

DYNAMIC CONVERGENCE IN EQUITY MARKETS: EVIDENCE FROM AN OPEN-DEVELOPING ECONOMY

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Abstract. This paper examines the speed and stability of stock market convergence in an open developing economy, using Vietnam as the case. The study applies a β -convergence framework to weekly FTSE equity-indices from 2013 to 2025, estimating both full-sample and time-varying models, including sub-period regressions and rolling-window analyses. Structural change is addressed by separating pre-crisis, crisis, and post-crisis periods. The findings reveal three key insights. First, Vietnam's equity market shows long-run convergence with regional benchmarks such as Korea, the Asia-Pacific, and emerging markets, but weaker linkages with advanced markets such as the United States (U.S.), the euro area (EMU), and Japan. Second, convergence speeds rose during the crisis period, indicating temporary synchronization with global markets, then fell sharply in the post-crisis phase. Third, regional linkages are more persistent, suggesting a re-orientation toward intra-regional financial alignment. These results have important research implications for understanding dynamic financial integration and convergence asymmetries. From a policy perspective, they support strengthening regional financial cooperation to bolster resilience and market development in open developing economies.

Keywords: stock market convergence, β -convergence, emerging markets, financial integration, time-varying integration, regional financial linkages.

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1. Introduction

In the context of rising global uncertainty and shifting geopolitical dynamics, the stability and adaptability of domestic financial markets have become essential indicators of economic resilience – particularly for open developing economies (Rodrik, 2011; Alsdan et al., 2025). These economies are more exposed to external shocks, often experiencing sharper asset-price corrections during global risk-aversion episodes and greater financial vulnerability (Hoque & Zaidi, 2020; Sun et al., 2025). The COVID-19 pandemic disrupted established financial linkages, intensified fragmentation, and raised systemic risks, particularly in economies reliant on foreign capital and export (Kapar et al., 2020; Lukanima et al., 2024). As a result, assessing how such markets adjust relative to global and regional benchmarks is both timely and policy relevant. Although developing country stock markets increasingly contribute to capital allocation and information transmission, questions remain about the durability, symmetry, and

stability of their integration with international financial systems – particularly in the wake of major global disruptions.

Prior work on international financial integration has emphasized financial market linkages and co-movement, focusing primarily on return correlations or cointegration across countries (e.g. Bekaert & Harvey, 1995; Forbes & Chinn, 2004; Pukthuanthong & Roll, 2009; Chien et al., 2015; among others). While globalization has tightened cross-market connections, most studies ask whether markets move together, not how quickly they realign after large shocks. Research on long-run cointegration (Kasa, 1992; Chien et al., 2015) rarely addresses the speed or durability of adjustment, and evidence on post-crisis dynamics in emerging markets – especially following COVID-19 or rising geopolitical tensions – remains limited. This omission suggests at least two notable gaps in the literature. First, co-movement does not imply convergence. A high correlation can reflect common shocks or changes in volatility, without any catch-up in levels or pricing gaps. Second, most studies are static: they tell us if markets move together, not how quickly a segmented market closes its gap to a benchmark.

This study is informed by the need to move beyond static assessments of integration and instead quantify the speed and stability of market re-alignment in response to systemic shocks. It shifts the focus from “are markets connected?” to “how fast do they re-align?” This paper adopts a β -convergence framework to measure the speed of re-coupling in open developing economies, taking Vietnam – an economy undergoing rapid financial liberalization – as a representative case. Utilizing FTSE indices at weekly frequency, this paper estimates not only the degree but also the speed of convergence between Vietnam’s equity market and a set of global and regional indices – including the U.S., World, EMU, ASEAN, Korea, and emerging market aggregates. This paper translates β into an economic half-life, and report full-sample, rolling-window, and subperiod estimates around major shock.

The results indicate a long-term convergence between Vietnam and Korea, emerging markets, and the Asia-Pacific region, with weaker integration with advanced markets like the U.S. and EMU. Convergence intensified sharply during COVID-19, consistent with temporary synchronization during global shocks, but declined in the post-COVID phase. Notably, Vietnam’s connections with ASEAN and frontier markets remained stable after the crisis. Rolling β -convergence estimates further confirm a rapid rise in convergence during the pandemic, followed by a quick return to previous levels, suggesting increasing regionalization alongside global fragmentation.

