert and Harvey (1995, 1997). However the estimation is not feasible due to the unavailability of some of the implicit variables at the monthly frequency and the small sample sizes. In addition, the proposed panel structure allows us to exploit the cross-sectional variation in the integration index.

Variables linked to the same environment show high correlations among each other and many of our variables from different types of environment are also highly correlated. Therefore, we start by separately analyzing the impact of institutional, corporate governance and information environments and estimate the multivariate

[29] See Cameron and Trivedi (2006) and Petersen (2009).

regressions with the explanatory variables that show a high R^2 from unreported univariate regressions.[30] In choosing among alternative variables, we also take into account other considerations such as country coverage. We run robustness tests with alternative variables and specifications as reported in the following sub-sections.

Some of the implicit barrier variables are missing for a few countries. Specifically the accounting measure, ACC, is only available for 15 of the 22 countries of our sample. Therefore we run the main specifications on a full cross-section that includes at least 21 countries and on a sub cross-section of at most 15 countries with an ACC score. Table VI contains our main results for variants of the basic regression Eq. (7). We report the estimated coefficients and their standard errors in Panels A and B for the full cross-section and the small cross-section respectively.

Models (1a) and (1b) of Table VI Panels A and B report the estimated coefficients of the regression imposing $b_2=b_3=0$. The evidence indicates that the institutional environment is economically important. We find a positive relation with the political risk variable, meaning that countries with a higher risk rating, i.e. smaller political risk, are more integrated. The significance on POL coefficient is not robust to the composition of the cross-section as POL is only statistically significant in the small cross-section. This finding is somewhat surprising in view of the importance of political risk. To further investigate the significance of POL, we use the cross-validation technique of Beck (2001). We re-run model (1a) leaving out a country at a time (results are not reported but are available from authors). Our results indicate that the coefficient on POL varies between 0.31 and 0.77 and becomes statistically significant when either one of Poland, Czech Republic or Indonesia is removed. These countries are not included in the small cross-section of Panel B.

The sign on the CIVIL variable supports our expectation that the countries from civil legal origin show a lower level of integration. However, the coefficient on CIVIL is statistically insignificant. The coefficient on CIVIL is marginally significant and economically larger when Pakistan is excluded (-0.19 with a standard error of 0.108). Pakistan is the least integrated country of our sample after Jordan even though Pakistan

[30] The advantage of univariate regressions is that they do not suffer multicollinearity nor the lack of data on other independent variables. Nonetheless, the results are very similar to the ones reported in Table VI. Thus, we only report and discuss the multivariate regression results.

has common-law origin. Note that our sample includes only six countries from a common law origin.

Next we report the relation between integration and measures of governance in Columns (2a) and (2b) and information asymmetry in Columns (3a) and (3b). We start with the firm-level measures of governance. The coefficient on C-HELD is negative and significant indicating that countries with concentrated insider ownership are more exposed to local factors and less integrated with the world market. The coefficient on C-HELD is robust to the cross-sectional specification. The coefficient on ASD is positively related to integration indicating that countries with better protection of minority shareholders show higher level of integration. The coefficient is 1.4 standard errors above zero. However, the coefficient is negative but insignificant in the small cross-section where the unexpected negative sign is driven by the high correlation between ASD and the controls. We re-estimate model (2b) without controls and obtain a positive and insignificant coefficient on ASD.

In models (3a) and (3b) we show the evidence with the analyst per firm (AN-F), and the cross-listing variable (CL-MC). Model (3b) also includes the measure of accounting disclosure (ACC). All the variables are significant at any statistical level. The coefficient on AN-F shows that a higher level of analyst coverage is associated with higher integration. The coefficients on disclosure practices (ACC) and on cross-listing activity (CL-MC) are positive and highly significant. Thus, countries with lower information asymmetry are those that are more integrated.

The information environment, followed by the governance variables, has the largest explanatory power in both samples. The adjusted R^2 in the full sample are 35%, 12%, and 11% for the information, the governance, and the institutional environments respectively. Correspondingly, the adjusted R^2 in the small sample are 58%, 21%, and 25%.

Models (4a) and (5a) of Panel A and (4b) and (5b) of Panel B report our main specifications without and with controls respectively. Overall the sign, significance and magnitude of the coefficients are consistent with those obtained with the smaller specifications of models (1), (2) and (3) of Panels A and B. The evidence indicates that countries with sound institutions, with less concentrated ownership, with a more

transparent information environment and less information asymmetry are those that are more integrated with the world.[31] The inclusion of controls in models (5a) and (5b) does not change the evidence on the importance of implicit barriers. Indeed, the sign, the magnitude, and the statistical significance of all the coefficients are confirmed. The adjusted R^2 in the full cross-section is 42% and increases by only 1% with the inclusion of the controls. The adjusted R^2 is 57% in the small cross-section and increases by 4% with the inclusion of the controls.

Our proxies for the market and economic development show mixed results. MC/GDP and VT/GDP are insignificant but with the correct sign in some specifications while the TR/GDP is often negative. We run a panel regression (unreported) with only market development measures. We find evidence that MC/GDP and VT/GDP have the predicted positive coefficients though only VT/GDP is significant. However, the coefficient on TR/GDP is negative and insignificant. These findings are driven by the inclusion of a trend in our regressions. Indeed, the sample correlations between the integration measures and the control variables indicate high positive linear dependence, which disappear after removing the linear trend from the integration index measures.

We follow Doidge, Karolyi, and Stulz (2007) and estimate (unreported) a statistical upper bound on the importance of country specific characteristics by regressing the integration indices on country dummy variables. We also add period fixed effects. In the full sample, the adjusted R^2 of that model is 77% and is about 1.8 times the adjusted R^2 of model (5a) in Table VI, while it is 13 times the adjusted R^2 of a model with only controls. In the small cross-section with less cross-sectional variation, the adjusted R^2 is 63% and is marginally higher than the adjusted R^2 of model (5b) reported in Panel B. Not surprisingly the proxies for implicit barriers cannot capture all of the variation in integration levels as well as country and time effects. Nonetheless, they substantially dominate market and economic development proxies in explaining the variation in the integration index measure.

[31] In models (4a), (4b), (5a) and (5b), CIVIL, ASD and POL are the least significant among our variables and are not robust. This result is not surprising given the insufficient time dimension for these variables.

This analysis leads us to conclude that overall, market integration for investable securities is more influenced by information, governance and institutional factors than economic and stock market characteristics.

B.3. Economic importance of results

Our main specifications in models (5a) and (5b) of Table VI help us shed light on the economic significance of implicit barriers for integration. We combine the estimated coefficients in models (5a) and (5b) with the cross-sectional distribution of the implicit barrier variables and assume a country move from the 25th percentile to the 75th percentile as reported in Figure 2. The message is quite compelling. We find that the integration index increases by about 30% as a result of joint reduction in all implicit barriers. In the full cross-section, most of this increase is associated with a reduction in the information asymmetry as well as an increase in the quality of corporate governance. Therefore, notwithstanding the lower R^2 for governance, economically it is at least as important as the information environment. In the small cross-section, most of the increase is driven by the reduction in information asymmetry and a stronger institutional environment. The lesser role of governance is likely due to the exclusion of the anti-self dealing index from the economic analysis since ASD shows an unpredicted negative sign in the small cross-section. This analysis suggests that substantial lowering of implicit barriers can impact the degree of integration in a way that is economically very meaningful.

To summarize, our results show that the implicit barriers proxies dominate market and economic development proxies in explaining the variation in the integration index measure from a statistical standpoint. Specifically, the quality of information environment, as captured by the intensity of analyst following, the cross-listing activity, and the degree of corporate disclosure, plays an important role in explaining the departure from full integration. We also show that implicit barriers have a substantial economic impact in the cross-section of countries.

C. Extensions

Models (6a), (6b), (7), and (8) of Panels A and B in Table VI include a set of estimations that extend the analysis from our main specifications of models (5a) and (5b).

There is the concern that some of our proxies for implicit barriers might be strongly linked to the liberalization process. For example, as countries liberalize, the domestic institutions are also modernized and some of the proxies might actually be picking up the effect of the changes in liberalization. We thus include in our model the *de jure* measure of the degree of openness. We use the intensity of capital controls (ICC) as a proxy for explicit barriers. The results are reported in models (6a) and (6b). The explicit barrier variable is still insignificant as in the baseline model and most importantly, the proxies for implicit barriers preserve the sign and significance of our main models in (5a) and (5b).

High transaction costs are another potential obstacle for investing in emerging markets. A measure of transaction costs is notoriously difficult to compute. No consensus exists on what would be the best proxy and there is an additional challenge of data availability for emerging markets. We proxy transaction costs by the zero-return measure that is used for Emerging Markets in Lesmond (2005) and Bekaert, Harvey and Lundblad (2007).[32] This measure is computed from the proportion of zero daily returns observed in a year and a higher fraction of zero returns is indication of higher level of transaction costs. Although an imperfect measure, Bekaert et al. (2007) show that it might capture features of transaction costs that are not related to other measures of market liquidity such as market turnover. Model (7) in Panel B of Table VI reports the results. The zero-return measure is negative, indicating that markets with lower transaction costs have higher level of integration; however the coefficient is not significant. We also run another check using data on the costs of transaction and settlement collected by Wilshire associate for the CalPERS report on Emerging Markets accessibility for the last five years of our sample. Results (not reported) indicate that countries that are more integrated are those with lower transactions costs. Thus the direction of the relationship is also confirmed with this proxy. We should note that in this last set of regressions, the pool of observations further shrinks and power becomes a problem.

