

Global Equity Integration Reconsidered: The Roles of Country and Industry Factors

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ABSTRACT

Global equity market integration is a central concept in international finance, yet the relative roles of country and industry factors in this integration remain debated. This study addresses the question by decomposing global market integration into country-level and industry-level components. We employ a bias-corrected integration measure, building on the Pukthuanthong and Roll (2009) approach, to mitigate estimation biases in R^2 -based integration metrics. Using a comprehensive dataset of 748 country–industry equity portfolios across 68 markets from 1973 to 2023, we track the evolution of integration over half a century and numerous market cycles. The analysis reveals that country-level integration has generally dominated in stable periods: national markets’ returns move largely in tandem with global forces during tranquil times. However, industry-level integration surges during global crises: sector-specific shocks become highly synchronized worldwide when volatility spikes and contagion spreads. These findings suggest that the structure of global comovements shifts under stress, with industries aligning more tightly across countries. The study provides new evidence and a refined measure to disentangle these effects, contributing to the literature on international diversification. Our results show the dynamic nature of market integration and offer insights for global investors and policymakers on how diversification benefits may vary with market conditions.

Keywords: Global equity market integration; Country and industry effects; Time-varying integration; Financial crises; International diversification

JEL Codes: F15, G11, G12, G15

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1. Introduction

Financial markets worldwide have become increasingly integrated over the past several decades, driven by capital market liberalization and globalization (Akbari and Ng, 2021; Bekaert and Harvey, 2003). The global integration brings well-known benefits such as lower cost of capital and improved risk sharing (Jappelli and Pistaferri, 2011; Colacito and Groce, 2010), but it also exposes markets to heightened contagion risk during crises (Longin and Solnik, 2001; Deverux and Yu, 2020). Extensive research documents that equity market integration is time-varying and generally rising (Quinn and Voth, 2008; Brooks and Del Negro, 2004). However, integration does not increase at the same pace everywhere; integration amongst developed markets occurs more rapidly than amongst emerging markets, although the latter experience increasing integration in recent years (Akbari et al., 2020).

Importantly, integration trends are not a one-way ascent. Recent evidence shows that short-lived reversals can occur in periods of stress. For example, global equity integration temporarily declines in the wake of the 2008 financial crisis (Bekaert and Mehl, 2019; Akbari et al., 2022). The European sovereign debt crisis of 2011 similarly hinders stock market integration within the Eurozone (Lee and Kim, 2020). Such episodes illustrate that financial integration can plateau or even retreat when economic disruptions or policy changes weaken cross-border risk sharing (Donadelli and Gufler, 2024). These patterns highlight that the degree of market integration evolves over time and differs markedly across markets (Bekaert and Harvey, 1995).

While most prior studies focus on country-level integration, far less is known about how integration operates at the industry level, and almost no work directly measures the relative strength of country- and industry-level financial integration. Some studies, such as Carrieri et al. (2004), decompose equity return variation into global, country, and industry components, but they do not quantify or track financial integration at the country and industry levels separately. Likewise, Bekaert et al. (2009) employ a world–regional factor structure to study international stock co-movements, but their approach does not isolate industry-specific sources of integration. Bekaert et al. (2011), for example, examine factors that segment equity markets and consider both country and industry effects, but stop short of decomposing integration itself. Similarly, Bekaert et al. (2013), Hardouvelis et al. (2006, 2007), and Nardo et al. (2022) investigate integration in the context of the European Union and Economic and Monetary Union (EMU), providing insights into regional convergence, policy reforms, and financial integration drivers, but without explicitly disentangling industry and country integration magnitudes. Meanwhile, research on the dominance

of country versus industry factors in return comovement (e.g., Heston and Rouwenhorst, 1994; Cavaglia et al., 2000) documents shifting dynamics over time, particularly as industry effects gain prominence post-1990s. More recent studies highlight substantial heterogeneity in global integration across sectors (Donadelli et al., 2024; Umutlu et al., 2023), yet they also stop short of measuring integration along distinct country and industry dimensions. Against this backdrop, our study proposes a novel framework that disentangles country-level from industry-level integration and analyzes how their relative importance evolves across time and market regimes. This approach allows us, for the first time, to directly measure the dynamics of financial integration along both dimensions and to clarify how these patterns affect diversification and contagion during crises.

We examine two overarching research questions. First, to what extent and how are equity markets integrated at the country level versus the industry level, and how do these integration patterns vary across industries? Second, how does the relative importance of global industry factors versus country-specific factors in stock returns shift between normal market conditions and crisis periods? To answer these questions, we construct a global dataset of equity portfolios covering 68 markets (classified by economic development into developed, emerging, and frontier markets) and 11 broad industries - Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL) - over the period from 1973 to 2023. This rich panel allows us to observe integration trends across both time and sectors.

In this study, we decompose global equity market integration into two distinct components: one driven by country-specific factors and another driven by industry-specific factors. Prior research on international integration predominantly focuses on country-level integration, and relatively little is known about the extent of integration at the industry level. By separating the country and industry contributions to market integration, we provide new insight into a longstanding question in international finance: the relative importance of country versus industry effects on equity returns.

Our methodology uses a bias-corrected integration measure that accounts for distortions during volatile periods. In particular, we build on Pukthuanthong and Roll's (2009) global integration measure while addressing its bias arising from heteroscedastic volatility and contagion in crisis times. Specifically, we apply the adjusted integration metric of Qin et al. (2022), which corrects for spuriously high integration readings when global risk factors experience volatility shocks (Cordella and Ospino Rojas, 2017). This adjustment yields a more accurate picture of true market integration across both calm and turbulent periods, consistent with the insight of Forbes and Rigobon (2002)

that correlation-based measures should be corrected for heteroscedasticity during crises. By applying this approach across a wide range of markets and sectors, we are able to paint a detailed picture of financial integration dynamics that has not been achieved in prior work on industry integration (see Carrieri et al., 2004; Donadelli and Paradiso, 2014; Ehling and Ramos, 2006; Eiling and Gerard, 2015; Eiling et al., 2012). This updated measurement approach resonates with Donadelli et al. (2024), who call for refined, bias-resistant metrics that capture dynamic and regime-switching integration structures.

Our analysis uncovers several key findings. First, we document that country-level integration exceeds industry-level integration on average, especially in developed and emerging markets. Even after decades of globalization, national market forces still generally exert a stronger influence on equity returns than global industry forces under normal conditions. In contrast, frontier markets remain largely segmented on both dimensions, reflecting structural barriers and idiosyncratic risks in those economies.

Second, we find significant heterogeneity across industries in their integration with the global market. For example, the Financials sector exhibits one of the highest degrees of country-level integration, indicating that bank and financial stocks around the world tend to be strongly driven by global market forces. This pattern is consistent with the Global Financial Cycle framework (Rey, 2022), which posits that globally synchronized credit conditions and monetary policies produce highly correlated financial markets across countries. On the other hand, the Energy sector (e.g. Oil & Gas) shows relatively low country-level integration but the highest industry-level integration, suggesting that energy companies are more tied to a common global industry factor (such as oil price movements) than to domestic market conditions. This accords with Kilian's (2009) oil shock framework, which finds that global oil supply and demand fluctuations create industry-wide disturbances that strongly affect energy stock returns worldwide. Several other sectors display unique patterns: for instance, Real Estate in developed markets achieves high industry integration driven by international property cycles and capital flows, whereas heavily regulated sectors such as Utilities and Telecommunications generally exhibit lower cross-country integration outside of crises.

We also observe that while country-level integration has trended upward over the past few decades for many markets (reflecting ongoing financial globalization), industry-level integration trends vary considerably by sector: some industries have become more globally integrated over time, whereas others have not, or have done so only episodically. These differences underscore the importance

of analyzing integration at a disaggregated industry level rather than solely at the aggregate country level. Conlon et al. (2024) provide complementary evidence that even within a single economy, stocks exhibit differential exposure to global integration, implying that aggregate measures can mask important heterogeneity in integration intensity.

Most strikingly, our results reveal that the balance between country and industry effects is state-dependent: during major financial crises, industry factors become much more influential. Under normal market conditions, global country factors tend to dominate equity return variation, consistent with earlier studies. However, during crisis periods (such as the 2008 Global Financial Crisis or other systemic shock episodes), industry-specific integration spikes, often narrowing or even reversing the gap versus country integration in several sectors. In other words, industries around the world exhibit surging co-movement in times of turmoil, as firms in the same sector respond similarly to global demand shocks, commodity price swings, or credit crunches regardless of their home country. This phenomenon is especially pronounced in certain industries: for instance, consumer-related sectors (both discretionary and staples), Financials, Industrials, and Energy see their stock performance increasingly driven by common global industry shocks during crises, at times rivaling or exceeding the influence of country factors.

Our evidence aligns with observations by Bessler et al. (2021), who find that in periods of global economic distress, industry-based investment strategies can outperform country-based strategies because most countries suffer synchronously while some industries fare relatively better or worse. These findings complement the conclusions of Donadelli et al. (2024) and Conlon et al. (2024), who both emphasize that globalization and technological convergence have increased the frequency of synchronization shocks, making time-varying integration an essential feature of modern capital markets. By quantitatively confirming that country effects dominate in calm times, but industry effects surge in crises, our findings highlight an important nuance: global integration is a dynamic concept, and what drives correlation in good times may not be what drives it in bad times. This has direct implications for international investors. During stable periods, when country integration typically exceeds industry integration, cross-industry diversification yields greater risk reduction than cross-country diversification. During global crises, however, industry integration rises and the gap between country and industry effects narrows, reducing the relative advantage of industry-based diversification (even though it may still offer marginal benefits when country correlations become extreme).

In summary, this study offers four key contributions. First, we develop a framework to separately measure global equity market integration at the country and industry levels over a half-century sample, providing the first direct evidence of how national versus sectoral forces each drive international stock return co-movements. Second, we demonstrate that the relative influence of country and industry factors is highly state-dependent: country effects dominate during tranquil periods, but global industry effects surge to prominence during crises, particularly in sectors such as finance and energy. Third, we refine the empirical measurement of integration by incorporating a heteroscedasticity-consistent bias correction (Qin et al., 2022) into the widely used Pukthuanthong and Roll (2009) R^2 -based integration metric, yielding more reliable integration estimates under volatile market conditions. Finally, our findings offer practical insights for global investors by showing that while rising country-level integration has diminished the marginal benefits of country-only diversification, meaningful industry-specific segmentation remains. Investors can therefore achieve more effective risk reduction by diversifying across both countries and industries, and by dynamically adjusting allocations to reflect prevailing market conditions.

Following this introduction, the remainder of the paper is organized as follows. Section 2 outlines the empirical framework and our bias-adjusted integration measurement methodology. Section 3 describes the data and portfolio construction. Section 4 presents the empirical results, and Section 5 concludes with a discussion of implications and avenues for future research.

2. Empirical Framework

2.1 The Factor Model

Building on the work of Bekaert et al. (2009), who evaluate the performance of various asset-pricing specifications using a mean squared error (MSE) criterion, we follow Bekaert et al. (2002) and implement an APT model, as they find it best captures the covariance structure of international equity returns.

For each calendar year t , we define the model as follows:

$$R_{ij,t} = (\beta_{ij,t}^0)' + (\beta_{ij,t}^{glo})' F_t^{glo} + (\beta_{ij,t}^{ind})' F_{i,t}^{ind} + (\beta_{ij,t}^{loc})' F_{j,t}^{loc} + \epsilon_{ij,t} \quad (1)$$

where, $R_{ij,t}$ represents the return on industry i in market j for calendar year t ; F_t^{glo} denotes the global risk factors for year t ; $F_{i,t}^{ind}$ refers to the global industry risk factors for industry i in year t ;

and $F_{j,t}^{loc}$ represents the local factors specific to market j in year t . If $\beta_{j,t}^{loc} = 0$, the model characterizes a fully integrated global APT, indicating that market is fully integrated. Conversely, if $\beta_{ij,t}^{glo} = \beta_{i,t}^{ind} = 0$, the model represents a local APT, implying the market is entirely segmented. In our study, we focus on quantifying the explanatory power of global and industry risk factors on returns, emphasizing the component attributed to common factors.

We employ Principal Component Analysis (PCA) to estimate global and industry risk factors on an annual basis. To determine the global risk factors, we use the returns from 17 developed markets, each with comprehensive data for the entire sample period and collectively representing a significant portion of global market capitalization. These markets include Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, the UK, and the US. In line with Bekaert et al. (2009), we identify the first three principal components as global risk factors, as they capture more than 60% of the total return variance on average.

To estimate the industry-specific factors, we select markets based on two criteria: (1) markets with the longest available history in each industry, and (2) a minimum of 10 main markets per industry. Table 1 provides a summary of the markets used to estimate principal components at the industry level. Notably, industries such as Energy, Technology, Telecommunications, and Utilities start later comparative to others, primarily due to the unavailability of historical data in some markets. Conversely, seven of the eleven industries have sufficient historical data to be included from the start of the sample period. These differences highlight varying stages of market development and the availability of sector-specific data.

Next, we construct a return matrix for each industry using the returns from the selected markets and apply PCA to calculate the principal components annually. The first principal component, which typically explains about 60% of the total variance, is considered the pure industry-specific risk factor.

<Insert Table 1 here>

Carrieri et al. (2004) propose a conditional asset pricing model in which market returns are driven by world factors, country factors, and pure industry factors. To ensure that pure industry factors are orthogonal to world and country risk factors, they derive residuals by regressing returns on world and country factors. Similarly, Bekaert et al. (2009) estimate orthogonal regional shocks in

their asset pricing model by regressing market returns on global shocks. Bekaert et al. (2014) extend this approach by incorporating three orthogonal types of risk factors. Building on these methodologies, our model estimates industry-specific risk factors by regressing market-industry returns on global risk factors and using the residuals as proxies for industry-specific factors. Specifically, we employ the following regression for industry i in market j :

$$R_{ij,t} = (\alpha_{ij,t}^0)' + (\alpha_{ij,t}^{glo})' F_t^{glo} + \omega_{ij,t} \quad (2)$$

where $\omega_{ij,t}$ can be considered as the returns excluding the effects of global risk factors. Then we use $\omega_{ij,t}$ of the chosen markets in Table 1 to establish the covariance return matrix and estimate the common factors each year in industry j , which are the pure industry risk factors. Hence, the industry risk factors are orthogonal to the global risk factors. Since $E(\omega_{ij,t}) = 0$, the expected value of $\beta_{ij,t}^{ind}$ is zero.

2.2 Decomposition of Market Integration

Pukthuanthong and Roll (2009) establish a measure of market integration by examining the explanatory power of a multi-factor model. They derive the principal components from the returns of 17 developed markets, as described in the previous subsection, and use the first ten principal components as global risk factors in their model. The explanatory power of these ten global risk factors serves as a measure of market integration. We extend their approach by further decomposing market integration into two components: global integration and industry integration. In Equation (1), we introduce two distinct groups of common factors: global risk factors and industry-specific risk factors. The factors in the first group are orthogonal to those in the second group. Since industry-specific risk factors are independent of global risks, overall market integration can be decomposed into global and industry components. Specifically, we define country integration as the explanatory power of global risk factors on market-industry returns, and industry integration as the explanatory power of pure industry-specific risk factors on market-industry returns.

To estimate the level of integration, we conduct a regression analysis to determine the explanatory power of all risk factors, including global and industry-specific risk factors, on market-industry returns.

$$R_{ij,t} = (\beta_{ij,t}^0)' + (\beta_{ij,t}^{glo})' F_t^{glo} + (\beta_{ij,t}^{ind})' F_{i,t}^{ind} + \varepsilon_{ij,t} \quad (3)$$

where F_t^{glo} denotes the global risk factors for year t ; $F_{i,t}^{ind}$ refers to the global industry risk factors for industry i in year t .

The explanatory power of all risk factors in Equation (3) is

$$EP_{ij}^{agg} = \frac{\sum_{t=1}^T (R_{ij,t} - \bar{R}_{ij,t})^2}{\sum_{t=1}^T (R_{ij,t} - \bar{R}_{ij})^2} \quad (4)$$

where, $\bar{R}_{ij} = \frac{1}{N} \sum_{t=1}^T R_{ij,t}$.

Since global risk factors are orthogonal to industry risk factors, the explanatory power of all risk factors (representing aggregate market integration) comprises two independent components: the explanatory power of global risk factors and that of industry risk factors. The relationship can be expressed as follows:

$$EP_{ij}^{agg} = EP_{ij}^{glo} + EP_{ij}^{ind} \quad (5)$$

where EP_{ij}^{agg} is the explanatory power of all risk factors, as defined in Equation (3), representing aggregate market integration; EP_{ij}^{glo} is the explanatory power of global risk factors, representing country market integration; and EP_{ij}^{ind} is the explanatory power of industry-specific risk factors, representing industry market integration.

2.3 Adjustments during Crises

The approach proposed by Pukthuanthong and Roll (2009) has been widely used to measure market integration. However, as highlighted by Qin et al. (2022), this method is prone to biases during financial crises, stemming from changes in factor loadings, factor heteroscedasticity, and residual heteroscedasticity. These biases can significantly distort the explanatory power of multi-factor models under crisis conditions. To address these issues, this study adjusts the multi-factor model to account for such biases, ensuring more accurate measurements of market integration during periods of financial instability.

