Integrated Markets: Economic or Financial Integration?

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ABSTRACT

We study the evolution of global economic and financial market integration in a theoretically-motivated framework. Using firm-level cash flow forecasts, we find that while the two forms of integration have been progressing rapidly over the years, they have reversed following the global financial crisis. In the post-crisis period, emerging markets are still lagging behind developed countries in financial integration, but their level of economic integration has converged to that of developed countries. This is suggestive evidence that the driver of integration for emerging markets is economic rather than financial. While country development, as measured by GDP per capita and communications technology, as well as the world business cycle are the leading common determinants of both forms of integration, a country's banking sector and investment profile drive, respectively, the progress of economic integration and the speed of financial integration.

Keywords: Financial Integration, Economic Integration, Cash Flow News, Discount Rate News, Analyst Forecasts

JEL Classification Number: F15, F30, G15, E44

The vast literature in international finance has shown that financial market liberalization and free trade have led to a distinct increase in market integration among developed countries in the 1980s, followed by emerging markets in the 1990s.[1] Extant studies have widely attributed the increased market integration to the rise in financial integration among world economies but seemed to ignore the existence of real economic integration for several reasons.[2] Measuring economic integration is a formidable task, and there is no universally accepted measure of economic integration. Any such measures typically rely on macroeconomic data which are plagued with problems of measurement error.[3]

Thus, the goal of our study is to disentangle the economic and financial integration in a theoretically motivated setting across countries worldwide. This approach enables us to evaluate more precisely how countries are integrated with the global market (economic, financial, or both) and through which channels. For example, after three decades of spectacular growth, in 2010 China passed Japan to become the world's second largest economy behind the U.S.,[4] but its financial markets are still largely inaccessible to foreign investors. Ireland, on the other hand, contributes little to global economic growth, but is one of the world's largest offshore financial centers. Such institutional and economic differences would likely suggest that China and Ireland exhibit dissimilar degrees of financial and economic integration. One would expect *a priori* that China be more economically integrated because its economic fundamentals are more susceptible to global economic forces, and that Ireland be more financially integrated through its large exposure to global financial shocks.

To more accurately assess the extent to which countries are globally linked, we propose simple, theoretically motivated metrics to measure not only world financial integration but also world economic integration. Our integration metrics are derived from the standard asset pricing formulation in a globally integrated financial market, where stock returns can be decomposed into revisions in cash flow expectations (or cash flow news, CF) and revisions in discount rate expectations (or discount rate news, DR). Cash flow news depends only on the country's economic fundamentals, whereas discount rate news reflects the adjustment of risk pricing in the financial market. If markets have attained full economic integration, a common shock would have a similar impact on economic output and growth, and in turn on corporate cash flows in different countries. Hence, we measure real economic integration by

[1] See, for example, Bekaert and Harvey (1995); Phylaktis and Ravazzolo (2002); Carrieri et al. (2007); Chambet and Gibson (2008); Bekaert et al. (2009); Pukthuanthong and Roll (2009); Bekaert et al. (2011); Carrieri et al. (2013); Eiling and Gerard (2015).

[2] Exceptions are the studies by Ammer and Mei (1996), Baele and Soriano (2010), and Bekaert et al. (2013).

[3] For a review of economic integration measures, see König and Ohr (2013).

[4] In 2010, China's GDP was valued at $5.87 trillion, surpassed Japan's $5.47 trillion, and has since become the world's second largest economy after the U.S.

calculating the proportion of a country's cash flow news that is explained by world cash flow news.[5] Similarly, if markets have gained complete financial integration, we should expect strong correlations in discount rate news between countries. Therefore, a country's degree of financial integration with the world market is measured by the proportion of the country's discount rate news that is influenced by world discount rate news. However, if a country is totally segmented from the global market, then the values of both of these metrics would be small (see, e.g., Stulz, 1981a, 1987; Pukthuanthong and Roll, 2009). In case of the so-called mild segmentation, market integration falls in between the two aforementioned extreme cases of full segmentation and full integration (Errunza and Losq, 1985).

We use firm-level analyst earnings forecasts to extract unobservable CF and DR, and then for every country, we employ the monthly value-weighted average of all firms' CFs and DRs as proxies for the aggregate measures at the country level. Analyst earnings forecasts are timely reflections of investors' cash flow expectations, and they incorporate forward looking information to circumvent the need to resort to predictive regressions employed in traditional approaches (e.g., Campbell and Shiller, 1988) and to longer time series data to estimate CF and DR.[6] Our focus on firm-level CF and DR to construct value-weighted country-level CF and DR starkly contrasts with prior studies' use of industry- or country-level return indexes.

Pukthuanthong and Roll (2009),[7] Lehkonen (2015), and Eiling and Gerard (2015) employ R-square as a measure of global financial integration, which is the closest to our metric, but they do not measure economic integration. Additionally, they employ country index returns, whereas we utilize individual firms' information to derive country-level cash flow and discount rate news. Recent studies, such as Bekaert et al. (2016) and Bekaert and Mehl (2017), advocate the sensitivity of a country's return to the world market return (i.e., the global beta) as a measure of financial integration. By definition, the market-cap weighted average beta must equal one. The stylized fact is that emerging markets typically have high betas and the U.S. has a low beta. But this does not necessarily imply that emerging markets are more integrated with the world market than US markets. Rather, it shows that emerging markets are more volatile (high betas) and a reduction of emerging market betas over time cannot be construed as a reduction in integration. Also, as Pukthuanthong and

[5] Ammer and Mei (1996) and Baele and Soriano (2010) use Campbell's (1991) variance decomposition approach and follow a similar intuition by looking at the correlation of changes in expected cash flows and in discount rate news between 15 developed countries to measure economic and financial integration.

[6] See Chen et al. (2013) for a critical review of the traditional approach in return decomposition.

[7] They state, "A sensible intuitive quantitative measure of financial market integration is the proportion of a country's returns that can be explained by global factors. If that proportion is small, the country is dominated by local or regional influences (p. 214)."

Roll (2009, p. 215) state, "integration could be complete and yet the beta could be quite low if the developing country is simply concentrated in lower risk industries."[8] Similar to our research, Bekaert et al. (2013) (BHLS , 2013) also study financial and economic integration, but they use equity market valuation convergence between industries in different countries to gauge the extent of financial and economic integration in Europe. They suggest that lower discount rate (expected earnings growth rate potential) differentials between two countries imply greater financial (economic) integration. In contrast to our approach, their measures of economic and financial integration are gauged by the respective size of industry earnings yield differences and of expected earnings growth rate differences in basis points.

Using data on a sample of 39,202 firms from 41 countries worldwide, we find that discount rate and cash flow news drive stock market price movements around the world over the sample period from 1989 to 2015. On average, there is a significant component of discount rate news in country stock returns (i.e., 58%), compared to the cash flow component (i.e., 43%). This finding is more pronounced in developed (66% vs. 34%) than in emerging markets (51% vs. 49%). For the China-Ireland example, China's integration with the world market is mainly through economic (i.e., 42%) rather than financial integration (i.e., 11%). On the other hand, the extent of Ireland's financial integration (i.e., 40%) relative to that of its economic integration (i.e., 23%) reflects a stronger linkage between Ireland's offshore financial activity rather than economic fundamentals and the world's.

It appears that many countries have not attained full financial integration using a benchmark derived from a fully integrated US economy. This finding may be attributed to differences in cross-country factors, such as monetary and fiscal policies, political issues, trade policies, market sentiments or other behavioral biases, institutional constraints, restrictions on capital flows, and other implicit and explicit financial barriers, that potentially drive their risk pricing differences. In contrast, the majority of developed countries and several emerging markets have converged to the null hypothesis of economic integration, indicating that their cash flows are heavily influenced by the world business cycle, even when their financial markets are quite segmented. Our baseline results are robust to the inclusion of multiple global factors, including industry factors, extracted using from a principal component analysis and to adjustments of analyst forecast biases.

Further, we show that economic and financial integration have been increasing across all countries since the start of the sample period, but have fallen after the global financial crisis. We directly model the dynamic correlation and volatility of our integration measures

[8]This constraint is sometimes relaxed by taking the US market or a group of developed markets (e.g., G7 countries) as a proxy for the world market index. But this ad hoc assumption changes the focus of the analysis.

using a smooth-transition dynamic conditional correlation (STDCC) model of Ohashi and Okimoto (2016) to capture short- and long-run dynamics of market integration. Economic integration increases at a faster pace for emerging than for developed markets, while the reverse is true for financial integration. The findings indicate that economic integration, while not financial integration, has converged in developed and emerging markets toward the end of 2015, suggesting that the driver of market integration for emerging markets is economic rather than financial. Some studies have shown that there could be some volatility bias when estimating correlation on different data subsamples when the time-dynamics of correlation are not directly modeled,[9] but our results remain materially unaffected even after incorporating time-varying volatility into our model.

Finally, we explore the channels through which country- or global-level variables potentially drive economic and financial integration of countries worldwide. Drawn from the existing literature, there are a large number of candidate variables that have been shown to affect primarily financial integration (e.g., Carrieri et al., 2007; Bekaert et al., 2011(BHLS, 2011); Carrieri et al., 2013; Lehkonen, 2015; Eiling and Gerard, 2015). One critical problem with these variables is that they are highly correlated, and except for BHLS (2011), no formal variable selection procedure is employed. Furthermore, the importance of determinants of market integration is typically determined by their statistical significance rather than economic significance. Thus, to gauge which mechanism is at work, we employ a powerful statistical tool, specifically a random forests regression technique,[10] that uses an ensemble machine learning method to evaluate the importance of each variable relative to the host of other candidate variables that can explain market integration. We then run pooled regressions to evaluate the statistical and economic significance of each candidate variable on the integration measures. Our analysis indicates that country development, as measured by GDP per capita and communications technology, as well as the business cycle are the leading shared determinants of both economic and financial integration. But the development of a country's banking sector and the investment environment of the country, respectively, affect primarily the advancement of economic integration and the pace of financial integration.

The paper is organized as follows. Section I presents a theoretical framework in which we develop the measures of economic and financial integration. Section II discusses the

[9]See, for e.g., Boyer (1997); Forbes and Rigobon (2002); Longin and Solnik (2001). The nature of this potential bias is often misunderstood, and these papers provide a discussion of this issue.

[10]The random forests regression technique has several advantages over the previously used approaches, such as BHLS's (2011) general-to-specific search algorithm and jackknife technique, for variable selection. The differences in these approaches will be evaluated in a subsequent section of the paper. More importantly, it evaluates each candidate variable's importance measure in determining its impact on integration, and such importance measures are consistent with the economic significance of the variables from regression analyses.

construction and estimation of the two theoretically-driven integration measures. Section III characterizes the dynamics of economic and financial integration through time. Section IV studies the channels through which country- and world-level variables influence economic and financial integration, and Section V concludes.

I. A Measure of Global Integration

In this section, we provide a theoretical framework that allows us to develop measures of economic and financial integration. If markets are financially integrated with the same pricing kernel, country-specific discount factors should move in tandem across the world. Similarly, in an economically integrated world economy, country-level cash flow expectations should be fully explained by global cash flow expectations. Extant studies have primarily focused on measuring the degree of financial integration using country index returns and largely ignored the existence of economic integration. Here we show how we disentangle the two aspects of market integration within the pricing framework and then derive a measure of each form of market integration that employs firm-level cash flow forecasts.

A. Theoretical framework

In integrated markets, one pricing kernel governs asset prices across the world.[11] The price of a security is derived based on its expected cash flows and their covariance with the discount factor.[12] For example, Cochrane (2005, p. 27) states the price of a security as

$$P_t = \sum_{j=1}^{\infty} \frac{E_t d_{t+j}}{(1+r_{f,t+j})^j} + \sum_{j=1}^{\infty} Cov_t(m_{t+j}, d_{t+j}), \tag{1}$$

where d is the dividend, r_f is the risk free rate, and m is the pricing kernel. From Eq. (1), the price of a firm can be decomposed into two components: $P = PV + RA$. The first term (PV) on the right hand side of expression (1) is the present value of expected future cash flows, discounted at the risk free rate, and it depends solely on the economic fundamentals of a company; the second term (RA) captures the adjustment of risk pricing (i.e., the risk premium adjustment) in the financial market. Contingent claims with the same risk properties should receive the same price, independent of the location of their

[11] See, for example, Solnik (1974), Stulz (1981b), Adler and Dumas (1983).

[12] In the standard capital asset pricing model, the pricing kernel m can be represented as $m = a + bR_w$, where R_w is the return on the world market portfolio.

trade. This development is not original, but it is quite different from the traditional finance, where expected cash flows are simply discounted at an implied cost of capital (identical for all maturities) derived from the data.

From Eq. (1), the return on a security can be decomposed as follows.

$$\begin{aligned} R_t &= \frac{P_t - P_{t-1}}{P_{t-1}} \\ &= \frac{PV_t - PV_{t-1}}{P_{t-1}} + \frac{RA_t - RA_{t-1}}{P_{t-1}} \\ &= CF + DR, \end{aligned} \tag{2}$$

where R_t is the rate of return on a security; CF is the percentage price effect of a revision in cash flow expectations (or cash flow news); DR is the percentage price effect of movements in the pricing kernel (or discount rate news). Therefore, R_t is driven in part by revisions in cash flow expectations and in part by revisions in discount rate expectations. As the pricing kernel is observed to be volatile,[13] we can attribute DR to the volatility in the market pricing valuation.

Applying a similar decomposition to the return on the world market portfolio yields

$$R_w = CF_w + DR_w, \tag{3}$$

where CF_w is the global market-weighted cash flow news and DR_w is the global market-weighted discount rate news.

The existing literature on return decomposition typically discounts future expected cash flows at the implied cost of capital (ICOC),[14] rather than at the term structure of risk free rates as in PV. Our theoretical framework yields a cleaner return decomposition as CF is not affected by risk pricing. The similarity in the methodologies is that they both estimate CF, which is due to changes in cash flow expectations, and then assign the residual return as the market risk adjustment RA. Integrated asset pricing suggests that the first component CF is the difference in the change of expected cash flows discounted at the term structure of risk free rates.[15] Hence, throughout our study, the baseline specification uses the present

[13]The stock market volatility puzzle is commonly ascribed to the large volatility in the pricing kernel (stochastic discount rate). As Cochrane (2011) concludes in his Presidential address, "[D]iscount rates vary a lot more than we thought" (p. 1091). Also, see a discussion and illustration for international markets in Campbell (1996).