Battacharya and Daouk (2002) show that insider trading law enforcement is associated with a significant decrease in the country-level cost of equity. To test and control for insider trading law enforcement, we use a dummy variable, IT, that changes

[32] We thank Christian Lundblad for kindly providing us his data.

from zero to one after the year the first prosecution is recorded as provided by the authors. We then add the IT dummy to the regressions of the main specification in models (5a) and (5b) (results not reported). As expected, the dummy enters with a positive coefficient meaning that integration is larger in countries in which insider trading law is enforced. The coefficient is insignificant and the inclusion of the IT dummy does not impact the coefficients of the other variables.

It might be the case that some of our explanatory variables are significant only because they are determined by the legal tradition. Therefore we investigate the importance of interaction effects for the legal origin with all our other proxies of implicit barriers. In unreported regressions, we run this analysis with model (5a) to which we add the interaction between the legal origin and the other implicit barriers. We find that the interaction coefficients are insignificant. More importantly, the evidence on the main effect of all our variables is unaffected. Thus each variable provides information on the importance of the different environments that is independent of the legal origin.

Construction of the diversification portfolio (DP) may impact the analysis of the role of implicit barriers. The integration index used in the previous regressions is based on a DP constructed from an eligible set that comprises MSCI world market, global industry portfolios as well as country funds and depository receipts. We also use R_G, the diversification portfolio constructed only from the world market and the industry portfolios, and re-run estimations of our asset-pricing model to obtain another integration index. This new "benchmark" integration index is interesting as it helps uncover the specific contribution of CFs and ADRs. Since this index is conditioned on a diversification portfolio obtained from a stepwise regression of the investable returns on a set of common global factors, it is comparable to the R-squared integration measure of Pukthuanthong and Roll (2009).

Panel B of Table II indicates that the "benchmark" integration index ranges from 0.06 for Jordan to 0.62 for South Africa and is always significantly lower than the index obtained when the eligible set includes the CFs and cross-listings. The average level of integration across countries is 0.35 with a standard deviation of 15%. This confirms that ADRs and CFs are very important in integrating financial markets. It is interesting to note that these benchmark indices show similar trends and/or reversals as our evidence in

Panel A of Table II. Occurrences of reversals are also documented for some countries by CEH and Pukthuanthong and Roll (2009). The rankings of the indices of Panel B are overall consistent with those of Panel A. Jordan and Pakistan are the least integrated countries according to the benchmark measure, while Israel and South Africa are the most integrated. China's integration level is above the average of the group even without the contribution of cross-listings. However for other countries cross-listings play a crucial role, as notably for Mexico where simply conditioning on world-wide factors generates a low integration measure.

We next run our panel estimation using the benchmark integration index as dependent variable. The results reported in Model (8) in Panel A of Table VI are broadly similar to the evidence obtained using the expanded eligible set. We find a significant upward trend of same magnitude. The fraction of the variation in the integration measure explained by the implicit barriers is in this case only 28%. The signs of the implicit barrier variables are unchanged while the significance and size of analyst activity and of cross-listing activity are affected. This lack of significance is likely due to the lower cross-sectional variation in the benchmark indices.

D. Robustness issues

D.1. Alternative measures

Panels A and B of Table VII present evidence on different specifications and on the use of our alternative independent variables. Detailed information on these variables is also provided in Appendix B. Specifications in Columns (1) and (2) of Panel A examine the institutional environment. Specifications in Columns (3) through (5) focus on the corporate governance environment while Columns (1) through (7) of Panel B investigate the information environment.

As alternative variables that capture the quality of the institutional environment and the effectiveness of the legal system, we use La Porta et al. (1998) index of the risk of expropriation by the state (RISK-EXP) and La Porta et al. (1998) rule of law measure (RULE-LAW). Columns (1) and (2) show that the coefficients on the two variables are positive, as expected, and significant. As other measures of corporate governance, we use the anti-director index (A-DIR) in Columns (3) and (4) and ownership concentration

(OWC) in columns (4) and (5). The coefficient of A-DIR is positive though not always significant, while the coefficient of OWC is insignificant but unexpectedly positive. However this coefficient is very fragile as it switches sign if we exclude the VT/GDP, a highly correlated variable. The specifications on the information environment further support conclusions drawn from Table VI. Both the analyst diffusion variable (AN-D) and the cross-listing activity variable (CL-N) are significant at any statistical level. The coefficient on the measure of the intensity of financial disclosure (DISC) is positive though insignificant. Finally, in regressions that combine all aspects of implicit barriers (results not tabulated) we confirm with the alternative variables the evidence of models (4a), (4b) (5a), and (5b) of Table VI.

D.2. Time-dynamic specifications

We explore the time dynamics of our panel with the help of time dummies. To preserve degrees of freedom in our specifications we have opted for a trend rather than time fixed effects as a way to account for the temporal characteristics of the series. To test for possible breaks in the series we consider time dummies adding them sequentially from 1996 to 2002. The estimated trend is always significant. We find that only dummies at 1997 and 1998 are positive and significant when the trend looses significance. In all other cases the time dummy is not significant and negative from 2000 to 2002. We also explore interaction of these time dummies with our time-varying and time-invariant explanatory variables of Table VI. For both subsets, the time interaction coefficients are insignificant. Thus, while we do not find clear statistical support for a common structural break or reversal in the series, the evidence of time interaction mitigates concerns that our variables are significant because they contribute to pick up a general trend in the data.

In our analysis, we are careful in accounting for a general type of time-dependence through the postulated trend and in the correction of the standard errors. However, the lack of a clear theoretical relationship between integration and implicit barriers over time precludes the development of a formal dynamic model. Nonetheless, as a final check on our main conclusions, we estimate a specification with a lagged

dependent variable.[33] We find that while the statistical significance is reduced, the sign of all our variables of interest is retained and their long run economic impact is very similar to the static specifications of Table VI.

D.3. Sample Composition

We run our main specifications in models (4a) and (5a) with different sample compositions. We run regressions with the full cross-section excluding some regions, for example, Latin America, Asia or the countries that joined the European Union. The regressions yield similar inferences. We also run models (4a) and (5a) with the sub-sample of civil law countries. Interestingly, the size of the coefficients on the other implicit barrier variables is larger than in the full cross-section. Nonetheless the exclusion of common law countries does not affect the results and inferences. Given that the sample of common law countries comprises only six countries, we cannot run the same specification on this sub-sample.[34]

D.4 Endogeneity

Beginning November 2000, S&P started adjusting market capitalization for strategic holdings to better reflect float available for trading.[35] This process was completed in November 2003 when all strategic holdings greater that 10% were excluded from the market capitalization of the IFC indices. To make sure the negative relationship between the integration index and ownership concentration does not result from endogeneity bias, we drop the time period over which the investable indices were adjusted for free float and rerun our panel regression. We find no change in results.

We are aware that other endogeneity issues and the direction of causality might be a concern for some of our variables. Changes in financial integration might spur improvement in the economic and political climate and also lead to changes in the ownership structure and the dissemination of information. The improvement in the economic environment could also be the result of concurrent changes in economic

[33] For use of OLS with lagged dependent variables and the ensuing trade-off between bias and efficiency in the estimated coefficients see the literature on methods for time-series cross-section in political science, such as Beck and Katz (2009).

[34] Similarly we do not pursue estimation for the three groupings (Leaders, Movers, Laggards) as per Figure 1 since we would also face problems related to statistical power.

[35] Strategic holdings include government holdings, holdings by insiders (current or former officers and directors of the company, founders of the company, or family trusts of officers, directors or founders), holdings by other publicly traded companies and private equity firms.

openness, financial markets and institutions. It is difficult to come up with convincing instruments to deal with these issues. As with previous literature, we acknowledge this shortcoming and leave this difficult task to future research.

V. Conclusion

Using a conditional version of the EL model under barriers to portfolio flows, we investigate the behavior of investable assets of 22 emerging markets over a period characterized by increasing financial liberalization. The investable indices are a subset of EM assets that take into account technical and practical foreign investment restrictions and as a result of this liberalization represent the segment of choice for institutional investors.

Our results suggest that in spite of reduction in explicit barriers on foreign investment, there is strong evidence that local factor - the conditional market risk - is still relevant in pricing the returns of investable assets. Indeed, the returns on investable indices are determined by a combination of domestic and global factors. We show that the extent of globalization in our sample has not been uniform, integration has not universally increased over time and the process has at times stalled.

The relevance of the local factor in the pricing of securities that have been *de jure* liberalized suggests that the persistent segmentation of emerging markets is associated with implicit barriers. Our results further show that implicit barriers related to the institutional environment, corporate governance and the quality of information play a major role in explaining the extent of financial globalization. The economic significance of our results points to the fact that improvement in corporate governance, transparency and institutions would complement market liberalization policies and help in further integrating emerging markets.