In multi-factor models with orthogonal variables, the explanatory power is derived from the sum of the squared correlations between each risk factor and the dependent variable. The explanatory power of Equation (3) can thus be expressed as:

$$EP_{ij}^{agg} = EP_{ij}^{glo} + EP_{ij}^{ind} = \sum_{p=1}^3 \left(\rho_{f_p^{glo} R_{ij}} \right)^2 + \sum_{q=1}^{m_i} \left(\rho_{f_{i,q}^{ind} R_{ij}} \right)^2 \quad (6)$$

where, $\rho_{f_p^{glo} R_{ij}}$ represents the correlation between each global risk factor (f^{glo}) and market-industry return (R_{ij}); $\rho_{f_{i,q}^{ind} R_{ij}}$ represents the correlation between each industry-specific risk factor (f_i^{ind}) and market-industry return (R_{ij}); m_i is the number of industry-specific risk factors for industry i .

To further refine the model, this study incorporates the relationship between conditional and unconditional correlations during financial crises, as defined by Qin et al. (2022):

$$\rho_{f R_{ij}}^* = \rho_{f R_{ij}} \frac{(1+\delta_{\beta_f})[(1+\delta_f)]^{1/2}}{\left\{ 1 + \sum_{i=1}^N \left[(1+\delta_{\beta_f})^2 (1+\delta_f) - 1 \right] \rho_{fR}^2 + \frac{\delta_{\varepsilon} \sigma_{\varepsilon\varepsilon}^l}{\sigma_{R_{ij} R_{ij}}} \right\}^{1/2}} \quad (7)$$

In order to explain the definition of variables in Equation (7), we consider two periods for each crisis: the stable period and the crisis period. During each period, separately regress Equation (3) to calculate changes in factor loadings (δ_{β_f}), changes in factor volatility (δ_f) and changes in residual volatility (δ_{ε}). More specifically, $\delta_{\beta_f} = \frac{\beta_f^h}{\beta_f^l} - 1$, $\delta_f = \frac{\sigma_{ff}^h}{\sigma_{ff}^l} - 1$ and $\delta_{\varepsilon} = \frac{\sigma_{\varepsilon\varepsilon}^h}{\sigma_{\varepsilon\varepsilon}^l} - 1$, where σ_{ff} is the variance of risk factor f ; $\sigma_{\varepsilon\varepsilon}$ is the variance of residuals ε ; h means crisis period and l means stable period.

To ensure robust analysis, this study examines seven major financial crises, drawing on prior literature (Forbes and Rigobon, 2002; Rigobon, 2003; Bekaert et al., 2014; Filoso et al., 2017). The crises considered include: the 1987 U.S. stock market crash, the 1994-1995 Mexican crisis, the 1997 Asian financial crisis, the 1998 Russian financial crisis including the Long-Term Capital Management (LTCM) crisis, the 2007-2007 Global Financial crisis (GFC), the 2009-2014 European Sovereign Debt crisis (ESDC), and the 2020-2023 Covid-19 Pandemic crisis. For each crisis, this study identifies distinct stable and crisis periods, as shown in Table 2. By adjusting for these biases, the model provides a more accurate and nuanced view of market integration during periods of financial instability, offering valuable insights into the dynamics of global and industry-specific risk factors.

<Insert Table 2 here>

3. Data

Our study encompasses a total of 68 markets and 11 industries, covering the sample period from January 1973 to December 2023. Daily equity indices at both market and industry levels are sourced from LSEG FR Equity Indices. Using the Level 2 Industry Classification Benchmark (ICB), all stocks within each market are classified into the following 11 industries: Basic Materials, Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Real Estate, Technology, Telecommunications, and Utilities.

To mitigate exchange rate fluctuations, all indices are denominated in U.S. dollars. While local currency returns represent the purest form of returns, they are less relevant for international investors. Hence, the majority of existing literature employs market returns expressed in a common currency, as seen in works by De Jong and De Roon (2005), Pukthuanthong and Roll (2009), Bekaert et al. (2011), Eiling et al. (2012) and Donadelli and Paradiso (2014).

Furthermore, consistent with Pukthuanthong and Roll (2009), it is crucial to include only trading days in the sample to prevent spurious asynchrony, which could significantly bias downward any measure of market integration. To ensure accuracy, we exclude holidays and other non-trading days from the sample, considering zero returns in one of the 17 main markets as indicative of holidays.

For clarity and conciseness, we categorize the 68 markets into four groups: one group representing all markets, and the other three groups based on economic levels according to Standard & Poors classification, namely, developed, emerging, and frontier markets¹. Table 3 provides an overview of the markets included in each group, comprising 25 developed markets, 25 emerging markets, and 18 frontier markets.

<Insert Table 3 here>

Table 4 presents the average returns and their standard deviations across industries in the four groups over the entire period. We observe that in the first group, Technology exhibits the highest average returns, while Utilities show the highest volatility across all industries. In developed markets, average returns are more evenly distributed across industries, though Technology displays slightly higher volatility compared to others. Emerging markets display a different trend, with

¹ We consider frontier markets because prior evidence shows that they provide distinct diversification potential compared to developed and emerging markets (Berger et al., 2011).

Utilities having the highest returns as well as the highest volatility among all industries. In frontier markets, there are significant differences in average returns between industries, with Health Care demonstrating the highest average return, while Utilities have the highest volatility. Generally, average returns are higher in emerging markets compared to developed markets, while developed markets tend to have lower volatility levels.

The observed trends can be attributed to several factors. The high returns in the Technology sector may be driven by rapid innovation and strong investor interest, particularly in developed markets. Utilities, on the other hand, often exhibit high volatility due to their sensitivity to regulatory changes and fluctuating energy prices. In emerging and frontier markets, industries such as Utilities and Health Care may yield higher returns due to increasing demand and market expansion, but they also face greater risks and uncertainties, contributing to their elevated volatility. Developed markets generally exhibit lower volatility, possibly due to more mature regulatory frameworks and market stability, which reduce risks across industries.

<Insert Table 4 here>

4. Empirical Analysis

4.1 Market Integration Across Industries and Markets

We estimate market integration at country, industry, and aggregate levels across eleven industries, categorizing our sample into developed, emerging, and frontier market cohorts. We find that country-level integration dominates industry-level integration in driving equity returns across all market cohorts, consistent with prior literature (Carrieri et al., 2004; Pukthuanthong and Roll, 2009; Bekaert et al., 2011). The higher explanatory power of country factors demonstrates the prevalent role of global economic and financial conditions over industry-specific dynamics in international equity markets.

Examining integration by market classification, we observe clear distinctions. Developed markets exhibit the highest levels of country integration, ranging from 0.2253 in Utilities to 0.3871 in Financials, reflecting advanced institutional frameworks, robust cross-border investment, and strong financial market infrastructure. This finding aligns with prior studies such as Bekaert et al. (2011) and Carrieri et al. (2007), which highlight the stronger global connectivity and lower segmentation of developed financial markets.

Emerging markets present intermediate levels of country integration: lower than developed markets but significantly higher than frontier markets. Industry integration in emerging markets remains relatively modest, reinforcing previous evidence that emerging markets, despite increasing globalization, still exhibit substantial local market-specific influences (Chambet and Gibson, 2008, Carrieri et al., 2013; Donadelli and Paradiso, 2014). Frontier markets exhibit notably low levels of integration, often close to zero, signifying considerable segmentation and a predominance of local economic determinants. This marked segmentation in frontier markets confirms the findings of prior research (Bekaert et al., 2011; Carrieri et al., 2013), which shows the diversification potential these markets offer international investors.

From an industry-specific viewpoint, the Financials sector consistently demonstrates the highest country-level integration across cohorts, emphasizing the sector's sensitivity to global macroeconomic factors and cross-border financial flows. In developed markets, Real Estate exhibits the highest industry-level integration (0.1125), reflecting its exposure to international property cycles and capital flows. Conversely, Industrials lead industry integration (0.0802) in emerging markets, likely driven by global supply chain linkages and trade dependencies (Carrieri et al., 2013; Donadelli and Paradiso, 2014). Within frontier markets, Consumer Discretionary shows the highest industry-level integration (0.0748), indicative of cross-border influences in consumer spending patterns, albeit at a lower magnitude due to the inherent segmentation of these economies.

Aggregate integration, reflecting the combined influence of country and industry factors, further reinforces differences across cohorts. Developed markets have the highest aggregate integration, driven by deep capital market integration globally. Emerging markets follow with moderate aggregate integration, evidencing partial connectivity and increasing openness to global capital. In contrast, frontier markets remain predominantly segmented, reflecting limited connectivity to global financial systems and significant diversification benefits. Our findings align with extant literature, confirming the hierarchy in integration levels (developed > emerging > frontier) and highlighting the persistence of market segmentation in less developed financial systems.

These empirical results have significant implications for global portfolio diversification. Investors seeking diversification benefits must recognize that developed markets offer limited opportunities for diversification across countries due to high global integration, emphasizing instead cross-industry diversification. In contrast, frontier markets, despite their higher risks and lower liquidity, provide unique diversification benefits due to their substantial segmentation from global factors

(Carrieri et al., 2004; Campa and Fernandes, 2006; Bekaert et al., 2011; Christoffersen et al., 2012; Carrieri et al., 2013). Recent evidence by Umutlu et al. (2023) further supports this view, showing that industry-based diversification outperforms country-based strategies because industry indexes remain more heterogeneously segmented from global factors and retain diversification benefits even during turbulent periods.

<Table 5 Insert Here>

4.2 Market Integration during Financial Crises

In this section, we examine how equity market integration evolves during seven major financial crises. We employ the integration measure of Pukthuanthong and Roll (2009) alongside the bias-corrected adjustment proposed by Qin et al. (2022). The original Pukthuanthong-Roll measure, which is based on multi-factor R^2 , is known to overstate integration during turbulent periods due to heightened volatility and shifts in factor correlations. Applying the correction for heteroscedasticity and time-varying factor loadings yields a clearer assessment of underlying market integration during crises. We summarize the results for each episode below, with particular emphasis on the relative roles of country (global) and industry risk factors.

4.2.1 The 1987 U.S. Crisis

The U.S. stock market crash of October 1987 is a short but global shock. Using the P&R methodology, measured integration spiked as markets worldwide fall together; however, after adjusting for volatility clustering and contagion effects, country-level integration values drop dramatically. This indicates the original method significantly overestimates how integrated markets are during the crash.

Even after adjustment, developed markets show substantial global integration (reflecting strong ties to the U.S.-led turmoil), whereas emerging markets' adjusted country integration remains much lower. Industry-level integration is generally small to begin with and becomes even smaller post-adjustment, especially in emerging economies.

Notably, in developed markets certain industries' integration rises to nearly match their country integration. For example, in the Consumer Discretionary sector of developed markets, the adjusted industry R^2 reaches 0.1072 versus 0.1375 at the country level, a striking convergence that implies industry-specific shocks are nearly as impactful as broad market shocks during the 1987 crash. By

contrast, in emerging markets the industry integrations collapse to very low levels (e.g. adjusted industry R^2 in Consumer Staples is only 0.0038), consistent with the view that any apparent comovement in those markets under the unadjusted measure is driven by transient volatility rather than real integration.

Overall, while global factors (the systemic crash) dominate returns, in line with the widespread contagion observed in 1987 (King and Wadhwani, 1990), the adjustments reveal that in developed markets certain industry factors also gain importance. This highlights the need to distinguish genuine integration from crisis-driven correlation spikes (Forbes and Rigobon, 2002).

<Insert Table 6 here>

4.2.2 The 1994-1995 Mexican crisis

The Mexican “Tequila” crisis of 1994–95 is relatively contained in scope and duration. Consistent with Forbes and Rigobon (2002)’s findings of only limited contagion from this event, we observe minimal differences between the original P&R integration measure and its bias-adjusted counterpart. Adjusting for volatility and spillovers therefore has little impact on the estimated R^2 , indicating that the crisis does not materially increase global market integration. This shock appears largely local, affecting Mexico and a small set of closely connected markets rather than transmitting broadly to world equity returns.

Nevertheless, one interesting aspect is the role of industry factors within certain markets. Several industries exhibit notable industry-level integration despite the crisis’s localized nature. In developed markets, seven out of eleven industries exhibit a non-trivial degree of industry-specific integration during the Mexican crisis, particularly sectors like Consumer Discretionary, Industrials, and Real Estate. Similarly, in emerging markets, industries such as Financials, Health Care, and Industrials have higher integration at the industry level than at the country level during the turmoil. Even some frontier markets see industry integration exceeding country integration in sectors like Consumer Discretionary, Health Care, and Real Estate.

These patterns suggest that while the Mexican peso crisis does not propagate a global shock, it coincides with (or perhaps induces) internal market rotations where certain industries are moving more in unison than the overall market. It highlights that even a crisis confined to one market can shift the structure of comovements, making industry effects temporarily more pronounced, without dragging the whole world into contagion.

<Insert Table 7 here>

4.2.3 The 1997 Asian crisis

The 1997 Asian financial crisis begins in Southeast Asia and quickly affects other global markets. The unadjusted P&R estimates show sharp increases in integration during this period. However, after accounting for volatility and changes in factor structure, adjusted integration levels drop significantly. This suggests that much of the observed co-movement during the crisis is driven by temporary panic rather than a sustained rise in global integration.

In developed markets, the explanatory power of global (country-level) factors declines after adjustment, but remains relatively high. Meanwhile, industry-level integration becomes more prominent. Notably, in sectors such as Energy and Technology, adjusted industry integration approaches country integration levels. For example, in developed markets, the Technology sector's adjusted R^2 rises to approximately 0.993, close to its corresponding country-level R^2 of 0.1359.

A similar pattern is observed in emerging markets. Industries like Consumer Discretionary, Real Estate and Telecommunications experience industry integration levels that rival or exceed country integration during the crisis. In frontier markets, industry effects occasionally dominate. For instance, in Consumer Discretionary, industry integration surpasses country-level integration, highlighting sector-specific contagion effects. These findings align with literature emphasizing that the Asian crisis produces both regional spillovers and global transmission across industries (Baig and Goldfajn, 1999; Forbes and Rigobon, 2002).

<Insert Table 8 here>

4.2.4 The 1998 Russian/LTCM crisis

The 1998 Russian default and Long-Term Capital Management collapse triggers a brief but global liquidity shock. The crisis produces an upward bias in the P&R integration estimates due to widespread volatility and contagion. Adjusted estimates reveal a sharp decline in country-level integration, indicating that much of the perceived co-movement is temporary.

In contrast, industry-level integration increases in many cases after adjustment. Developed markets see narrowing gaps between country and industry integration, especially in sectors like Basic Materials, Financials, Industrials, and Health Care. For example, Industrials in developed markets have an adjusted industry R^2 close to its country-level counterpart, implying the importance of

global sector-specific risk during the episode. Emerging markets exhibit similar dynamics. Six industries show notable increases in adjusted industry integration, suggesting dual sources of contagion, both market-wide and sector-specific. In frontier markets, sectors like Financials and Industrials occasionally report industry integration exceeding country integration. These findings are consistent with Bekaert et al. (2005), who document strong cross-market contagion during this episode, particularly in financial-related sectors.

<Insert Table 9 here>

4.2.5 The 2007-2009 Global Financial Crisis

The Global Financial Crisis (GFC) is a systemic event that originates in the United States and spreads across the world. Unadjusted P&R estimates indicate very high integration during this period. However, after correcting for volatility clustering and factor instability, country-level integration values drop substantially.

Despite the adjusted decline, global (country-level) factors remain the dominant drivers of return variation. Industry-level integration remains modest by comparison, except in select cases. In developed markets, Energy, Financials and Real Estate show relatively higher industry integration, reflecting the broad-based impact of the crisis on credit and commodity-sensitive sectors.

In emerging and frontier markets, adjusted integration remains much lower, with country-level effects still explaining the bulk of return co-movements. Industry effects in these markets are negligible during the GFC. These findings reinforce the notion that the GFC is primarily a global macro-financial shock, where systemic risk overwhelms industry-specific dynamics (Bekaert et al., 2014).

<Insert Table 10 here>

4.2.6 The 2009-2014 European Sovereign Debt Crisis

The European Sovereign Debt Crisis is regionally concentrated but protracted. Unadjusted integration estimates indicate high co-movement across markets, particularly within the Eurozone. However, once adjusted for crisis-induced volatility and instability in factor structures, both country- and industry-level integration are significantly overstated.

Post-adjustment, country-level integration declines across all market types, with a more pronounced effect in developed markets. Nevertheless, the drawn-out nature of the crisis leads to a relative increase in the importance of industry-level factors. Sectors such as Financials, Real Estate, and Utilities, with particular exposure to sovereign debt and fiscal constraints, show notable increases in adjusted industry integration in developed markets. In emerging markets, industries like Industrials exhibit convergence between adjusted industry and country integration levels, reflecting global trade and supply chain impacts. Frontier markets, by contrast, remain largely segmented, with negligible integration at both country and industry levels. These findings are consistent with Beirne and Fratzscher (2013), who document risk spillovers from sovereign debt to corporate entities during the Eurozone crisis, particularly through financial intermediaries.

Together, these results suggest that while the crisis does not cause widespread global contagion, it reshapes integration patterns within Europe. Industry effects become more relevant as financial distress persists, supporting the view that long-duration regional crises can intensify sectoral comovement, even when broader global linkages remain stable.

<Insert Table 11 here>

4.2.7 The 2020-2023 Covid-19 Pandemic

The COVID-19 pandemic (January 2020 to May 2023) triggers a sharp increase in global market co-movement. While unadjusted estimates suggest extremely high integration, adjusted figures reveal a more nuanced picture. Country-level integration remains dominant in developed and emerging markets across all sectors, but several sectors in frontier markets display higher industry than country integration, a reversal of typical patterns.