[14]See, for e.g., Pastor et al. (2008), Hail and Leuz (2006), Chen and Zhao (2009), Lau et al. (2012), and Chen et al. (2013).

[15]ICOC, or changes thereof, play no role here as opposed to the traditional literature.

value of future expected cash flows discounted at the risk free rate.

B. R^2 measures for global economic and financial integration

We rely on a simple metric that allows us to study the evolution of integration over time. If markets are financially integrated with the same pricing kernel, discount factors should move in tandem across the world, and the country-level discount rate news (DR_c) should be strongly linked to the world discount rate news (DR_w). If our benchmark does not apply and local risk pricing (i.e., country-level pricing kernel) is prevalent, then we would expect DR_c to be weakly correlated with DR_w. Our indicator of a country's financial integration with the world market is measured by the proportion of its cash discount rate news that is influenced by global discount rate news. In other words, our measure of financial integration R^2_{Fin} is the R^2 obtained from regressing country discount rate news DR_c on global discount rate news DR_w as follows.

$$DR_{c,t} = \alpha^{DR} + \beta^{DR} DR_{w,t} + \varepsilon_t^{DR}, \tag{4}$$

where β^{DR} represents a country's discount rate news exposure to world discount rate news, and ε_t^{DR} is the random error. Based on our asset return decomposition, the global exposure of a country's discount rate news is summed up by its exposure to world aggregate discount rate news. However, there is a possibility of other sources of global exposure, such as industry or other global factors. To address this issue, we perform additional multiple global-factor tests to evaluate the robustness of our measure in a subsequent section.

As mentioned in the introduction, there is no widely-accepted measure of economic integration (see König and Ohr, 2013). Some researchers have tried to assess economic integration by looking at tariffs and barriers to trade, labor, and capital movements, or the extent to which the law of one price or purchasing power parity applies (e.g., Kalemli-Ozcan et al., 2001; Baldwin, 2006; Nowotny et al., 2009). Others have looked at indicators of openness of economies, such as the ratio of imports or exports to national outputs (e.g., Baldwin, 2006; BHLS, 2011). More recent estimates of economic integration look at the measured commonality in country outputs (e.g., correlation in GDP growth rates). An increasing integration of goods and factor markets would lead to increased similarities in the production structures and the pattern of foreign trade. Hence, countries are similarly affected by exogenous shocks. As König and Ohr (2013) state, "[s]ymmetry of business cycles therefore indicates that the economies are driven largely by common external shocks and that they are highly interdependent". Also, Dumas et al. (2003) present an interesting theoretical model

of the link between correlation in national output growth rates with global shocks and correlation in stock returns. Our metric of economic integration is inspired by this measure of national-output-growth correlation but uses data at the firm level rather than at the national output level. If countries become more integrated, then corporate cash flows should get more correlated across countries. Global shocks will have a strong influence on firm cash flows.

Similar to the measure of financial integration, the economic integration measure R^2_{Econ} is defined as the proportion of a country's cash flow news CF_C that can be explained by the world cash flow news CF_w. Accordingly, R^2_{Econ} is the R-square obtained from regressing a country's CF_c on global CF_w, as shown below.

$$CF_{c,t} \quad = \quad \alpha^{CF} + \beta^{CF} CF_{w,t} + \varepsilon^{CF}_t, \tag{5}$$

where β^{CF} represents the sensitivity of a country's cash flow news to world cash flow news. If countries are globally integrated, then they will be susceptible to the same global forces. Hence, their R^2_{Econ} as well as R^2_{Fin} measures are expected to be high as they reflect countries' common exposures to international macro economies and to changes in world risk pricing, respectively. If R^2_{Econ} and R^2_{Fin} are low, then the implication is that the country is primarily influenced by local or regional forces.

Pukthuanthong and Roll (2009) and Eiling and Gerard (2015) employ the explanatory power of global factor models as a measure of global integration; their integration constructs are closest to our measures. Pukthuanthong and Roll use the R-square from the regression of a country's daily market index returns on the first 10 principal components extracted from a cross-section of daily returns on 17 most globally integrated countries as proxies for global risk factors. On the other hand, Eiling and Gerard construct market integration by the proportion of explained return variance of a single global factor model. However, both studies focus on equity returns which tend to be more volatile than cash flow and discount rate news. Table I below shows that on average, country annual return variance is 3.63 times larger than the annual variance of cash flow news and about 1.40 times bigger than the annual variance of discount rate news. Such high equity return volatility, as BHLS (2011) point out, would reduce the power of a statistical test. Furthermore, unlike our study, Pukthuanthong and Roll and Eiling and Gerard focus solely on measuring global financial integration only.

II. Measuring Economic and Financial Integration

In this section, we briefly describe how we compute cash flow news CF and discount rate news DR and then evaluate the extent to which cash flow news and discount rate news drive stock market return variation. Finally, we employ these return components (CF and DR) to develop measures of economic and financial integration as well as to characterize the dynamics of the two integration measures across developed and emerging markets.

A. Cash flow news and discount rate news

We construct cash flow and discount rate news following Pastor et al. (2008) and Chen et al. (2013). We first estimate firm-level PV (i.e., the first right-hand-side term in Eq. (1)) as follows.

$$\begin{aligned} PV_t &= \sum_{j=1}^{\infty} \frac{E_t d_{t+j}}{(1+r_{f,t+j})^j} \\ &= \sum_{j=1}^{15} \frac{EF_{t+j} \cdot payout_{t+j}}{(1+r_{f,t+j})^j} + \frac{TV_{t+15}}{(1+r_{f,t+15})^{15}}, \end{aligned} \tag{6}$$

where EF_{t+j} is the earnings forecast j years ahead, $payout_{t+j}$ is the payout ratio, TV_{t+15} is the terminal value, and $r_{f,t+j}$ is the term structure of risk free rates. Details of our estimation procedure and sample selection are contained in Appendix Table A.1, and the summary statistics are shown in Appendix Table A.2.

We compute firm-level cash flow news (CF_t) and discount rate news (DR_t) following Eq. (2):

$$CF_t = \frac{PV_t - PV_{t-1}}{P_{t-1}}, \tag{7}$$

$$DR_t = R_t - CF_t, \tag{8}$$

where R_t is the firm's rate of equity return. For every t, we construct a value-weighted average of CF_ts and a value-weighted average of DR_ts of all available firms within a country as proxies for the country's cash flow news ($CF_{c,t}$) and discount rate news ($DR_{c,t}$), respectively. Similarly, we use the value-weighted average of R_ts as a proxy for the country's stock market return ($R_{c,t}$). Notably, Eq. (6) shows that CF_t comes from three factors, namely changes in future expected cash flows, changes in payout ratios, and changes in risk free rates. As a first approximation, CF_t is the sum of the percentage change in these three factors. Dividend

information is obtained from Datastream, and dating of changes in payout ratios can be imprecise. However, as long as changes in payouts are orthogonal to changes in expected cash flows, any data error is pure noise and would have little effect on our results.

To assess the relative contributions of country cash flow news $CF_{c,t}$ and country discount rate news $DR_{c,t}$ to the variation in the stock market return $R_{c,t}$, we decompose the variance of $R_{c,t}$ as follows:

$$\begin{aligned} Var(R_{c,t}) &= Cov(R_{c,t}, CF_{c,t} + DR_{c,t}), \\ 1 &= \frac{Cov(R_{c,t}, CF_{c,t})}{Var(R_{c,t})} + \frac{Cov(R_{c,t}, DR_{c,t})}{Var(R_{c,t})}. \end{aligned} \tag{9}$$

From Eq. (9), the proportionate contribution of cash flow news CF to $Var(R_{c,t})$ is the slope coefficient from regressing $CF_{c,t}$ on $R_{c,t}$, and the proportionate contribution of $DR_{c,t}$ to $Var(R_{c,t})$ is the slope coefficient from regressing $DR_{c,t}$ on $R_{c,t}$. We estimate these components on a total sample of 39,202 firms; 28,411 of them are from 21 developed countries and 10,791 from 20 emerging markets. Based on the number of firms reported in Appendix Table A.2, there is limited information on firms from emerging markets and information only becomes increasingly available after the first subperiod. Summary statistics of $R_{c,t}$, $CF_{c,t}$, and $DR_{c,t}$, as well as of individual variance components and variance decompositions, are shown in Table I. Panel A of the table shows aggregate statistics on our sample of 41 countries, and Panels B and C report those on 21 developed countries (DEV) and 20 emerging markets (EMG), respectively. Several noticeable results emerge from the table.

As shown in Panel A, regardless of the type of markets, a larger fraction of stock market returns is due to discount rate news rather than to cash flow news, and this result is more pronounced in developed than in emerging markets. For example, on average, about 58% (=7.73%/13.26%) of annual country equity returns is due to $DR_{c,t}$, with the remaining 42% to $CF_{c,t}$. For developed markets, the return compositions are about 66% (=8.4%/12.7%) $DR_{c,t}$ and 34% $CF_{c,t}$, compared to 51% (=7.02%/13.84%) and 49% for emerging markets. In terms of volatility, the return variance is greater in emerging markets than in developed markets, and the overall high variance is mainly attributed to a larger $DR_{c,t}$ variance than $CF_{c,t}$ variance. The last two columns of the table report the slope coefficients from regressing country cash flow news and discount rate news separately on the country stock return; they indicate that for both markets, a substantial portion of their stock market return variation is driven by discount rate news.

The finding that discount rate news explains a large fraction of stock market return variation is in line with prior evidence that stock market volatility is largely due to the

high volatility in stochastic discount rates (Campbell, 1996). For instance, using different methodologies and different samples, Lau et al. (2012) find that movements in equity risk premiums contribute significantly to variations in stock market returns for 41 developed and emerging markets. Ammer and Mei (1996) reach a similar conclusion for U.S. and U.K. stock markets. Other studies find consistent evidence based solely on U.S. equity markets (Campbell, 1991; Campbell and Vuolteenaho, 2004; Chen et al., 2013).

In the subsequent subsection, we employ cash flow news and discount rate news to quantify a country's degrees of economic and financial integration with the world market.

B. Estimating economic and financial integration

As discussed in Section I, our measures of a country's economic and financial integration are based on the explanatory powers of the single global-factor model, where we regress monthly country cash flow news on monthly global cash flow news, and correspondingly, we run monthly country discount rate news on monthly global discount rate news. Both global cash flow and discount rate news are computed by taking the value-weighted averages of monthly country cash flow news and discount rate news, respectively. The resulting estimated R-squares from the two regressions are our respective proxies for economic and financial integration. The regression results are reported in Table II. Panel A of the table shows the cross-country averages of economic integration measure (R^2_{Econ}), the slope coefficient β^{CF}, financial integration metric (R^2_{Fin}), and the slope coefficient β^{DR} by market type, and Panels B and C report those of individual developed and emerging countries.

The table reveals a number of interesting findings. First, Panel A shows that countries are more integrated through financial integration than through economic integration, and this finding is largely attributed to the greater degree of financial integration experienced by developed markets than by emerging markets. The aggregate mean R^2_{Fin} is 45.2%, compared to 41.0% for the aggregate mean R^2_{Econ}. For developed countries, their mean R^2_{Fin} is 55.2% and mean R^2_{Econ} is 48.2%, thereby underscoring the strength of financial integration in these markets. On the other hand, there is little difference in the degrees of financial and economic integration among emerging markets. Their average R^2_{Econ} and R^2_{Fin} are 33.4% and 34.8%, respectively. It is evident that emerging markets are still lagging behind their developed counterparts in terms of economic and financial integration, an indication that they still remain segmented from the world market, consistent with prior evidence (e.g., BHLS, 2011).

Second, the cash flow news sensitivity β^{CF} and discount rate news sensitivity β^{DR} are greater in emerging markets than in developed markets. The average β^{CF} and β^{DR} are 1.701

and 1.216 for emerging markets, but 1.163 and 1.036 for their developed counterparts. Inferring from these results, we would have erroneously interpreted that emerging markets are more integrated with the world market than developed countries if we were to use the sensitivity as a measure of global integration as in some existing studies, a concern appropriately raised by Pukthuanthong and Roll (2009).

Lastly, individual country-level results, shown in Panels B and C, indicate that financial and economic integration vary widely across emerging and developed markets. Specifically, 14 of the 21 developed markets exhibit a larger degree of financial than economic integration with the world market, while only half of the 20 emerging markets do. Among the developed markets, the U.S. has the greatest degree of financial integration with the world market (82.4%), and Austria has the lowest of 20.4%. Given the U.S.'s dominant financial role in world capital markets, it is not surprising that its markets are highly integrated with the world market. However, the U.K. displays the highest degree of economic integration (81.3%), followed by Germany (73.9%), whereas Spain is the lowest (16.2%). The U.S.'s economic integration of 49.5% places the U.S. way below the U.K. and Germany. Even though the US economy is the largest in the world, its economic interdependence with the rest of the world is small compared to its size. For example, its trade ratio (sum of exports and imports of goods and services measured as a share of GDP) is only 30%, compared to 84% for Germany and 60% for the U.K.[16] The strong economic integration of Germany and the U.K. (fourth and fifth world largest economies) with the global market lends support to their influential economic roles in Europe as well as in global markets. Japan is the world third largest economy, and is globally more integrated through economic (64.6%) than through financial integration (45.7%).

Among the emerging markets, Israel has the highest degree of financial integration with the world market (57.3%), whereas China has the lowest (10.9%). On the other hand, India displays the largest degree of economic integration (57.5%), and Egypt exhibits the weakest (11.1%). Of particular interest is China, the second largest economy in the world. China has a larger degree of economic than financial integration; its R^2_{Econ} is 41.9%, compared to R^2_{Fin} of 10.9%. While China's government has improved capital mobility in its country, there are still extensive capital controls in place, thereby inhibiting the extent of its financial integration with the world market. These measures of economic integration loom large for some emerging markets, but these markets have large trade ratios. For example, China has a trade ratio of 47%, compared to 30% for the U.S. A more detailed discussion of the determinants of integration is provided in Section 5.