The contributions of this paper are at least twofold. From the scholar perspective, the paper advances the literature by shifting the focus of financial integration research from static linkages to the dynamics of convergence speed, fragmentation, and resilience- dimensions that remain underexplored in existing empirical work. It applies a β -convergence framework rarely used in stock market analysis, as a complementary tool to traditional co-movement and cointegration methods. Empirically, it provides time-sensitive evidence from a fast-growing developing economy using globally consistent benchmarks.

From a policy standpoint, the findings imply that global shocks may synchronize markets only transiently, whereas sustained integration is more robust within regional frameworks, supporting policies that enhance intra-regional liquidity and institutional coordination.

The remainder proceeds as follows. Section 2 reviews theory and evidence. Section 3 describes data and methods. Section 4 reports results and discussion. Section 5 concludes with implications for stakeholders.

2. Theoretical framework and empirical review

2.1. Theoretical framework

The literature on financial integration builds on several foundational theories in international finance, namely the Law of One Price (LOOP), the Capital Asset Pricing Model (CAPM) and its international extensions (ICAPM), and capital mobility.

LOOP posits that in fully integrated markets, assets with comparable risk–return profiles should command the same price across countries (Adam et al., 2002; Baele et al., 2004; Yu et al., 2010). Arbitrage then eliminates cross-market pricing gaps, equalizing expected returns and enabling risk sharing. In such settings, domestic idiosyncratic risks are diversifiable through international portfolios (Batten et al., 2019). However, heightened return co-movements under integration may reduce the diversification benefits during periods of global stress. The LOOP motivates the β -convergence framework by suggesting that, in integrated markets, price differentials should narrow over time.

ICAPM complements this view by linking expected returns to international systematic risk. When markets become more integrated, local returns increasingly reflect international factors rather than idiosyncratic shocks. For example, Batten et al. (2019) employ a conditional ICAPM framework to assess the integration of stock markets with energy commodities, while Boako and Alagidede (2018) apply a factor-based CAPM to test volatility spillovers in African markets during the Global Financial Crisis (GFC), finding that crisis periods may induce temporary re-coupling or divergence depending on regional dynamics.

Capital mobility is a key mechanism of financial integration. While classical models link capital account liberalization to efficient allocation and market discipline (Batten et al., 2019; Park & Newaz, in press), Obstfeld (1986) distinguishes between potential (legal openness) and effective (behavioural) capital mobility. True integration occurs only when capital flows respond to return differentials and domestic markets are sufficiently developed, transparent, and liquid to facilitate such flows. A country may be classified as “open” on paper yet only partially integrated due to institutional weaknesses, political risk, or low investor confidence. This perspective implies that effective integration should be assessed not only via co-movement but also via the speed and quality of price convergence.

2.2. Empirical review

There has been extensive research on financial market integration, where the two terms “linkage” and “convergence” used interchangeably. However, these two terms are meaningfully distinct. Linkage, often measured through correlation, cointegration, or co-movement of returns, refers to the degree to which financial markets move together at a given point in time or over a specific period. High correlation often reflects common global shocks or volatility shifts and may be short-lived, especially during periods of elevated risk aversion (Forbes & Chinn, 2004). In contrast, convergence – particularly β -convergence – addresses a long-term dynamic process: it asks whether a lagging market is catching up to or realigning with a more advanced benchmark over time (Barro & Sala-i-Martin, 1992). In the context of stock markets, convergence means that stock prices of different countries sharing long-run and short-run relationships become integrated (Chien et al., 2015).