In developed markets, country integration in sectors such as Consumer Staples (0.2962) and Financials (0.4681) far exceed industry integration. Emerging markets show a similar hierarchy, with country effects leading across sectors. However, in frontier markets, industries such as Consumer Discretionary (industry: 0.1726 vs. country: 0.0396) and Industrials (0.0735 vs. 0.0436) see industry integration surpass country integration. This suggests that global industry shocks, such as those related to supply chains and mobility, are more influential than national drivers in some less integrated economies.

Overall, the pandemic compresses integration gaps across market types, elevating co-movement globally while also amplifying sector-specific effects, particularly in frontier markets. These results

reinforce that while country factors remain primary, crisis conditions can significantly elevate the role of industry-specific dynamics, especially in markets with limited global exposure in normal periods.

<Insert Table 12 here>

4.3 Dynamics of market integration

Figures 1 through 4 illustrate the time-varying dynamics of global equity market integration, decomposed into adjusted country and industry components. The results confirm that while country-level integration remains the dominant driver of international return comovements, industry-level integration becomes more pronounced during crisis periods and varies meaningfully across sectors and development groups.

Figure 1 shows that, globally, country-level integration is persistently higher than industry-level integration, supporting the established literature that country effects outweigh industry effects in explaining equity returns (Heston and Rouwenhorst, 1994; Carrieri et al., 2004). However, during global crises, such as the Global Financial Crisis (2007–2009) and the European Sovereign Debt Crisis (2010–2012), industry integration rises sharply in several sectors. Notable increases are observed in Consumer Staples, Financials, Health Care and Industrials, narrowing the gap between country and industry integration.

<Insert Figure 1 here>

In developed markets (Figure 2), country-level integration remains high across all industries, with Financials, Industrials, and Technology exhibiting consistently elevated values. Industry integration remains lower but increases during crises, especially in sectors like Financials and Health Care, indicating a shift toward industry-driven comovement during periods of global uncertainty. These findings suggest that even in globally connected markets, industry-specific risks become more relevant under duress.

<Insert Figure 2 here>

Emerging markets (Figure 3) display lower baseline integration but a similar trajectory. Country-level integration increases steadily from the early 2000s, especially in Financials, Industrials, and Technology. Industry-level integration also rises, particularly during crisis years, albeit from a lower base. These dynamics align with Donadelli and Paradiso (2014), who find that industry co-

movements in emerging markets strengthen with increased globalization. Nevertheless, macroeconomic and policy-driven factors continue to dominate sectoral effects.

<Insert Figure 3 here>

Frontier markets (Figure 4) remain largely segmented from global influences. Across all 11 industries, both country and industry integration are near zero for most of the sample. Modest spikes in integration occur during major global crises, with sectors such as Consumer Discretionary, Consumer Staples, and Industrials exhibiting temporary rises in industry integration. However, these effects are limited in scale and duration. The results highlight the continued insulation of frontier markets, as found in prior studies (Bekaert et al., 2005; Akbari et al., 2020).

<Insert Figure 4 here>

The results in Table 13 indicate that country-level integration has generally trended upward across a wide range of industries, with the most pervasive increases occurring in developed and emerging markets. In developed markets, eight of the eleven industries exhibit statistically significant positive trends, while in emerging markets the number rises to ten, highlighting the sustained influence of global factors in these economies. By contrast, frontier markets display a more muted pattern: only five industries show significant increases at 1% level, and Health Care records significant declines, consistent with their continued segmentation from global financial systems.

At the industry-integration level, trends are more heterogeneous. Certain sectors, such as Industrials, post significant increases across multiple market groups, whereas others, including Technology and Real Estate for all markets, and Telecommunications in frontier markets, show significant declines, suggesting erosion in sectoral co-movement over time. Aggregate integration largely mirrors the country-level results, with broad and significant increases across industries in both developed and emerging markets. Notably, in sectors such as Basic Materials, Technology and Utilities, the rate of increase is higher in emerging markets than in developed markets. In frontier markets, aggregate integration remains broadly flat, with declines concentrated in industries already exhibiting weak or falling industry-level integration. Overall, the evidence points to a sustained rise in country integration across most sectors and market groups, but with marked variation in industry-level dynamics, highlighting that sectoral trends do not always move in tandem with broader market integration.

<Insert Table 13 here>

5. Conclusion

This study examines the evolution of global equity market integration by decomposing total return variation into country- and industry-level components for 748 country–industry portfolios over the period 1973–2023. Building on Pukthuanthong and Roll (2009), we apply the bias adjustments of Qin et al. (2022) to account for factor volatility, heteroscedasticity, and changing loadings during periods of financial stress, providing a more reliable measure of integration under varying market conditions.

The results yield three main conclusions. First, unadjusted measures substantially overstate integration during crises due to volatility-driven correlation spikes. The bias-adjusted estimates reveal that country-level integration declines sharply in these episodes, while industry-level integration increases in several sectors, including Financials, Industrials, Technology, and Basic Materials. In some cases, industry integration approaches the magnitude of country integration, highlighting the increased importance of sector-specific shocks under systemic stress. Second, integration patterns differ markedly across market classifications. Developed markets remain the most integrated, with country effects dominating in normal periods but with pronounced industry surges during crises. Emerging markets have experienced sustained increases in both country and industry integration since the mid-2000s, whereas frontier markets remain largely segmented, with only occasional and short-lived connections to global factors. Third, the time-trend analysis shows broad and significant increases in country integration across most industries in developed and emerging markets, while industry integration exhibits greater heterogeneity, with sectors such as Technology and Real Estate recording significant declines in certain market groups.

These findings have important implications. For investors, the increasing dominance of country effects in developed markets limits cross-country diversification, making cross-industry allocation strategies more relevant. In emerging markets, the faster growth of integration in industries such as Basic Materials, Health Care, Industrials, and Technology signals changing diversification benefits and risk exposures. In frontier markets, persistent segmentation continues to offer diversification opportunities but is accompanied by higher trading costs and liquidity constraints. For policymakers, the sharp increases in industry integration during crises imply the importance of monitoring sectoral vulnerabilities alongside broader market risks.

Future research could explore higher-frequency data to capture the speed and channels of integration changes during crises, decompose industry integration into global, regional, and local

components, and assess the impact of structural shifts such as technological change, regulatory reforms, and geopolitical developments. Extending the analysis to other asset classes would provide a broader perspective on cross-market linkages and diversification potential.

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Table 1: Main Markets

This table shows the main markets included in the global category and industries. Begins is the earliest sample start date and Ends the sample end date of the main markets.

Industry	No.	Begins	Ends	Included Markets
The World	17	01/01/1973	31/12/2023	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, UK, US
Basic Materials	15	01/01/1973	31/12/2023	Australia, Austria, Belgium, Canada, France, Germany, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, UK, US
Consumer Discretionary	14	01/01/1973	31/12/2023	Australia, Belgium, Canada, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, Switzerland, UK, US
Consumer Staples	10	01/01/1973	31/12/2023	Australia, Denmark, France, Germany, Ireland, Italy, Japan, Netherlands, UK, US
Energy	10	01/01/1986	31/12/2023	Australia, Canada, France, Ireland, Japan, Netherlands, Norway, South Africa, UK, US
Financials	17	01/01/1973	31/12/2023	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, UK, US
Health Care	13	01/01/1973	31/12/2023	Australia, Belgium, Canada, Denmark, France, Germany, Japan, Netherlands, Singapore, South Africa, Switzerland, UK, US
Industrials	17	01/01/1973	31/12/2023	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, UK, US
Real Estate	10	01/01/1973	31/12/2023	Australia, Belgium, France, Hong Kong, Italy, Japan, Netherlands, Singapore, UK, US
Technology	10	01/01/1986	31/12/2023	Canada, France, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, UK, US
Telecommunications	10	01/01/1988	31/12/2023	Belgium, Canada, Germany, Italy, Japan, Malaysia, Philippines, Spain, UK, US
Utilities	11	01/01/1987	31/12/2023	Australia, Belgium, Canada, Germany, Hong Kong, Italy, Japan, Netherlands, Switzerland, UK, US

Table 2: Financial Crises

This table lists the seven main financial crises and their corresponding crisis period dates and stable period dates. GFC refers to the Global Financial crisis and ESDC refers to the European Sovereign Debt crisis; LTCM is Long-Term Capital Management.

Crisis	Crisis Period	Stable Period
1987 US crisis	17/10/1987-04/12/1987	01/01/1986-17/10/1987
1994-1995 Mexican crisis	19/12/1994-31/03/1995	01/06/1994-16/12/1994
1997 Asian crisis	17/10/1997-16/11/1997	01/01/1996-16/10/1997
1998 Russian/LCTM crisis	03/08/1998-15/10/1998	02/03/1998-01/06/1998
2007-2009 GFC	07/08/2007-15/03/2009	01/01/2003-31/12/2006
2009-2014 ESDC	01/06/2009-23/06/2014	01/01/2015-31/12/2017
Covid-19 Pandemic ²	30/01/2020-05/05/2023	01/01/2018-31/12/2019

² The COVID-19 pandemic crisis period is defined as spanning from 30 January 2020 to 5 May 2023, based on the World Health Organization's designation of a Public Health Emergency of International Concern (PHEIC). The start date corresponds to the initial PHEIC declaration, which coincides with the onset of pronounced global financial market disruption. Although COVID-19 is formally designated a pandemic on 11 March 2020, financial market volatility intensifies immediately following the PHEIC announcement. The end date reflects the WHO's declaration on 5 May 2023 that COVID-19 no longer constitutes a PHEIC, marking the conclusion of the formal global health emergency. This externally defined window captures both the acute shock and the subsequent pandemic-related adjustment phase, which is particularly relevant for analyzing time-varying market integration rather than short-lived volatility spikes.

Table 3: Country Classification

This table presents markets included in four categories: All Markets, Developed Markets, Emerging Markets and Frontier Markets. All Markets includes all 68 markets in our sample. The three economic classifications are based on Standard & Poors market classification.

Categories	Markets	No.
All Markets	Argentina, Australia, Austria, Bahrain, Belgium, Brazil, Bulgaria, Canada, Chile, China, China H+B, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Korea, Kuwait, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Morocco, Netherlands, New Zealand, Nigeria, Norway, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Qatar, Romania, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Turkey, U.K., U.S., United Arab Emirates, Venezuela, Vietnam	68
Developed Markets	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, U.K., U.S	25
Emerging Markets	Brazil, Chile, China, China H+B, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Kuwait, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Saudi Arabia, South Africa, Taiwan, Thailand, Turkey, United Arab Emirates, Venezuela	25
Frontier Markets	Argentina, Bahrain, Bulgaria, Croatia, Cyprus, Estonia, Jordan, Lithuania, Malta, Morocco, Nigeria, Oman, Pakistan, Romania, Slovakia, Slovenia, Sri Lanka, Vietnam	18

Table 4: Statistics Summary

This table reports the average of stock returns and their standard deviation of four cohorts across industries. The four cohorts are All Markets, Developed Markets, Emerging Markets and Frontier Markets. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). The averages of country index returns are also reported (TM). All data are expressed as US dollars and the values in brackets are standard deviations. Returns are expressed by percentage and the whole sample is 01/01/1973-31/12/2023.

Cohort/Industry	TM	BM	CD	CS	EN	FIN	HC	IND	RE	TEC	TEL	UTL
All Markets	0.0379 (0.0154)	0.0492 (0.0259)	0.0434 (0.0196)	0.0446 (0.0208)	0.0434 (0.0235)	0.0423 (0.0185)	0.0518 (0.0196)	0.0464 (0.0229)	0.0426 (0.0247)	0.0504 (0.0244)	0.0421 (0.0229)	0.2784 (1.3912)
Developed Markets	0.0386 (0.0135)	0.0422 (0.0219)	0.0422 (0.0168)	0.0426 (0.0180)	0.0422 (0.0216)	0.0402 (0.0162)	0.0459 (0.0167)	0.0421 (0.0167)	0.0400 (0.0208)	0.0483 (0.0232)	0.0423 (0.0213)	0.0484 (0.0196)
Emerging Markets	0.0438 (0.0183)	0.0512 (0.0238)	0.0495 (0.0234)	0.0553 (0.0233)	0.0472 (0.0259)	0.0508 (0.0216)	0.0615 (0.0218)	0.0514 (0.0268)	0.0505 (0.0269)	0.0594 (0.0255)	0.0487 (0.0253)	0.7590 (2.4437)
Frontier Markets	0.0251 (0.0143)	0.0663 (0.0383)	0.0364 (0.0196)	0.0305 (0.0222)	0.0391 (0.0229)	0.0325 (0.0183)	0.0510 (0.0237)	0.0489 (0.0287)	0.0352 (0.0307)	0.0421 (0.0275)	0.0273 (0.0215)	0.0468 (0.0406)

Table 5: Integration Summary

This table summarizes the average levels of market integration, measured at the country, industry, and aggregate levels, across 11 industries for four cohorts: All Markets, Developed Markets, Emerging Markets, and Frontier Markets. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). The integration measures are averaged across the entire sample period, with standard deviations reported in parentheses.

Panel A All Markets											
	BM	CD	CS	EN	FIN	HC	IND	RE	TEC	TEL	UTL
Country	0.2228 (0.1934)	0.2275 (0.2032)	0.1831 (0.1780)	0.1675 (0.1500)	0.2665 (0.2186)	0.1942 (0.1722)	0.2376 (0.2152)	0.1734 (0.1535)	0.2192 (0.1745)	0.1733 (0.1431)	0.1696 (0.1483)
Industry	0.0567 (0.0798)	0.0600 (0.0831)	0.0463 (0.0806)	0.0640 (0.1135)	0.0696 (0.0885)	0.0618 (0.1092)	0.0668 (0.0939)	0.0833 (0.1067)	0.0550 (0.0834)	0.0568 (0.0768)	0.0403 (0.0840)
Aggregate	0.2796 (0.2157)	0.2875 (0.2179)	0.2295 (0.2031)	0.2314 (0.2173)	0.3360 (0.2473)	0.2560 (0.2182)	0.3044 (0.2361)	0.2567 (0.2090)	0.2742 (0.2138)	0.2300 (0.1794)	0.2099 (0.1856)
Panel B Developed Markets											
	BM	CD	CS	EN	FIN	HC	IND	RE	TEC	TEL	UTL
Country	0.3155 (0.1992)	0.3203 (0.2173)	0.2648 (0.2008)	0.2326 (0.1632)	0.3871 (0.2193)	0.2778 (0.1787)	0.3569 (0.2250)	0.2404 (0.1610)	0.2827 (0.1744)	0.2440 (0.1515)	0.2253 (0.1657)
Industry	0.0627 (0.0805)	0.0537 (0.0601)	0.0587 (0.0893)	0.1095 (0.1456)	0.0837 (0.0971)	0.0894 (0.1418)	0.0601 (0.0610)	0.1125 (0.1227)	0.0713 (0.0949)	0.0868 (0.0957)	0.0673 (0.1116)
Aggregate	0.3782 (0.2162)	0.3740 (0.2244)	0.3235 (0.2285)	0.3421 (0.2451)	0.4708 (0.2411)	0.3673 (0.2308)	0.4170 (0.2366)	0.3530 (0.2115)	0.3541 (0.2168)	0.3309 (0.1929)	0.2926 (0.2097)

(Continued)

(Table 5 Continued)

Panel C Emerging Markets											
	BM	CD	CS	EN	FIN	HC	IND	RE	TEC	TEL	UTL
Country	0.1623 (0.1353)	0.1644 (0.1354)	0.1368 (0.1227)	0.1435 (0.1219)	0.1807 (0.1464)	0.1117 (0.1021)	0.1525 (0.1318)	0.1177 (0.1050)	0.1524 (0.1254)	0.1346 (0.1073)	0.1337 (0.1053)
Industry	0.0590 (0.0878)	0.0621 (0.0781)	0.0361 (0.0815)	0.0283 (0.0500)	0.0647 (0.0892)	0.0297 (0.0196)	0.0802 (0.1109)	0.0537 (0.0723)	0.0330 (0.0635)	0.0348 (0.0496)	0.0143 (0.0161)
Aggregate	0.2213 (0.1664)	0.2265 (0.1671)	0.1728 (0.1380)	0.1718 (0.1426)	0.2454 (0.1817)	0.1414 (0.1023)	0.2327 (0.1816)	0.1714 (0.1497)	0.1854 (0.1445)	0.1694 (0.1154)	0.1480 (0.1103)
Panel D Frontier Markets											
	BM	CD	CS	EN	FIN	HC	IND	RE	TEC	TEL	UTL
Country	0.0479 (0.0623)	0.0629 (0.0644)	0.0608 (0.0666)	0.0556 (0.0627)	0.0804 (0.0778)	0.0573 (0.0663)	0.0622 (0.0615)	0.0554 (0.0719)	0.0590 (0.0872)	0.0678 (0.0806)	0.0687 (0.0766)
Industry	0.0325 (0.0506)	0.0748 (0.1330)	0.0336 (0.0425)	0.0250 (0.0671)	0.0380 (0.0375)	0.0290 (0.0263)	0.0609 (0.1272)	0.0427 (0.0699)	0.0241 (0.0165)	0.0255 (0.0202)	0.0116 (0.0133)
Aggregate	0.0804 (0.0819)	0.1376 (0.1488)	0.0944 (0.0862)	0.0806 (0.1032)	0.1184 (0.0874)	0.0863 (0.0749)	0.1231 (0.1396)	0.0981 (0.1077)	0.0831 (0.0938)	0.0933 (0.0880)	0.0804 (0.0795)

Table 6: The 1987 US Crisis

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 1987 US crisis. The crisis period is defined as spanning from October 17, 1987, to December 4, 1987, with the stable period extending from January 1, 1986, to October 17, 1987. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. Due to data availability, the analysis distinguishes between all markets (All), developed markets (Developed), and emerging markets (Emerging). The values are the equally-weighted average of market integration.