[16] These are the average ratios over the 2010-2015 period given by the World Bank.

At this juncture, it is useful to gain some perspective of the significance of economic and financial integration measures of our sample of 41 countries. To do so, we construct benchmark measures by assuming that the U.S. is a representative of a fully integrated economy.[17] While it is an extreme assumption, the wide heterogeneity of U.S. firms (i.e., differences in business diversification, locations, industries, size, leverage, earnings volatility, among others) makes the U.S. a reasonable benchmark. We randomly draw 1,000 firms from a sample of 10,810 unique US firms and consider this random draw of firms as a pseudo country. Our simulation is based on 1,000 firms as representative firms; the average number of firms in our sample of countries is 956 firms. For this pseudo country, we construct the cash flow news CF and discount rate news DR and then regress the CF (DR) measure against the aggregate CF (DR) measure of the whole US market to estimate the pseudo country's R^2_{Econ} (R^2_{Fin}). We repeat this experiment 1,000 times. Based on the simulation, the average R^2_{Econ} is 61.8%, and its R^2_{Fin} counterpart is 86.1%. The 95% lower and upper bounds of R^2_{Econ} are 46.3% and 75.3%, respectively. Correspondingly, the bounds of R^2_{Fin} are 80.0% and 92.2%.

Even within an integrated country such as the U.S., economic integration is lower than financial integration. Perhaps this result is not unexpected. It is likely that the real economy of the U.S. with a greater dispersion of firms is still slow to adjust to shocks countrywide, and that there is a large variation in cash flow reactions. This could be explained, in part, by economic prices and real adjustments being sticky and by firms operating in different industries and at different levels of the value chain. On the other hand, while US firms are very diverse, their shares are predominantly listed in local markets. Expectedly, they are all affected by the same pricing (discount rate) effects, and their financial prices adjust immediately to marketwide shocks.

Comparing with the fully-integrated US benchmark, many countries still have not achieved full financial integration. This finding reflects the varying factors that influence risk pricing across different countries, such as differences in monetary and fiscal policies that impact interest rates, differences in market sentiment or other behavioral biases, various institutional constraints, restrictions on capital flows, and other implicit and explicit financial barriers. On the other hand, the majority of developed countries[18] and several emerging markets have converged to the null hypothesis of economic integration. Nations and corporations face economic challenges from global competition and rapid international technological developments. As they trade and compete globally, their cash flows would be greatly affected by

[17] BHLS (2011) adopt a similar US benchmark.

[18] Belgium, Denmark, Finland, Hong Kong, Ireland, New Zealand, and Spain have not converged toward full economic integration.

the world business cycle, even if their financial markets are largely segmented. Overall, the findings suggest that economic realities of companies and nations precede financial market openness in their path to global integration.

C. Robustness

In this section, we perform a number of additional tests to evaluate the robustness of our findings. We first investigate the validity of our single global factor model and next verify whether our results are affected by the quality of analyst earnings forecasts.

C.1. *Multiple global-factor models*

We have shown that our single global factor explains a substantial variation of country cash flow and discount rate news. One may, however, argue that in reality, there are several global factors, and that using a single global factor might not capture the complete picture of a country's global integration (e.g., Brooks and Del Negro, 2005; Pukthuanthong and Roll, 2009). Nevertheless, to address this issue, we estimate our integration metrics, R^2_{Econ} and R^2_{Fin}, based on the explanatory power of multiple global-factor models, whose global factors are estimated using a principal component approach.

To fully utilize the information of the sample, we construct the global factors in the following manner. To begin, we compute the covariance matrix of cash flows news using 27 countries with non-missing information for the entire sample period 1989-2015 (see Appendix Table A.1) and calculate the eigenvalues and corresponding eigenvectors of this covariance matrix. Next, the eigenvalues are sorted from the largest to smallest, and then principal components from the cash flow news are estimated. In 1990, data on Indonesia become available. The procedure is repeated using 28 countries for the period 1990-2015, and accordingly, the principal components for 1990 onwards are updated based on the additional information. We do the same until information from the last country (i.e., Egypt in 1999) is added to the estimation process. By the last period 1999, the information of all 41 country indexes is employed. The top five principal components, which account for 74% of the cumulative eigenvalues, are employed as proxies for global factors. Our moving window approach exploits the full information of country cash flow news and is in the spirit of Pukthuanthong and Roll (2009), who estimate 10 principal components using index returns for 17 largest developed countries with the longest period of available data. We repeat the same methodology by constructing five principal components using 41 country-level discount rate

news.

In addition, we conduct similar global principal-component analyses using 39 value-weighted global industry portfolios of cash flow news as well as of discount rate news. We also employ the top five world industry factors to estimate the levels of economic and financial integration. Analyzing the effects of global industry factors helps to rule out the possibility that our main findings of global integration are driven by the importance of industry composition across countries (see, for e.g., Hou et al., 2011 and BHLS, 2013).

Table III reports integration results from multiple global-factor models with principal components. Panel A shows cross-country averages of both economic and financial integration measures (R^2_{Econ} and R^2_{Fin}) using five world market principal component factors, and Panel B depicts those using five world industry principal component factors. We find that the measure of financial integration is larger than its economic counterpart and that developed countries are more integrated than their emerging counterparts, consistent with evidence from Table II. Furthermore, the difference in the integration level between emerging and developed markets, along with its significance level, are also in line with those reported in Table II.

Moreover, the magnitudes of the multi-factor R^2_{Econ} or R^2_{Fin} are fairly similar regardless of the set of global factors used. For example, the degree of economic integration hovers between 48.1% (EMG) and 64.9% (DEV) using five world market factors, and between 42.8% (EMG) and 60.0% (DEV) based on five global industry factors. The integration measures are expectedly larger in multi-factor models than in single-factor ones. Increasing the number of global factors (i.e., principal components) will statistically improve the overall cross-country mean R^2_{Econ} only by about 15.7% and cross-country mean R^2_{Fin} by about 17.1%. However, such increases pale in comparison with the respective aggregate averages of 41.0% and 45.2% generated by a single global factor.

The overall results suggest that the explained variance from country cash flow news (discount rate news) regressed on the value-weighted world cash flow news (value-weighted world discount rate news) offers a reasonably adequate measure of economic (financial) integration.

C.2. *Analyst earnings forecasts*

While international data on analyst earnings forecasts have been popularly employed in extant studies, including recent research such as Hail and Leuz (2006), Lau et al. (2010, 2012), and Hung et al. (2015), earlier studies have raised concerns about the quality of analyst earnings forecasts. For example, earnings forecasts may be optimistic, inaccurate,

or sluggish, and hence, variations in stock returns are most likely driven by discount rate news rather than cash flow news in the short run. First, to address the bias associated with analyst optimism, we follow Li et al. (2013) by employing the minimum value of analyst forecasts instead of the consensus mean of analyst forecasts. Second, to mitigate analyst forecast errors, we use the inverse of (1 + a firm's analyst forecast errors) as the weight to compute both the weighted-average country and weighted-average global portfolio cash flow and discount rate news instead of using the market capitalization as the weight. Finally, to allay the potential concern of sluggish analyst forecasts, we follow Guay et al. (2011) and sort firms in each country into five portfolios based on their past year's stock returns, as forecast errors tend to vary with recent stock price performance. For each portfolio, we calculate the average of the portfolio forecast error and subtract the portfolio average forecast error from each firm's analyst forecast for all stocks in that portfolio to adjust for near-term analyst staleness.

Table IV highlights only the cross-country mean R^2_{Econ} and mean R^2_{Fin} based on the above three adjustments to analyst forecast biases, whose results are reported separately in Panels B-D. For ease of comparison, Panel A shows the mean R^2_{Econ} and R^2_{Fin} from our base model in Table II, Panel A. The results suggest that while the economic and financial integration measures remain materially unaltered, the bias associated with sluggish analyst forecasts has a slightly greater impact on the measures of developed than on emerging markets. Comparing the results of Panels A and D, the average R^2_{Econ} drops by 6.3% in developed countries, but by 1.3% in emerging markets.

In summary, our integration measures based on the explained variance of country-specific CF_c and DR_c by global CF_w and DR_w are robust to the inclusion of multiple global risk factors as well as to adjustments of analyst forecast biases.

III. Characterizing Economic and Financial Integration through Time

A growing number of studies have shown that the developmental process of market integration is time varying. Bekaert and Harvey (1995) are the first to study the time-series dynamics of market integration, and they characterize each market's integration process to switch between two regimes (i.e., full integration and complete segmentation).[19] While

[19]Subsequent studies, such as Baele (2005) and Hardouvelis et al. (2006), also employ the regime-switching method to study time-varying integration in European countries.

recent research produces evidence mainly of increased financial integration,[20] Bekaert and Mehl (2017) find that kernel-weighted equity return correlations in developed and emerging markets are flat or decreasing in the beginning of their sample period (i.e., 1885) but display a sharp upward trend around the end of the 1990s through the global financial crisis and then they turn downward till the end of their sample period (i.e., 2014). Moreover, their study looks only at 17 developed countries. In this section, we employ a couple of approaches to study the time-series dynamics of our metrics for economic and financial integration. The first approach adopts a simple regression analysis to examine time trends in economic and financial integration over the entire sample, whereas the other estimates dynamics of the conditional correlations between country-level cash flow (discount rate) news and world cash flows (discount rate) news while adjusting for changes in volatility.

A. Time trend analysis

To test for existence of a time trend, we regress our integration measures on a time variable, T, and separately on T and market volatility, as proxied by VIX, as follows.

$$Y_{i,t} = a + b\ T + \ VIX_t + \ u_{i,t}, \qquad Y \in \{R^2_{Econ},\ R^2_{Fin}\}. \tag{10}$$

Our above expression also controls for global market volatility in the regression by including the VIX index (see Forbes and Rigobon, 2002). Results are summarized in Panels A and B of Table V.

The time trends associated with both economic and financial integration are positive and statistically significant, and remain qualitatively unchanged even after controlling for market volatility. The time-trend coefficient is larger for financial than for economic integration especially in developed markets, suggesting that the average speed of financial integration is somewhat faster than that of economic integration over the entire sample period. However, economic integration has been growing at a much quicker pace in emerging markets than in their developed counterparts (i.e., 0.116 vs. 0.086 in Panel B), whereas the reverse applies to financial integration (i.e., 0.133 vs. 0.161). The rapid increase in economic integration for emerging markets could be linked to the opening of their economies to the world market since the start of the new millennium. This can be seen in terms of their international trade (e.g., merchandise trade) and foreign direct investments inflows (FDI); both have grown at a fast pace for emerging countries relative to developed countries. To demonstrate, Figure 1 plots

[20] For e.g., Carrieri et al. (2007); Pukthuanthong and Roll (2009); Christoffersen et al. (2012); Eiling and Gerard (2015).

the time-series of the two variables, measured in US dollars and scaled to their respective 1989 values.[21] The plots show both merchandise trade and FDI to be increasing at a faster rate in emerging than in developed markets, especially after the global crisis period. In contrast, as shown in the existing literature,[22] emerging markets have been slow in opening their capital markets, possibly hindered by their financial development and liberalization policies (Carrieri et al., 2007).

B. Market integration across subperiods

In this subsection, we illustrate the dynamics of integration by using a subperiod analysis. We divide the entire sample period into four subperiods (i.e., 1989-1995, 1996-2002, 2003-2009, and 2010-2015), and next re-estimate models (4) and (5) with monthly observations for each country and for each subperiod to obtain measures of economic and financial integration. Average estimates of the integration measures are depicted in Table VI by market type.

A few interesting patterns emerge from the table. All countries have experienced increases in both world economic and financial integration from the first (1989-1995) to third subperiod (2003-2009) but become less integrated following the global financial crisis (2010-2015). The process of economic integration seems slow during the first two subperiods, but sharply increases in the 2003-2009 period and then reverses after the global financial crisis. On the contrary, the pace of financial integration picks up earlier than that of economic integration. Specifically, financial integration surges from the first to second subperiod and then slows down during the third subperiod before it starts to trend downward in the last subperiod.

Overall, the subperiod regression analysis provides significant evidence that the world economic and financial integration are time varying, but these results, as well as our above simple trend analysis, do not offer any detailed month-to-month variation of the measures. We address this issue in the following subsection.

C. Time-varying market integration

We employ the STDCC model, proposed by Ohashi and Okimoto (2016), to generate time-varying conditional correlations of a country's economic and financial integration with the world market. The STDCC model expands Engle's (2002) dynamic conditional corre-

[21] The information of the two variables is obtained from the World Development Indicators and United Nations Conference on Trade and Development (UNCTAD).

[22] See Footnote 1 above.

lation (DCC) model to allow both the unconditional correlation, or the stationary level of correlation, and the conditional correlation to be time-varying. Additionally, STDCC permits us to control for the effect of volatility in estimating the market integration measure. For DCC models, the unconditional correlation is constant through time, and they capture only the short-run dynamics of market integration. STDCC models, on the other hand, have the ability to capture both short- and long-run dynamics of market integration.