A large body of literature devotes to study the linkages between financial markets. Early studies established long-run common trends and static integration using cointegration and common-factor methods, showing that equity indices can share persistent stochastic trends

(Johansen, 1988, 1991). Subsequent work documented time-varying degrees of integration (Bekaert & Harvey, 1995), proposed alternative metrics of synchronization (Pukthuanthong & Roll, 2009), decomposed cross-market co-movements into real and financial channels (Forbes & Chinn, 2004), and introduced directional volatility spillovers to identify who transmits or absorbs risk (Diebold & Yilmaz, 2009). Evidence is consistent that co-movement intensifies in crises (Boako & Alagidede, 2018; Duong, 2024; Sher et al., 2024), while post-crisis phases often feature slower convergence and persistent fragmentation driven by policy divergence, regulatory asymmetries, and rising geoeconomic segmentation (Caporale et al., 2019; Park & Newaz, in press).

Not many studies focus on the long-term linkage or convergence among financial markets, but several important contributions stand out. Kasa (1992) identifies a common stochastic trend binding major equity markets. Barro and Sala-i-Martin (1992) develop the foundational concepts of beta- and sigma-convergence, which have been widely adapted to assess financial market convergence beyond macroeconomic growth. Phillips and Sul (2007) develop a panel approach that detects club convergence and divergence in heterogeneous settings. Manning (2002) combines cointegration with state-space methods to show partial long-run co-movement. Caporale et al. (2019) apply Phillips and Sul's method to equity sectors and uncover sector-level convergence with notable shifts during crisis periods.

Findings for advanced economies consistently point to stronger and more persistent integration, often linked to institutional convergence and monetary coordination. Around the euro's introduction, studies documented elevated return co-movements and risk transmission within the euro area (Adam et al., 2002; Baele et al., 2004). This pattern endures, with return connectedness increasing during shocks and reinforced by shared policy frameworks (Lee & Kim, 2020; Park & Newaz, in press). In contrast, evidence for developing economies is mixed. Many papers find both global (U.S.) and regional (Asia) ties but disagree on which dominates. Several show regional effects are stronger, especially in global instability (Duong & Kool, 2022). For Pakistan, Lee et al. (2024) shows limited long-run integration with major markets (hence potential diversification) despite prevalent short-run linkage. In Africa, during the GFC, correlations rose, but regional spillovers dominated global ones – suggesting partial decoupling from world shocks and stronger intra-regional transmission (Boako & Alagidede, 2018). For China, linkages to developed markets remain modest, preserving some global diversification (Sher et al., 2024). By contrast Caporale et al. (2019) show that the speed of convergence can decline after 2008 even when co-movement increases.

In sum, convergence speeds often fall following large global shocks, even as short-term synchronization rises. This asymmetry reinforces the need to measure not only whether markets are linked, but also how quickly they adjust. A β -convergence approach, estimated against multiple regional and global reference markets, provides a tractable framework for evaluating the temporal dynamics of integration. Expressing β in terms of half-lives adds interpretive clarity, distinguishing between transitory synchronization and enduring structural alignment – an insight not captured by static correlation or cointegration measures.

3. Methodology and data

3.1. Methodology

Beta-convergence provides a dynamic and intuitive method to assess whether stock markets that are initially behind adjust more quickly and close their gap with advanced benchmarks

over time (Barro & Sala-i-Martin, 1992; Matos & Faustino, 2012). Unlike static cointegration tests, beta-convergence captures the speed of adjustment, making it suitable for analysing evolving financial linkages, particularly in open developing economies subject to reforms and external shocks (Rodrik, 2011; Alsadan et al., 2025).

Adapting the Barro and Sala-i-Martin approach to equities, I examine whether lagging log price levels adjust toward benchmark levels over time:

$$(r_{i,t}^S - r_{B,t}^S) = \alpha_i + \beta_i^S (\ln P_{i,t-1} - \varphi \ln P_{B,t-1}) + \sum_{l=1}^L \gamma_l (r_{i,t-l}^S - r_{B,t-l}^S) + \varepsilon_{i,t}, \quad (1)$$

where $r_{i,t}^S$ and $r_{B,t}^S$ are the returns of stock market i and benchmark market B at time t , respectively; $\ln P_{i,t-1}$ and $\ln P_{B,t-1}$ are the lagged logarithm index level of stock market i and stock market B at time $t-1$, respectively; β_i^S captures the price convergence of stock market i to stock market B , φ is the scale factor. L is the number of lags, which is determined by the Schwarz Bayesian information criterion. A negative β_i^S signals price convergence of stock market i to stock market B , while a positive one suggests a divergence or fragmentation. When β_i^S is not statistically different from zero, it suggests no meaningful dynamic adjustment, i.e., a stagnant linkage.