		All			Developed			Emerging		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.5862	0.1733	0.4128	0.6263	0.1811	0.4452	0.2649	0.1114	0.1535
	Industry	0.1142	0.0510	0.0633	0.0960	0.0469	0.0491	0.2599	0.0831	0.1768
	Aggregate	0.7004	0.2243	0.4761	0.7223	0.2280	0.4943	0.5248	0.1945	0.3303
CD	Country	0.5803	0.1409	0.4394	0.5941	0.1375	0.4565	0.3734	0.1919	0.1815
	Industry	0.1096	0.1371	-0.0274	0.1036	0.1072	-0.0036	0.1998	0.5849	-0.3851
	Aggregate	0.6899	0.2780	0.4119	0.6977	0.2447	0.4529	0.5732	0.7768	-0.2036
CS	Country	0.5544	0.1830	0.3713	0.5668	0.1884	0.3784	0.4058	0.1190	0.2867
	Industry	0.0991	0.0985	0.0006	0.0915	0.1064	-0.0149	0.1906	0.0038	0.1868
	Aggregate	0.6535	0.2816	0.3720	0.6583	0.2948	0.3635	0.5963	0.1228	0.4735
EN	Country	0.4507	0.1201	0.3306	0.4616	0.1253	0.3363	0.4016	0.0969	0.3047
	Industry	0.0975	0.1415	-0.0439	0.1142	0.1689	-0.0547	0.0227	0.0180	0.0047
	Aggregate	0.5482	0.2616	0.2867	0.5758	0.2941	0.2816	0.4243	0.1149	0.3094
FIN	Country	0.4999	0.1864	0.3135	0.5095	0.1861	0.3234	0.3366	0.1904	0.1462
	Industry	0.1575	0.0575	0.1000	0.1556	0.0568	0.0988	0.1887	0.0690	0.1197
	Aggregate	0.6574	0.2438	0.4136	0.6652	0.2429	0.4222	0.5254	0.2594	0.2660

(Continued)

(Table 6 Continued)

		All			Developed			Emerging		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.5665	0.1920	0.3745	0.5720	0.2047	0.3672	0.5004	0.0390	0.4614
	Industry	0.1115	0.0633	0.0483	0.1121	0.0666	0.0455	0.1054	0.0234	0.0820
	Aggregate	0.6780	0.2553	0.4228	0.6840	0.2713	0.4127	0.6059	0.0624	0.5434
IND	Country	0.5076	0.1528	0.3548	0.5233	0.1286	0.3947	0.3743	0.3579	0.0164
	Industry	0.1249	0.0608	0.0641	0.1210	0.0569	0.0641	0.1580	0.0937	0.0643
	Aggregate	0.6325	0.2135	0.4189	0.6443	0.1855	0.4587	0.5322	0.4516	0.0807
RE	Country	0.3626	0.1126	0.2500	0.3800	0.1214	0.2586	0.1541	0.0077	0.1465
	Industry	0.1633	0.1605	0.0028	0.1586	0.1665	-0.0079	0.2194	0.0882	0.1312
	Aggregate	0.5259	0.2731	0.2528	0.5386	0.2879	0.2507	0.3736	0.0959	0.2777
TEC	Country	0.6005	0.1396	0.4608	0.6005	0.1396	0.4608	---	---	---
	Industry	0.1064	0.0550	0.0514	0.1064	0.0550	0.0514	---	---	---
	Aggregate	0.7068	0.1946	0.5122	0.7068	0.1946	0.5122	---	---	---

Table 7: The 1994-1995 Mexican Crisis

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 1994–1995 Mexican crisis. The crisis period is from December 19, 1994, to March 31, 1995 and the stable period is from 1 June, 1994, to 16 December, 1994. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. All markets (All) are divided into three subgroups based on their economic level: developed markets (Developed), emerging markets (Emerging) and frontier markets (Frontier). The values are the equally-weighted average of market integration.

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.1806	0.1798	0.0008	0.2179	0.2380	-0.0201	0.1515	0.1285	0.0230	0.0565	0.0223	0.0341
	Industry	0.0619	0.0560	0.0059	0.0587	0.0363	0.0223	0.0657	0.0631	0.0025	0.0652	0.1705	-0.1054
	Aggregate	0.2425	0.2358	0.0066	0.2765	0.2744	0.0022	0.2172	0.1916	0.0256	0.1217	0.1929	-0.0712
CD	Country	0.1817	0.1536	0.0281	0.2099	0.1992	0.0107	0.1498	0.0919	0.0579	0.1072	0.0607	0.0465
	Industry	0.0772	0.1397	-0.0625	0.0809	0.1421	-0.0612	0.0754	0.1301	-0.0548	0.0606	0.1523	-0.0917
	Aggregate	0.2589	0.2933	-0.0344	0.2908	0.3413	-0.0505	0.2252	0.2221	0.0032	0.1678	0.2130	-0.0453
CS	Country	0.1230	0.1121	0.0109	0.1648	0.1751	-0.0102	0.0902	0.0570	0.0332	0.0504	0.0290	0.0214
	Industry	0.0558	0.0406	0.0152	0.0615	0.0495	0.0121	0.0500	0.0307	0.0193	0.0513	0.0380	0.0132
	Aggregate	0.1787	0.1526	0.0261	0.2264	0.2245	0.0018	0.1402	0.0878	0.0525	0.1017	0.0670	0.0347
EN	Country	0.1342	0.1242	0.0101	0.1509	0.1675	-0.0167	0.1164	0.0531	0.0632	0.0133	0.0542	-0.0410
	Industry	0.0554	0.0675	-0.0121	0.0657	0.0945	-0.0288	0.0371	0.0236	0.0135	0.0539	0.0208	0.0331
	Aggregate	0.1897	0.1917	-0.0020	0.2166	0.2621	-0.0455	0.1535	0.0768	0.0767	0.0672	0.0750	-0.0079
FIN	Country	0.1979	0.2092	-0.0113	0.2478	0.3069	-0.0591	0.1572	0.0958	0.0613	0.0967	0.1253	-0.0286
	Industry	0.0860	0.0970	-0.0111	0.0868	0.1024	-0.0156	0.0889	0.1041	-0.0152	0.0720	0.0474	0.0245
	Aggregate	0.2839	0.3062	-0.0223	0.3347	0.4093	-0.0746	0.2460	0.1999	0.0461	0.1687	0.1727	-0.0040

(Continued)

(Table 7 Continued)

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.1664	0.1986	-0.0323	0.1974	0.2856	-0.0882	0.1209	0.0390	0.0819	0.0177	0.0700	-0.0522
	Industry	0.1071	0.1001	0.0070	0.1266	0.1125	0.0142	0.0695	0.0806	-0.0111	0.0928	0.0517	0.0411
	Aggregate	0.2734	0.2987	-0.0253	0.3240	0.3980	-0.0741	0.1904	0.1196	0.0708	0.1105	0.1217	-0.0112
IND	Country	0.1639	0.1916	-0.0277	0.2107	0.2279	-0.0173	0.1094	0.1618	-0.0524	0.0992	0.0943	0.0048
	Industry	0.1022	0.1376	-0.0354	0.0940	0.1566	-0.0626	0.1225	0.1317	-0.0092	0.0735	0.0505	0.0230
	Aggregate	0.2661	0.3292	-0.0631	0.3046	0.3845	-0.0799	0.2319	0.2935	-0.0617	0.1727	0.1448	0.0278
RE	Country	0.1765	0.1265	0.0499	0.1922	0.1666	0.0256	0.1569	0.0505	0.1064	0.0379	0.0096	0.0284
	Industry	0.1221	0.1352	-0.0131	0.1271	0.1581	-0.0310	0.1145	0.0983	0.0162	0.0921	0.0098	0.0823
	Aggregate	0.2986	0.2617	0.0369	0.3192	0.3246	-0.0054	0.2714	0.1488	0.1226	0.1300	0.0194	0.1106
TEC	Country	0.1592	0.1484	0.0108	0.1696	0.1506	0.0190	0.0703	0.1294	-0.0591	---	---	---
	Industry	0.1050	0.0951	0.0099	0.1112	0.1025	0.0087	0.0528	0.0323	0.0205	---	---	---
	Aggregate	0.2642	0.2435	0.0207	0.2808	0.2531	0.0277	0.1231	0.1617	-0.0386	---	---	---
TEL	Country	0.1514	0.1405	0.0109	0.1562	0.1754	-0.0193	0.1549	0.0831	0.0718	0.0525	0.0757	-0.0233
	Industry	0.0974	0.0605	0.0368	0.0889	0.0552	0.0336	0.0981	0.0481	0.0500	0.2190	0.2395	-0.0205
	Aggregate	0.2488	0.2010	0.0478	0.2451	0.2307	0.0144	0.2530	0.1311	0.1218	0.2715	0.3153	-0.0438
UTL	Country	0.1393	0.1222	0.0170	0.1802	0.1768	0.0034	0.0692	0.0316	0.0376	0.0728	0.0106	0.0621
	Industry	0.0605	0.0469	0.0136	0.0633	0.0535	0.0098	0.0539	0.0391	0.0148	0.0730	0.0052	0.0678
	Aggregate	0.1998	0.1691	0.0306	0.2435	0.2303	0.0132	0.1231	0.0707	0.0524	0.1458	0.0158	0.1300

Table 8: The 1997 Asian Crisis

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 1997 Asian crisis. The crisis period is from October 17, 1997 to November 16, 1997 and the stable period is from January 1, 1996 to October 16, 1997. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. All markets (All) are divided into three subgroups based on their economic level: developed markets (Developed), emerging markets (Emerging) and frontier markets (Frontier). The values are the equally-weighted average of market integration.

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.6237	0.1298	0.4939	0.7468	0.1916	0.5551	0.4933	0.0618	0.4316	0.4651	0.0658	0.3993
	Industry	0.0984	0.0515	0.0469	0.0682	0.0721	-0.0039	0.1270	0.0310	0.0960	0.1584	0.0164	0.1420
	Aggregate	0.7221	0.1813	0.5408	0.8150	0.2638	0.5512	0.6203	0.0927	0.5276	0.6236	0.0822	0.5413
CD	Country	0.5365	0.1233	0.4132	0.6376	0.1986	0.4390	0.4146	0.0344	0.3802	0.4075	0.0203	0.3872
	Industry	0.1813	0.0713	0.1100	0.1198	0.0490	0.0708	0.2388	0.1004	0.1385	0.3180	0.0924	0.2256
	Aggregate	0.7179	0.1947	0.5232	0.7575	0.2477	0.5098	0.6534	0.1348	0.5186	0.7255	0.1127	0.6128
CS	Country	0.4821	0.0811	0.4010	0.5796	0.1221	0.4576	0.3887	0.0467	0.3420	0.3885	0.0235	0.3649
	Industry	0.1219	0.0378	0.0840	0.1304	0.0456	0.0848	0.1338	0.0367	0.0971	0.0375	0.0065	0.0311
	Aggregate	0.6040	0.1189	0.4851	0.7101	0.1677	0.5424	0.5225	0.0833	0.4391	0.4260	0.0300	0.3960
EN	Country	0.5362	0.0858	0.4504	0.5925	0.1203	0.4722	0.4470	0.0404	0.4065	0.6535	0.0927	0.5608
	Industry	0.0752	0.0462	0.0290	0.0553	0.0805	-0.0251	0.1078	0.0068	0.1010	0.0263	0.0133	0.0130
	Aggregate	0.6114	0.1320	0.4794	0.6479	0.2008	0.4471	0.5547	0.0472	0.5075	0.6798	0.1060	0.5738
FIN	Country	0.6174	0.1696	0.4478	0.7453	0.2103	0.5350	0.4982	0.1390	0.3591	0.4800	0.0906	0.3894
	Industry	0.1030	0.0806	0.0225	0.0618	0.1045	-0.0428	0.1349	0.0561	0.0789	0.1785	0.0652	0.1133
	Aggregate	0.7204	0.2501	0.4703	0.8071	0.3148	0.4923	0.6331	0.1951	0.4380	0.6585	0.1558	0.5026

(Continued)

(Table 8 Continued)

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.6169	0.1367	0.4802	0.7125	0.1912	0.5213	0.4448	0.0558	0.3890	0.7906	0.0467	0.7438
	Industry	0.1512	0.0444	0.1067	0.1220	0.0668	0.0553	0.2045	0.0106	0.1940	0.0881	0.0140	0.0741
	Aggregate	0.7681	0.1812	0.5869	0.8345	0.2580	0.5765	0.6493	0.0664	0.5829	0.8786	0.0607	0.8179
IND	Country	0.5753	0.2175	0.3578	0.7513	0.3078	0.4435	0.4357	0.1404	0.2953	0.2825	0.0849	0.1977
	Industry	0.1612	0.0599	0.1014	0.0897	0.0878	0.0019	0.1957	0.0266	0.1691	0.3511	0.0488	0.3024
	Aggregate	0.7365	0.2774	0.4591	0.8411	0.3956	0.4454	0.6314	0.1670	0.4644	0.6337	0.1336	0.5000
RE	Country	0.5269	0.0791	0.4478	0.5852	0.1084	0.4768	0.4165	0.0233	0.3932	0.4961	0.0652	0.4309
	Industry	0.1627	0.0389	0.1238	0.1449	0.0490	0.0959	0.1914	0.0233	0.1680	0.1963	0.0149	0.1814
	Aggregate	0.6895	0.1180	0.5716	0.7301	0.1575	0.5726	0.6079	0.0466	0.5612	0.6924	0.0800	0.6123
TEC	Country	0.5616	0.1132	0.4484	0.6485	0.1359	0.5126	0.1708	0.0114	0.1594	---	---	---
	Industry	0.1362	0.1251	0.0111	0.1141	0.0993	0.0147	0.2359	0.2410	-0.0051	---	---	---
	Aggregate	0.6979	0.2383	0.4595	0.7625	0.2352	0.5273	0.4068	0.2524	0.1543	---	---	---
TEL	Country	0.5619	0.1358	0.4261	0.5683	0.1763	0.3919	0.5088	0.0819	0.4269	0.7993	0.0876	0.7116
	Industry	0.1217	0.0604	0.0612	0.1178	0.0410	0.0768	0.1378	0.0951	0.0427	0.0656	0.0350	0.0306
	Aggregate	0.6836	0.1962	0.4873	0.6861	0.2173	0.4688	0.6466	0.1770	0.4696	0.8649	0.1226	0.7422
UTL	Country	0.4536	0.0812	0.3724	0.4393	0.1073	0.3319	0.4226	0.0476	0.3749	0.7695	0.0479	0.7216
	Industry	0.0653	0.0274	0.0378	0.0751	0.0412	0.0339	0.0538	0.0099	0.0439	0.0455	0.0084	0.0371
	Aggregate	0.5189	0.1086	0.4103	0.5144	0.1485	0.3659	0.4763	0.0575	0.4188	0.8150	0.0563	0.7587

Table 9: The 1998 Russian/LTCM Crisis

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 1998 Russian/LTCM crisis. The crisis period is from August 3, 1998 to October 15, 1998 and the stable period is from March 2, 1998 to June 1, 1998. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. All markets (All) are divided into three subgroups based on their economic level: developed markets (Developed), emerging markets (Emerging) and frontier markets (Frontier). The values are the equally-weighted average of market integration.