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Appendix A - Securities for the Diversification Portfolios

Country	Cross-listings	Country Funds
ARGENTINA	YPF S.A.(USA, 1993/07), BBVA BANCO FRANCES S.A.(USA, 1993/11), TELEFONICA DE ARGENTINA S.A.(USA, 1994/03), TRANSPORTADORA DE GAS DEL SUR, S.A.(USA, 1994/11), METROGAS S.A.(USA, 1994/11)	ARGENTINE INVESTMENT (1991/10-2001/06)
BRAZIL	ARACRUZ CELULOSE (USA, 1992/05), COMPANHIA BRASILEIRA DE DISTRIBUICAO (USA, 1997/06), COMP. PARANAENSE DE ENERGIA-COPEL (USA, 1997/07), COMPANHIA SIDERURGICA NACIONAL (USA, 1997/11), PETROLEO BRASILEIRO S.A. (USA, 2000/08)	BRAZIL FUND (1988/03 2006/06)
CHILE	COMPANIA DE TELECOMUNICACIONES DE CHILE (USA, 1990/07), COMPANIA CERVECERIAS UNIDAS S.A. (USA, 1992/10), MADECO S.A. (USA, 1993/05), SOC. QUIMICA Y MINERA DE CHILE, S.A. (USA, 1993/09), ENERSIS S.A. (USA, 1993/10)	CHILE FUND (1989/09)
CHINA	SINOPEC SHANGHAI PETROCHEMICALS A (USA, 1993/07), HUANENG POWER 'H' (USA, 1994/10), GUANGSHEN RAILWAY (USA, 1996/05), CHINA EASTERN AIRLINES (USA, 1997/02), CHINA SOUTHERN AIRLINES (USA, 1997/07)	CHINA FUND (1992/07)
COLOMBIA	BANCO GANADERO (USA,1995/01- 2001/03), BANCOCOLOMBIA (USA, 1995/08)	N.A.
CZECH REPUBLIC	CESKA SPORITEL (Germany, 1996/11- 2002/06), SLOVAKOFARMA AS GDR (UK, 1997/12-2003/06), CESKE RADIOKOM.(UK, 1998/06-2005/02)	N.A.
HUNGARY	IBUSZ CERT. (Austria, 1990/06), FOTEX CERT. (Austria, 1992/11), ZWACK UNICUM (Germany, 1993/11), TISZAI VEGYI KOM (Germany, 1996/11), OTP BANK (Germany, 1996/11)	N.A.
INDIA	CESC LTD (UK, 1996/08), STATE BANK OF INDIA (Germany, 1997/02), MAHANAGAR TEL.NIGAM(UK, 1998/02), INFOSYS TECHNOLOGIES LIMITED (USA, 1999/03), SIFY LTD. (USA, 1999/10)	INDIA FUND (1994/02)
INDONESIA	PT INDONESIAN SATELLITE CORPORATION TBK (USA, 1994/10), PT TELEKOMUNIKASI INDONESIA TBK (USA, 1995/11)	INDONESIA FUND (1990/03)
ISRAEL	TEVA PHARMACEUTICAL INDS LTD (USA, 1982/02), ELRON ELECTRONIC INDUSTRIES LTD (USA, 1982/11), OPTROTECH LTD (USA, 1984/08), RADA ELECTRONIC INDUSTRIES LTD (USA, 1985/06), GALAGRAPH LTD (USA, 1987/04)	FIRST ISRAEL FUND (1992/10)
JORDAN	ARAB POTASH CO (UK, 1997/12)	N.A.
KOREA	KOREA ELECTRIC POWER CORP. (USA, 1994/10), POSCO (USA, 1994/10), SK TELECOM CO. LTD. (USA, 1996/06) , KT CORPORATION (USA, 1999/04), MIRAE CORP. (USA, 1999/11)	KOREA FUND (1984/08)

Appendix A - continued

Country	Cross-listings	Country Funds
MALAYSIA	PETALING TIN (UK, 1950/01), KUALA LUMPUR KEPONG BERHAD (UK, 1973/01-), HIGHLANDS & LOWLANDS BERHAD (UK, 1976/02-)	MALAYSIA FUND (1987/05)
MEXICO	TELEFONOS DE MEXICO SA DE CV - SERIES A (USA, 1976/01), TUBOS DE ACERO DE MEXICO S.A. (USA, 1976/01), VITRO S.A. DE C.V. (USA, 1991/11), EMPRESAS ICA S.A. DE C.V. (USA, 1992/04), GRUPO RADIO CENTRO S.A. DE C.V. (1993/07)	MEXICO FUND (1981/06)
PAKISTAN	N.A.	PAKISTAN INVEST. FUND (1993/12-2001/06)
PERU	BANCO WIESE LIMITADO (USA, 1994/09-2002/06), CEMENTOS LIMA (USA, 1995/03), COMPANIA DE MINAS BUENAVENTURA (USA, 1996/05), TELEFONICA DEL PERU S.A. (USA, 1996/07-2004/03)	N.A.
PHILIPPINES	SAN CARLOS MILLING INC. (1962/07-1994/08), PHILIPPINES LONG DISTANCE TELEPHONE (USA, 1970/01), SAN MIGUEL 'B' (USA, 1993/08), JG SUMMIT HOLDINGS (USA, 1995-2001/09), PSI TECHNOLOGIES (USA, 2000/03)	FIRST PHILIPPINES (1989/11-2003/06)
POLAND	KGHM POLSKA MIEDZ (UK, 1997/08), MOSTOSTAL EXPORT (USA, 1999/10-2001/07)	N.A.
SOUTH AFRICA	HIGHVELD STEEL AND VANADIUM (1981/10), SASOL (1982/04) ANGLOGOLD ASHANTI (Germany, 1988/09), BARLOWORLDZERT (Germany, 1988/09), ABSA GROUP (Germany, 1996/01)	SOUTHERN AFRICA FUND (1994/02-2004/11)
TAIWAN	MACRONIX INTERNATIONAL COMPANY LIMITED (USA, 1996/05) TAIWAN SEMICONDUCTOR MANUFACTURING CO. (USA, 1997/10) ADVANCED SEMICONDUCTOR ENGINEERING INC. (USA, 2000/09) UNITED MICROELECTRONICS CORPORATION (USA, 2000/09) SILICONWARE PRECISION IND., CO. LTD. (U	TAIWAN FUND (1986/12)
THAILAND	ADVANCED INFO. SERVICE (USA, 1993/08), CHAROEN POKPHAND GROUP (USA, 1994/12), THAI AIRWAYS INTL. (Germany, 1997/07), TT&T (Germany, 1998/01), INTERNET THAILAND (Germany, 2002/01)	THAI FUND (1988/02)
TURKEY	TOFAS OTOMOBIL ADR (UK, 1994/12), TURKCELL ILETISIM HIZMETLERI (USA, 2000/07)	TURKISH INVESTMENT FUND (1989/12)

Listings are from the four primary depository banks, Citibank, JP Morgan, the Bank of New York Mellon, and Deutsche Bank. Direct and ADR listings are then complented from the US major exchanges; NYSE, AMEX and NASDAQ. GDR listings are complemented from major world market exchanges, Datastream, as well as the 1998 listings available from Sergei Sarkissian website, http://web.management.mcgill.ca/Sergei.Sarkissian/. Given that the effective dates provided by the depository banks are the dates of the last change in listing, we made sure to have the date of initial listing. All the information was cross-checked and supplemented with the listed company's website and LEXIS/NEXIS. For a full description on the procedure to obtain the ADRs listing please refer to Karolyi (2004).

Appendix B - Variable definition

Variable	Description	Sources
Political risk POL	Political risk ratings based on the sum of 12 weighted variables covering both political and social attributes. The index has 100 points, with higher scores indicating lower risk. Frequency: annual.	International Country Risk (ICR) Guide
Risk of expropriation RISK-EXP	ICR's assessment of a threat of "outright confiscation" or "forced nationalization." LLSV average the index for the months of April and October between 1982 and 1995. Scale from 0 to 10 with lower scores for higher risk.	La Porta et al. (1998)
Rule of law RULE-LAW	ICR's assessment of law and order tradition of a country. LLSV average the index for the months of April and October between 1982 and 1995. Scale from 0 to 10 with lower scores for less tradition for law and order.	La Porta et al. (1998)
Closely Held C-HELD	Value weighted average fraction of firm stock market capitalization held by insiders i.e. corporate officers, directors, immediate family members, by individual shareholder holdings representing more than 5%, by other corporations (except shares held in fiduciary capacity by financial institutions), and by pension/ benefit plans and trusts. Frequency: annual.	WorldScope and authors calculations
Ownership concentration OWC	Average percentage of common shares owned by the top three shareholders in the ten largest non-financial, privately-owned domestic firms in a given country. A firm is considered privately owned if the state is not a known shareholder in it.	La Porta et al. (2006)
Anti-directors rights index A-DIR	Aggregate index of shareholder rights. The index ranges from 0 to 6 and it is formed by summing: (1) vote by mail; (2) shares not blocked or deposited; (3) cumulative voting; (4) oppressed minority; (5) pre-emptive rights; and (6) capital.	Djankov et al. (2008)
Anti-self-dealing index ASD	Average of ex-ante and ex-post private control of self-dealing. The index ranges from 0 to 1. It measures approval by disinterested shareholders, ex-ante disclosure, disclosure in periodic filings and ease of proving wrongdoing.	Djankov et al. (2008)
Analyst coverage AN-F	Mean number of analysts providing a forecast for a specific firm in a given calendar year. Frequency: annual.	I/B/E/S and authors calculations
Analyst diffusion AN-D	Proportion of firms with analyst coverage in a given calendar year, or number of firms included in IBES/number of listed companies in the domestic market. Frequency: annual.	I/B/E/S, EMDB of S&P and authors calculations
Accounting standards ACC	Index created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items. These items fall into seven categories (general information, income statements, balance sheets, funds flow statement, accounting standard, stock data, and special items).	La Porta et al. (1997). International accounting and auditing trends, Center for International Financial Analysis and Research (CIFAR)

Appendix B - continued

Variable	Description	Sources
Disclosure DISC	Intensity of financial disclosure created by examining and rating companies' 1995 annual reports on their inclusion or omission of R&D, capital expenditures, subsidiary data and accounting methods.	Bushman, Piotroski, and Smith (2004). International accounting and auditing trends, Center for International Financial Analysis and Research (CIFAR)
Cross-listing activity CL-MC	Proportion of market capitalization for firms that are cross-listed on US markets in a given calendar year, or combined market capitalization of cross-listed firms/total market capitalization of the domestic market. Frequency: annual.	Authors calculations from Citibank, JP Morgan, the Bank of New York Mellon, Deutsche Bank, NYSE, AMEX and NASDAQ for the cross-listings, Datastream, Compustat, EMDB of S&P for the market capitalization
Cross-listing activity CL-N	Proportion of firms that are cross-listed around the world, or number of world-wide cross-listed firms/number of listed companies in the domestic market. Frequency: annual.	Data on world-wide cross-listings kindly provided by Sergei Sarkissian, EMDB of S&P and authors calculations
Trade to GDP TR/GDP	Sum of exports and imports of goods and services measured as a share of gross domestic product. Frequency: Annual.	World Bank Development Indicators
Mcap to GDP MC/GDP	Equity market capitalization divided by gross domestic product. Frequency: Annual.	$&P/IFC emerging market and World Bank
Value traded to GDP VT/GDP	Ratio of equity market value traded to GDP. Frequency: Annual.	Standard and Poor's/International Finance Corporation's Emerging Stock Markets Factbook & World Bank Development Indicators
Intensity of Capital Controls ICC	ICC = (1-Investability) where investability is defined as the ratio of the market capitalization of the IFCI index over the market capitalization of the IFCG index. Frequency: Annual from monthly data.	Standard and Poor's/International Finance Corporation's Emerging Stock Markets Factbook and authors calculations
Zero returns Z-RET	Proportion of zero daily returns observed over the relevant year for each equity market, used as measure of transaction cost. Frequency: annual.	Kindly provided by Christian Lundblad as used in Bekaert, Harvey and Lundblad (2007)