The half-life of a shock to the price differential is computed as:

$$\text{half-life} = \frac{\ln(0.5)}{\beta_i}. \quad (2)$$

The half-life refers to the amount of time it takes for half of the deviation from equilibrium between two markets to disappear. A shorter half-life indicates a faster rate of convergence, meaning that shocks or misalignments in prices are corrected more quickly, implying stronger financial integration or resilience. Conversely, a longer half-life suggests that adjustments are slow, pointing to market frictions, segmentation, or persistent divergence.

3.2. Data

This study employs weekly stock index data from the FTSE database to ensure consistency across countries and regions. Local-currency indices are converted to USD by dividing the local index level by the corresponding exchange rate (local currency per US dollar). This adjustment eliminates distortions caused by exchange rate fluctuations and allows for meaningful cross-country comparisons. The sample covers Vietnam (the focal country), China, South Korea, Japan, and the United States, plus aggregate indices including the World, Asia Pacific, ASEAN, emerging markets, and frontier markets. The sample spans from 2013 to 2025, as FTSE data for Vietnam are only available from 2013 onward. Weekly returns are computed as:

$$r_{i,t} = 100(\ln P_{i,t} - \ln P_{i,t-1}). \quad (3)$$

Table 1 reports descriptive statistics. Mean returns are positive for most markets, with the U.S. and world indices the highest (0.224% and 0.161%, respectively). ASEAN and Frontier exhibit slightly negative means. Return volatility, measured by standard deviation, is highest in China (3.42%) and Korea (3.04%), while frontier markets exhibit the lowest volatility (1.96%) despite also showing extreme values in skewness (−2.90) and kurtosis (24.17). Across markets, return distributions are negatively skewed and leptokurtic – indicating asymmetry

and fat tails consistent with large negative shocks and volatility clustering. Notably, Vietnam shows relatively high volatility (2.94%), negative skewness (−0.66), and excess kurtosis (6.51), reflecting a return profile that is both risky and prone to extreme outcomes, typical of open developing economies.

Table 1. Descriptive statistics

	N	mean	max	min	sd	skewness	kurtosis
Vietnam	646	0.035	14.466	−16.057	2.943	−0.663	6.509
Japan	644	0.113	15.596	−17.839	2.429	−0.340	10.359
Korea	644	0.030	12.492	−15.413	3.035	−0.200	5.312
China	646	0.014	16.300	−11.327	3.417	−0.036	4.088
The U.S.	646	0.224	11.591	−16.292	2.293	−0.907	10.410
ASEAN	581	−0.012	10.378	−16.421	2.007	−0.984	14.214
Asia Pacific	646	0.073	9.124	−14.185	2.064	−0.545	7.477
Frontier	646	−0.012	6.084	−18.708	1.955	−2.897	24.174
Emerging	646	0.037	7.889	−10.774	2.352	−0.363	4.039
EMU	646	0.084	11.922	−25.215	2.682	−1.450	17.001
World	646	0.161	10.239	−13.492	2.138	−0.885	10.194

Note: This table reports descriptive statistics. The sample periods spans 2013–2025.

Table 2 reports the time series properties of weekly stock returns across economies. Some consistent patterns are observed. First, the Dickey–Fuller (DF) tests indicate that log prices are non-stationary, whereas log returns are stationary. Second, Normality is strongly rejected for all markets at the 1% level. This is a well-documented stylized fact in financial time series, reflecting skewness and excess kurtosis. Third, significant autocorrelation in returns and squared returns is found in most markets – particularly for Japan, the U.S., ASEAN, and frontier indices – highlighting the presence of linear and nonlinear dependencies. Fourth, the ARCH(2) test results confirm conditional heteroskedasticity in nearly all series, supporting the presence of time-varying volatility. These diagnostics validate the use of econometric models that account for volatility clustering, serial correlation, and structural breaks in subsequent analyses.