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.3621	0.2472	0.1149	0.4674	0.3369	0.1305	0.2775	0.1755	0.1020	0.1994	0.1077	0.0917
	Industry	0.0749	0.0988	-0.0239	0.0778	0.1156	-0.0378	0.0786	0.0859	-0.0074	0.0473	0.0701	-0.0228
	Aggregate	0.4370	0.3460	0.0910	0.5452	0.4524	0.0928	0.3561	0.2614	0.0947	0.2467	0.1778	0.0688
CD	Country	0.3110	0.2363	0.0747	0.4042	0.2897	0.1145	0.2343	0.2093	0.0250	0.1097	0.0665	0.0432
	Industry	0.1133	0.1546	-0.0413	0.1123	0.1512	-0.0390	0.1141	0.1836	-0.0695	0.1153	0.0778	0.0374
	Aggregate	0.4243	0.3909	0.0334	0.5164	0.4409	0.0755	0.3484	0.3929	-0.0445	0.2250	0.1443	0.0807
CS	Country	0.2484	0.1697	0.0787	0.3458	0.2020	0.1438	0.1878	0.1655	0.0224	0.0960	0.0713	0.0247
	Industry	0.0845	0.0729	0.0117	0.1005	0.0901	0.0104	0.0655	0.0511	0.0144	0.0872	0.0793	0.0079
	Aggregate	0.3329	0.2425	0.0904	0.4463	0.2921	0.1542	0.2533	0.2165	0.0368	0.1832	0.1506	0.0326
EN	Country	0.2345	0.1547	0.0798	0.2357	0.1538	0.0820	0.2647	0.1770	0.0877	0.1390	0.0912	0.0478
	Industry	0.1028	0.0995	0.0034	0.1615	0.1597	0.0018	0.0464	0.0303	0.0161	0.0492	0.0782	-0.0290
	Aggregate	0.3373	0.2542	0.0831	0.3972	0.3135	0.0837	0.3111	0.2073	0.1038	0.1882	0.1695	0.0188
FIN	Country	0.3500	0.2549	0.0951	0.5259	0.3901	0.1358	0.2477	0.1783	0.0694	0.0658	0.0311	0.0347
	Industry	0.0918	0.1517	-0.0599	0.0782	0.1297	-0.0515	0.1078	0.1478	-0.0400	0.0925	0.2321	-0.1396
	Aggregate	0.4418	0.4067	0.0351	0.6040	0.5198	0.0842	0.3555	0.3261	0.0294	0.1583	0.2633	-0.1050

(Continued)

(Table 9 Continued)

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.3333	0.2384	0.0949	0.4219	0.3110	0.1109	0.1769	0.1248	0.0522	0.3178	0.1539	0.1639
	Industry	0.1076	0.1280	-0.0204	0.1038	0.1373	-0.0335	0.1136	0.1064	0.0072	0.1113	0.1529	-0.0416
	Aggregate	0.4409	0.3664	0.0744	0.5257	0.4482	0.0775	0.2905	0.2311	0.0594	0.4291	0.3068	0.1223
IND	Country	0.3254	0.2481	0.0773	0.4727	0.3315	0.1412	0.2343	0.1871	0.0472	0.0966	0.1427	-0.0461
	Industry	0.1313	0.1850	-0.0537	0.1044	0.1695	-0.0651	0.1540	0.2092	-0.0552	0.1577	0.1716	-0.0138
	Aggregate	0.4567	0.4331	0.0236	0.5771	0.5010	0.0761	0.3882	0.3963	-0.0080	0.2543	0.3143	-0.0600
RE	Country	0.2204	0.2223	-0.0019	0.2790	0.2791	-0.0001	0.1220	0.1304	-0.0084	0.1838	0.1732	0.0106
	Industry	0.1332	0.1478	-0.0146	0.1503	0.1755	-0.0252	0.1088	0.1228	-0.0140	0.1053	0.0450	0.0604
	Aggregate	0.3536	0.3701	-0.0166	0.4293	0.4547	-0.0253	0.2308	0.2531	-0.0224	0.2892	0.2181	0.0710
TEC	Country	0.3575	0.2296	0.1279	0.4172	0.2842	0.1330	0.2040	0.0892	0.1149	---	---	---
	Industry	0.0832	0.1344	-0.0512	0.0729	0.1489	-0.0759	0.1097	0.0973	0.0125	---	---	---
	Aggregate	0.4407	0.3640	0.0767	0.4901	0.4331	0.0570	0.3138	0.1864	0.1273	---	---	---
TEL	Country	0.3675	0.2378	0.1297	0.3818	0.2552	0.1265	0.3515	0.2131	0.1385	0.3437	0.2485	0.0953
	Industry	0.0893	0.0940	-0.0047	0.0943	0.1087	-0.0144	0.0902	0.0730	0.0172	0.0323	0.1038	-0.0715
	Aggregate	0.4567	0.3317	0.1250	0.4760	0.3639	0.1121	0.4418	0.2861	0.1557	0.3761	0.3523	0.0238
UTL	Country	0.2773	0.2240	0.0532	0.2539	0.2558	-0.0019	0.3382	0.1964	0.1419	0.1611	0.1428	0.0184
	Industry	0.0740	0.0571	0.0169	0.1139	0.0657	0.0483	0.0263	0.0526	-0.0263	0.0276	0.0218	0.0058
	Aggregate	0.3512	0.2811	0.0701	0.3678	0.3215	0.0464	0.3645	0.2490	0.1155	0.1887	0.1646	0.0241

Table 10: The 2007-2008 GFC

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 2007-2009 GFC. The crisis period is from August 7, 2007 to March 15, 2009 and the stable period is from March 1, 2003 to December 31, 2006. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. All markets (All) are divided into three subgroups based on their economic level: developed markets (Developed), emerging markets (Emerging) and frontier markets (Frontier). The values are the equally-weighted average of market integration.

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.4208	0.2276	0.1932	0.5189	0.3457	0.1732	0.4138	0.1692	0.2445	0.1636	0.0289	0.1347
	Industry	0.0404	0.0617	-0.0213	0.0578	0.0643	-0.0064	0.0317	0.0817	-0.0501	0.0112	0.0098	0.0014
	Aggregate	0.4611	0.2892	0.1719	0.5768	0.4100	0.1668	0.4454	0.2510	0.1944	0.1749	0.0387	0.1361
CD	Country	0.4233	0.2460	0.1773	0.5451	0.3563	0.1888	0.3730	0.1887	0.1843	0.1990	0.0663	0.1327
	Industry	0.0357	0.0556	-0.0199	0.0424	0.0720	-0.0296	0.0306	0.0431	-0.0126	0.0280	0.0367	-0.0087
	Aggregate	0.4590	0.3015	0.1574	0.5876	0.4283	0.1593	0.4035	0.2318	0.1717	0.2270	0.1030	0.1240
CS	Country	0.3849	0.1650	0.2200	0.5052	0.2630	0.2422	0.3485	0.1037	0.2448	0.1811	0.0590	0.1221
	Industry	0.0294	0.0231	0.0063	0.0389	0.0441	-0.0052	0.0229	0.0064	0.0164	0.0200	0.0072	0.0129
	Aggregate	0.4143	0.1880	0.2263	0.5441	0.3070	0.2371	0.3714	0.1102	0.2612	0.2011	0.0662	0.1349
EN	Country	0.3998	0.1579	0.2419	0.4913	0.2225	0.2688	0.3899	0.1292	0.2607	0.1623	0.0428	0.1194
	Industry	0.0336	0.0555	-0.0219	0.0551	0.0997	-0.0445	0.0187	0.0223	-0.0035	0.0082	0.0099	-0.0017
	Aggregate	0.4334	0.2134	0.2201	0.5465	0.3222	0.2243	0.4086	0.1515	0.2572	0.1705	0.0527	0.1177
FIN	Country	0.5039	0.2843	0.2196	0.6452	0.4531	0.1922	0.4638	0.1738	0.2900	0.2590	0.1116	0.1473
	Industry	0.0364	0.0521	-0.0157	0.0476	0.0970	-0.0494	0.0288	0.0226	0.0061	0.0257	0.0064	0.0193
	Aggregate	0.5403	0.3364	0.2039	0.6928	0.5501	0.1427	0.4926	0.1964	0.2962	0.2847	0.1181	0.1666

(Continued)

(Table 10 Continued)

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.3358	0.1796	0.1562	0.4043	0.2813	0.1231	0.2626	0.0780	0.1846	0.2838	0.0776	0.2062
	Industry	0.0394	0.0366	0.0029	0.0576	0.0543	0.0033	0.0251	0.0078	0.0172	0.0080	0.0575	-0.0495
	Aggregate	0.3753	0.2161	0.1591	0.4619	0.3355	0.1264	0.2877	0.0858	0.2019	0.2918	0.1351	0.1568
IND	Country	0.5018	0.2302	0.2716	0.7136	0.4072	0.3064	0.4273	0.1393	0.2880	0.2201	0.0494	0.1708
	Industry	0.0321	0.0467	-0.0146	0.0323	0.0325	-0.0001	0.0362	0.0453	-0.0091	0.0239	0.0777	-0.0538
	Aggregate	0.5339	0.2768	0.2571	0.7460	0.4397	0.3063	0.4635	0.1846	0.2789	0.2440	0.1271	0.1169
RE	Country	0.3454	0.1406	0.2048	0.4481	0.2262	0.2219	0.2465	0.0558	0.1908	0.1997	0.0249	0.1749
	Industry	0.0405	0.0752	-0.0347	0.0599	0.0953	-0.0354	0.0217	0.0634	-0.0417	0.0131	0.0290	-0.0159
	Aggregate	0.3859	0.2158	0.1701	0.5080	0.3215	0.1865	0.2683	0.1192	0.1490	0.2128	0.0538	0.1590
TEC	Country	0.4063	0.2279	0.1784	0.4594	0.2908	0.1686	0.3188	0.1221	0.1967	0.2335	0.0329	0.2006
	Industry	0.0237	0.0532	-0.0294	0.0300	0.0669	-0.0369	0.0128	0.0296	-0.0168	0.0063	0.0129	-0.0067
	Aggregate	0.4301	0.2811	0.1490	0.4894	0.3577	0.1317	0.3316	0.1518	0.1799	0.2398	0.0458	0.1940
TEL	Country	0.3598	0.1841	0.1757	0.4093	0.2404	0.1689	0.3341	0.1450	0.1891	0.1910	0.0412	0.1497
	Industry	0.0488	0.0336	0.0152	0.0726	0.0565	0.0161	0.0247	0.0110	0.0137	0.0263	0.0096	0.0168
	Aggregate	0.4086	0.2177	0.1909	0.4819	0.2969	0.1850	0.3588	0.1561	0.2027	0.2173	0.0508	0.1665
UTL	Country	0.3885	0.1686	0.2199	0.4340	0.2283	0.2057	0.3607	0.1227	0.2381	0.2534	0.0271	0.2263
	Industry	0.0416	0.0348	0.0068	0.0732	0.0605	0.0127	0.0079	0.0062	0.0017	0.0026	0.0072	-0.0047
	Aggregate	0.4301	0.2034	0.2267	0.5072	0.2888	0.2183	0.3686	0.1289	0.2397	0.2560	0.0343	0.2217

Table 11: The 2009-2014 ESDC

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 2009-2014 ESDC. The crisis period is from June 1, 2009 to June 23, 2014 and the stable period is from January 1, 2015 to December 31, 2023. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. All markets (All) are divided into three subgroups based on their economic level: developed markets (Developed), emerging markets (Emerging) and frontier markets (Frontier). The values are the equally-weighted average of market integration.

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.3391	0.2208	0.1183	0.5295	0.3506	0.1789	0.3090	0.1981	0.1109	0.0657	0.0376	0.0281
	Industry	0.0217	0.0684	-0.0467	0.0308	0.0940	-0.0632	0.0236	0.0620	-0.0384	0.0038	0.0352	-0.0314
	Aggregate	0.3608	0.2892	0.0716	0.5603	0.4447	0.1156	0.3327	0.2601	0.0725	0.0695	0.0728	-0.0033
CD	Country	0.3276	0.2655	0.0620	0.5459	0.4397	0.1061	0.2450	0.2151	0.0299	0.0999	0.0626	0.0373
	Industry	0.0148	0.0750	-0.0603	0.0174	0.0633	-0.0460	0.0184	0.0705	-0.0521	0.0057	0.0996	-0.0939
	Aggregate	0.3423	0.3406	0.0018	0.5632	0.5031	0.0602	0.2634	0.2856	-0.0222	0.1056	0.1622	-0.0566
CS	Country	0.3189	0.2305	0.0884	0.5080	0.3888	0.1193	0.2450	0.1893	0.0557	0.1451	0.0558	0.0893
	Industry	0.0134	0.0771	-0.0637	0.0297	0.0798	-0.0501	0.0032	0.0946	-0.0913	0.0038	0.0485	-0.0447
	Aggregate	0.3323	0.3076	0.0247	0.5377	0.4686	0.0691	0.2483	0.2839	-0.0356	0.1489	0.1044	0.0446
EN	Country	0.3040	0.1979	0.1061	0.4837	0.2981	0.1856	0.2542	0.1867	0.0674	0.0906	0.0516	0.0390
	Industry	0.0124	0.0694	-0.0570	0.0211	0.1201	-0.0989	0.0095	0.0318	-0.0223	0.0030	0.0479	-0.0450
	Aggregate	0.3164	0.2673	0.0491	0.5048	0.4182	0.0866	0.2637	0.2186	0.0451	0.0936	0.0995	-0.0060
FIN	Country	0.3992	0.3024	0.0968	0.6266	0.4930	0.1336	0.3183	0.2521	0.0661	0.1655	0.0801	0.0854
	Industry	0.0231	0.0920	-0.0689	0.0305	0.1181	-0.0875	0.0274	0.1052	-0.0778	0.0049	0.0313	-0.0264
	Aggregate	0.4223	0.3944	0.0280	0.6571	0.6110	0.0461	0.3457	0.3573	-0.0116	0.1704	0.1114	0.0590

(Continued)

(Table 11 Continued)

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.2468	0.1792	0.0675	0.3826	0.2820	0.1006	0.1953	0.1420	0.0533	0.0728	0.0445	0.0283
	Industry	0.0200	0.0740	-0.0540	0.0408	0.1635	-0.1227	0.0056	0.0144	-0.0088	0.0057	0.0082	-0.0024
	Aggregate	0.2668	0.2532	0.0135	0.4235	0.4455	-0.0221	0.2009	0.1564	0.0445	0.0785	0.0526	0.0259
IND	Country	0.3701	0.2569	0.1132	0.6406	0.4798	0.1608	0.2790	0.1736	0.1053	0.1168	0.0598	0.0569
	Industry	0.0195	0.1193	-0.0998	0.0193	0.0987	-0.0793	0.0285	0.1656	-0.1370	0.0071	0.0832	-0.0761
	Aggregate	0.3896	0.3762	0.0134	0.6600	0.5785	0.0815	0.3075	0.3392	-0.0317	0.1239	0.1430	-0.0191
RE	Country	0.2617	0.2003	0.0614	0.4516	0.3355	0.1161	0.1768	0.1460	0.0309	0.0532	0.0407	0.0125
	Industry	0.0221	0.0704	-0.0483	0.0371	0.1133	-0.0762	0.0142	0.0498	-0.0356	0.0077	0.0257	-0.0181
	Aggregate	0.2837	0.2706	0.0131	0.4887	0.4488	0.0399	0.1910	0.1958	-0.0048	0.0609	0.0664	-0.0056
TEC	Country	0.2861	0.2425	0.0435	0.3889	0.3266	0.0623	0.2270	0.1824	0.0446	0.0199	0.0506	-0.0307
	Industry	0.0146	0.0354	-0.0208	0.0214	0.0519	-0.0305	0.0077	0.0171	-0.0093	0.0031	0.0115	-0.0083
	Aggregate	0.3006	0.2779	0.0227	0.4103	0.3785	0.0318	0.2347	0.1995	0.0352	0.0230	0.0620	-0.0390
TEL	Country	0.2227	0.1844	0.0383	0.3532	0.2999	0.0533	0.1779	0.1432	0.0347	0.0696	0.0518	0.0178
	Industry	0.0277	0.0490	-0.0213	0.0551	0.0833	-0.0281	0.0129	0.0373	-0.0244	0.0052	0.0086	-0.0034
	Aggregate	0.2504	0.2334	0.0170	0.4083	0.3832	0.0251	0.1908	0.1805	0.0103	0.0748	0.0604	0.0144
UTL	Country	0.2722	0.2010	0.0712	0.4118	0.2909	0.1209	0.2143	0.1764	0.0378	0.0834	0.0566	0.0268
	Industry	0.0172	0.0413	-0.0240	0.0327	0.0803	-0.0476	0.0072	0.0138	-0.0066	0.0028	0.0087	-0.0059
	Aggregate	0.2895	0.2423	0.0472	0.4445	0.3712	0.0733	0.2215	0.1903	0.0312	0.0862	0.0653	0.0209

Table 12: The 2020-2023 Covid-19 Pandemic

This table presents market integration estimates using the method proposed by Pukthuanthong and Roll (2009) (PR), an adjusted method (Adj), and the differences (Diff) between the two approaches across industries during the 2020-2023 Covid-19 Pandemic. The crisis period is from January 30, 2020 to May 5, 2023 and the stable period is from January 1, 2018 to December 31, 2019. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported for each industry: country-level, industry-level, and aggregate market integration. All markets (All) are divided into three subgroups based on their economic level: developed markets (Developed), emerging markets (Emerging) and frontier markets (Frontier). The values are the equally-weighted average of market integration.