Table I: Summary statistics for asset excess returns and information variables

Panel A presents basic statistics of the investable indices. The emerging markets investable equity indices returns are proxied by IFC investable indices (IFCI) from the S&P/IFC Emerging Markets Database for all countries except Colombia, Jordan, Pakistan. The investable return series for these three countries has been discontinued by S&P/IFC since November 2001 due to their small size or illiquidity. For these countries, we use MSCI EM Free indices. For Isreal, we also use MSCI EM Free as the returns data starts on January 1993, while it starts on January 1997 for the Israelian IFCI. The world market portfolio (WMP) return is the U.S. dollar return on the MSCI value-weighted world market portfolio. The IFCG index is the index of all domestic companies from the S&P/IFC Emerging Markets Database. Returns are monthly percentage, denominated in USD and in excess of the one-month Eurodollar deposit rate. The period is from January 1989 or later to December 2006. For each country, the table presents the starting date for the return data, the market cap. of the IFCG index (MCG) and of the IFCI index (MCI) in billions of U.S. dollars at the start of the sample and at December 2006, the number of firms in the IFCG index (NG) and IFCI index (NI) as of December 2006, the averages and standard deviation over the whole sample period. B-J is the Bera-Jarque test for normality based on excess skewness and kurtosis. Q is the Ljung-Box test for autocorrelation of order 12 for the excess returns and the excess returns squared. Superscripts a, b and c indicate statistical significance at the 1%, 5% and 10% level respectively.

Panel B presents for each country, the correlation between the Diversification Portfolio, the IFCI index, and the World Market Portfolio. The diversification portfolio is constructed as described in Section 2.

Panel C presents the basic statistics for the global information variables. The global instruments include a constant, the world dividend yield in excess of the one-month Euro-dollar interest rate (XWDY), the change in US term premium (ΔUSTP), and the US default premium (USDP). All variables are in percent per month, lagged one month with respect to the returns series.

Panel D reports the basic statistics for the local information variables. The local instruments include a constant, the lagged emerging market excess returns (LagRet), the local dividend yield in excess of the one-month Euro-dollar interest rate (XLDY), the change in bilateral exchange rate (ΔFX). All variables are in percent per month, lagged one month with respect to the return series.

Panel A: Distributional Statistics of the IFC investable indices

	Start date	MCG start	MCG 2006	N_{G} 2006	MCI start	MCI 2006	N_{I} 2006	Mean	Std. Dev.	B-J	$Q(z)_{12}$	p-value	$Q(z^2)_{12}$	p-value
ARGENTINA	Jan-89	1.24	20.15	18	1.03	19.48	14	1.18	18.11	1659.8[b]	19.97	0.07	75.05	0.00
BRAZIL	Jan-89	10.52	316.63	123	2.14	302.51	115	1.12	17.72	827.5[b]	22.90	0.03	41.07	0.00
CHILE	Jan-89	4.92	57.67	56	0.81	55.59	50	1.14	7.07	27.83[b]	16.84	0.16	15.92	0.19
CHINA	Jan-93	12.11	511.24	411	0.74	363.13	195	-0.04	9.66	44.17[b]	28.84	0.00	118.83	0.00
COLOMBIA	Jan-93	1.38	16.56	17	0.69	na	na	0.78	8.39	19.55[b]	21.74	0.04	96.25	0.00
CZECH REP.	Jan-94	9.63	15.53	6	3.90	15.53	6	0.45	8.07	532.95[b]	20.97	0.05	12.15	0.43
HUNGARY	Jan-93	0.47	27.94	11	0.24	27.70	8	0.94	9.58	350.29[b]	16.62	0.16	15.85	0.20
INDIA	Dec-92	24.81	305.84	192	5.53	210.16	182	0.37	7.16	2.76	18.84	0.09	31.26	0.00
INDONESIA	Oct-90	5.10	37.82	42	1.66	37.82	42	-0.23	12.79	88.48[b]	33.51	0.00	213.56	0.00
ISRAEL	Jan-93	12.61	65.40	70	11.82	65.27	69	0.15	6.56	29.07[b]	13.96	0.30	84.05	0.00
JORDAN	Jan-89	1.70	na	na	0.65	na	na	0.29	5.15	28.57[b]	37.92	0.00	17.58	0.13
KOREA	Feb-92	68.97	511.24	305	5.16	487.75	242	0.21	10.68	166.4[b]	8.19	0.77	141.06	0.00
MALAYSIA	Jan-89	20.18	76.00	113	14.30	71.44	113	0.11	9.33	152.85[b]	46.98	0.00	189.49	0.00
MEXICO	Jan-89	8.83	160.44	55	0.95	160.09	52	1.25	9.34	203.95[b]	26.58	0.01	24.18	0.02
PAKISTAN	Jan-93	1.49	10.23	48	0.38	na	na	0.28	9.83	132.38[b]	11.62	0.48	55.80	0.00
PERU	Jan-93	1.73	17.31	30	1.48	15.88	19	0.86	7.25	130.63[b]	24.59	0.02	20.83	0.05
PHILIPPINES	Jan-89	2.59	24.90	29	1.26	15.79	20	-0.17	10.08	34.19[b]	22.16	0.04	26.87	0.01
POLAND	Jan-94	0.19	53.23	53	0.19	53.23	53	0.18	9.94	169.68[b]	21.37	0.05	46.80	0.00
SOUTH AFRICA	Jan-93	60.10	256.04	146	58.35	255.91	144	0.74	7.13	293.38[b]	10.22	0.60	49.86	0.00
TAIWAN	Feb-91	72.31	400.89	176	2.24	391.92	176	0.04	8.80	65.92[b]	19.83	0.07	21.19	0.05
THAILAND	Jan-89	6.48	65.38	85	1.87	38.25	71	-0.06	11.37	24.70[b]	36.37	0.00	119.39	0.00
TURKEY	Sep-89	1.69	42.92	60	1.13	42.13	55	0.53	17.05	10.06[b]	7.88	0.79	9.73	0.64
WMP	Jan-89							0.29	4.06	17.73[b]	7.56	0.82	19.17	0.08

Panel B: Summary Statistics for Diversification Portfolios and Pairwise Correlations for Assets Returns

	Number of obs.	Mean	St. Dev.	B-J	p-value	$Q(z)_{12}$	p-value	$Q(z^2)_{12}$	p-value	correlations		
										IFCI and WMP	DP and IFCI	DP and WMP
ARGENTINA	216	3.27%	11.59%	14.14	0.00	48.50	0.00	144.35	0.00	0.13	0.57	0.36
BRAZIL	216	2.90%	13.68%	14.16	0.00	9.31	0.68	45.84	0.00	0.39	0.77	0.55
CHILE	216	1.76%	5.85%	4.87	0.09	6.65	0.88	23.79	0.02	0.37	0.79	0.48
CHINA	168	0.94%	10.03%	2.76	0.25	34.85	0.00	77.84	0.00	0.35	0.86	0.40
COLOMBIA	168	1.80%	6.03%	89.31	0.00	29.59	0.00	41.37	0.00	0.21	0.63	0.50
CZECH REP.	156	1.43%	6.60%	55.61	0.00	9.65	0.65	14.33	0.28	0.36	0.67	0.56
HUNGARY	168	2.16%	9.54%	12.41	0.00	8.86	0.71	25.46	0.01	0.47	0.85	0.57
INDIA	169	1.15%	6.51%	2.26	0.32	14.90	0.25	158.36	0.00	0.29	0.80	0.47
INDONESIA	195	0.99%	10.96%	364.81	0.00	18.24	0.11	59.98	0.00	0.34	0.82	0.48
ISRAEL	168	0.82%	6.70%	12.21	0.00	8.48	0.75	41.14	0.00	0.54	0.90	0.63
JORDAN	216	0.81%	0.89%	1100.36	0.00	16.99	0.15	7.24	0.84	0.11	0.17	0.60
KOREA	179	1.29%	10.68%	97.36	0.00	11.38	0.50	119.04	0.00	0.46	0.87	0.59
MALAYSIA	216	0.94%	7.31%	127.43	0.00	22.20	0.04	17.79	0.12	0.40	0.77	0.59
MEXICO	216	2.08%	8.20%	19.53	0.00	16.13	0.19	8.72	0.73	0.48	0.91	0.56
PAKISTAN	168	1.33%	6.74%	180.25	0.00	28.49	0.00	44.59	0.00	0.11	0.60	0.26
PERU	168	1.74%	5.17%	47.72	0.00	24.14	0.02	30.59	0.00	0.28	0.60	0.47
PHILIPPINES	216	0.73%	8.80%	63.71	0.00	13.18	0.36	39.93	0.00	0.37	0.87	0.51
POLAND	156	1.28%	7.11%	2.11	0.35	24.05	0.02	44.00	0.00	0.47	0.61	0.70
SOUTH AFRICA	168	1.62%	7.12%	85.41	0.00	10.41	0.58	58.01	0.00	0.51	0.90	0.57
TAIWAN	191	0.84%	8.71%	358.05	0.00	24.76	0.02	6.39	0.90	0.41	0.89	0.51
THAILAND	216	0.97%	10.19%	75.52	0.00	28.21	0.01	83.25	0.00	0.44	0.89	0.54
TURKEY	208	2.47%	13.37%	200.07	0.00	12.14	0.43	8.71	0.73	0.32	0.74	0.54