To start, we assume that a country's CF_c and the world CF_w follow a bivariate AR(1)-GARCH(1,1) process,

$$CF_{c,t} = c_0 + c_1 CF_{c,t-1} + u_{c,t}, \tag{11}$$
$$CF_{w,t} = w_0 + w_1 CF_{w,t-1} + u_{w,t}, \tag{12}$$

where $\mathbf{u_t} = (u_{c,t} \;\; u_{w,t})' = \mathbf{H_t^{1/2}} \mathbf{v_t}$, where $\mathbf{H_t}$ is the 2×2 conditional covariance matrix at time t of CFs, and $\mathbf{v_t}$ is assumed to be independently identically normally distributed with mean 0 and an identity covariance matrix $\mathbf{I_2}$. $\mathbf{H_t}$ can be expressed as $\mathbf{H_t} = \mathbf{D_t C_t D_t}$, where $\mathbf{D_t}$= diag$(h_{cc,t} \;\; h_{ww,t})^{1/2}$, the conditional variance of each CF follows a GARCH(1,1) process,

$$h_{cc,t} = \alpha_{0,c} + \alpha_{1,c} h_{cc,t-1} + \alpha_{2,c} u^2_{cc,t-1}, \tag{13}$$
$$h_{ww,t} = \alpha_{0,w} + \alpha_{1,w} h_{ww,t-1} + \alpha_{2,w} u^2_{ww,t-1}, \tag{14}$$

and $\mathbf{C_t}$ is the time-varying conditional correlation. $\mathbf{C_t}$ is modeled as follows.

$$\mathbf{\bar{Q}_t} = (1 - G(s_t; \gamma, d)) \; \mathbf{\bar{Q}^{(1)}} + G(s_t; \gamma, d) \; \mathbf{\bar{Q}^{(2)}}, \tag{15}$$
$$\mathbf{Q_t} = (1 - a - b) \; \mathbf{\bar{Q}_t} + b \; \mathbf{Q_{t-1}} + a \; \epsilon_{\mathbf{t-1}} \epsilon_{\mathbf{t-1}}', \tag{16}$$
$$\mathbf{R_t} = \text{diag}(q_{cc,t} \;\; q_{ww,t})^{-1/2} \; \mathbf{Q_t} \; \text{diag}(q_{cc,t} \;\; q_{ww,t})^{-1/2}, \tag{17}$$

where $\epsilon_{\mathbf{t}} = \mathbf{D_t}^{-1} \mathbf{u_t}$ is a standardized error vector, $q_{cc,t}$ and $q_{ww,t}$ are the diagonal elements of $\mathbf{Q_t}$, $\mathbf{\bar{Q}}_t$ is the unconditional correlation matrix of the standardized error $\epsilon_{\mathbf{t}}$, and G is a logistic transition function given by

$$G(s_t; \gamma, d) = \frac{1}{1 + exp(-\gamma(s_t - d))}, \gamma > 0. \tag{18}$$

In (18), s_t (i.e., $s_t = t/T$) is a time trend, employed as a transition variable capturing long-run trends in unconditional correlation, d is a location parameter specifying the center of the transition, and γ is a smoothness parameter specifying the speed of transition. We repeat the same procedure when estimating the conditional correlation between country-level DR_c

and world DR_w. All models are estimated using the maximum likelihood estimation, and the dynamics of economic and financial integration are shown in Figures 2a and 2b, respectively.

Figure 2a allows for a detailed comparison of economic integration between emerging and developed countries. Growth in economic integration has been slow but rather steady for both types of economies until 2005. The 2008-2009 global crisis has led to economies being much more interconnected and susceptible to the same economic shocks. As economic integration reflects the correlation of cash flow news across countries, a spike at the end of 2008 indicates worldwide revisions of future cash flow expectations. But the interconnection continues to persist years after the initial shock. Interestingly, such shocks influence only revisions in cash flow expectations, but not revisions in discount rate expectations (see Figure 2b).

It is important to emphasize that our cash flow measures are forward looking, as opposed to other integration or segmentation measures which employ earnings yields based on trailing realized cash flows published in the past twelve months.[23] One example of a segmentation measure is defined as the difference between the earnings yield of a country (or its industries) and the earnings yield of the world (or world industries) (see BHLS, 2011). Let's assume that there is a global crisis leading to a drastic percentage drop of all stock prices and expectations that the future economic situation will worsen. In this case, the segmentation measure will rise by a similar percentage amount, as earnings are sticky and hence, the price effect in denominators of the various earnings yields could predominantly drive the segmentation measure. On the other hand, our measure of economic integration will remain stable if a drastic drop in expected future earnings could offset the drop in prices. As a result, one would expect differences in the results between our measure based on forward-looking earnings and the segmentation or integration measure based on earnings yields.

Additionally, the plots show that the gap in economic integration between emerging and developed countries has narrowed and subsequently converged by the end of our sample period. While economic integration has increased faster for developed countries than emerging markets until 2005, the phenomenon has reversed in this recent decade. The narrowing of the economic integration differential is apparent during the post-crisis period. This phenomenon is not due to the rising economic integration among emerging countries in the post-crisis period, but is an outcome of a sharp reversal in developed countries. This observed reversal may not be surprising, because developed economies seem less integrated following the wave of protectionism measures they employed in 2009. For example, according to a study by

[23]When quarterly earnings are used, Datastream typically adds the last four earnings available. Until a decade ago, companies in a large number of countries only reported annual earnings, so the lag was even more pronounced (i.e., November earnings were those for the previous calendar year).

the World Trade Organization, G20 countries have imposed a total of 1,583 trade restrictive measures since 2009, but as of early 2016 only a quarter of these measures have been removed.[24] Similar to that of developed countries, the economic integration of emerging economies has also been trending downward following the crisis, albeit at a much slower pace. This pattern can be explained by the continued growth of global businesses moving their manufacturing operations to emerging economies, as well as the globalization of local companies in these markets as their exports thrive significantly in the recent two decades. For example, FDI inflows of emerging markets have soared from $526 billion in 2007 to $698 billion in 2014, whereas those of developed countries have fallen from its 2007 peak of $1,290 billion to a low of $522 billion in 2014.[25]

Unlike Figure 2a, Figure 2b shows that while the gap in financial integration between emerging and developed countries has slightly narrowed from 1989 to 2012, it remains large in recent years. The reason is that financial integration in developed countries has plateaued out as early as 2012, while that in emerging markets keeps slowly rising until 2012. However, both markets experience a drop in financial integration in recent years.[26] These patterns indicate that many emerging markets are still financially segmented from the world market and have not really relaxed their restrictions on foreign ownership of their domestic capital. However, such capital restrictions do not prohibit these economies from enjoying the benefits of globalization. Combined, the evidence suggests that the driver of integration for emerging markets is economic rather than financial.

In summary, our analysis in this section offers new evidence on the relative advancements in financial and economic integration between developed and emerging markets. Specifically, we show that while there is a fairly large and constant gap in financial integration between these two markets, they have attained convergence in economic integration in recent years.

IV. Determinants of Economic and Financial Integration

We have, thus far, established that both economic and financial integration contribute to the observed increasing globalization over the past three decades and have shown how each

[24] WTO report: "G20 trade restrictions reach highest monthly level since the crisis," https://www.wto.org/english/news_e/news16_e/trdev_21jun16_e.htm.

[25] Source: UNCTAD.

[26] Note that STDCC accounts for changes in volatility (the GARCH type), so these results are not driven by volatility.

form of integration varies across countries. In this section, we identify the mechanisms that can explain the varying degrees of economic and financial integration.

A. Variable selection procedure

Theory does not predict the channels through which countries are integrated with the world market. Thus, drawn mainly from the empirical literature, existing studies select economic, financial, and institutional variables that can potentially affect economic and financial integration. These studies typically conduct regression analyses on an exhaustive list of variables and infer from the statistical significance of the coefficients to conclude which variables play an important role in explaining global integration. Many of these variables are highly correlated, and the resulting problem of multicollinearity may mask the importance of some variables. Instead of using a kitchen sink approach, our study proposes a novel technique to formally select the variables based on their measures of importance in affecting each aspect of integration.

Specifically, our analysis applies the random forests technique to identify the determinants that play the most important role in explaining cross-sectional and temporal variations in economic and financial integration. Random forests are a powerful statistical tool, which uses an ensemble machine learning method in the context of a multitude of decision trees. The decision tree is formed based on splitting the explanatory variables into homogeneous groups. Then, in a given tree, the random forests technique implements a series of piece-wise linear relations between candidate variables and the metric of economic or financial integration. The random forests accommodate a more general form of relationships, including nonlinear relationships, between dependent and independent variables, and they also correct for over-fitting, which may result from a more complex classifier (e.g., a larger set of explanatory variables) often observed in other similar methods, such as least squares. In other words, the method is robust to the inclusion of irrelevant explanatory variables. We employ Breiman (2001) bootstrapping procedure to compute and rank the importance of each candidate variable. The variable importance measure is calculated by averaging the difference in out-of-sample error before and after the permutation over all trees, and the measure is normalized by the standard deviation of these differences. This bootstrapping procedure leads to better model performance, because it decreases the variance of the model, without increasing the bias.

It is worthwhile to point out that our variable selection technique has several advantages over the jackknife methodology and general-to-specific search algorithm employed in the lit-

erature (e.g., BHLS, 2011). The random forests approach is based on maximizing information entropy and not minimizing the p-value of a regression coefficient. It allows for nonlinear relationships in its implementation and corrects for over-fitting; it is therefore less prone to noise. Overall, it achieves better precision by reducing variance through averaging the prediction of orthogonal trees. The jackknife methodology is also based on introducing randomness in the estimation process, but it randomly selects candidate variables to determine whether they are statistically significant in a multivariate regression. The general-to-specific algorithm is based on eliminating insignificant regressors. In cases of multicollinearity and high correlation among regressors, this algorithm is less precise. Furthermore, simply comparing the p-values may be misleading.

B. Variable description

Our study employs a fairly exhaustive list of 30 variables, which are mainly drawn from the existing empirical literature. To facilitate discussion, we describe the relevance of the variables in terms of explaining each aspect of integration or both, but relegate the construction of these variables and their data sources to Appendix A.

First, a country's level of economic and financial development offers a broad array of benefits that promote global integration. We employ six proxies for development in different areas of an economy that potentially can have an impact on both economic and financial integration. (a) GDP per capita (GDPC) reflects a country's availability of economic and financial resources, as well as its efficient reallocation of these resources within the economy. Thus, it is the most general measure of the country's level of economic and financial development. (b) We draw from the growth literature (see, for e.g., Barro, 1996) and use GDP growth rate (gGDP) and world GDP growth rate (gGDP_w) as measures of the overall growth of a country and the world, respectively. gGDP_w captures the world business cycle and can affect global discount rate expectations as well as investors' cash flow expectations. (c) Following Bekaert and Mehl (2017), we include the uncertainty of world growth rate (gUncertainty_w); these authors show that gUncertainty_w decreases integration. (d) The ratio of private credit provided by financial institutions to GDP (Private Credit) serves as a proxy for the banking-sector development. As banks are dominant financing sources in many emerging and bank-based countries, poor banking sector development (represented by low levels of Private Credit) can significantly hamper integration (Levine and Zervos, 1998). Also, such development facilitates a more efficient allocation of capital (Wurgler, 2000) and can promote global integration. (e) The number of internet users per 1000 people (Internet)

captures the general ease of information access in a particular country, and particularly, the extent of the country's communications technology.

Second, we choose additional 13 variables that are likely to explain the variation in economic integration. The international tradability of goods, services, and financial assets as well as the free flow of capital are critical conditions for promoting integration (Edwards, 1993; Bekaert and Harvey, 1995). The existence of formal trade or capital restrictions is likely to stifle economic integration. To measure a country's intensity in domestic and foreign trade activities, as well as its level of economic openness, we employ the following nine proxies: (a) current account openness (Current Account Openness) and trade openness (Trade Openness); (b) the values of trade (Trade) and merchandise trade (Merchandise Trade); (c) the value of exports (Exports) and imports (Imports); and (d) the amounts of FDI inflow (FDI Inflow), FDI outflow (FDI Outflow), and the sum of FDI inflow and outflow (FDI Total). Moreover, we include four more proxies for other aspects of economic development, such as access to education (School), better infrastructure measured by the amount of electricity consumed per capita (Electricity), and the advancement in science as well as quality of life, as measured by the rate of population growth (gPopulation) and average life expectancy (Life).

Finally, our study includes 11 more variables that can possibly explain financial integration. We ask whether varying financial market regulations are one of the mechanisms that promote financial integration. We employ four proxies to reflect the strength and quality of legal institutions, such as the law and order index (Law & Order), the investment profile of a country (Inv Profile), the extent of shareholder protection measured by anti-director index (Anti-director), and a measure of capital account openness (Capital Account Openness). Law & Order measures the strength and impartiality of the legal system and the extent of popular observance and enforcement of the law. Inv Profile reflects the risk of expropriation, contract viability, payment delays, and the ability to repatriate profits. Anti-director accounts for the extent of shareholder protection, while Capital Account Openness reflects the degree of openness across the entire capital account. Our analysis also includes variables that measure the extent of a country's financial development, information environment, and financial barriers that have been identified in the literature as salient factors influencing international financial investments and market integration (e.g., Bae et al., 2006; Carrieri et al., 2013). Information and monitoring costs may make it difficult for foreign investors to assess financial risks and deter investments in capital markets. On the other hand, the availability of timely and reliable information in an economy may help investors to recognize risks and improve risk sharing. Thus, we adopt five proxies for such environments,

including a country's adoption of the International Financial Reporting Standards (IFRS), equity market openness (Equity Mkt Openness), financial openness (Financial Openness), corporate credit spread (Credit Spread), and the advancement of stock market development (Market Cap). Lastly, we incorporate the past year's return performance (R_{-1}) and world stock market volatility (VIX).

C. What drives economic and financial integration?

We implement the random forests technique to select candidate variables from the 30 predetermined variables described above. Based on our unreported preliminary analyses using the random forests technique, we narrow the number of candidate variables for economic integration to 19, and for financial variables to 17. Of the two sets of predetermined variables, the six proxies that reflect a country's level of financial and economic development are common to both measures of integration.

In the first round, we again apply the technique to compute each variable importance measure: the relative importance of the variable in explaining the integration metric. The results are reported in Table VII. Among the variables that are highly correlated (i.e., a correlation above 0.80),[27] we keep the variable with the largest importance measure. For example, the correlations between Trade, Export, Import, and Merchandise Trade are greater than 0.9, but among the four, Merchandise Trade has the largest importance measure (i.e., 3.2%). Hence, Merchandise Trade is selected, with the other variables excluded marked gray. Then, we subject the selected variables for another round of computation, and the variable importance measures of Round 2 are also shown in the table. Note that the rankings of variable importance measures in both rounds of computation should be the same; the difference lies in the magnitude as these measures must sum to 100%.

The results show that a country's level of financial and economic development, including Internet and GDPC, the world business cycle (gGDP_w), and world growth uncertainty (gUncertainty_w) are the most important determinants of economic integration with importance measures greater than 10% (i.e., 16.5%, 10.6%, 13.0%, and 11.0%), whereas Current Account Openness has the lowest importance measure of 2.9%. On the other hand, Internet, GDPC, Market Cap, and Inv Profile have the largest importance measures with values of 20.1%, 14.0%, 13.6%, and 10.2%, respectively.