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
BM	Country	0.2845	0.2180	0.0665	0.4554	0.3731	0.0823	0.2403	0.1723	0.0680	0.0812	0.0414	0.0397
	Industry	0.0414	0.0668	-0.0254	0.0558	0.0568	-0.0010	0.0487	0.1141	-0.0654	0.0084	0.0145	-0.0061
	Aggregate	0.3259	0.2848	0.0411	0.5112	0.4299	0.0813	0.2890	0.2864	0.0025	0.0896	0.0559	0.0336
CD	Country	0.3051	0.2036	0.1014	0.5016	0.3479	0.1537	0.2277	0.1730	0.0547	0.1278	0.0396	0.0883
	Industry	0.0259	0.1021	-0.0762	0.0278	0.0575	-0.0297	0.0359	0.0964	-0.0605	0.0103	0.1726	-0.1623
	Aggregate	0.3310	0.3058	0.0252	0.5294	0.4054	0.1240	0.2636	0.2694	-0.0058	0.1381	0.2121	-0.0740
CS	Country	0.2401	0.1775	0.0625	0.3775	0.2962	0.0813	0.1940	0.1521	0.0419	0.1133	0.0481	0.0652
	Industry	0.0270	0.0396	-0.0126	0.0593	0.0612	-0.0019	0.0096	0.0275	-0.0179	0.0065	0.0264	-0.0199
	Aggregate	0.2671	0.2171	0.0500	0.4368	0.3574	0.0794	0.2035	0.1796	0.0239	0.1198	0.0744	0.0453
EN	Country	0.2275	0.1630	0.0645	0.3309	0.2751	0.0558	0.1996	0.1356	0.0640	0.1161	0.0379	0.0782
	Industry	0.0649	0.0414	0.0235	0.1122	0.0851	0.0271	0.0503	0.0201	0.0302	0.0169	0.0093	0.0077
	Aggregate	0.2924	0.2045	0.0880	0.4431	0.3602	0.0829	0.2499	0.1557	0.0942	0.1330	0.0471	0.0859
FIN	Country	0.3549	0.2655	0.0894	0.5623	0.4681	0.0942	0.2745	0.1992	0.0753	0.1784	0.0762	0.1023
	Industry	0.0454	0.0657	-0.0203	0.0732	0.0927	-0.0196	0.0416	0.0716	-0.0299	0.0121	0.0201	-0.0080
	Aggregate	0.4003	0.3312	0.0691	0.6355	0.5608	0.0746	0.3161	0.2708	0.0454	0.1905	0.0962	0.0943

(Continued)

(Table 12 Continued)

		All			Developed			Emerging			Frontier		
		PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff	PR	Adj	Diff
HC	Country	0.2099	0.1658	0.0442	0.3378	0.2772	0.0606	0.1604	0.1311	0.0293	0.0662	0.0250	0.0412
	Industry	0.0349	0.0655	-0.0306	0.0732	0.1408	-0.0676	0.0134	0.0153	-0.0018	0.0042	0.0195	-0.0154
	Aggregate	0.2448	0.2313	0.0136	0.4110	0.4180	-0.0070	0.1738	0.1464	0.0274	0.0704	0.0445	0.0259
IND	Country	0.3448	0.2541	0.0907	0.5903	0.4708	0.1196	0.2423	0.1836	0.0587	0.1369	0.0436	0.0933
	Industry	0.0235	0.0829	-0.0594	0.0251	0.0779	-0.0528	0.0331	0.0950	-0.0619	0.0084	0.0735	-0.0652
	Aggregate	0.3683	0.3370	0.0313	0.6154	0.5487	0.0667	0.2754	0.2786	-0.0032	0.1453	0.1171	0.0282
RE	Country	0.2424	0.1599	0.0825	0.4041	0.2559	0.1482	0.2005	0.1387	0.0617	0.0626	0.0475	0.0151
	Industry	0.0532	0.0758	-0.0226	0.0801	0.1008	-0.0207	0.0550	0.0597	-0.0047	0.0100	0.0624	-0.0524
	Aggregate	0.2956	0.2357	0.0599	0.4842	0.3567	0.1275	0.2555	0.1984	0.0571	0.0726	0.1100	-0.0373
TEC	Country	0.3102	0.1991	0.1110	0.4518	0.3027	0.1491	0.2506	0.1587	0.0919	0.1157	0.0529	0.0628
	Industry	0.0372	0.0515	-0.0143	0.0649	0.0724	-0.0075	0.0162	0.0511	-0.0349	0.0114	0.0119	-0.0005
	Aggregate	0.3474	0.2506	0.0968	0.5167	0.3751	0.1417	0.2668	0.2098	0.0570	0.1272	0.0648	0.0624
TEL	Country	0.2389	0.1180	0.1209	0.3625	0.1709	0.1916	0.1705	0.1013	0.0692	0.1529	0.0615	0.0913
	Industry	0.0331	0.0495	-0.0164	0.0637	0.1069	-0.0432	0.0177	0.0184	-0.0007	0.0094	0.0086	0.0008
	Aggregate	0.2720	0.1675	0.1045	0.4262	0.2778	0.1484	0.1881	0.1197	0.0685	0.1623	0.0701	0.0922
UTL	Country	0.2390	0.1219	0.1170	0.3351	0.1605	0.1747	0.1812	0.1172	0.0640	0.1430	0.0551	0.0879
	Industry	0.0274	0.0451	-0.0177	0.0561	0.0961	-0.0399	0.0075	0.0066	0.0009	0.0029	0.0063	-0.0034
	Aggregate	0.2664	0.1670	0.0994	0.3913	0.2566	0.1347	0.1887	0.1238	0.0649	0.1459	0.0614	0.0845

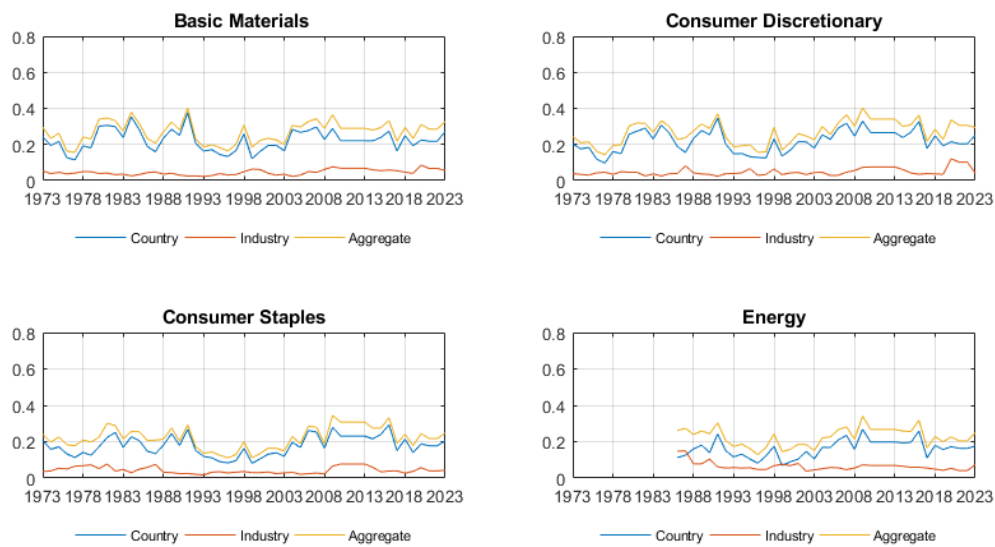
Table 13: Time trend

This table reports the coefficients of a time variable and t values by regressing the level of market integration on a time variable. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported in each industry: country-level, industry-level and aggregate market integration. All markets are divided into developed markets, emerging markets and frontier markets based on economic levels. ***, ** and * indicate significance at the 1%, 5% and 10% level.

		BM	CD	CS	EN	FIN	HC	IND	RE	TEC	UEL	UTL
Country	All Markets	0.0002 (0.3497)	0.0012** (2.0924)	0.0009* (1.8777)	0.0017** (2.5054)	0.0015** (2.3574)	-0.0015*** (-2.6566)	0.0018*** (3.3126)	0.0008* (1.6467)	0.0012 (1.5502)	-0.0008 (-1.0853)	-0.0007 (-0.6998)
	Developed Markets	0.0036*** (5.4635)	0.0054*** (7.5214)	0.0044*** (6.4015)	0.0047*** (5.5554)	0.0066*** (8.7391)	0.0009 (1.3702)	0.0077*** (10.9921)	0.0039*** (6.0362)	0.0044*** (5.0975)	0.0010 (0.9418)	0.0005 (0.4300)
	Emerging Markets	0.0038*** (8.3875)	0.0031*** (3.7637)	0.0035*** (4.7011)	0.0024*** (2.8806)	0.0043*** (7.3885)	0.0018*** (4.0625)	0.0023*** (3.9828)	0.0026*** (3.9534)	0.0056*** (7.9910)	0.0006 (0.8428)	0.0035*** (3.9160)
	Frontier Markets	0.0007* (1.9519)	0.0011*** (2.8608)	0.0010*** (2.6029)	-0.0003 (-0.4656)	0.0016*** (3.7939)	-0.0020** (-2.4093)	0.0012*** (2.7413)	0.0010** (2.3531)	0.0010 (1.4104)	-0.0006 (-0.7921)	0.0016*** (2.7998)
Industry	All Markets	0.0004*** (3.6494)	0.0004*** (2.6620)	-0.0002 (-1.2810)	-0.0011*** (-3.4607)	-0.0006*** (-2.9385)	0.0002 (1.2144)	0.0005*** (2.6586)	-0.0012*** (-5.7534)	-0.0013*** (-6.5071)	-0.0005** (-2.1171)	0.0005*** (4.0578)
	Developed Markets	0.0008*** (3.9876)	0.0001 (1.0479)	0.0003** (2.0683)	-0.0003 (-0.6376)	0.0000 (0.0194)	0.0016*** (5.4628)	0.0003* (1.8278)	0.0000 (-0.1515)	-0.0007*** (-3.2723)	0.0007* (1.9101)	0.0021*** (9.8832)
	Emerging Markets	0.0008*** (3.0169)	-0.0008 (-1.2420)	0.0007** (2.1125)	0.0006*** (4.7531)	0.0005** (1.7342)	-0.0001 (-1.0832)	0.0012*** (3.0814)	-0.0013* (-1.9223)	0.0002 (0.9650)	0.0000 (-0.0460)	-0.0001 (-1.0479)
	Frontier Markets	0.0001 (0.4760)	0.0023*** (4.1589)	0.0005*** (2.7610)	0.0001 (0.4053)	0.0001 (0.2651)	-0.0005* (-1.8362)	0.0009*** (2.7018)	0.0003 (1.4308)	-0.0001 (-0.4101)	-0.0013*** (-3.4362)	0.0002 (1.5410)
Aggregate	All Markets	0.0006 (1.1017)	0.0016*** (2.8454)	0.0007 (1.3254)	0.0006 (0.7658)	0.0008 (1.2928)	-0.0014** (-2.2394)	0.0024*** (4.0031)	-0.0003 (-0.5875)	-0.0001 (-0.1438)	-0.0013 (-1.6296)	-0.0001 (-0.1393)
	Developed Markets	0.0044*** (6.8915)	0.0055*** (7.8814)	0.0047*** (6.8362)	0.0044*** (5.2572)	0.0066*** (8.7425)	0.0025*** (3.5872)	0.0080*** (11.2773)	0.0039*** (6.2102)	0.0037*** (4.4965)	0.0017 (1.5188)	0.0026** (2.1974)
	Emerging Markets	0.0046*** (9.1358)	0.0023** (1.9859)	0.0042*** (4.5561)	0.0030*** (3.4057)	0.0048*** (6.6221)	0.0016*** (3.4638)	0.0036*** (4.5908)	0.0013 (1.1762)	0.0058*** (8.3373)	0.0006 (0.8357)	0.0034*** (3.7081)
	Frontier Markets	0.0008 (1.8195)	0.0035*** (6.0334)	0.0016*** (3.8870)	-0.0001 (-0.1645)	0.0017*** (3.5112)	-0.0025** (-2.5489)	0.0020*** (3.5576)	0.0013*** (2.6777)	0.0009 (1.1941)	-0.0019* (-1.9171)	0.0018*** (2.8664)

Figure 1: Integration dynamics in all markets

This figure shows the dynamics of the market integration (country/industry/aggregate) of all markets over time. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported in each industry: country-level, industry-level and aggregate market integration. The value each year is equally averaged by the level of the market integration of all existing markets in the year. The market integration is calculated by adjusted explanatory power after considering the bias caused by factor and residual heteroscedasticity and changes in factors loadings during financial crises and by the method of Pukthuanthong and Roll (2009) during normal periods.



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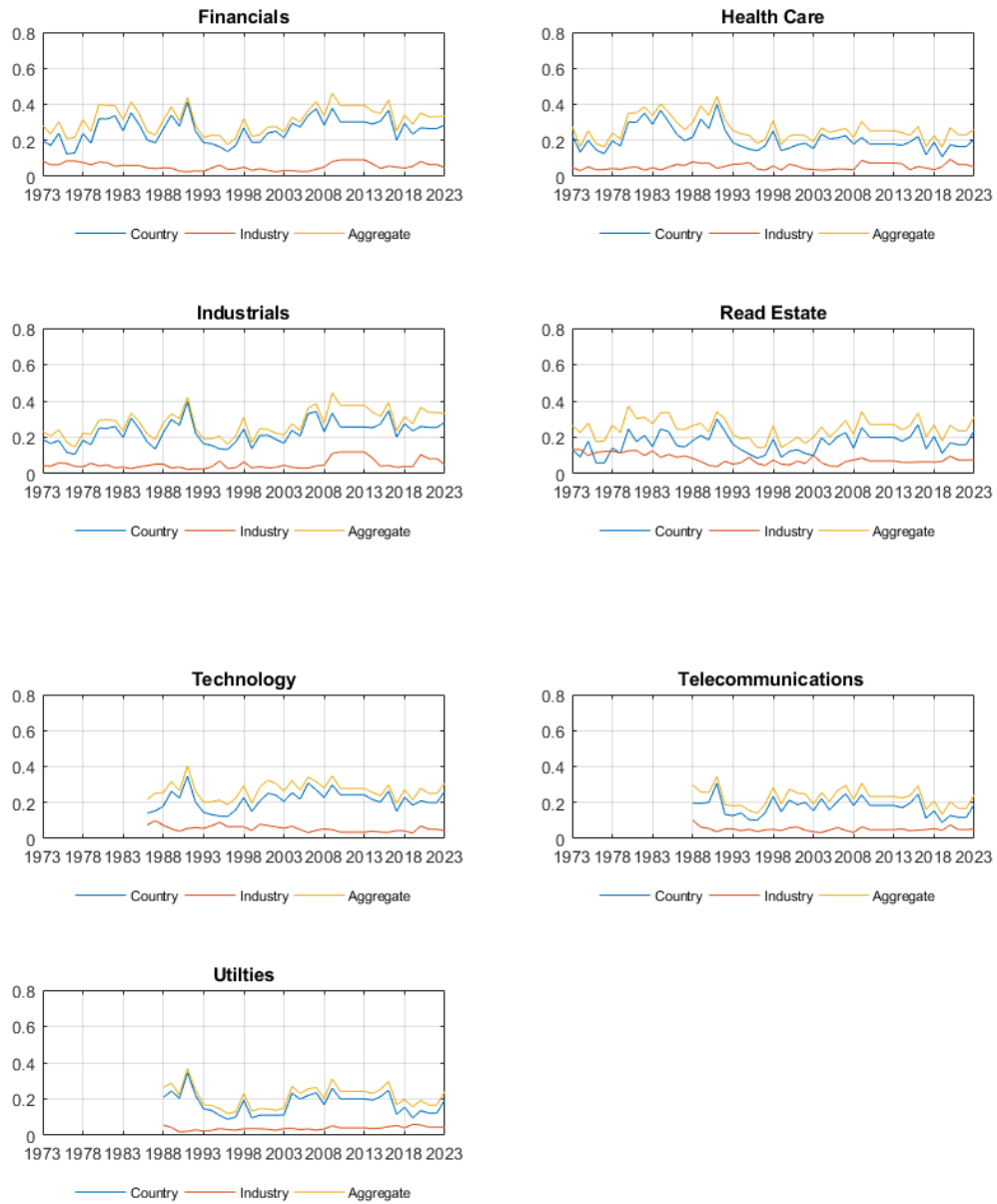
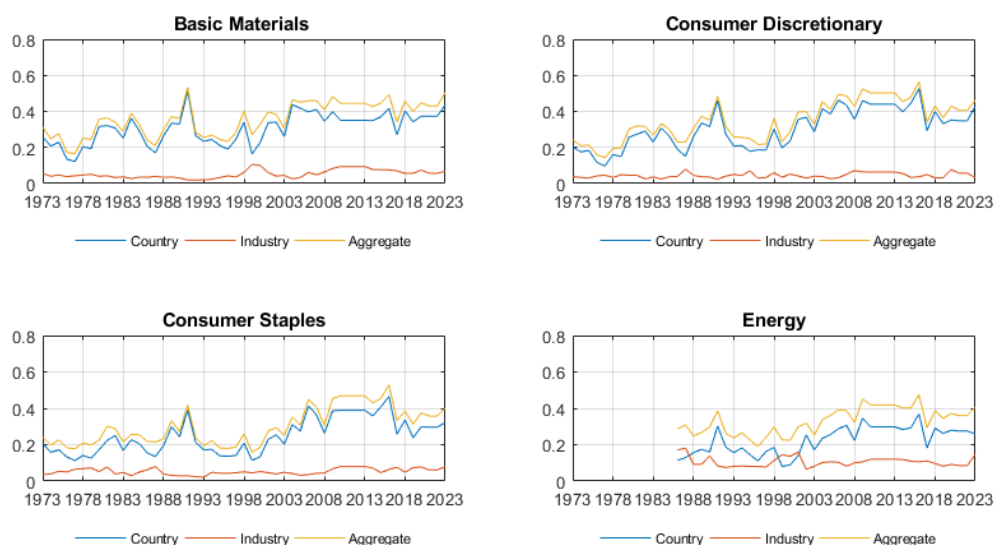


Figure 2: Integration dynamics in developed markets

This figure shows the dynamics of the market integration (country/industry/aggregate) of developed markets over time. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported in each industry: country-level, industry-level and aggregate market integration. The value each year is equally averaged by the level of the market integration of all existing developed markets in the year. The market integration is calculated by adjusted explanatory power after considering the bias caused by factor and residual heteroscedasticity and changes in factors loadings during financial crises and by the method of Pukthuanthong and Roll (2009) during normal periods.