Panel C: Global information variables

	Mean	Std. Dev.	Pairwise Correlations		
XWDY	-0.23	0.19	1.00	0.03	0.23
ΔUSTP	-0.01	0.23		1.00	0.18
USDP	0.84	0.20			1.00

Panel D: Local information variables

	Mean	Std. Dev.	Pairwise Correlations		Mean	Std. Dev.	Pairwise
	XLDY		With LagRet	With ΔFX	**ΔFX**		With LagRet
ARGENTINA	-0.19	0.21	-0.196	0.248	-3.60	18.24	0.108
BRAZIL	-0.07	0.29	-0.198	0.235	-7.47	13.11	0.226
CHILE	-0.05	0.19	-0.032	0.055	-0.36	2.16	0.427
CHINA	-0.31	0.22	0.068	0.003	-0.35	3.28	0.117
COLOMBIA	-0.05	0.21	0.110	0.053	-0.90	2.40	0.396
CZECH REP.	-0.08	0.27	0.179	0.108	0.17	4.15	0.256
HUNGARY	-0.17	0.16	0.099	0.292	-0.59	2.94	0.234
INDIA	-0.26	0.19	0.144	0.131	-0.51	2.16	0.420
INDONESIA	-0.25	0.26	0.110	0.022	-0.77	8.20	0.619
ISRAEL	-0.31	0.22	0.010	0.050	-0.46	2.07	0.397
JORDAN	-0.15	0.21	0.250	0.302	-0.19	0.99	0.094
KOREA	-0.26	0.21	0.064	0.028	-0.14	3.79	0.585
MALAYSIA	-0.19	0.22	0.022	0.011	-0.14	2.59	0.523
MEXICO	-0.24	0.18	-0.016	0.076	-0.73	3.99	0.513
PAKISTAN	0.05	0.35	0.038	0.172	-0.55	1.78	0.148
PERU	-0.23	0.26	0.071	0.245	-4.06	15.47	0.271
PHILIPPINES	-0.29	0.20	0.089	0.102	-0.39	2.70	0.374
POLAND	-0.30	0.22	0.088	0.169	-1.88	7.72	0.418
SOUTH AFRICA	-0.20	0.28	0.058	0.162	-0.52	3.68	0.583
TAIWAN	-0.30	0.22	0.060	0.133	-0.02	2.41	0.200
THAILAND	-0.19	0.19	-0.003	-0.022	-0.17	3.32	0.349
TURKEY	-0.14	0.18	-0.056	0.090	-3.10	5.28	0.414

Table II - Summary statistics for the estimated Integration Indices

For each IFCI index, the table presents summary statistics of the integration index estimated from the model in section I. The sample period is from 1989 to 2006. The mean, subperiod means and standard deviation are reported for each country. We also report means and standard deviation for the pool of observations. In Panel A, the integration index is based on the diversification portfolio R_{DP}, constructed as described in Section II from the world market, industry portfolios, country fund and the cross- listings detailed in Appendix A. In Panel B, the integration index is based on the diversification portfolio R_G, constructed only from the world market and industry portfolios, and is termed "benchmark " integration index. Superscripts a, b and c indicate statistical significance at the 1%, 5% and 10% level respectively.

Panel A - Integration Index

	Mean	Before 1995	After 2001	Std. Dev.	Obs.	Test for trend	
						coefficient	std. error
ARGENTINA	0.599	0.391	0.687	0.265	18	0.03[c]	0.014
BRAZIL	0.748	0.547	0.923	0.194	18	0.031[a]	0.004
CHILE	0.661	0.584	0.744	0.095	18	0.015[a]	0.003
CHINA	0.769	0.775	0.740	0.090	14	-0.005	0.004
COLOMBIA	0.419	0.387	0.480	0.098	14	0.016[a]	0.006
CZECH REPUBLIC	0.386	0.191	0.449	0.145	13	0.023[a]	0.007
HUNGARY	0.774	0.721	0.827	0.073	14	0.011[b]	0.004
INDIA	0.664	0.436	0.773	0.162	14	0.031[a]	0.008
INDONESIA	0.707	0.606	0.768	0.101	17	0.014[a]	0.003
ISRAEL	0.821	0.833	0.825	0.034	14	0.002	0.003
JORDAN	0.056	0.056	0.066	0.045	18	0.000	0.003
KOREA	0.741	0.643	0.818	0.102	15	0.017[a]	0.004
MALAYSIA	0.628	0.641	0.589	0.080	18	-0.003	0.003
MEXICO	0.835	0.829	0.840	0.013	18	0.001[c]	0.001
PAKISTAN	0.357	0.345	0.182	0.199	14	-0.024	0.014
PERU	0.466	0.366	0.495	0.089	14	0.006	0.005
PHILIPPINES	0.742	0.698	0.737	0.093	18	0.003	0.006
POLAND	0.428	0.229	0.556	0.161	13	0.039[a]	0.003
SOUTH AFRICA	0.820	0.816	0.823	0.012	14	0.001	0.001
TAIWAN	0.784	0.776	0.790	0.013	16	0.001[b]	0.001
THAILAND	0.780	0.733	0.790	0.079	18	0.006	0.004
TURKEY	0.583	0.395	0.739	0.185	18	0.027[a]	0.006
Country pool	0.626	0.545	0.666	0.198	348	0.009[a]	0.003

Panel B - Benchmark Integration Index

	Mean	Before 1995	After 2001	Std. Dev.	Obs.
ARGENTINA	0.221	0.139	0.294	0.111	18
BRAZIL	0.364	0.189	0.539	0.171	18
CHILE	0.242	0.161	0.329	0.101	18
CHINA	0.551	0.607	0.543	0.090	14
COLOMBIA	0.202	0.180	0.201	0.034	14
CZECH REPUBLIC	0.273	0.186	0.351	0.099	13
HUNGARY	0.353	0.341	0.359	0.047	14
INDIA	0.256	0.197	0.393	0.133	14
INDONESIA	0.392	0.406	0.390	0.052	17
ISRAEL	0.525	0.459	0.554	0.090	14
JORDAN	0.059	0.059	0.078	0.056	18
KOREA	0.513	0.361	0.597	0.113	15
MALAYSIA	0.454	0.482	0.462	0.089	18
MEXICO	0.366	0.279	0.490	0.115	18
PAKISTAN	0.078	0.087	0.081	0.025	14
PERU	0.206	0.205	0.215	0.025	14
PHILIPPINES	0.452	0.448	0.412	0.056	18
POLAND	0.315	0.179	0.415	0.125	13
SOUTH AFRICA	0.618	0.600	0.625	0.022	14
TAIWAN	0.483	0.480	0.479	0.057	16
THAILAND	0.467	0.441	0.468	0.085	18
TURKEY	0.249	0.176	0.391	0.114	18
Country pool	0.347	0.303	0.394	0.151	348

Table III: Pricing tests of the model

The estimated model is:

$$r_{IFCI,t} = \delta_{W,t-1}\, cov\ (r_{IFCIt}, r_{Wt}) + \lambda_{It-1}\, var\ (r_{IFCIt} | r_{DPt}) + \varepsilon_{It}$$

$$r_{DP,t} = \delta_{W,t-1}\, cov\ (r_{DPt}, r_{Wt}) + \varepsilon_{DP,t}$$

$$r_{W,t} = \delta_{W,t-1}\, var\ (r_{W,t}) + \varepsilon_{W,t}$$

where $r_{IFCI,t}$ is the country investable index excess returns, $r_{DP,t}$ is the diversification portfolio excess returns, $r_{W,t}$ is the world index excess returns, δ_W is the price of world covariance risk, λ_I is the prices of local risk and $\varepsilon_t | \vartheta_{t-1} \sim N(0, H_t)$. The time-varying prices are estimated with a different set of conditioning information. Price specifications are given by:

$$\delta_{W,t-1} = (\kappa_W' \mathbf{Z}_{w,t-1})^2$$

where $\mathbf{Z_W}$ is a set of information variables which includes a constant, the U.S. default spread, the U.S. term structure spread and the world dividend yield in excess of the risk free rate,

$$\lambda_{I,t-1} = (\kappa_I' \mathbf{Z}_{i,t-1})^2$$

where $\mathbf{Z_I}$ is a set which includes a constant, the lagged local equity return, the local dividend yield and the change in the local exchange rate.
H_t is the time-varying conditional covariance parameterized as:

$$H_t = H_0 * (\iota\iota' - \mathbf{aa}' - \mathbf{bb}') + \mathbf{aa}' * \Sigma_{t-1} + \mathbf{bb}' * H_{t-1},$$

where * denotes the Hadamard product, **a** and **b** are (3 x 1) vector of constants, ι is (3 x 1) unit vector, and Σ_{t-1} is the matrix of cross error terms, $\varepsilon_{t-1}\varepsilon'_{t-1}$.

Country equity investable indices are from IFC and MSCI and the world equity index is from MSCI. The risk free rate is the one-month Eurodollar rate from Datastream. All returns are denominated in USD. Sample is from January 1989 or later to December 2006. The model is estimated by Quasi-Maximum Likelihood. P-values for robust Wald test for the hypothesis are reported under each country. B-J is the Bera-Jarque test for normality based on excess skewness and kurtosis. Q is the Ljung-Box test for autocorrelation of order 12 for the residuals and the residuals squared. EN-AN and EN-AP are respectively the Engle-Ng (1993) negative size bias and positive size bias test on the squared residuals.