Table 2. Time-series properties

	lags	DF stat		Normality	Autocorrelation				ARCH(2)
		ln(price)	ln(return)	chi2(2)	Q(2)	Q(12)	Q2(2)	Q2(12)	
Vietnam	2	−1.958	−14.411***	99.16***	5.964*	18.284	3.439	24.452**	4.669*
Japan	1	−1.636	−20.027***	115.38***	8.818**	20.657*	165.855***	187.252***	155.466***
Korea	1	−2.151	−18.004***	43.21***	0.205	8.213	148.494***	213.158***	117.439***
China	1	−2.235	−17.337***	16.04***	2.021	6.539	47.033***	60.643***	42.748***
The U.S.	2	−0.411	−14.791***	171.86***	7.213**	15.984	107.70***	306.32***	83.297***
ASEAN	2	−3.372**	−12.637***	190.46***	12.209***	23.443**	74.499***	115.066***	61.407***

End of Table 2

	lags	DF stat		Normality	Autocorrelation				ARCH(2)
		ln(price)	ln(return)	chi2(2)	Q(2)	Q(12)	Q2(2)	Q2(12)	
Asia Pacific	1	-1.505	-17.683***	100.97***	0.111	11.957	134.940***	169.635***	109.880***
Frontier	2	-1.649	-13.378***	471.61***	38.036***	53.771***	78.197***	85.317***	79.208***
Emerging	1	-2.155	-17.967***	28.58***	1.312	12.422	27.041***	44.660***	24.210***
EMU	1	-1.945	-18.011***	282.17***	0.799	15.060	80.564***	111.474***	75.720***
World	1	-0.369	-17.481***	167.35***	1.907	10.027	224.493***	363.910***	156.480***

Notes: This table reports the properties of the weekly percentage return series for all economies. DF stat is the Dickey-Fuller test statistic. Q(x) and Q2(x) are the Ljung-Box statistics for serial correlation in returns and squared returns for order x. ARCH is the Lagrange multiplier test for autoregressive conditional heteroskedasticity. *, **, ***: The rejection of the null hypotheses of no autocorrelation, normality and homoscedasticity at the 10%, 5%, 1% levels of significance respectively for statistical tests, respectively.

4. Results and discussion

4.1. Full-sample convergence estimates

Table 3 reports the estimates from Equation (1) for Vietnam relative to key trading partners and regional aggregates. For the sake of brevity, I report only the main coefficients of interest (i.e. β coefficients), and the implied half-lives computed from Equation (2). The full results are available upon request.

Overall, all β estimates are negative, indicating that Vietnam's equity prices tend to close gaps with the chosen anchors rather than drift away. Adjustment speed, however, differs markedly across counterparts. Translating β into half-life shows a range from approximately six months (fast) to more than five years (very slow).

Table 3. Beta-convergence and half-life

	Japan	Korea	China	The U.S.	ASEAN	Asia Pacific	Frontier	Emerging	EMU	World
Beta	-1.16	-2.92***	-0.77	-0.4	-1.04*	-1.82**	-0.26	-2.93***	-0.66	-0.46
	(0.73)	(1.10)	(1.04)	(0.71)	(0.58)	(0.77)	(0.46)	(0.98)	(0.71)	(0.68)
Half-life	59.754	23.738	90.019	173.287	66.649	38.085	266.595	23.657	105.022	150.684
No. Obs	640	640	644	644	579	644	644	644	644	644

Note: This table reports the β estimates from the estimation of Equation (1) for the period 2013–2025. Standard errors are in parentheses. *, **, *** indicate significant levels of 10%, 5%, and 1% respectively.

The most rapid convergence is observed for Korea and emerging markets. The magnitude of β , -2.92 (to Korea) and -2.93 (to emerging markets), indicates that approximately 2.9% of the log price differential between Vietnam and Korea or emerging markets were corrected each week on average, corresponding to a half-life adjustment period of about 24 weeks. Economically, this means that price gaps between Vietnam and Korea/emerging markets would reduce by half in about 6 months. These results align with recent evidence on the significant spillover effects and co-movement of Vietnam with other emerging equity

markets (Vo & Ellis, 2018). Korean investors are also among the top foreign investors both in direct and indirect investments.¹ Convergence to the Asia-Pacific aggregate is also statistically significant with an implied half-life of 38.1 weeks (about 9.5 months). The coefficient on the ASEAN benchmark is negative and marginally significant at the 10 % level, yielding a half-life of about 66.6 weeks (about 16.7 months).