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(Figure 2 Continued)

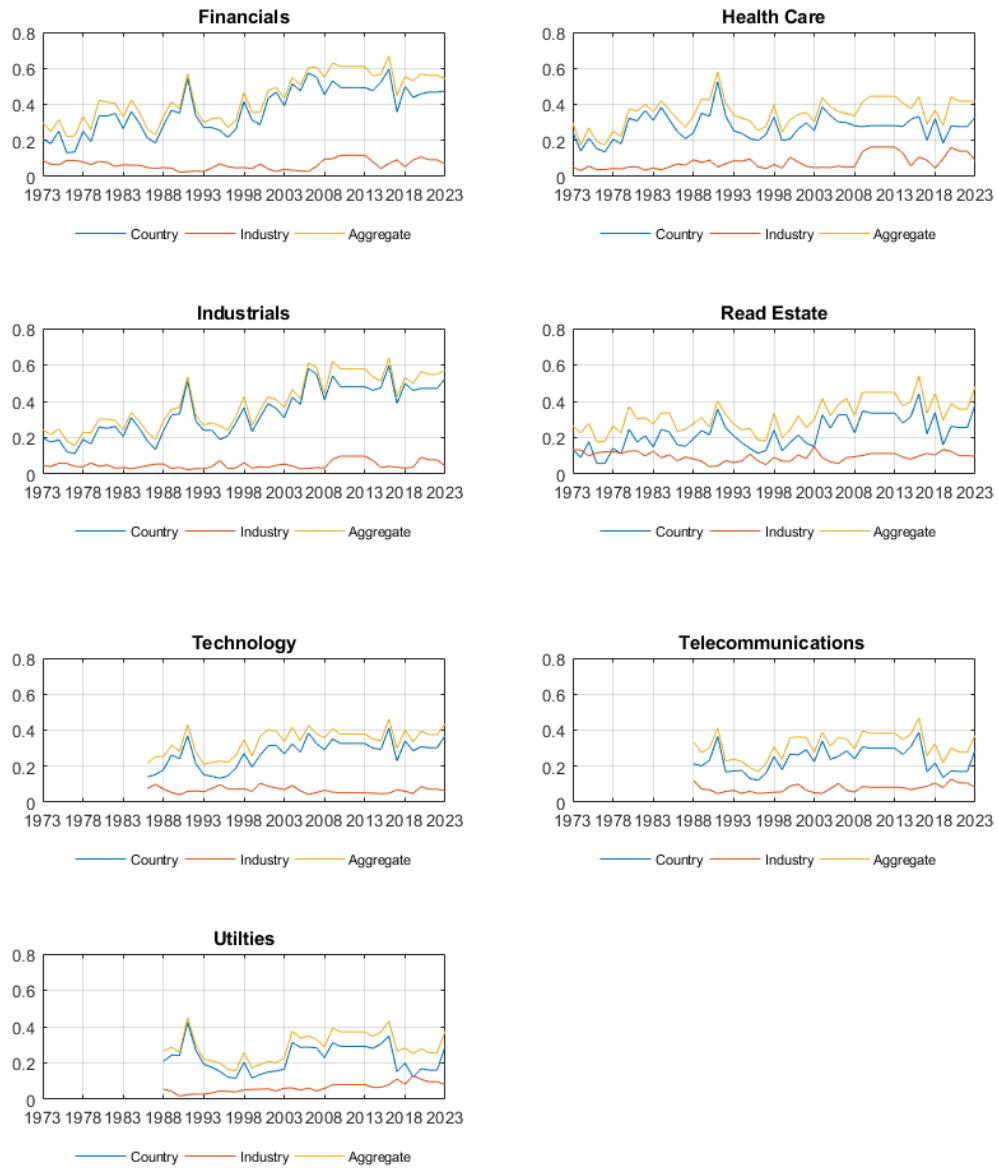
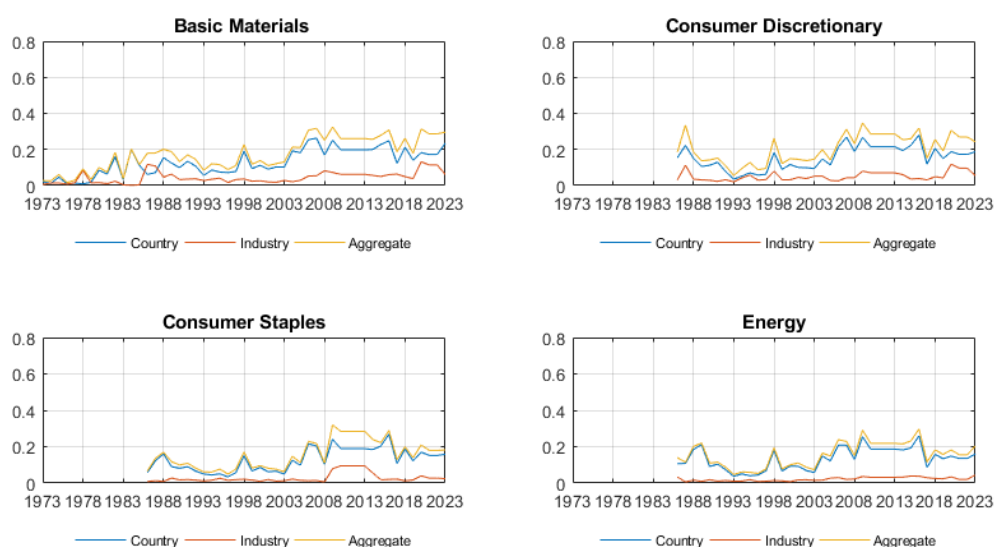


Figure 3: Integration dynamics in emerging markets

This figure shows the dynamics of the market integration (country/industry/aggregate) of emerging markets over time. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported in each industry: country-level, industry-level and aggregate market integration. The value each year is equally averaged by the level of the market integration of all existing emerging markets in the year. The market integration is calculated by adjusted explanatory power after considering the bias caused by factor and residual heteroscedasticity and changes in factors loadings during financial crises and by the method of Pukthuanthong and Roll (2009) during normal periods.



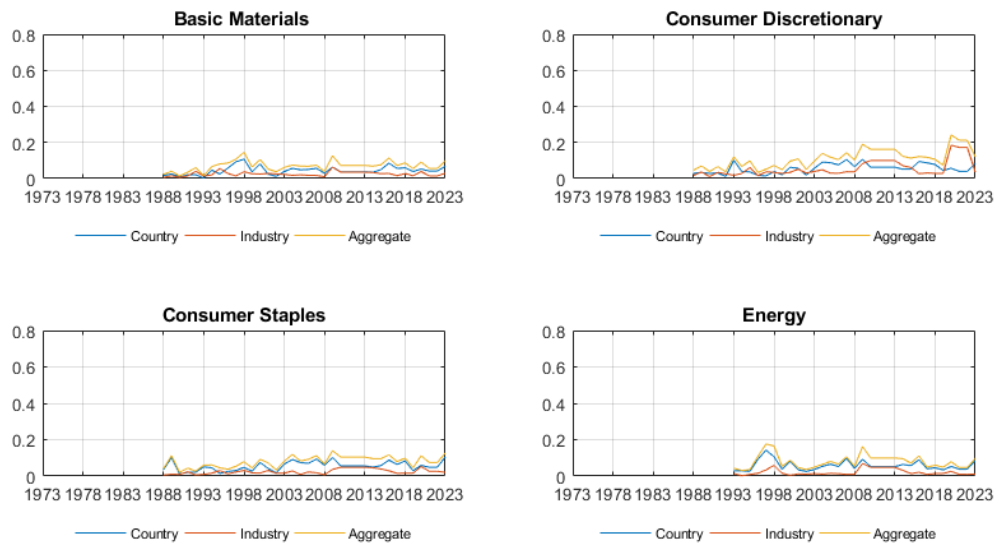
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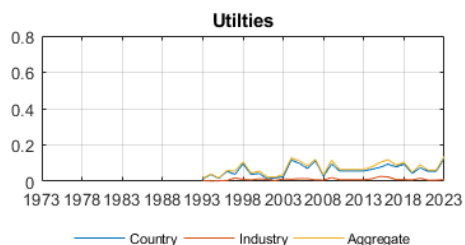
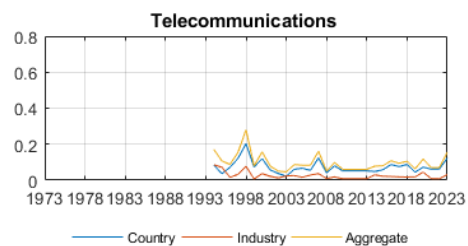
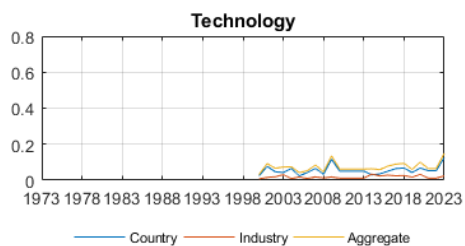
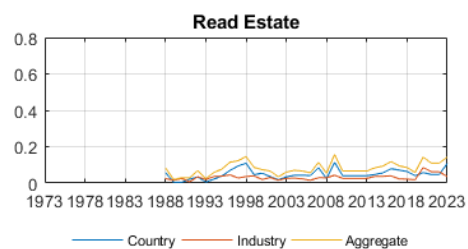
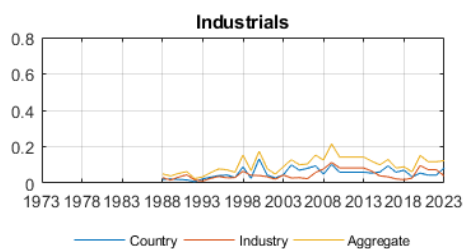
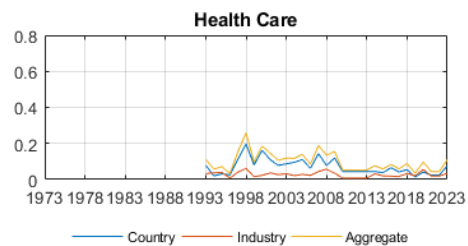
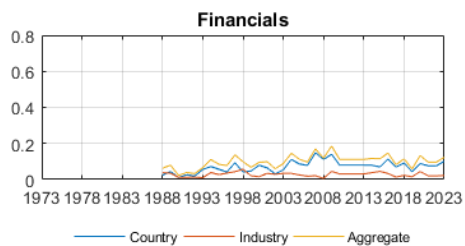
Figure 4: Integration dynamics in frontier markets

This figure shows the dynamics of the market integration (country/industry/aggregate) of frontier markets over time. The 11 industries include Basic Materials (BM), Consumer Discretionary (CD), Consumer Staples (CS), Energy (EN), Financials (FIN), Health Care (HC), Industrials (IND), Real Estate (RE), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Three types of market integration are reported in each industry: country-level, industry-level and aggregate market integration. The value each year is equally averaged by the level of the market integration of all existing frontier markets in the year. The market integration is calculated by adjusted explanatory power after considering the bias caused by factor and residual heteroscedasticity and changes in factors loadings during financial crises and by the method of P Pukthuanthong and Roll (2009) during normal periods.



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(Figure 4 Continued)



Appendix

A1 Summary statistics across 68 countries and 11 industries

This table reports average returns and their standard deviation across 64 markets and 10 industries. The 10 industries include Basic Materials (BM), Consumer Goods (CG), Consumer Services (CS), Financials (FIN), Health Care (HC), Industrials (IND), Oil & Gas (OG), Technology (TEC), Telecommunications (TEL), and Utilities (UTL). Besides, the country index average returns are also reported (TM). The starting time of each data series is determined by data availability and the ending time is 31/12/2023. All data are expressed as US dollars and the values in brackets are standard deviations. Returns are expressed by percentage.

Market/Industry	TM	BM	CG	CS	FIN	HC	IND	OG	TEC	TEL	UTL
Argentina	8.6053 (3.0736)	9.4518 (3.4254)	6.0822 (3.7335)	4.4786 (1.9927)	4.0445 (2.4118)	---	12.0442 (3.4364)	8.4179 (3.5254)	---	1.4229 (2.6075)	-0.1817 (2.0547)
Australia	3.9456 (1.3466)	3.7083 (1.6037)	7.2036 (1.9591)	4.7324 (1.4301)	4.7211 (1.3649)	5.5600 (1.3029)	4.3993 (1.4547)	3.6240 (1.7026)	7.4917 (2.0690)	4.3882 (1.8598)	6.9897 (1.7893)
Austria	3.9380 (1.1995)	4.5783 (1.5724)	0.6815 (2.2184)	3.7454 (2.1510)	5.1083 (1.3672)	3.3788 (1.8178)	2.2917 (1.4800)	6.7632 (2.0687)	4.3268 (2.6152)	0.9260 (2.0155)	3.5941 (1.6086)
Bahrain	1.3346 (0.7829)	2.0219 (1.1600)	5.3116 (1.1237)	5.8380 (1.2547)	1.4181 (0.9199)	---	11.9176 (7.1982)	---	---	-0.0291 (1.2398)	---
Belgium	4.5521 (1.1563)	4.4436 (1.4532)	5.7936 (1.8705)	5.9447 (1.3131)	4.2673 (1.3405)	6.6611 (1.6954)	4.0501 (1.3765)	5.4422 (1.6290)	6.4030 (2.1552)	6.1182 (2.1423)	4.9723 (1.2157)
Brazil	3.8156 (2.0419)	2.8660 (2.2683)	7.8411 (1.9737)	7.7075 (2.3847)	5.7445 (2.2675)	2.9063 (2.4821)	4.8361 (2.2354)	6.0121 (2.8459)	5.7543 (2.5591)	2.6695 (2.2976)	2.5627 (2.3420)
Bulgaria	6.2222 (1.7071)	16.2051 (2.8769)	2.3462 (3.3187)	14.2983 (3.9060)	6.7350 (1.8777)	12.5929 (3.4880)	19.5038 (6.1421)	11.4342 (4.2652)	6.3313 (1.7854)	18.0485 (7.3748)	9.9466 (3.7905)
Canada	3.1709 (1.0746)	2.4385 (1.5348)	3.6798 (2.2796)	2.5813 (1.0281)	4.3535 (1.1461)	5.4094 (1.6446)	3.7850 (2.0547)	3.2483 (1.5005)	2.6299 (1.9268)	4.3168 (1.1796)	3.2865 (0.9793)
Chile	5.0680 (1.1764)	6.0707 (1.3981)	6.1888 (1.3943)	5.0605 (1.4972)	6.3405 (1.3438)	8.0548 (2.0432)	4.2724 (1.5345)	5.2366 (1.6265)	5.1411 (1.8427)	3.2674 (1.6805)	4.8944 (1.3163)
China A shares	8.4672 (2.2354)	6.7412 (2.4568)	5.8284 (2.3943)	8.0236 (2.7543)	7.9971 (2.2788)	7.2769 (2.0389)	7.5130 (2.1389)	4.9679 (1.9104)	6.2306 (2.1564)	4.7972 (2.4000)	6.1754 (2.2801)
China H+B shares	4.5687 (1.9517)	6.6894 (2.5669)	6.8105 (2.2573)	4.5985 (2.6208)	7.2970 (2.3000)	17.1726 (2.5181)	6.6796 (2.4202)	2.3220 (2.5684)	-3.0134 (2.1375)	3.6691 (2.2909)	5.4261 (2.4402)

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Market/Industry	TM	BM	CG	CS	FIN	HC	IND	OG	TEC	TEL	UTL
Colombia	3.5279 (1.3802)	5.7794 (1.9791)	3.6972 (1.7372)	2.5743 (2.0291)	2.5782 (1.3964)	-0.6557 (1.6097)	0.9728 (2.3741)	2.8582 (2.3337)	3.6423 (1.4527)	5.8847 (2.3269)	9.4919 (1.6485)
Croatia	2.8387 (1.2982)	19.6413 (5.4189)	1.7712 (1.2900)	5.2450 (1.6813)	1.7600 (1.7746)	4.3010 (2.6879)	1.9544 (1.7481)	8.1026 (2.3563)	---	3.0756 (1.4265)	---
Cyprus	1.2437 (1.8233)	8.2254 (3.6376)	1.8002 (2.1326)	6.7095 (1.7155)	0.3338 (2.1091)	---	5.3887 (2.0715)	9.7552 (4.0373)	-4.1905 (3.2654)	-6.2908 (4.1949)	0.4676 (0.5540)
Czech Republic	4.4353 (1.5965)	1.5955 (1.6802)	3.8687 (2.2537)	1.4375 (2.8814)	4.9551 (2.1295)	3.8757 (1.5427)	10.4661 (1.8127)	7.1093 (2.0254)	4.4938 (1.9531)	4.8901 (2.0370)	5.3064 (1.9270)
Denmark	4.3800 (1.2694)	3.8105 (2.3237)	3.6985 (1.8308)	3.1438 (2.0721)	4.9022 (1.3553)	5.5059 (1.3696)	3.3688 (1.8724)	7.1950 (3.5681)	8.3356 (2.4030)	3.4318 (2.0362)	12.0899 (1.5092)
Egypt	4.2718 (1.4574)	4.9623 (1.6347)	2.4067 (1.7248)	24.9657 (9.2178)	4.9112 (1.6981)	12.9737 (1.9961)	6.8395 (1.7773)	5.3104 (1.9131)	515.8096 (129.5921)	7.5864 (2.1510)	---
Finland	4.2524 (1.7801)	2.6220 (1.8746)	9.2062 (2.0337)	3.2014 (1.4501)	5.3275 (1.8774)	3.6694 (1.5265)	3.5948 (1.5636)	8.1933 (2.4745)	6.8925 (2.6877)	5.8579 (2.5302)	5.9008 (1.9894)
France	4.7033 (1.3157)	5.7011 (1.4507)	4.2600 (1.5261)	4.2191 (1.3793)	5.2293 (1.5261)	4.4670 (1.3738)	5.6031 (1.4469)	5.7765 (1.7130)	5.1672 (1.9750)	4.2984 (2.2432)	1.2053 (1.9165)
Germany	3.8900 (1.2211)	4.9057 (1.3630)	4.7831 (1.7046)	3.2351 (1.3312)	3.7410 (1.3639)	4.3234 (1.0572)	3.7323 (1.3783)	-5.7297 (2.5221)	7.8829 (2.1287)	3.8787 (1.7560)	3.6964 (1.1835)
Greece	2.4890 (2.0344)	6.1643 (2.2747)	13.6233 (4.1809)	7.0446 (2.9323)	0.8185 (2.8972)	5.5329 (3.4045)	9.0849 (2.9757)	5.6944 (2.1909)	6.5157 (4.6546)	5.2316 (2.5002)	2.8658 (2.5521)
Hong Kong	5.8288 (1.7328)	4.0697 (2.2650)	6.0002 (1.7022)	4.1120 (1.6446)	6.1663 (1.7810)	17.9579 (2.6877)	5.5213 (2.1610)	8.4785 (3.7124)	9.0007 (2.5083)	4.6563 (1.9927)	8.8099 (1.7061)
Hungary	5.3743 (1.9002)	6.6209 (2.6300)	5.2451 (2.1393)	13.1313 (2.7177)	8.8577 (2.7302)	8.7481 (2.1797)	0.6654 (2.3891)	6.9622 (2.5053)	-2.0141 (2.6323)	2.8920 (2.0855)	7.6118 (2.1649)
India	3.4471 (1.7229)	2.9531 (1.9576)	4.7998 (1.6926)	5.5356 (2.3922)	6.9718 (2.5597)	6.5203 (1.6347)	3.6519 (1.9939)	2.3057 (2.3862)	11.2488 (2.8085)	3.3051 (2.3674)	4.4254 (2.3854)
Indonesia	4.5246 (2.3300)	3.0233 (2.8467)	5.9034 (2.4918)	1.6997 (2.5743)	4.0557 (2.8199)	9.8504 (2.7631)	13.2668 (2.9169)	4.0498 (2.6283)	23.5118 (2.6194)	7.1593 (2.7428)	10.1088 (2.8911)
Ireland	4.6813 (1.3214)	5.7106 (2.9622)	2.2292 (2.4228)	5.5838 (1.4562)	4.7369 (2.2584)	-10.8961 (1.4024)	9.1725 (2.5078)	4.5310 (3.2521)	7.6897 (3.0360)	31.9611 (9.4767)	---