However, one disadvantage of the random forests technique is that it does not provide the direction of impacts. To determine such effects, we regress each integration measure on the

[27] The cross-correlation matrix of the predetermined variables are reported in Appendix Table A.3.

selected variables shown in Round 2 of Table VII; these variables have importance measures of at least 5% high.[28] Results on the determinants of economic integration are reported in Table VIII and on those of financial integration are in Table IX. In both tables, model (1) includes only country-specific variables, model (2) expands model (1) to include world-level variables, model (3) includes the other form of integration measure, and model (4) adds a time trend to model (2).

Table VIII reveals several noticeable results. First, the selected variables can explain the cross-country variation in world economic integration. The explanatory power of the determinants varies from 12.3% in model (1) to 15.3% in model (3). Second, adding a time trend variable to the model barely improves the adjusted R-square of the regression, suggesting that our selected variables have the ability to capture the temporal variation in R^2_{Econ}. In contrast, including R^2_{Fin} to the model enhances the adjusted R-square by 1.7% from 13.6%. This finding should not come as a surprise as one should expect financially integrated countries to be more economically integrated as well. In comparison, BHLS (2013) find that their set of factors, including EU membership, can explain about 5%-12% of the economic integration among European countries (see Table III, p. 590). Their explanatory power for financial integration is somewhat comparable to ours, but they use a more homogeneous group of European markets. Third and importantly, among the selected variables, Internet, GDPC, and Private Credit have positive and statistically significant effects on economic integration, whereas gGDP_w has a negative and statistically significant effect. Among the GDP variables, a country's GDP per capita plays the most important role: countries with increasing GDP per capita tend to be more integrated. As seen in Model (2), the world GDP growth rate is negative and statistically significant, suggesting that world economic integration increases in periods of poor world economic growth. In other words, when the world economy is going through tough times, national economies tend to be more interdependent with lower economic growth, suggesting that companies might be looking abroad for sales and investment opportunities.

We also examine the economic significance of each variable, and the results are shown in Appendix Table A.4. The evidence is fairly similar to the importance measures computed in Table VII. We find that Internet, GDPC, and gGDP_w exhibit the largest impacts on world economic integration. Taking model (2) as an example, a one-standard deviation increase in Internet (GDPC) is associated with a 5.091% (3.875%) rise in the level of economic integration, whereas the same increase in gGDP_w results in a 3.368% fall.

Compared to the determinants of economic integration, those of financial integration

[28] The results do not materially change with the inclusion of such variables.

have a greater explanatory power (see Table IX). On average, the eight selected country-level variables can explain about 31.5% of the variation in financial integration(column 1). Adding the world Credit Spread, R^2_{Econ}, or a time trend to the model has only a marginal impact on the adjusted R-square; the incremental explanatory power of each variable is less than one percentage point. Combined, the results suggest that a country's communications technology, financial and economic development (i.e., Internet and GDPC), and investment environment (i.e., Inv Profile), as well as the world business cycle (as proxied by Credit Spread) are critical in promoting world financial integration. As in the case of economic integration, the world GDP growth rate also exhibits a statistically significantly negative effect on financial integration.

In terms of their economic significance as tabulated in Appendix Table A.5, a country's Inv Profile, GDPC, and Internet have the largest economic impact on financial integration. For example, based on the estimates of model (2), one-standard deviation increases in Inv Profile, GDPC, and Internet are associated with their respective increases of 6.832%, 5.694%, and 3.264% in financial integration. On the other hand, a one-standard deviation rise in Credit Spread induces a decline of 2.193%. In general, these findings are in line with the variable importance measures reported in Table VII. Except for Credit Spread, Inv Profile, GDPC, and Internet all have at least 10% importance measures.

In addition, unreported results suggest no significant difference in the channels of market integration for developed and emerging markets. In this analysis, we introduce a binary variable that equals one if the country is an emerging market and zero if otherwise. We interact this binary variable with each of the candidate variables for economic and financial integration, and find that most of the interaction variables are statistically insignificant. This finding suggests that the drivers of economic and financial integration are broadly common for both developed and emerging markets.

To summarize, the results indicate that the extent of a country's financial/economic development and the world business cycle are the crucial mechanisms behind both economic and financial integration. Moreover, the banking-sector development of a country also contributes to the progress of economic integration, while the quality of a country's investment environment also determines the pace of financial integration.

V. Conclusion

We study the dynamics of two measures of integration, namely economic and financial integration, through time and across countries. Our integration measures are constructed using forward-looking firm-level cash flow forecasts, which reflect investors' expectations of future cash flows. These measures are theoretically-motivated and different from those of extant studies which mostly employ either industry- or country-level return indexes and focus primarily on measuring financial integration. Our measures rely on the premise that if markets are fully integrated, a global economic shock ought to similarly affect economic fundamentals of all countries worldwide. Correspondingly, if markets are strongly interconnected, a global financial shock should induce similar revisions of discount rate expectations of different countries. Hence, our real economic (financial) integration is measured by the explained variance from country cash-flow (discount rate) news regressed on world cash flow (discount rate) news.

Based on a sample of 39,202 unique firms from 41 different countries over the period from 1989 to 2015, we find existence of two distinct forces of global integration underlying globalization. On average, economic and financial integration have been rising over the sample period until 2009 when the global financial crisis occurred. The trends of economic and financial integration, however, are distinct between emerging and developed markets. Financial integration is substantially greater among developed than in emerging markets, and the gap between the two markets still remains large throughout the period, suggesting that emerging markets are largely segmented from the world market. This finding is consistent with the presence of various restrictions on capital mobility and on foreign ownership of domestic markets still in place in emerging economies. These constraints, however, do not hinder their economic advancement toward globalization: emerging markets have converged to the level of economic integration of developed markets toward the end of 2015. The convergence of economic integration is due in part to a sharper reversal in economic integration among developed than in emerging markets following the global financial crisis, and in part, to the rapid globalization of firms in these markets. The combined results offer suggestive evidence that the integrative force of emerging markets is economic rather than financial.

In exploring the mechanisms that can explain the varying degrees of economic and financial integration, we find that country development and the world business cycle are two common drivers of economic and financial integration. In addition, the process of economic integration also depends on the advancement of a country's banking sector, whereas the speed of financial integration further relies on the country's financial investment environment.

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Figure 1
Evolution of Merchandise Trade ($MTrade$) and FDI (FDI) by Market Type

The top panel shows merchandise trade ($MTrade$) as measured by the sum of exports and imports for developed (DEV) and emerging markets (EMG). The bottom panel depicts foreign direct investment inflows ($FDI\ \ inflow$) for developed (DEV) and emerging markets (EMG). Both series are measured in US dollars and are scaled to their respective values reported in 1989.

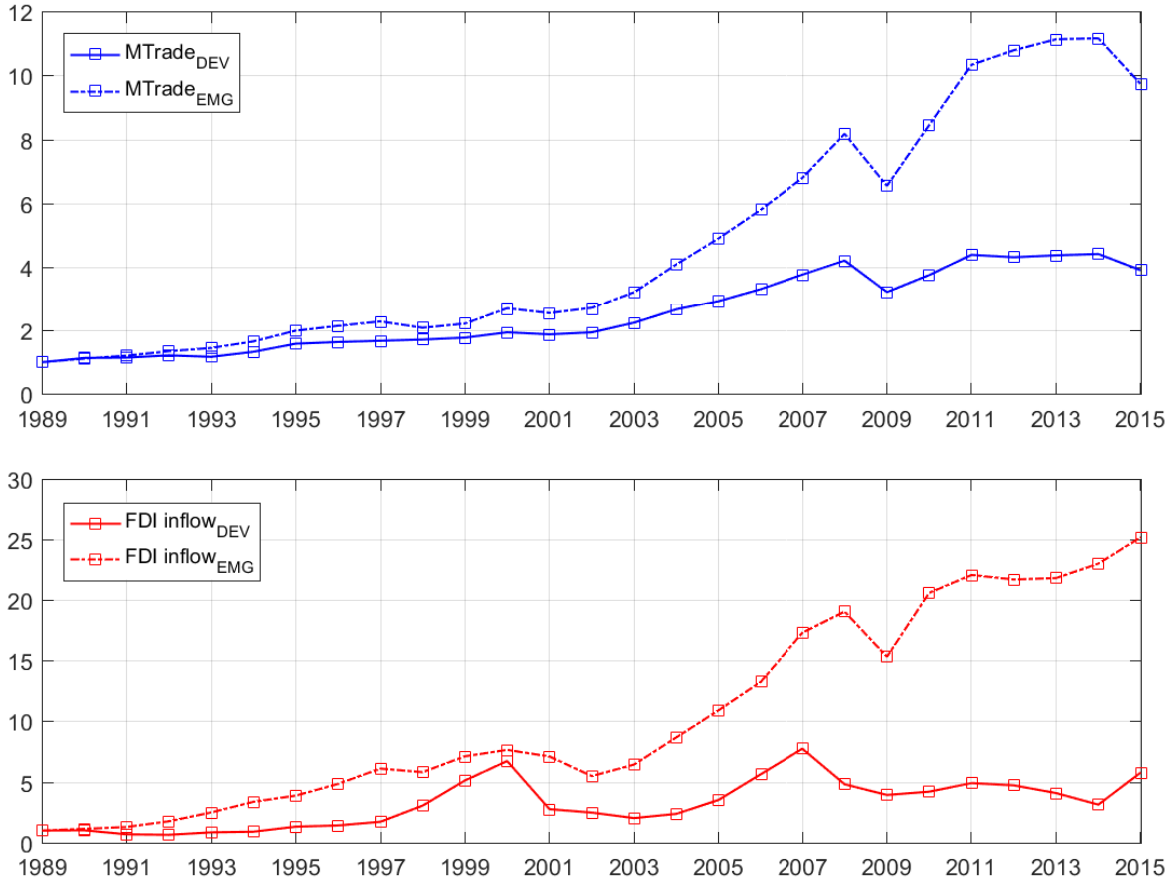

Figure 2
Dynamic Conditional Correlations of Economic (CF) and Financial Integration (DR) by Market Type

Figure 1a shows the equal-weighted conditional correlations of country-level cash flow news (CF) and world (CF) for developed (DEV) and emerging markets (EMG). Figure 1b depicts the equal-weighted conditional correlations of country-level discount rate news (DR) and world discount rate news for developed (DEV) and emerging markets (EMG). The dynamics of conditional correlations of CF depicts the time-variation in economic integration and the dynamics of conditional correlations of DR indicates the time-variation in financial integration.

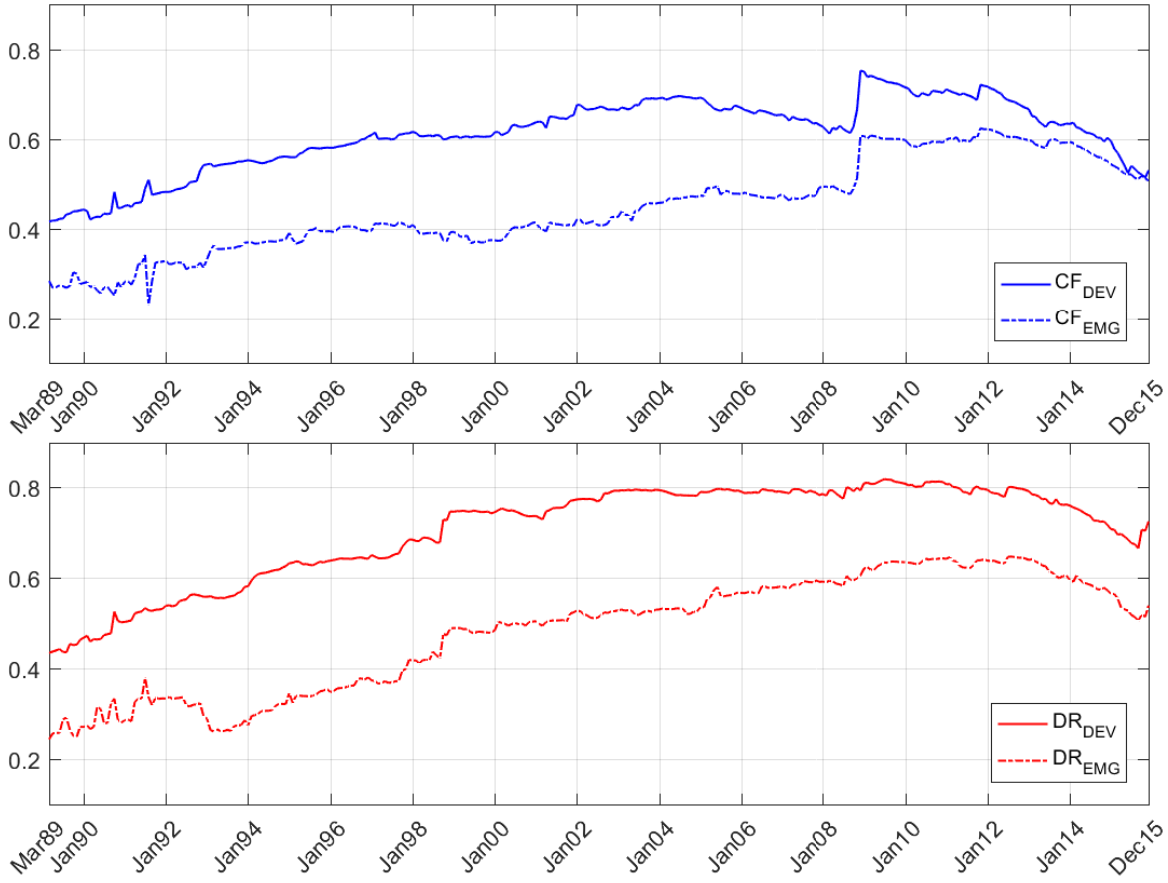

Table I
Return and Variance Decompositions

This table reports the cross-country distribution of return and variance decompositions for value-weighted country portfolios, as well as the variance of each individual return component. For the return decomposition, we report annual averages of returns (R_c), cash flow news (CF_c), and discount rate news (DR_c), and their respective variances. For the variance decomposition, we report the slope coefficient from the regression of CF_c (DR_c) on R_c, and it represents the proportion of the CF_c (DR_c) covariance with R_c in the variance of R_c. Panel A shows average values for the whole sample (ALL), developed markets (DEV), and emerging markets (EMG); Panels B and C reports those for 21 DEV and 20 EMG over the sample period of 1989-2015.