Panel A. Specification tests

Null hypothesis	for insignificant world market risk		for constant world market risk		for insignificant local market risk		for constant local market risk	
	d.f.	p-value	d.f.	p-value	d.f.	p-value	d.f.	p-value
ARGENTINA	4	0.000	3	0.005	4	0.377	3	0.253
BRAZIL	4	0.000	3	0.029	4	0.000	3	0.000
CHILE	4	0.000	3	0.371	4	0.002	3	0.004
CHINA	4	0.000	3	0.049	4	0.000	3	0.000
COLOMBIA	4	0.000	3	0.375	4	0.891	3	0.993
CZECH REPUBLIC	4	0.000	3	0.033	4	0.000	3	0.000
HUNGARY	4	0.008	3	0.839	4	0.049	3	0.033
INDIA	4	0.000	3	0.008	4	0.041	3	0.071
INDONESIA	4	0.000	3	0.267	4	0.000	3	0.000
ISRAEL	4	0.000	3	0.299	4	0.001	3	0.001
JORDAN	4	0.000	3	0.034	4	0.000	3	0.000
KOREA	4	0.000	3	0.489	4	0.025	3	0.018
MALAYSIA	4	0.000	3	0.023	4	0.005	3	0.002
MEXICO	4	0.000	3	0.376	4	0.000	3	0.000
PAKISTAN	4	0.000	3	0.594	4	0.000	3	0.000
PERU	4	0.000	3	0.712	4	0.000	3	0.000
PHILIPPINES	4	0.000	3	0.034	4	0.000	3	0.002
POLAND	4	0.001	3	0.442	4	0.879	3	0.756
SOUTH AFRICA	4	0.000	3	0.345	4	0.560	3	0.571
TAIWAN	4	0.000	3	0.006	4	0.358	3	0.338
THAILAND	4	0.000	3	0.014	4	0.094	3	0.082
TURKEY	4	0.000	3	0.003	4	0.397	3	0.305

Panel B. Diagnostics for the residual

	B-J	p-value	$Q(z)_{12}$	p-value	$Q(z^2)_{12}$	p-value	EN-AN	p-value	EN-AP	p-value	R^2(%)
ARGENTINA	152.090	*0.000*	6.195	*0.906*	6.701	*0.877*	1.636	*0.052*	2.614	*0.005*	-1.03%
BRAZIL	122.690	*0.000*	16.284	*0.179*	24.763	*0.016*	1.144	*0.127*	0.084	*0.467*	6.12%
CHILE	11.660	*0.003*	19.816	*0.071*	6.922	*0.863*	1.212	*0.113*	1.198	*0.116*	3.51%
CHINA	3.443	*0.179*	14.943	*0.245*	8.652	*0.732*	0.760	*0.224*	1.445	*0.075*	-0.70%
COLOMBIA	0.644	*0.725*	9.064	*0.697*	12.638	*0.396*	-0.174	*0.431*	0.158	*0.437*	2.10%
CZECH REP.	5.828	*0.054*	15.527	*0.214*	12.660	*0.394*	-1.462	*0.073*	-1.356	*0.088*	4.00%
HUNGARY	140.650	*0.000*	9.721	*0.640*	7.616	*0.814*	-1.270	*0.103*	0.735	*0.232*	2.74%
INDIA	17.058	*0.000*	8.016	*0.784*	7.051	*0.854*	-0.504	*0.307*	-1.506	*0.067*	1.76%
INDONESIA	71.527	*0.000*	16.844	*0.156*	14.576	*0.265*	-1.798	*0.037*	-1.963	*0.026*	-2.32%
ISRAEL	11.770	*0.003*	14.423	*0.275*	6.361	*0.897*	-0.568	*0.285*	-1.321	*0.094*	1.34%
JORDAN	14.826	*0.001*	16.847	*0.155*	6.049	*0.914*	1.919	*0.028*	1.218	*0.112*	4.64%
KOREA	12.822	*0.002*	2.732	*0.997*	13.105	*0.361*	-2.419	*0.008*	-0.886	*0.188*	3.35%
MALAYSIA	65.781	*0.000*	17.890	*0.119*	8.303	*0.761*	-1.763	*0.040*	-1.859	*0.032*	4.93%
MEXICO	394.030	*0.000*	19.757	*0.072*	3.961	*0.984*	-0.331	*0.371*	-0.577	*0.282*	-3.46%
PAKISTAN	25.968	*0.000*	9.434	*0.665*	6.815	*0.870*	-1.003	*0.159*	-0.270	*0.394*	5.90%
PERU	22.813	*0.000*	23.483	*0.024*	6.971	*0.860*	0.756	*0.225*	0.325	*0.373*	2.09%
PHILIPPINES	30.462	*0.000*	8.095	*0.778*	23.379	*0.025*	-2.807	*0.003*	-2.153	*0.016*	1.94%
POLAND	23.948	*0.000*	9.593	*0.652*	10.191	*0.599*	0.092	*0.463*	1.715	*0.044*	0.96%
SOUTH AFRICA	15.877	*0.000*	9.011	*0.702*	19.991	*0.067*	0.374	*0.354*	-1.262	*0.104*	2.22%
TAIWAN	18.773	*0.000*	7.949	*0.789*	8.422	*0.751*	-0.139	*0.445*	0.403	*0.344*	0.37%
THAILAND	3.471	*0.176*	28.420	*0.005*	8.101	*0.777*	0.939	*0.174*	0.046	*0.482*	0.67%
TURKEY	5.191	*0.075*	8.420	*0.752*	14.045	*0.298*	0.107	*0.458*	-0.600	*0.275*	1.08%

Table IV - Summary statistics for the independent variables

The table presents averages of the variables for each country and for the pool. The period is from 1989 to 2006. Not all variables are available in every period for every country. The definition of the variables in in Appendix B.

	POL	RISK-EXP	RULE-LAW	CIVIL	C-HELD	OWC	ASD	A-DIR	AN-F	AN-D	ACC	DISC	CL-MC	CL-N	MC/GDP	TR/GDP	VT/GDP	ICC	Z-RET
ARGENTINA	0.69	5.91	5.35	1	0.67	0.53	0.34	2.0	5.30	0.35	0.45	0.71	0.38	0.12	0.29	0.21	0.04	0.04	0.28
BRAZIL	0.66	7.62	6.32	1	0.57	0.57	0.27	5.0	4.75	0.23	0.54	0.57	0.21	0.04	0.30	0.17	0.13	0.12	0.49
CHILE	0.74	7.50	7.02	1	0.61	0.45	0.63	4.0	3.62	0.27	0.52	0.93	0.30	0.06	0.88	0.51	0.09	0.05	0.36
CHINA	0.66			1	0.66		0.76	1.0	5.44	0.19			0.23	0.02	0.27	0.42	0.31	0.64	0.14
COLOMBIA	0.55	6.95	2.08	1	0.53	0.63	0.57	3.0	2.21	0.10	0.50	0.14	0.04	0.02	0.17	0.29	0.02	0.59	0.47
CZECH REP.	0.79			1	0.72		0.33	4.0	5.46	0.17			0.00	0.05	0.23	1.00	0.12	0.23	
HUNGARY	0.78			1	0.46		0.18	2.0	6.91	0.54			0.18	0.19	0.19	0.91	0.13	0.09	
INDIA	0.56	7.75	4.17	0	0.52	0.40	0.58	5.0	5.11	0.04	0.57	0.79	0.08	0.01	0.36	0.20	0.36	0.58	0.23
INDONESIA	0.53	7.16	3.98	1	0.68	0.58	0.65	4.0	5.69	0.43			0.13	0.01	0.22	0.50	0.09	0.17	0.35
ISRAEL	0.60	8.25	4.82	0	0.50	0.51	0.73	4.0	2.77	0.04	0.64	1.00	0.39	0.15	0.51	0.56	0.26	0.17	0.20
JORDAN	0.66	6.07	4.35	1	0.62	0.52	0.16	1.0	1.00	0.30			0.00	0.00	0.96	0.87	0.31	0.84	0.51
KOREA	0.75	8.31	5.35	1	0.40	0.23	0.47	4.5	4.17	0.34	0.62	0.65	0.19	0.02	0.48	0.57	0.89	0.27	0.16
MALAYSIA	0.72	7.95	6.78	0	0.54	0.54	0.95	5.0	8.94	0.39	0.76	1.00	0.00	0.01	1.69	1.66	0.73	0.15	0.29
MEXICO	0.70	7.29	5.35	1	0.46	0.64	0.17	3.0	7.96	0.49	0.60	0.68	0.45	0.15	0.28	0.48	0.09	0.04	0.26
PAKISTAN	0.47	5.62	3.03	0	0.69	0.37	0.41	4.0	2.45	0.07		0.68	0.00	0.00	0.18	0.32	0.32	0.58	0.28
PERU	0.56	5.54	2.50	1	0.51	0.56	0.45	3.5	1.23	0.03	0.38	0.54	0.14	0.01	0.22	0.27	0.04	0.12	
PHILIPPINES	0.60	5.22	2.73	1	0.58	0.57	0.22	4.0	6.54	0.31	0.65	0.80	0.09	0.04	0.49	0.75	0.12	0.48	0.36
POLAND	0.74			1	0.62		0.29	2.0	5.17	0.33			0.00	0.03	0.14	0.46	0.05	0.01	
SOUTH AFRICA	0.67	6.88	4.42	0	0.42	0.52	0.81	5.0	3.82	0.38	0.70	0.88	0.14	0.10	1.61	0.42	0.51	0.01	0.24
TAIWAN	0.78	9.12	8.52	1	0.29	0.18	0.56	3.0	3.47	0.58	0.65	0.60		0.05	0.58	0.81	2.63	0.46	
THAILAND	0.67	7.42	6.25	0	0.43	0.47	0.81	4.0	5.82	0.62	0.64	0.52	0.00	0.01	0.54	0.89	0.40	0.50	0.26
TURKEY	0.58	7.00	5.18	1	0.68	0.59	0.43	3.0	1.25	0.01	0.51	0.59	0.03	0.02	0.18	0.28	0.24	0.01	0.35
Country Pool																			
Average	0.66	7.09	4.90	0.73	0.55	0.49	0.49	3.45	4.50	0.28	0.58	0.69	0.14	0.05	0.49	0.57	0.36	0.28	0.31
Standard Dev.	0.09	1.07	1.70	0.46	0.11	0.13	0.23	1.23	2.14	0.19	0.10	0.21	0.14	0.06	0.44	0.35	0.56	0.25	0.11

Table V - Cross-correlations of variables - by country

The table presents correlations of the variables computed from the averages over the period of each country. The period is from 1989 to 2006. The definition of the variables in in Appendix B.