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Market/Industry	TM	BM	CG	CS	FIN	HC	IND	OG	TEC	TEL	UTL
Israel	2.0927 (1.3554)	2.6116 (1.8919)	5.1380 (1.9741)	5.1821 (1.6099)	3.0096 (1.5919)	3.2292 (1.8810)	2.6390 (1.6723)	3.9171 (1.9293)	0.1287 (2.1695)	2.9455 (1.7543)	4.0522 (2.0544)
Italy	3.3149 (1.5059)	2.9480 (1.8152)	3.7523 (1.7793)	2.1176 (1.7561)	3.5858 (1.7331)	3.3713 (1.5472)	2.2250 (1.5579)	3.4573 (1.8775)	0.1634 (2.1632)	3.7040 (1.9512)	4.9872 (1.7684)
Japan	4.0737 (1.2928)	4.1665 (1.4845)	4.9721 (1.4414)	3.5552 (1.2026)	3.9284 (1.5878)	5.0713 (1.2174)	4.4305 (1.4523)	4.2662 (1.8884)	4.6970 (1.7161)	7.3790 (2.0984)	4.4526 (1.4988)
Jordan	-0.5283 (0.8888)	1.4706 (1.8749)	5.4837 (1.1499)	0.3136 (0.6392)	-0.6410 (0.8995)	-1.0629 (1.5925)	0.0463 (1.3619)	3.1036 (1.9011)	--- ---	0.6186 (1.4843)	6.8504 (2.0899)
Korea	3.3850 (2.0718)	4.6998 (2.2929)	4.7292 (2.2826)	1.3560 (2.2288)	2.1338 (2.5082)	8.8585 (2.7005)	4.9598 (2.4556)	5.3588 (2.5121)	4.5392 (3.0852)	5.9973 (2.3006)	2.9294 (2.4406)
Kuwait	2.8678 (1.0260)	3.9878 (1.7017)	4.3567 (2.0200)	2.0243 (2.0892)	3.0875 (1.0518)	5.6454 (1.4555)	3.8567 (1.4227)	7.3695 (2.7197)	--- ---	2.5625 (1.7981)	--- ---
Luxembourg	3.5542 (1.1644)	2.5576 (1.8086)	6.8189 (1.9503)	0.7388 (1.8934)	4.6902 (1.1644)	-33.7154 (1.5323)	1.0311 (1.8593)	1.6294 (1.6332)	5.0724 (2.0240)	6.6147 (4.3199)	7.1391 (1.8138)
Malaysia	5.0797 (1.4369)	4.3747 (1.8220)	5.9666 (1.8937)	5.6123 (1.6383)	5.7060 (1.7054)	12.1883 (1.4963)	4.5595 (1.6840)	6.4042 (1.6808)	22.0349 (2.4884)	3.5296 (2.2721)	3.3504 (1.7408)
Malta	1.8617 (0.9142)	--- ---	6.6426 (1.2502)	2.7025 (1.8700)	1.9611 (1.0032)	--- ---	6.9779 (1.1544)	6.8825 (2.1797)	1.3678 (2.7768)	1.8251 (1.9398)	--- ---
Mexico	5.1582 (1.6953)	5.8465 (2.0250)	1.9264 (2.3910)	5.0863 (1.6725)	8.7410 (2.3979)	5.1855 (2.5125)	2.9884 (1.9919)	--- ---	--- ---	5.3468 (1.9817)	6.0136 (1.7808)
Morocco	4.8731 (0.8439)	5.7592 (1.4334)	4.7372 (1.0137)	7.9503 (2.2736)	5.2118 (0.9567)	3.0662 (1.4959)	4.2296 (1.3672)	3.5280 (1.6395)	3.6619 (2.1769)	6.1088 (1.2535)	10.2830 (1.9310)
Netherlands	4.1731 (1.1920)	2.6084 (1.7388)	5.1291 (1.5125)	4.7161 (1.2293)	3.2549 (1.3241)	3.2130 (1.6978)	4.6446 (1.8406)	5.6027 (1.7143)	7.5723 (2.1288)	2.1910 (2.1711)	8.5627 (1.3625)
New Zealand	3.9605 (1.2347)	3.6738 (1.7807)	4.3833 (1.6085)	4.1857 (1.2670)	3.2061 (1.4749)	5.3981 (1.3627)	7.1396 (1.6811)	9.8582 (1.9197)	14.6190 (2.5129)	5.1304 (1.7712)	6.4413 (1.3339)

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Market/Industry	TM	BM	CG	CS	FIN	HC	IND	OG	TEC	TEL	UTL
Nigeria	0.5237 (1.3467)	6.1793 (2.4223)	1.8961 (1.4123)	-11.8354 (1.8126)	-1.4606 (1.7041)	3.2482 (2.3573)	4.9286 (1.8799)	-3.7390 (1.7159)	-5.3750 (1.5352)	---	---
Norway	4.8138 (1.6427)	5.1746 (1.9917)	5.3600 (1.8763)	8.9962 (3.0004)	6.7066 (2.0100)	-2.3962 (2.3488)	4.5044 (1.9229)	5.2601 (2.0135)	3.9073 (2.5040)	4.6982 (2.3726)	7.9736 (2.1775)
Oman	1.0988 (0.9846)	1.2126 (1.4529)	9.2666 (1.0473)	5.6544 (0.9256)	1.2900 (1.2627)	---	1.3954 (1.4511)	2.0307 (1.2845)	7.1300 (1.4615)	-0.0493 (1.4381)	4.2503 (1.0210)
Pakistan	5.7123 (1.6272)	6.6169 (1.9195)	7.4893 (1.6279)	5.5949 (3.8229)	8.6762 (2.2993)	3.8560 (1.8026)	3.2489 (2.3389)	7.3785 (1.8234)	---	2.6951 (2.4275)	6.3687 (2.3992)
Peru	3.8965 (1.1097)	2.8551 (1.5612)	4.1300 (1.4639)	12.5493 (3.5110)	5.7111 (0.9517)	---	15.3135 (8.3150)	-0.6447 (3.0376)	---	9.3332 (3.7025)	3.9904 (1.2464)
Philippines	4.3311 (1.5604)	9.4636 (3.2997)	5.3046 (1.6983)	2.8930 (2.2590)	3.2507 (1.5896)	2.5769 (1.5734)	3.8074 (2.2562)	1.7025 (2.8427)	12.7520 (3.5030)	3.7997 (2.0794)	6.0242 (2.3371)
Poland	2.3479 (1.9580)	3.7130 (2.2502)	4.1156 (1.8562)	3.9045 (2.1127)	2.6647 (2.1188)	-0.5188 (2.2151)	1.6559 (1.9447)	6.5380 (2.3186)	1.7601 (2.3361)	2.2694 (2.2546)	3.8826 (2.3636)
Portugal	1.7599 (1.2490)	3.1930 (1.4297)	3.7773 (2.1151)	0.8327 (1.6870)	-1.2286 (1.8378)	13.6436 (6.1943)	1.2825 (1.4669)	6.0828 (2.3625)	-1.5841 (2.2625)	2.0162 (1.9708)	3.4940 (1.7080)
Qatar	5.9782 (1.4079)	---	5.1201 (1.7651)	10.6749 (1.8034)	6.7440 (1.5232)	6.9762 (3.1476)	6.1869 (1.7564)	3.7119 (1.9228)	---	5.0422 (1.8266)	9.6018 (2.0820)
Romania	4.0901 (2.3745)	5.0096 (3.1073)	6.7768 (4.9313)	7.1623 (3.4652)	5.5994 (2.4845)	3.4045 (2.3929)	8.4473 (2.3565)	4.6910 (2.4742)	61.0963 (11.4064)	0.0936 (1.3193)	17.7708 (12.5572)
Russia	7.8451 (2.9166)	7.8483 (2.3259)	14.7062 (3.9090)	16.6486 (3.6098)	10.5053 (3.7778)	-2.4417 (2.8652)	3.0529 (3.6196)	8.5459 (3.0914)	25.8257 (10.5767)	7.7136 (3.4961)	8.3738 (3.7096)
Singapore	3.9245 (1.3523)	1.9512 (2.6255)	6.8231 (2.2254)	5.0602 (1.4760)	4.4800 (1.5669)	4.5034 (1.4926)	3.8409 (1.7100)	4.0239 (2.1149)	0.9144 (2.6546)	3.5250 (1.7944)	9.2006 (2.4223)
Slovenia	2.5464 (1.1303)	3.5497 (1.8478)	2.3064 (1.6323)	-0.5328 (1.6160)	1.9097 (1.7998)	6.3509 (1.4805)	2.4405 (1.6137)	3.1582 (1.5984)	2.2469 (2.9185)	-0.9291 (1.8503)	7.7805 (0.4276)
South Africa	6.2928 (1.6775)	5.0175 (2.2936)	6.0702 (2.1852)	6.4826 (1.7058)	7.5048 (1.9138)	6.4899 (1.6085)	6.0735 (1.8257)	5.7545 (1.9658)	113.8199 (1.7128)	9.3600 (2.7561)	5.0285 (2.2159)

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Market/Industry	TM	BM	CG	CS	FIN	HC	IND	OG	TEC	TEL	UTL
Spain	3.4321 (1.4041)	2.6014 (1.5732)	0.1172 (2.0985)	3.9005 (1.5756)	3.9329 (1.7186)	3.4644 (1.5568)	2.4658 (1.4682)	3.3034 (1.8002)	3.5808 (4.2424)	4.6850 (1.8463)	5.2303 (1.4464)
Sri Lanka	3.6504 (1.3997)	5.3227 (3.8661)	6.1363 (2.2747)	4.0935 (1.9576)	4.6659 (1.6470)	13.4255 (3.5202)	6.2961 (1.9548)	8.3305 (1.8483)	0.5014 (2.2508)	2.8279 (1.9020)	-1.7799 (2.0132)
Sweden	5.5840 (1.5726)	6.0177 (1.7387)	7.0310 (1.7696)	7.8360 (1.7797)	5.7314 (1.8263)	4.3212 (1.6739)	6.2387 (1.6831)	14.0152 (3.0013)	6.9819 (2.5898)	5.1486 (2.1289)	4.1611 (1.5212)
Switzerland	4.6388 (1.0559)	5.1513 (1.2316)	6.1976 (1.7147)	4.5609 (1.3091)	4.4984 (1.3012)	4.9306 (1.1187)	4.7394 (1.3178)	-8.8459 (2.4697)	2.5158 (1.9351)	4.8556 (1.4395)	4.7523 (1.1307)
Taiwan	3.7246 (1.8567)	3.5045 (1.8798)	4.3983 (2.0552)	2.0650 (2.0303)	2.7775 (2.0858)	8.0893 (2.7689)	5.3079 (2.1286)	5.1114 (1.6603)	8.2185 (2.3229)	3.0687 (1.2030)	--- ---
Thailand	5.0423 (1.8443)	7.3752 (2.2316)	6.3407 (2.2588)	5.8125 (2.0674)	4.3238 (2.2280)	6.9508 (1.9278)	7.3894 (2.5486)	8.3399 (2.4453)	8.6292 (2.7433)	5.2189 (2.4597)	4.4127 (2.0162)
Turkey	8.3235 (2.8194)	9.5071 (3.0435)	6.9118 (2.9382)	11.3462 (3.7949)	9.1452 (3.1916)	8.8419 (3.8707)	10.8873 (3.3667)	12.5943 (3.5682)	10.6458 (3.9838)	12.8386 (4.2565)	7.2817 (3.1870)
U.K.	5.0194 (1.2436)	5.2222 (1.7263)	5.1751 (1.5432)	4.9102 (1.2961)	5.2023 (1.4557)	5.4397 (1.2589)	5.1577 (1.3814)	5.8413 (1.5309)	6.0222 (1.7548)	5.7839 (1.7503)	4.8741 (1.2392)
U.S.	3.6969 (1.0625)	3.9180 (1.3683)	3.0636 (1.1473)	3.7911 (1.1874)	3.8671 (1.3250)	4.4630 (1.0421)	4.3919 (1.1960)	4.1975 (1.4026)	3.5499 (1.5691)	3.9429 (1.1979)	3.3676 (0.9164)
United Arab Emirates	3.7037 (1.2539)	--- ---	3.0662 (1.9264)	2.3590 (1.8389)	4.0657 (1.3713)	6.9118 (2.2773)	-0.0734 (1.9903)	17.0372 (1.8390)	--- ---	6.3465 (1.5371)	-8.4054 (2.2492)
Venezuela	16.2164 (2.6759)	19.9626 (4.4040)	17.1132 (4.6063)	-4.7996 (1.9550)	15.6224 (2.6227)	--- ---	9.3372 (3.5989)	0.9495 (2.7044)	--- ---	21.6768 (4.5797)	17.2077 (4.1424)

B: Interpreting Bekaert et al. (2009) Through Our Integration Framework

Bekaert et al. (2009) document a significant rise in international stock return comovement over the past several decades, attributing it largely to world and regional market integration. Their model is grounded in a hybrid multifactor structure, where return covariation is explained by exposure to global and regional factors. A key conclusion from their study is that country-level factors consistently dominate in driving equity return comovements, and while industry-level co-movements exist, they are largely transitory and secondary to regional influences.

Our paper complements and clarifies these results by decomposing global market integration into two analytically distinct components: integration driven by country-specific factors and integration driven by industry-specific factors. This distinction allows us to not only confirm that country-level integration is dominant during normal periods, as Bekaert et al. (2009) found, but also to explain why and when industry-level integration becomes important, particularly during financial crises.

Whereas Bekaert et al. (2009) rely on factor model residual correlations to infer integration, our approach uses a bias-corrected integration measure derived from the R^2 of global factor models, adjusted for volatility clustering and heteroscedasticity. Specifically, our method is grounded in the adjustment proposed by Qin et al. (2022), which refines the original measure of Pukthuanthong and Roll (2009). This bias correction is particularly important during crisis periods when global volatility surges may inflate correlation measures. The corrected integration metric for portfolio i at time t is given by:

$$Integration_{i,t} = 1 - \frac{Var(\varepsilon_{i,t})}{Var(R_{i,t})}$$

where $\varepsilon_{i,t}$ is the residual from a regression of the asset return on global factors, and the integration estimate is bias-corrected to account for time-varying volatility in global factors using the analytical adjustment proposed by Qin et al. (2022), which corrects spurious increases in R^2 that arise when global risk factor variances surge during crises. This equation provides a dynamic measure of integration that distinguishes between spurious correlation and true factor alignment.

Our empirical results corroborate Bekaert et al. (2009)'s core finding of strong country-level integration. However, we provide two key extensions:

1. State-contingent dynamics: We show that industry-level integration intensifies markedly during crisis periods, narrowing or even reversing the historical gap between country and industry factors. This helps to explain why Bekaert et al. (2009) may have viewed industry co-movement as transitory, it is not persistently high, but episodically surging under specific market regimes.
2. Structural insight into integration mechanisms: By disaggregating integration at the industry level, we identify that certain global industry shocks (e.g., oil price movements, global demand collapses in manufacturing) drive the co-movement of sector returns across countries. This structure was not captured in the regional vs. world factor framework of Bekaert et al. (2009), which treated industry shocks as noise or absorbed them into residuals.

In essence, our findings are consistent with the world-regional integration view of Bekaert et al. (2009), but extend it by highlighting that industry-specific factors can act as dominant channels of integration under stress, and that these effects are predictable and measurable rather than merely transient.