	Return Decomposition			Variance			Variance Decomposition	
Country	R_c	CF_c	DR_c	R_c	CF_c	DR_c	$\frac{Cov(R_c,CF_c)}{Var(R_c)}$	$\frac{Cov(R_c,DR_c)}{Var(R_c)}$
Panel A: All, Developed (DEV), and Emerging Markets (EMG)								
Mean ALL	13.26%	5.53%	7.73%	0.112	0.031	0.080	0.252	0.748
Mean DEV	12.70%	4.30%	8.40%	0.066	0.013	0.048	0.226	0.774
Mean EMG	13.84%	6.82%	7.02%	0.161	0.050	0.114	0.279	0.721
Panel B: Developed Markets (DEV)								
Australia	13.25%	3.82%	9.43%	0.056	0.018	0.030	0.399	0.601
Austria	11.06%	4.21%	6.86%	0.114	0.019	0.076	0.249	0.751
Belgium	11.77%	4.38%	7.39%	0.055	0.010	0.047	0.168	0.832
Canada	12.23%	2.80%	9.43%	0.042	0.005	0.028	0.226	0.774
Denmark	14.50%	5.01%	9.49%	0.047	0.006	0.036	0.171	0.829
Finland	19.38%	3.53%	15.85%	0.168	0.032	0.118	0.245	0.755
France	11.58%	3.07%	8.51%	0.043	0.006	0.032	0.202	0.798
Germany	10.22%	3.33%	6.88%	0.060	0.007	0.046	0.172	0.828
Hong Kong	15.98%	5.55%	10.43%	0.086	0.021	0.065	0.244	0.756
Ireland	15.15%	7.48%	7.67%	0.065	0.015	0.049	0.241	0.759
Italy	8.42%	3.26%	5.16%	0.063	0.010	0.048	0.203	0.797
Japan	4.24%	1.85%	2.40%	0.056	0.007	0.051	0.105	0.895
Netherlands	12.36%	4.33%	8.03%	0.043	0.009	0.037	0.173	0.827
New Zealand	14.03%	5.34%	8.68%	0.059	0.022	0.029	0.441	0.559
Norway	15.33%	6.14%	9.19%	0.098	0.020	0.067	0.258	0.742
Singapore	11.97%	5.04%	6.93%	0.086	0.014	0.056	0.253	0.747
Spain	10.69%	4.03%	6.66%	0.059	0.019	0.047	0.254	0.746
Sweden	16.23%	5.61%	10.62%	0.089	0.015	0.062	0.233	0.767
Switzerland	13.87%	4.64%	9.23%	0.034	0.006	0.025	0.216	0.784
United Kingdom	10.25%	2.67%	7.58%	0.031	0.006	0.024	0.208	0.792
United States	14.20%	4.27%	9.93%	0.028	0.002	0.025	0.081	0.919
Panel C: Emerging Markets (EMG)								
Argentina	14.39%	10.43%	3.95%	0.210	0.134	0.163	0.431	0.569
Brazil	19.06%	10.43%	8.63%	0.226	0.072	0.142	0.345	0.655
Chile	13.76%	5.18%	8.58%	0.107	0.019	0.071	0.260	0.740
China	15.25%	4.84%	10.41%	0.194	0.079	0.152	0.310	0.690
Egypt	22.14%	14.66%	7.49%	0.358	0.168	0.132	0.549	0.451
Greece	8.05%	2.93%	5.12%	0.196	0.051	0.160	0.220	0.780
India	17.85%	7.33%	10.52%	0.146	0.013	0.108	0.176	0.824
Indonesia	15.02%	9.30%	5.72%	0.216	0.059	0.101	0.403	0.597
Israel	11.65%	5.22%	6.43%	0.062	0.025	0.062	0.201	0.799
Malaysia	14.06%	4.78%	9.28%	0.121	0.023	0.071	0.303	0.697
Mexico	14.42%	5.66%	8.76%	0.117	0.015	0.088	0.187	0.813
Pakistan	15.33%	8.78%	6.55%	0.180	0.098	0.208	0.194	0.806
Philippines	15.44%	6.39%	9.05%	0.150	0.020	0.098	0.237	0.763
Poland	10.44%	3.81%	6.63%	0.106	0.027	0.090	0.203	0.797
Portugal	10.49%	3.56%	6.94%	0.079	0.018	0.060	0.230	0.770
South Africa	12.34%	6.05%	6.29%	0.067	0.023	0.044	0.344	0.656
South Korea	8.91%	5.69%	3.23%	0.153	0.042	0.109	0.281	0.719
Taiwan	9.20%	4.62%	4.58%	0.106	0.022	0.082	0.213	0.787
Thailand	10.97%	9.31%	1.66%	0.139	0.035	0.083	0.328	0.672
Turkey	18.04%	7.42%	10.62%	0.298	0.059	0.262	0.159	0.841

Table II
Measures of Economic and Financial Integration by Country

This table shows measures of economic and financial integration by market category. Economic integration is measured by the value of R^2 (R^2_{Econ}) obtained from regressing a country's cash flow news (CF_c) on the world cash flow news (CF_W). Financial integration is measured by the value of R^2 (R^2_{Fin}) obtained from regressing a country's discount rate news (DR_c) on the world discount rate DR_w. Panel A reports average values of the regression estimates and the R^2s for the full sample, developed markets (DEV), and emerging markets (EMG), as well as the $t-$statistic on the difference between the values of DEV and EMG. Panels B and C report those by developed country and emerging market. The sample consists of 21 developed markets (DEV) and 20 emerging markets (EMG) for the period of 1989-2015.

	R^2_{Econ}	β^{CF}	R^2_{Fin}	β^{DR}
Panel A: All, Developed (DEV), and Emerging Markets (EMG)				
Mean ALL	0.410	1.425	0.452	1.124
Mean DEV	0.482	1.163	0.552	1.036
Mean EMG	0.334	1.701	0.348	1.216
DEV-EMG	**0.148**	**-0.538**	**0.203**	**-0.181**
	(3.16)	(-4.45)	(4.63)	(-2.11)
Panel B: Developed Markets (DEV)				
Australia	0.541	1.623	0.565	0.871
Austria	0.520	1.599	0.204	0.834
Belgium	0.438	1.094	0.509	1.039
Canada	0.649	0.925	0.592	0.862
Denmark	0.447	0.818	0.448	0.857
Finland	0.287	1.561	0.450	1.544
France	0.466	0.868	0.813	1.077
Germany	0.739	1.149	0.699	1.203
Hong Kong	0.329	1.362	0.427	1.122
Ireland	0.233	0.971	0.400	0.941
Italy	0.483	1.147	0.519	1.060
Japan	0.646	1.119	0.457	1.030
Netherlands	0.491	1.111	0.719	1.101
New Zealand	0.267	1.243	0.348	0.672
Norway	0.462	1.547	0.510	1.237
Singapore	0.588	1.454	0.519	1.147
Spain	0.162	0.893	0.587	1.121
Sweden	0.478	1.376	0.649	1.352
Switzerland	0.583	0.925	0.579	0.804
United Kingdom	0.813	1.136	0.765	0.908
United States	0.495	0.499	0.824	0.965
Panel C: Emerging Markets (EMG)				
Argentina	0.241	2.685	0.449	1.698
Brazil	0.255	2.026	0.393	1.484
Chile	0.483	1.478	0.333	0.979
China	0.419	2.694	0.109	0.796
Egypt	0.111	1.827	0.295	1.151
Greece	0.145	1.302	0.458	1.724
India	0.575	1.314	0.477	1.444
Indonesia	0.283	2.034	0.267	1.081
Israel	0.387	1.446	0.573	1.148
Malaysia	0.454	1.681	0.184	0.768
Mexico	0.479	1.301	0.467	1.301
Pakistan	0.165	1.914	0.346	1.690
Philippines	0.183	0.976	0.179	0.888
Poland	0.365	1.448	0.443	1.215
Portugal	0.255	1.055	0.521	1.162
South Africa	0.532	1.805	0.365	0.851
South Korea	0.237	1.628	0.295	1.204
Taiwan	0.469	1.623	0.244	0.941
Thailand	0.332	1.743	0.253	0.968
Turkey	0.303	2.037	0.315	1.833

Table III
Measures of Economic and Financial Integration Using Multiple Global-factor Models

This table reports cross-country averages of economic and financial integration measures computed using the following multiple global-factor models with principal components.

$$CF_c = \alpha^{CF} + \sum_{j=1}^{5} \beta_j^{CF} CF_{w,j} + \varepsilon^{CF_c}$$

$$DR_c = \alpha^{DR} + \sum_{j=1}^{5} \beta_j^{DR} DR_{w,j} + \varepsilon^{DR}.$$

R^2_{Econ} is obtained from regressing a country's monthly cash flow news (CF_c) on five world market factors ($CF_{w,j}$, $j = 1, 2, ..., 5$), which are computed using the weights of the first five principal components extracted from value-weighted cash flow news indices of both developed and developing markets. Similarly, the financial integration (R^2_{Fin}) is measured by the R^2 obtained from regressing a country's monthly discount rate news (DR_c) on five world market factors ($DR_{w,j}$, $j = 1, 2, ..., 5$), which are computed using the weights of the first five principal components extracted from value-weighted discount rate news market indices. The integration measures are reported in Panel A. Panel B reports similar measures of economic and financial integration but using five world industry factors, which are computed using the weights of the first five principal components extracted from 39 world industry portfolios of cash flow news and of discount rate news. The table also reports the differential integration measures between the emerging and developed markets with $t-$statistic in parentheses.

	Economic Integration (R^2_{Econ})	Financial Integration (R^2_{Fin})
	Panel A: Using 5 World Market Factors	
Mean ALL	0.567	0.624
Mean DEV	0.649	0.701
Mean EMG	0.481	0.542
DEV-EMG	**0.168**	**0.159**
	(3.80)	(3.70)
	Panel B: Using 5 World Industry Factors	
Mean ALL	0.516	0.627
Mean DEV	0.600	0.704
Mean EMG	0.428	0.546
DEV-EMG	**0.172**	**0.158**
	(4.15)	(4.32)

Table IV
Robustness Tests

This table reports cross-country averages of economic and financial integration measures. R^2_{Econ} is obtained from regressing country monthly cash flow news (CF_c) on world monthly cash flow news (CF_w). Similarly, the financial integration (R^2_{Fin}) is measured by the R^2 obtained from regressing country monthly discount rate news (DR_c) on world monthly discount rate news (DR_w). Panel A shows the results from Panel A of Table II as a benchmark for comparison purposes. Panels B-D report results that adjust for biases associated with (i) analyst optimism, (ii) analyst forecast errors, and (iii) sluggish analyst forecasts. To circumvent the bias in (i), we employ the consensus minimum value of analyst forecasts; to mitigate the error in (ii), we use the inverse of (1 + a firm's analyst forecast errors) as the weight to compute both the weighted-average country and weighted-average global portfolio cash flow and discount rate news; (iii) to address the problem of sluggish analyst forecasts, we take the difference between each firm's analyst forecast and its portfolio forecast error. The table also reports the differential integration measures between the emerging and developed markets with $t-$statistics in parentheses.

	Economic Integration (R^2_{Econ})	Financial Integration (R^2_{Fin})
	Panel A: Baseline Model	
Mean ALL	0.410	0.452
Mean DEV	0.482	0.552
Mean EMG	0.334	0.348
DEV-EMG	**0.148**	**0.203**
(t-stat)	(3.16)	(4.63)
	Panel B: Analyst Optimism	
Mean ALL	0.402	0.446
Mean DEV	0.473	0.540
Mean EMG	0.327	0.347
DEV-EMG	**0.145**	**0.193**
(t-stat)	(3.30)	(4.48)
	Panel C: Analyst forecast Errors as Weights	
Mean ALL	0.409	0.451
Mean DEV	0.480	0.552
Mean EMG	0.335	0.345
DEV-EMG	**0.145**	**0.207**
(t-stat)	(3.10)	(4.63)
	Panel D: Sluggish Analyst Forecasts	
Mean ALL	0.372	0.417
Mean DEV	0.419	0.515
Mean EMG	0.321	0.315
DEV-EMG	**0.098**	**0.201**
(t-stat)	(2.06)	(4.32)

Table V
Trend Analysis

This table shows regression results from the trend analysis of economic and financial integration by market type. Economic integration (R^2_{Econ}) is measured by the R^2 obtained from regressing a country's monthly cash flow news (CF_c) on the world cash flow news (CF_w). Financial integration (R^2_{Fin}) is measured by the R^2 obtained from regressing a country's monthly discount rate news (DR_c) on the world discount rate news (DR_w). Panels A and B regress each integration measure on a time trend (T) and the volatility index (VIX), with $t-$statistics adjusted for robust standard errors shown in parentheses. NObs is the number of observations. The sample consists of 41 countries (ALL), which are grouped into 21 developed markets (DEV) and 20 emerging markets (EMG).