For Japan, China, the U.S., EMU, World and Frontier markets, the β -coefficients are negative but not statistically different from zero; the corresponding half-life estimates range from 59.8 weeks (about 14.9 months) for Japan to more than 266 weeks (about 66.6 months) for the Frontier index. These results indicate slow or statistically indistinguishable adjustment for Vietnam vis-à-vis developed-market anchors and the Frontier composite. This suggests weak long-run convergence, which is consistent with findings that Vietnam's stock market integration is still limited relative to global benchmarks.

These findings align with the LOOP, which posits that under financial integration, assets with similar risk-return profiles should exhibit price parity. Faster convergence with regional peers suggests that regional markets share more aligned pricing mechanisms, possibly due to common regulatory frameworks, geographical proximity, and trade linkages. The persistent gaps with advanced markets reflect incomplete arbitrage and segmentation – likely due to institutional differences, market depth disparities, or higher transaction costs.

These above results are also consistent with studies reporting stronger integration with emerging and Asia-Pacific markets than with developed markets (Yu et al., 2010; Chien et al., 2015). On the trade side, initiatives such as the ASEAN Economic Community and the Regional Comprehensive Economic Partnership (RCEP) have fostered intra-regional linkages. Empirical studies such as Caporale et al. (2019) and Kapar et al. (2020) confirm that bilateral trade and intra-regional trade agreements enhance asset price synchronization by reducing market segmentation and fostering economic interdependence. On the financial integration side, frameworks such as the ASEAN Banking Integration Framework (ABIF) and the Asian Bond Markets Initiative (ABMI) have supported regional capital mobility and reduced structural frictions. These mechanisms complement capital account liberalization policies, which, although important, are insufficient without accompanying market development and regulatory harmonization (Akbari et al., 2021).

4.2. Subperiod analysis of convergence dynamics around COVID-19

COVID-19 was a large, discrete shock that plausibly altered the speed of stock-price convergence through changes in volatility, liquidity, capital flows, and policy interventions (Sher et al., 2024; Xiang et al., 2025; Gopinath et al., 2025). To assess whether the speed of re-coupling changed, I split the sample into three non-overlapping windows: pre-COVID, during COVID, and post-COVID – and re-estimate Equation (1) separately for each subperiod using the same specification and estimation protocol. I then conduct Wald tests of parameter equality across windows. Table 4 reports the estimation of β coefficients and associated Wald test statistics.

The sub-period analysis in Table 4 highlights notable shifts in stock market convergence dynamics between Vietnam and various regional and global markets. Before the pandemic, Vietnam exhibited statistically significant convergence with most markets, consistent with early evidence of regional co-movement (Mohthi et al., 2019; Kapar et al., 2020).

¹ <https://koreainvestment.com.vn/en/home>

<https://en.vietnamplus.vn/vietnam-rising-star-for-foreign-investment-in-southeast-asia-post308451.vnp>

During COVID-19, convergence intensified markedly – particularly with the U.S. ($\beta = -20.393$), EMU (-16.623), and world (-17.438) – while linkages with others (e.g., Korea, China) became insignificant or even reversed. Wald tests reject equality of β between the pre- and during-COVID windows for these markets. These results suggest that Vietnam’s market became more tightly coupled with global markets during the crisis, consistent with crisis contagion hypothesis where panic and synchronized policy responses – such as monetary easing and fiscal stimulus – temporarily aligned investor behaviour (Park & Newaz, in press). This convergence reflected mechanical synchronization under stress rather than durable structural integration.