	POL	RISK-EXP	RULE-LAW	CIVIL	C-HELD	OWC	ASD	A-DIR	CL-MC	CL-N	AN-F	AN-D	ACC	DISC	MC/GDP	TR/GDP	VT/GDP	ICC
RISK-EXP	0.54																	
RULE-LAW	0.80	0.71																
CIVIL	0.29	-0.15	0.00															
C-HELD	-0.33	-0.61	-0.38	0.20														
OWC	-0.37	-0.47	-0.43	0.14	0.49													
ASD	-0.12	0.47	0.25	-0.61	-0.20	-0.16												
A-DIR	-0.17	0.34	0.09	-0.53	-0.22	-0.14	0.40											
CL-MC	0.19	0.22	0.29	0.19	-0.23	0.11	-0.08	-0.09										
CL-N	0.38	0.14	0.20	0.04	-0.27	0.20	-0.24	-0.14	0.71									
AN-F	0.42	0.20	0.31	-0.09	-0.10	0.13	0.07	0.16	0.17	0.29								
AN-D	0.59	0.30	0.57	0.09	-0.49	-0.21	0.00	-0.10	0.11	0.29	0.57							
ACC	0.43	0.48	0.38	-0.59	-0.48	-0.26	0.49	0.53	-0.20	0.06	0.58	0.52						
DISC	0.27	0.14	0.31	-0.45	0.07	-0.11	0.31	0.43	0.29	0.38	0.38	0.06	0.50					
MC/GDP	0.49	0.26	0.40	-0.19	-0.18	-0.12	0.22	0.06	-0.32	0.00	0.48	0.48	0.74	0.38				
TR/GDP	0.25	0.20	0.34	-0.47	-0.29	-0.06	0.52	0.34	-0.10	-0.02	0.16	0.27	0.70	0.61	0.54			
VT/GDP	0.34	0.60	0.60	-0.08	-0.62	-0.77	0.25	0.08	-0.20	-0.11	-0.05	0.38	0.44	0.03	0.30	0.28		
ICC	-0.32	-0.14	-0.28	-0.13	0.02	-0.29	0.03	-0.23	-0.42	-0.52	-0.24	-0.12	0.16	-0.38	0.08	-0.05	0.21	
Z-RET	-0.19	-0.35	-0.16	0.41	0.33	0.55	-0.46	-0.12	-0.32	-0.24	-0.33	-0.06	-0.43	-0.50	-0.02	-0.04	-0.50	0.13

Table VI - Role of implicit barriers

The table reports the estimated coefficients from pooled regressions of the integration indices on proxies for implicit barriers and other country characteristics. The estimated models are based on the general equation below

$$II_{it} = a_0 + b_0 \times trend + b_1 \times \text{institutional environment proxies}_{it} + b_2 \times \text{governance environment proxies}_{it} + b_3 \times \text{information environment proxies}_{it} + cX_{it} + \varepsilon_{it}$$

The dependent variable in model (1a) through (6a) and (1b) through (7) is the integration index based on R_{DP}, constructed as described in Section II from the world market, industry portfolios, country fund and cross-listings. In model (8a), the dependent variable is the benchmark integration index based on R_G, constructed only from the world market and industry portfolios. The monthly integration indices are averaged to obtain yearly values. We run unbalanced regression as not all the explanatory variables are available for all the cross-sectional units. Standard errors in parenthesis are clustered by country and time. The sample period is from 1989 to 2006. All regressions include a trend. Estimates of the constant are not reported. Superscripts a, b and c indicate statistical significance at the 1%, 5% and 10% level respectively. Definition of the variables and data source is in Appendix B.

Panel A - Full cross-section (at least 21 countries included)

dependent variable				*II*				*benchmark II*
	baseline model	**(1a)**	**(2a)**	**(3a)**	**(4a)**	**(5a)**	**(6a)**	**(8)**
POL		0.542			-0.008	0.065	0.034	0.144
		(0.406)			(0.224)	(0.271)	(0.240)	(0.267)
CIVIL		-0.107			0.004	-0.004	-0.002	0.049
		(0.112)			(0.050)	(0.049)	(0.049)	(0.066)
C-HELD			-0.373[a]		-0.282[a]	-0.344[a]	-0.347[a]	-0.205[c]
			(0.138)		(0.109)	(0.087)	(0.088)	(0.111)
ASD			0.170		0.167	0.193	0.200	0.289[b]
			(0.178)		(0.067)	(0.124)	(0.133)	(0.139)
CL-MC				0.432[a]	0.432[a]	0.374[a]	0.352[a]	0.128
				(0.110)	(0.099)	(0.097)	(0.099)	(0.107)
AN-F				0.023[a]	0.020[a]	0.024[a]	0.023[a]	0.010
				(0.007)	(0.006)	(0.007)	(0.007)	(0.007)
ICC	-0.181						-0.040	
	(0.142)						(0.077)	
Trend	0.007[b]	0.009[b]	0.009[b]	0.004	0.005[b]	0.008[a]	0.007[a]	0.006[c]
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
TR/GDP		-0.100	-0.020	-0.02[a]		-0.053	-0.054	0.014
		(0.083)	(0.070)	(0.064)		(0.065)	(0.067)	(0.073)
MC/GDP		-0.020	-0.016	0.060		0.012	0.005	0.014
		(0.087)	(0.064)	(0.052)		(0.043)	(0.045)	(0.061)
VT/GDP		0.055	-0.008	-0.013		-0.070	-0.061	0.011
		(0.036)	(0.037)	(0.071)		(0.061)	(0.053)	(0.064)
Nobs	348	347	307	277	269	269	269	269
Adj. R^2	9.9%	11.1%	11.6%	35.4%	40.9%	42.1%	42.2%	28.3%

Panel B - Small cross-section (at most 15 countries included)

	dependent variable = II							
	baseline model	**(1b)**	**(2b)**	**(3b)**	**(4b)**	**(5b)**	**(6b)**	**(7)**
POL		0.694[b]			0.414[b]	0.434[c]	0.436[c]	0.389[c]
		(0.333)			(0.179)	(0.224)	(0.225)	(0.221)
CIVIL		-0.087			-0.157[b]	-0.095	-0.096	-0.075
		(0.056)			(0.074)	(0.086)	(0.087)	(0.092)
C-HELD			-0.212[a]		-0.164[a]	-0.114[b]	-0.113[a]	-0.131[a]
			(0.066)		(0.043)	(0.047)	(0.042)	(0.050)
ASD			-0.203		-0.345[b]	-0.203	-0.204	-0.210
			(0.137)		(0.142)	(0.155)	(0.157)	(0.155)
CL-MC				0.317[a]	0.264[a]	0.221[b]	0.225[b]	0.175[c]
				(0.096)	(0.082)	(0.086)	(0.089)	(0.092)
AN-F				0.016[a]	0.006	0.012[a]	0.012[a]	0.01[b]
				(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
ACC				1.304[a]	0.479[b]	0.893[a]	0.891[a]	0.779[a]
				(0.157)	(0.221)	(0.172)	(0.181)	(0.275)
ICC	-0.000						0.004	
	(0.087)						(0.055)	
Z-RET								-0.195
								(0.133)
Trend	0.012[a]	0.009[b]	0.010[a]	0.013[a]	0.007[a]	0.010[a]	0.010[a]	0.008[b]
	(0.004)	(0.004)	0.004	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
TR/GDP		-0.047	0.026	-0.183[a]		-0.139[a]	-0.138[a]	-0.112[b]
		(0.074)	(0.057)	(0.054)		(0.050)	(0.049)	(0.052)
MC/GDP		-0.007	0.074	-0.008		0.003	0.004	0.015
		(0.024)	(0.045)	(0.028)		(0.030)	(0.032)	(0.029)
VT/GDP		0.029	0.023	0.004		-0.017	-0.017	-0.044[c]
		(0.019)	(0.021)	(0.014)		(0.017)	(0.017)	(0.025)
Nobs	245	244	218	194	187	187	187	177
Adj. R^2	10.1%	25.4%	20.8%	57.5%	53.4%	56.8%	49.3%	52.3%

Table VII - Robustness: Alternative measures of implicit barriers

The table reports the estimated coefficients from pooled regressions of the integration indices on proxies for implicit barriers and other country characteristics. We run unbalanced regression as not all the explanatory variables are available for all the cross-sectional units. Standard errors in parenthesis are clustered by country and time. The sample period is from 1989 to 2006. All regressions include a trend. Estimates of the constant are not reported. Superscripts a, b and c indicate statistical significance at the 1%, 5% and 10% level respectively. Definition of the variables is in Appendix B.