	Economic Integration (R^2_{Econ})			Financial Integration (R^2_{Fin})		
	Panel A: $Y_{i,t} = a + b\ T + u_{i,t}, \quad Y \in \{R^2_{Econ}, R^2_{Fin}\}$					
	ALL	DEV	EMG	ALL	DEV	EMG
T	**0.093**	0.092	**0.121**	**0.137**	**0.167**	**0.135**
	(2.21)	(1.92)	(3.18)	(4.15)	(4.51)	(4.22)
Intercept	**0.261**	**0.327**	**0.150**	**0.275**	**0.341**	**0.160**
	(5.22)	(5.64)	(3.57)	(6.71)	(7.26)	(4.21)
NObs	1,044	567	477	1,044	567	477
Adjusted R^2	0.051	0.051	0.090	0.101	0.175	0.111
	Panel B: $Y_{i,t} = a + b\ T + c\ VIX_t + u_{i,t}, \quad Y \in \{R^2_{Econ}, R^2_{Fin}\}$					
T	**0.088**	0.086	**0.116**	**0.133**	**0.161**	**0.133**
	(2.20)	(1.87)	(3.13)	(4.29)	(4.60)	(4.29)
VIX	0.704	0.749	0.672	**0.505**	**0.723**	0.281
	(1.50)	(1.42)	(1.55)	(2.28)	(2.47)	(1.46)
Intercept	0.128	0.185	0.021	**0.179**	**0.204**	**0.106**
	(1.19)	(1.51)	(0.22)	(3.31)	(3.09)	(2.41)
NObs	1,044	567	477	1,044	567	477
Adjusted R^2	0.082	0.084	0.123	0.115	0.206	0.115

Table VI
Subperiod Analysis

This table replicates the regression analysis of Table II for each of the four subperiods (i.e., 1989-1995, 1996-2002, 2003-2009, and 2010-2015) by market type. It reports the average measures of economic and financial integration, as well as the difference in integration levels between developed (DEV) and emerging markets (EMG), with $t-$statistics shown in parentheses. Economic integration (R^2_{Econ}) is measured by the R^2 obtained from regressing a country's monthly cash flow news (CF_c) on the world cash flow news (CF_w). Financial integration (R^2_{Fin}) is measured by the R^2 obtained from regressing a country's monthly discount rate news (DR_c) on the world discount rate news (DR_w). The sample consists of 41 countries (ALL), which are grouped into 21 developed markets (DEV) and 20 emerging markets (EMG).

	Economic Integration (R^2_{Econ})				Financial Integration (R^2_{Fin})			
Market	1989-1995	1996-2002	2003-2009	2010-2015	1989-1995	1996-2002	2003-2009	2010-2015
Mean ALL	0.234	0.253	0.538	0.451	0.210	0.420	0.558	0.517
Mean DEV	0.310	0.368	0.634	0.502	0.278	0.576	0.690	0.627
Mean EMG	0.115	0.131	0.436	0.397	0.122	0.257	0.420	0.401
DEV-EMG	**0.194**	**0.237**	**0.198**	**0.105**	**0.155**	**0.318**	**0.269**	**0.226**
	(3.61)	(6.72)	(4.82)	(3.27)	(2.86)	(6.89)	(5.51)	(5.10)

Table VII
Variable Importance Measures of Integration Determinants

This table shows the variable importance measures of a preselected set of variables that can drive cross-country and time-series variations in economic and financial integration. The variable importance measure is computed based on the prediction error of random forests approach, in a context of a multitude of decision trees. In each decision tree, the random forests regression implements a series of piece-wise linear relations between the candidate variables and the observations (i.e., the economic or financial measure of integration). The resulting variable importance measures are used reliably for variable selection. The predetermined set of variables include six variables common for the two forms of integration, 13 for economic integration only, and 11 for financial integration only. The variable importance measures sum up to one for each set of predetermined variables. Our analysis conducts two rounds of variable selection. In Round 1, among the variables that are highly correlated with correlation above 0.75, we keep only the most important variable and exclude the remaining variables, which are marked gray. In Round 2, we recompute the variable important measures on the remaining candidate variables. All variables are defined in Appendix A.

	Economic Integration		Financial Integration	
	Round 1	Round 2	Round 1	Round 2
GDPC	8.0%	10.6%	13.7%	14.0%
gGDP	6.0%	7.6%	6.2%	6.7%
gGDP_w	11.5%	13.0%	3.1%	2.8%
gUncertainty_w	10.1%	11.0%	3.9%	4.4%
Internet	14.6%	16.5%	21.2%	20.1%
Private Credit	5.8%	8.7%	6.6%	7.2%
Current Account Openness	2.0%	2.9%		
Electricity	3.5%	5.9%		
Exports	2.8%			
FDI Inflow	3.9%			
FDI Outflow	4.2%	7.1%		
FDI Total	3.6%			
gPopulation	6.9%	8.7%		
Imports	2.5%			
Life	4.2%			
Merchandise Trade	3.2%	8.2%		
School	5.3%			
Trade	1.7%			
Trade Openness	0.2%			
Anti-Director			2.1%	2.4%
Capital Account Openness			2.3%	2.3%
Credit Spread			6.2%	5.6%
Equity Mkt Openness			2.2%	
IFRS			0.4%	0.3%
Inv Profile			8.4%	10.2%
Financial Openness			1.4%	
Law & Order			1.7%	1.7%
Market Cap			12.6%	13.6%
R_{-1}			5.3%	5.7%
VIX			2.7%	3.0%
Total	100%	100%	100.0%	100%

Table VIII
Determinants of Economic Integration

This table shows regression results of economic integration (measured by R^2_{Econ}) on the 10 predetermined country- and world-level variables with the largest important measures reported in Table VI. R^2_{Econ} is the model R^2 obtained from regressing a country's monthly cash flow news (CF_c) on the monthly world cash flow news (CF_w). In addition to the 11 selected variables, the regressions also include the measure of financial integration (R^2_{Fin}) and a time trend. All variables are defined in Appendix A. The t-statistics reported in parentheses are adjusted for clustered standard errors at the country and year levels in models (1-3) and at the country level in model (4). NObs is the number of country-year observations, and $\bar{R}^2$ is the adjusted R^2. The sample period is from January 1989 to December 2015.

	(1)	(2)	(3)	(4)
Internet	**1.556**	**1.608**	**1.165**	0.681
	(4.82)	(4.74)	(3.31)	(1.19)
GDPC	**2.860**	**3.039**	**2.411**	**3.453**
	(2.69)	(2.88)	(2.30)	(3.27)
gPopulation	-0.634	-0.944	-1.050	-0.990
	(-0.52)	(-0.78)	(-0.89)	(-0.82)
gGDP	-0.282	0.214	0.220	0.216
	(-1.09)	(0.73)	(0.77)	(0.74)
Private Credit	**0.041**	**0.041**	**0.037**	**0.046**
	(2.20)	(2.20)	(1.99)	(2.41)
Merchandise Trade	-0.012	-0.017	-0.014	-0.015
	(-0.84)	(-1.14)	(-0.96)	(-1.02)
FDI Outflow	0.041	0.071	0.052	0.086
	(0.31)	(0.50)	(0.38)	(0.61)
Electricity	-0.100	-0.084	-0.126	0.059
	(-0.47)	(-0.39)	(-0.60)	(0.26)
$gGDP_w$		**-2.631**	**-2.643**	**-2.431**
		(-3.85)	(-3.98)	(-3.55)
$gUncertainty_w$		1.292	-0.628	3.908
		(0.31)	(-0.15)	(0.90)
R^2_{Fin}			**0.151**	
			(4.63)	
Time Trend				**0.399**
				(2.00)
NObs	1,044	1,044	1,044	1,044
Adjusted R^2	0.123	0.136	0.153	0.138

Table IX
Determinants of Financial Integration

This table shows regression results of the financial integration metric (measured by R^2_{Fin}) on the 8 predetermined country- and world-level variables with the largest important measures reported in Table VII. R^2_{Fin} is the model R^2 obtained from regressing a country's monthly discount rate news (DR_c) on the monthly world discount rate news (DR_w). In addition to the 15 selected variables, the regressions also include the measure of economic integration (R^2_{Econ}) and a time trend. All variables are defined in Appendix A. The t-statistics reported in parentheses are adjusted for clustered standard errors at the country and year levels in models (1-3), and at the country level in model (4). NObs is the number of country-year observations, and $\bar{R}^2$ is the adjusted R-square. The sample period is from January 1989 to December 2015

	(1)	(2)	(3)	(4)
Internet	**1.215**	**1.031**	**1.004**	0.758
	(3.60)	(2.99)	(2.93)	(1.59)
GDPC	**4.192**	**4.466**	**4.131**	**4.735**
	(5.62)	(5.90)	(5.43)	(5.78)
Market Cap	0.020	0.022	0.022	0.022
	(1.65)	(1.77)	(1.81)	(1.75)
Inv profile	**3.031**	**2.884**	**2.743**	**2.870**
	(7.61)	(7.25)	(6.84)	(7.17)
Private Credit	0.003	0.005	0.005	0.006
	(0.17)	(0.24)	(0.02)	(0.31)
gGDP	**-0.595**	**-0.546**	**-0.523**	**-0.541**
	(-2.26)	(-2.04)	(-1.97)	(-2.01)
R_{-1}	-0.001	0.027	0.028	0.026
	(-0.04)	(1.11)	(1.19)	(1.10)
Credit Spread		**4.138**	2.803	**4.026**
		(2.90)	(1.94)	(2.80)
R^2_{Econ}			**0.106**	
			(3.55)	
Time Trend				0.114
				(0.70)
NObs	1,042	1,042	1,042	1,042
Adjusted R^2	0.315	0.319	0.326	0.318

Appendix Table A.1
Estimating Cash flow News (CF) and Discount Rate News (DR)

Following Pastor, Sinha, and Swaminathan (2008) and Chen, Da, and Zhao (2013), we construct CF and DR by first estimating PV in Eq. (1) as follows.

$$\begin{aligned} PV_t &= \sum_{j=1}^{\infty} \frac{E_t d_{t+j}}{(1+r_{f,t+j})^j} \\ &= \sum_{j=1}^{15} \frac{EF_{t+j} \cdot payout_{t+j}}{(1+r_{f,t+j})^j} + \frac{TV_t + 15}{(1+r_{f,t+15})^{15}}, \end{aligned} \tag{19}$$

where EF_{t+j} is the earnings forecast j years ahead, $payout_{t+j}$ is the payout ratio (i.e., the ratio of dividends to net income), TV_{t+15} is the terminal value, and $r_{f,t+j}$ is the risk free rate that is inferred from the Treasury debt term structure of interest rates. PV_t is estimated with the information available at time t to the investors. Therefore, we assume that the payout ratio stays constant for three years and for the rest of the investment horizon it linearly converges to the payout ratio of the industry of the firm. We follow a similar approach for the growth rate of firms (see below). Payout ratios are obtained from Datastream which backfills the payout ratio for year t based on dividends for year t and decided in year $t+1$. In order to compute each firm's PV_t, we require that the firm has non-missing data for earnings forecasts for the current year (EF_{t+1}), the next two fiscal years ahead (EF_{t+2} and EF_{t+3}), or a long-term growth forecast (g_{t+3}).[29]

For earnings forecasts beyond $t+3$, the long-term growth rate of each firm in country c is assumed to revert from g_{t+3} to the average long-term GDP growth rate of country c (lg_{t+3}) by $t+16$. lg_{t+3} is the expanding average of the country's GDP growth rates based on all available information to date, and all GDP growth rates are obtained from the World Development Indicators (WDI). Hence, the earnings growth rate and earnings forecast are computed as

$$\begin{aligned} g_{t+j} &= g_{t+j-1} \times \exp\left[\frac{log(lg_{t+3}/g_{t+3})}{13}\right] \\ EF_{t+j} &= EF_{t+j-1} \times (1+g_{t+j}) \\ &\forall j, \quad 4 \le j \le 16. \end{aligned}$$

The terminal value (TV_{t+15}) of each firm in industry k is estimated under the assumption that the price-earnings ratio of the firm converges to that of the world industry k. To properly discount the future cash flows in the above estimation, we use yields of a 15-year constant maturity note that we interpolate from 10-year and 20-year treasury notes as $r_{f,t+j}$.

[29] If g_{t+3} is missing, then $g_{t+3} = EF_{t+3}/EF_{t+2} - 1$. If both EF_{t+3} and g_{t+3} are missing, then $g_{t+3} = EF_{t+2}/EF_{t+1} - 1$. If EF_{t+2} is missing, then $EF_{t+3} = EF_{t+2} \times (1+g_{t+3})$. If $g_{t+3} < 0.02$, then $g_{t+3} = 0.02$. If $g_{t+3} > 1$, then $g_{t+3} = 1$.

Appendix Table A.2
The Number of Firms in the Sample

This table shows the average number of firms available within the full sample period and four subperiods, and the starting year of the available data (Start) by country. It provides the information across all 41 markets (All), 21 developing markets (DEV), and 20 emerging markets (EMG). The sample period is from January 1989 to December 2015.

Country	Start	1989-2015	1989-1995	1996-2002	2003-2009	2010-2015
Panel A: All, Developed (DEV), and Emerging Markets (EMG)						
Mean All		39202	11234	21867	22339	21764
Mean DEV		28411	9360	17673	16756	14152
Mean EMG		10791	1874	4194	5583	7612
Panel B: Developed Markets (DEV)						
Australia	1989	1515	225	584	853	950
Austria	1989	139	72	96	71	54
Belgium	1989	187	61	131	129	107
Canada	1989	1959	286	666	1234	1231
Denmark	1989	227	134	183	114	84
Finland	1989	193	76	150	131	123
France	1989	1124	428	707	646	526
Germany	1989	1170	384	805	722	634
Hong Kong	1989	831	213	446	637	581
Ireland	1989	90	44	54	60	44
Italy	1989	436	165	260	309	236
Japan	1989	3890	1016	3011	2452	1888
Netherlands	1989	265	167	218	159	104
New Zealand	1989	149	45	83	91	86
Norway	1989	356	77	178	250	207
Singapore	1989	679	162	318	458	306
Spain	1989	231	131	167	158	121
Sweden	1989	519	135	319	291	329
Switzerland	1989	295	144	205	225	185
United Kingdom	1989	3346	1257	1840	1982	1489
United States	1989	10810	4138	7252	5784	4867
Panel C: Emerging Markets (EMG)						
Argentina	1993	73	29	65	53	24
Brazil	1992	342	87	173	221	199
Chile	1992	126	65	94	59	66
China	1993	2375	11	53	1131	2279
Egypt	1999	84		14	59	74
Greece	1992	295	117	255	179	68
India	1993	1313	173	286	695	1119
Indonesia	1990	325	126	174	154	185
Israel	1995	110	4	46	56	82
Malaysia	1989	934	247	411	698	526
Mexico	1992	151	58	103	89	92
Pakistan	1993	106	33	56	49	71
Philippines	1989	146	71	101	76	81
Poland	1995	307	23	71	141	248
Portugal	1991	81	44	63	42	35
South Africa	1989	477	128	368	230	193
South Korea	1989	1446	248	772	485	935
Taiwan	1989	1255	182	576	562	906
Thailand	1989	559	190	295	360	282
Turkey	1991	286	38	218	244	147

Appendix Table A.3
Correlation Matrices for Determinants of Economic and Financial Integration

This table reports pairwise correlations of the potential determinants of economic and financial integration in our sample.For ease of reference, we shorten some of the variable names so that the correlation matrix can fit in a single page. In Panel A, the variables are gGDP, $gGDP_w$, $gUncertainty_w$ (gUnc), Internet (Inter), Private Credit (PCred), Current Account Openness (CuAO), Electricity (Elec), Exports (Expor), FDI Inflow (FDII), FDI Outflow (FDIO), FDI Total (FDIT), gPopulation (gPop), Imports (Impo), Life, Merchandise Trade (MTrade), School (Scho), Trade, and Trade Openness (TOpen). In Panel B, they are GDPC, gGDP, $gGDP_w$, $gUncertainty_w$ (gUnc), Internet (Inter), Private Credit (PCred), Anit-Director (ADir), Capital Account Openness (CaAO), Credit Spread (CSprd), Equity Mkt Openness (EqOp), IFRS, Inv Profile (IPro), Financial Openness (FOpen), Law & Order (Law), Market Cap (MCap), R$_1$, VIX. Statistically significant correlations (at 5% p-value) are marked with a bold font.

Panel A: Determinants of Economic Integration

	gGDP	$gGDP_w$	gUnc	Inter	PCred	CuAO	Elec	Expor	FDII	FDIO	FDIT	gPop	Impor	Life	MTrad	Scho	Trade	TOpen
GDPC	**-0.271**	-0.026	0.056	**0.720**	**0.588**	**0.701**	**0.698**	**0.213**	**0.252**	**0.352**	**0.323**	**-0.481**	**0.190**	**0.817**	**0.167**	**0.751**	**0.203**	**0.441**
gGDP		**0.520**	**-0.318**	**-0.270**	**-0.273**	**-0.167**	**-0.161**	**0.132**	**0.097**	0.028	**0.058**	**0.281**	**0.138**	**-0.231**	**0.138**	**-0.223**	**0.135**	**-0.174**
$gGDP_w$			**-0.489**	-0.105	-0.052	-0.013	0.003	0.009	**0.069**	**0.071**	**0.075**	-0.001	0.009	-0.033	0.018	-0.013	0.009	-0.012
gUnc				**0.112**	0.059	0.018	0.000	-0.006	**-0.049**	**-0.055**	**-0.056**	-0.034	-0.007	**0.047**	-0.016	**0.015**	-0.007	-0.001
Inter					**0.560**	**0.491**	**0.584**	**0.224**	**0.222**	**0.311**	**0.290**	**-0.328**	**0.194**	**0.614**	**0.184**	**0.451**	**0.210**	**0.223**
PCred						**0.336**	**0.399**	**0.230**	**0.136**	**0.229**	**0.198**	**-0.274**	**0.227**	**0.392**	**0.193**	**0.310**	**0.229**	**0.218**
CuAO							**0.482**	**0.226**	**0.228**	**0.301**	**0.283**	**-0.359**	**0.225**	**0.773**	**0.194**	**0.519**	**0.226**	**0.326**
Elec								0.063	0.074	**0.169**	**0.134**	**-0.310**	0.016	**0.514**	**0.021**	**0.577**	0.041	**0.219**
Expor									**0.595**	**0.509**	**0.573**	**0.170**	**0.990**	**0.231**	**0.975**	0.002	**0.998**	**0.128**
FDII										**0.863**	**0.955**	-0.008	**0.598**	**0.235**	**0.613**	**0.173**	**0.598**	**0.087**
FDIO											**0.962**	**-0.103**	**0.511**	**0.303**	**0.528**	**0.241**	**0.511**	**0.093**
FDIT												-0.062	**0.575**	**0.285**	**0.591**	**0.228**	**0.576**	**0.098**
gPop													**0.178**	**-0.445**	**0.153**	**-0.446**	**0.174**	**-0.192**
Impor														**0.219**	**0.980**	-0.021	**0.997**	**0.116**
Life															**0.200**	**0.600**	**0.226**	**0.370**
MTrad																-0.025	**0.980**	**0.123**
Scho																	-0.009	**0.398**
Trade																		**0.123**

Appendix Table A.3 – Continued
Correlation Matrices for Determinants of Economic and Financial Integration

Panel B: Determinants of Financial Integration

	gGDP	$gGDP_w$	gUnc	Inter	PCred	ADir	CaAO	CSprd	EqOp	IFRS	IPro	FOpen	Law	MCap	R_1	VIX
GDPC	**-0.271**	-0.026	0.056	**0.720**	**0.588**	-0.082	**0.737**	**0.090**	**0.726**	**0.456**	**0.596**	**0.749**	**0.703**	**0.285**	-0.043	-0.022
gGDP		**0.520**	**-0.318**	**-0.270**	**-0.273**	0.067	**-0.209**	**-0.193**	**-0.188**	**-0.295**	**-0.085**	**-0.244**	**-0.131**	0.102	**0.104**	**-0.176**
$gGDP_w$			**-0.489**	-0.105	-0.052	-0.013	-0.012	**-0.319**	0.029	**-0.097**	**-0.039**	-0.009	0.030	0.042	**-0.115**	**-0.346**
gUnc				**0.112**	**0.059**	**-0.002**	0.005	**0.014**	-0.046	**0.166**	**-0.088**	-0.017	**-0.016**	**0.009**	**0.152**	0.088
Inter					**0.560**	**0.009**	**0.492**	**0.259**	**0.478**	**0.625**	**0.584**	**0.515**	**0.465**	**0.268**	-0.024	-0.099
PCred						**0.195**	**0.411**	**0.089**	**0.407**	**0.339**	**0.455**	**0.454**	**0.472**	**0.416**	**-0.088**	-0.018
ADir							-0.047	0.039	**-0.076**	-0.009	**0.022**	-0.075	**-0.055**	**0.176**	-0.013	-0.017
CaAO								0.034	**0.822**	**0.298**	**0.534**	**0.864**	**0.686**	**0.251**	-0.033	0.001
CSprd									-0.013	**0.240**	**0.161**	0.042	**-0.052**	-0.059	**-0.488**	**0.691**
EqOp										**0.240**	**0.448**	**0.786**	**0.690**	**0.230**	-0.037	0.001
IFRS											**0.324**	**0.306**	**0.204**	**0.158**	**-0.046**	-0.091
IPro												**0.514**	**0.424**	**0.298**	0.001	**-0.099**
FOpen													**0.674**	**0.243**	-0.037	-0.008
Law														**0.189**	-0.048	0.004
MCap															**0.108**	-0.102
R_1																**-0.521**

Appendix Table A.4
Supplemental Results to Table VII:
Economic Significance of the Determinants of Economic Integration

This table shows the economic significance of the estimated coefficients of regressing economic integration (measured by R^2_{Econ}) on 11 predetermined variables, as well as on R^2_{Fin} and a time trend, reported in Table VII. R^2_{Econ} is the model R^2 obtained from regressing a country's monthly cash flow news (CF_c) on the monthly world cash flow news (CF_w). The reported values reflect the effect on R^2_{Econ} for every one-standard deviation increase in the independent variable. For example, a one-standard deviation increase in Internet in model (1) leads to a 4.926% increase in R^2_{Econ}. All variables are defined in Appendix A. The sample period is from January 1989 to December 2015.

	(1)	(2)	(3)	(4)
Internet	4.926	5.091	3.688	2.156
GDPC	3.647	3.875	3.074	4.403
gPopulation	-0.481	-0.716	-0.797	-0.751
gGDP	-0.937	0.711	0.731	0.718
Private Credit	1.976	1.976	1.783	2.217
Merchandise Trade	-0.734	-1.040	-0.856	-0.917
FDI Outflow	0.297	0.514	0.377	0.623
Electricity	-0.501	-0.421	-0.631	0.296
gGDP_w		-3.368	-3.383	-3.112
gUncertainty_w		0.275	-0.134	0.832
R^2_{Fin}			4.065	
Time Trend				NA
NObs	1,044	1,044	1,044	1,044
Adjusted R^2	0.123	0.136	0.153	0.138

Appendix Table A.5
Supplemental Results to Table VIII:
Economic Significance of the Determinants of Financial Integration

This table shows the economic significance of the estimated coefficients of regressing economic integration (measured by R^2_{Fin}) on 11 predetermined variables, as well as on R^2_{Econ} and a time trend, reported in Table VIII. R^2_{Fin} is the model R^2 obtained from regressing a country's monthly discount-rate news (DR_c) on the monthly world discount-rate news (DR_w). The reported values reflect the effect on R^2_{Fin} for every one-standard deviation increase in the independent variable. For example, a one-standard deviation increase in Internet in model (1) leads to a 3.847% increase in R^2_{Fin}. All variables are defined in Appendix A. The sample period is from January 1989 to December 2015.

	(1)	(2)	(3)	(4)
Internet	3.847	3.264	3.179	2.400
GDPC	5.345	5.694	5.267	6.037
Market Cap	1.505	1.656	1.656	1.656
Inv Profile	7.180	6.832	6.498	6.799
Private Credit	0.145	0.241	0.241	0.289
gGDP	-1.977	-1.814	-1.738	-1.798
R_{-1}	-0.034	0.906	0.940	0.872
Credit Spread		2.193	1.486	2.134
R^2_{Econ}			2.722	
Time Trend				NA
NObs	1,042	1,042	1,042	1,042
Adjusted R^2	0.315	0.319	0.326	0.318

Appendix A
Variable Definition and Data Source

Variable	Description	Data source
R_c	Country returns – monthly value-weighted average of stocks' capital gain returns in a country.	IBES
CF_c	Country cash flow news – monthly value-weighted average of stocks' cash flow news in a country.	IBES
DR_c	Country discount rate news – monthly value-weighted average of stocks' discount rate news in a country.	IBES
R_w	World returns – monthly value-weighted average of country capital gain returns.	IBES
CF_w	World cash flow news – monthly value-weighted average of countries" cash flow news.	IBES
DR_w	World discount rate news – monthly value-weighted average of countries' discount rate news.	IBES
R^2_{Econ}	Economic integration – the R^2 obtained from a country's monthly cash flow news regressed on world cash flow news in a year.	IBES
R^2_{Fin}	Financial integration – the R^2 obtained from a country's monthly discount rate news regressed on world discount rate news in a year.	IBES
GDPC	GDP per capita – log of annual GDP per capita.	WDI
gGDP_c	Country GDP growth – annual GDP growth of a country	WDI
gGDP_w	World GDP growth – annual world GDP growth	WDI
gUncertainty_w	World growth uncertainty; log of the standard deviation of real GDP growth across 41 countries from IMF World Economic Outlook	Maddison (2010)
Internet	Annual number of internet users per 1000 people.	WDI
Private Credit	Financial resources available to the private sector, through loans, purchases of non-equity securities, and trade credits and other accounts receivable scaled by GDP	WDI
Current Account Openness	Current Account Openness – annual publications of the IMF ends in 2011 Quinn and Toyoda (2008), and extend using Fernndez et al. (2016) variables.	Various sources
Electricity	Electric power consumption measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants	WDI
Exports	Value of all goods and other market services provided to the rest of the world	WDI
FDI Inflow	Ratio of the sum of absolute values of FDI inflows to GDP.	WDI
FDI Outflow	Ratio of the sum of absolute values of FDI outflows to GDP.	WDI
FDI Total	Ratio of the sum of absolute values of FDI inflows and outflows to GDP.	WDI
gPopulation	Population growth – a country's annual population growth.	WDI
Imports	Imports of goods and services representing the value of all goods and other market services received from the rest of the world scaled by GDP.	WDI
Life	Log of life expectancy at birth.	WDI
Merchandise Trade	Sum of merchandise exports and imports divided by the value of GDP.	WDI
School	Ratio of total secondary school enrollment, regardless of age, to the population of the age group.	WDI

Appendix A – Continued
Variable Definition and Data Source

Variable	Description	Data source
Trade	Sum of exports and imports of goods and services measured as a share of GDP.	WDI
Trade Openness	A dummy variable equals one if the trade of the country is liberalized in the year. The trade liberalization date is based on five criteria: average tariff rates of 40% or more; non-tariff barriers covering 40% or more of trade; a black market exchange rate that is depreciated by 20% or more; a state monopoly on major exports; and a socialist economic system.	Wacziarg and Welch (2008)
Anti-Director	The index covers years 1993 to 2002. Before 1993 and after 2002, we assume the anti-director index is constant over time.	Pagano and Volpin (2005)
Capital Account Openness	The index ranges from zero to four and is constructed from IMF annual publications which end in 2011 (Quinn and Toyoda, 2008). Following Bekaert et al. (2016), we predict the values for 2012 and 2013 from Fernndez et al. (2016) variables with linear predictive regressions.	Various sources
Credit Spread	US corporate spread calculated as the difference between US Baa and Aaa bond yields.	Federal Reserve Bank of St. Louis
Equity Market Openness	Equity market openness is one minus the equity market restrictions from Fernndez et al. (2016). The dataset covers from 1995 to 2013. Following Bekaert et al. (2016), we predict the values for 1989 to 1994 from Quinn and Toyoda (2008) and Chinn and Ito (2008).	Fernndez et al. (2016)
IFRS	A dummy variable that is equal to one if the country adopts International Financial Reporting System in the year and zero otherwise. http://www.iasplus.com/country/useias.htm	
Inv Profile	Investment profile index that International Country Risk Guide (ICRG) constructs to assess factors (i.e., country expropriation, profits repatriation, and payment delays) affecting the risk to investment.	ICRG
Financial Openness	Financial Openness from Chinn and Ito (2008). The dataset coverage is up to 2014.	Chinn and Ito (2008)
Law & Order	Measures the strength and impartiality of the legal system and popular observance of the law.	ICRG
Market Cap	Ratio of stock market capitalization to GDP in a year.	WDI; DataStream
R_1	Past-year local stock market annual returns.	Datastream
VIX	The 30-day implied volatility index derived from S&P500 option prices; the options are traded on CBOE.	Chicago Board of Options Exchange (CBOE)