Panel A

	dependent variable = II				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
RISK-EXP	0.11[c]				
	(0.059)				
RULE-LAW		0.062[b]			
		(0.031)			
CIVIL	-0.033	-0.088			
	(0.088)	(0.110)			
C-HELD			-0.349[b]		
			(0.136)		
OWC				0.381	0.252
				0.359	(0.415)
A-DIR			0.027	0.117[a]	
			(0.036)	(0.042)	
ASD					0.349
					(0.332)
Trend	0.011[a]	0.013[a]	0.008[b]	0.008[b]	0.010[b]
	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
TR/GDP	-0.080	-0.115	-0.008	-0.023	-0.090
	(0.114)	(0.122)	(0.065)	(0.077)	(0.115)
MC/GDP	0.015	-0.018	-0.008	-0.065	-0.045
	(0.064)	(0.072)	(0.065)	(0.055)	(0.079)
VT/GDP	-0.031	-0.005	0.000	0.12[b]	0.09[c]
	(0.044)	(0.039)	0.037	(0.046)	(0.052)
Nobs	293	293	322	293	293
Adj. R^2	23.2%	20.1%	10.8%	32.8%	13.8%

Panel B

	dependent variable = II						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
AN-F	0.023[a]	0.024[a]	0.019[a]				
	(0.006)	(0.007)	(0.005)				
AN-D				0.247[a]	0.257[a]	0.375[a]	0.377[a]
				(0.053)	(0.062)	(0.053)	(0.057)
ACC			1.115[a]	1.289[a]	1.169[a]		
			(0.211)	(0.144)	(0.188)		
DISC	0.042	0.041				0.171	0.212
	(0.172)	(0.166)				(0.133)	(0.124)
CL-MC	0.362[a]			0.340[a]		0.334[b]	
	(0.122)			(0.077)		(0.130)	
CL-N		1.089[a]	0.653[a]		0.543[a]		0.738[c]
		(0.345)	(0.223)		(0.207)		(0.390)
Trend	0.0055	0.0018	0.010[a]	0.014[a]	0.015[a]	0.010[a]	0.010[c]
	(0.004)	(0.005)	(0.003)	(0.003)	(0.004)	(0.004)	(0.006)
TR/GDP	-0.015	-0.016	-0.182[a]	-0.158[a]	-0.167[a]	-0.005	-0.019
	(0.086)	(0.074)	(0.057)	(0.037)	(0.051)	(0.072)	(0.070)
MC/GDP	0.063	0.008	-0.036	-0.020	-0.031	0.018	-0.011
	(0.057)	(0.040)	(0.024)	(0.025)	(0.027)	(0.051)	(0.027)
VT/GDP	-0.0005	0.054[b]	0.035[a]	0.018	-0.0001	0.017	0.012
	(0.061)	(0.022)	(0.011)	(0.019)	(0.018)	(0.051)	(0.022)
Nobs	208	223	209	194	209	208	223
Adj. R^2	41.6%	40.0%	52.4%	61.1%	51.6%	44.9%	41.1%

Figure 1
Estimated Integration Indices

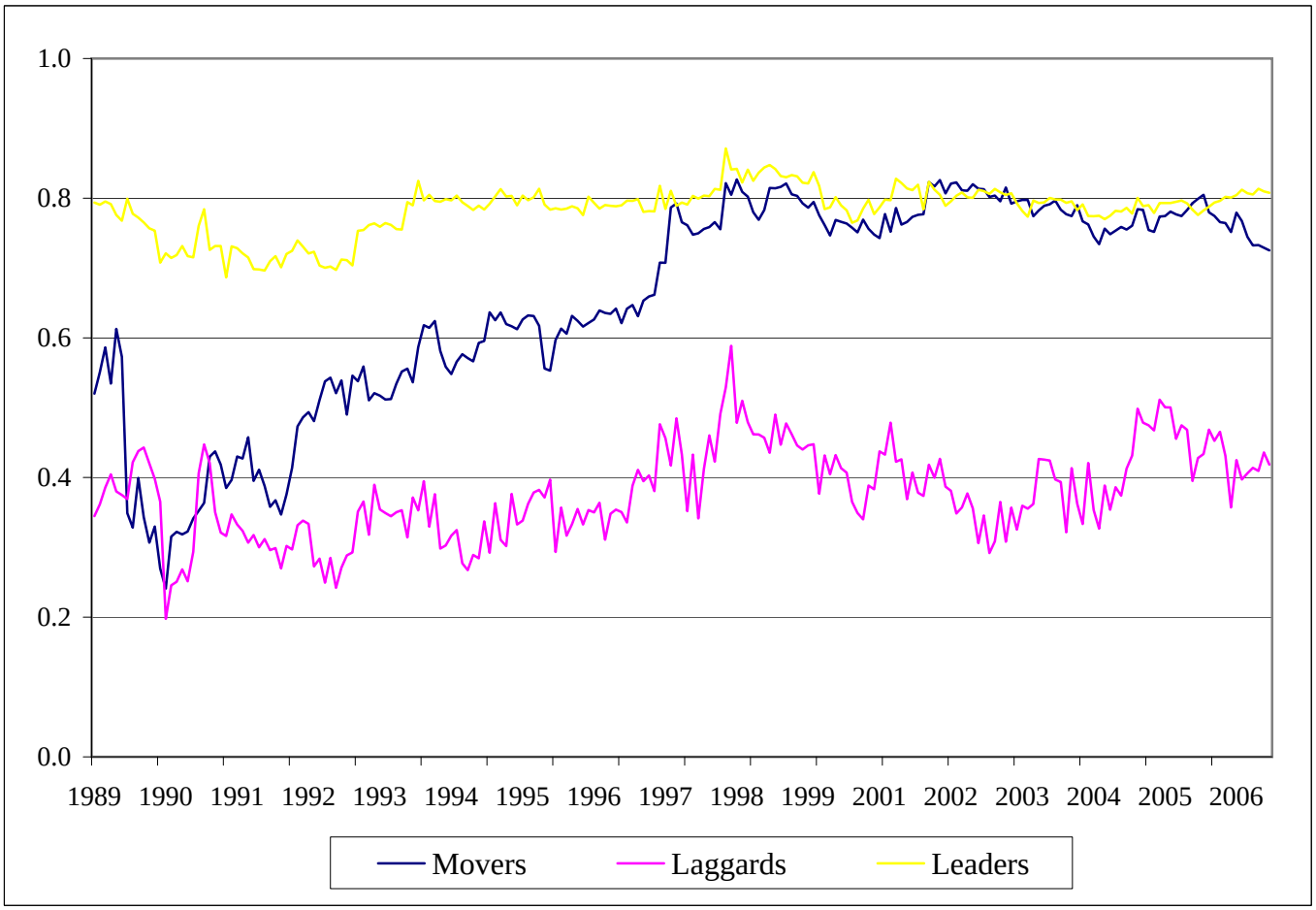

Figure 1: Equally weighted averages at each point in time of the estimated integration indices from the EL model presented in table 2. The countries are grouped based on the median of the whole sample. Leaders are those countries always above the median. Laggards are those always below the median. Movers are those countries that move from below the median to above the median in the first to the last subsample.

Figure 2

Economic impact on integration

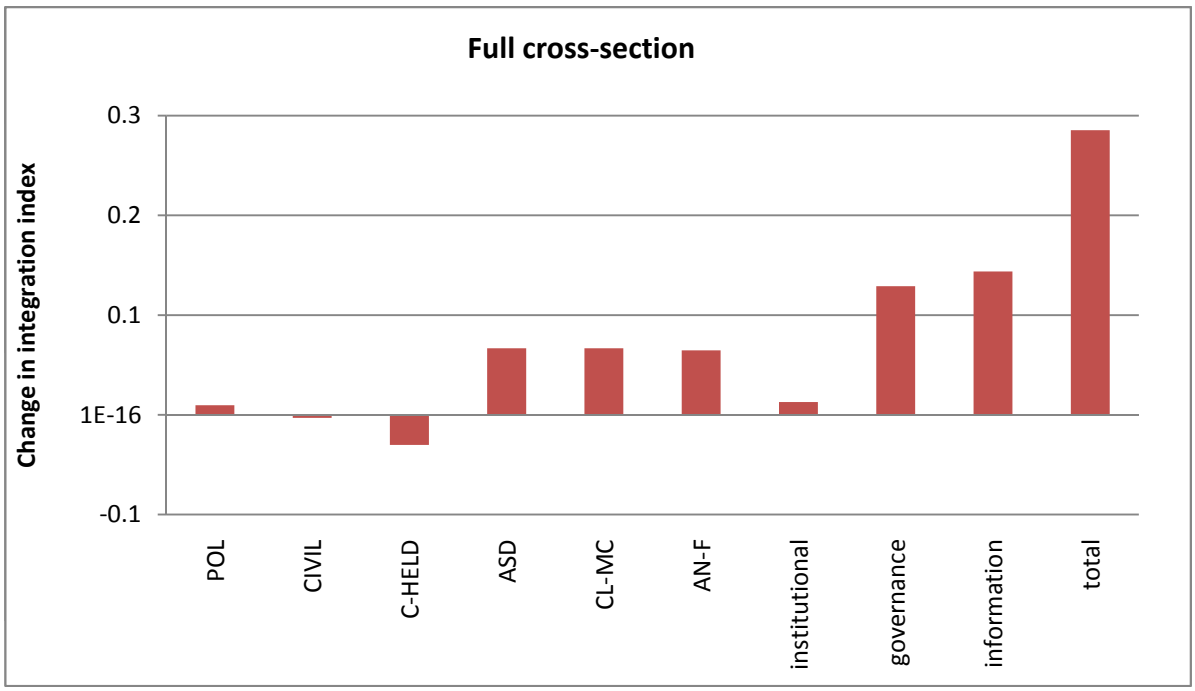

Figure 2: The figure assumes a move from the 25th percentile to 75th percentile in the cross-section of countries. Institutional environment is the sum of the political risk (POL) and legal origin variable (CIVIL), the corporate governance environment is the sum of ownership concentration (C-HELD), and anti-self dealing (ASD). The information environment is the sum of analyst activity (ANAV) and cross-listing activity (CL-MC).