However, this pattern shifted in the post-COVID period. Beta estimates generally moved closer to zero, particularly for the U.S. (0.917), World (0.925), and EMU (1.135), indicating a slowdown or reversal in convergence. Wald tests show significant differences between the during- and post-COVID windows for the U.S., Korea, EMU, and world, reinforcing the view that the heightened integration during the pandemic was temporary. In contrast, convergence with ASEAN (-4.908) and Frontier (-5.083) remained strong post-pandemic. These findings are consistent with elevated geopolitical risk, capital controls, and a growing retreat from globalization (Gopinath et al., 2025; Alsdan et al., 2025). Trade protectionism, capital outflows, and policy-induced uncertainty disrupted the transmission channels that previously facilitated integration.

The above results are consistent with the ICAPM framework, which helps explain the crisis-induced surge in convergence. During global shocks like COVID-19, risk aversion rises and markets become more sensitive to global systematic risk factors, causing returns to co-move regardless of fundamentals. The ICAPM predicts such temporary synchronization, where global shocks dominate local pricing. However, the post-crisis divergence and return to regional alignment suggest a reversion to regionally priced risks and the persistence of local risk premiums – highlighting the limits of global integration and the influence of regional systematic risk factors.

Table 4. Subperiod analysis of convergence dynamics around COVID-19

	Japan	Korea	China	The U.S.	ASEAN	Asia Pacific	Frontier	Emerging	EMU	World
(1) Before COVID-19	-3.112** (1.335)	-2.798** (1.588)	-3.432** (1.591)	-2.449** (1.311)	-2.732** (1.264)	-4.087*** (1.405)	-0.370 (0.938)	-4.387*** (1.572)	-2.177** (1.206)	-3.474** (1.420)
(2) During COVID-19	-6.384** (2.729)	1.327 (2.708)	2.617 (1.872)	-20.393*** (5.582)	-5.994** (2.551)	-2.390 (2.236)	-5.815** (2.371)	0.473 (1.865)	-16.623*** (4.873)	-17.438*** (4.975)
(3) After COVID-19	0.944 (1.981)	-4.231** (2.325)	-4.163 (2.838)	0.917 (2.067)	-4.908*** (1.799)	-0.851 (1.721)	-5.083** (1.973)	-3.375** (1.795)	1.135 (2.035)	0.925 (1.957)
Wald test (1)=(2)	2.113	1.717	0.587	8.244***	0.557	0.000	1.898	0.777	5.198**	5.182**
Wald test (2)=(3)	0.923	7.081***	1.448	6.432**	0.032	0.134	0.050	1.271	4.142**	4.519**
Wald test (1)=(3)	1.054	3.954**	0.490	1.393	1.007	0.271	2.619	0.279	0.312	0.177

Note: This table reports the β estimates from the estimation of Equation (1) for sub-periods before, during, and after the COVID-19, and the Wald test statistics for the equality of the β coefficients across sub-periods. Standard errors are in parentheses. *, **, *** indicate significant levels of 10%, 5%, and 1% respectively.

Overall, the results support the view that global shocks act as temporary synchronizers of financial markets, while structural linkages – particularly with regional partners – drive longer-term convergence.

4.3. Rolling β -convergence analysis

To capture the evolving dynamics of stock market convergence, I estimate rolling β -convergence analysis using a 104-week moving window. This approach is widely used to track gradual transitions, regime shifts, and episodes of heightened or diminished integration (Batten et al., 2019; Marfatia, 2020; Park & Newaz, in press). Given that financial markets are subject to external shocks, including geopolitical tensions, economic policy shifts, and global crises such as the COVID-19 pandemic, this approach reveals time variation that full-sample estimates may obscure. The choice of a 104-week (two-year) window balances statistical reliability with responsiveness to medium-term changes in integration.

Figure 1 illustrates the 104-week rolling β -convergence between Vietnam and major international benchmarks. Across the figures, the β coefficients show considerable fluctuations over time, reflecting dynamic integration. During the COVID-19 period, there is a notable deepening of convergence, as evidenced by increasingly negative β values – particularly with respect to the U.S., EMU, ASEAN, and World markets – reaching values between approximately -20 and nearly -40 . These patterns align with the contagion and co-movement literature, which finds that financial integration often accelerates during global crises due to synchronized policy shocks and risk transmission (Boako & Alagidede, 2018; Caporale et al., 2019; Park & Newaz, in press).

However, the surge in convergence was short-lived. In most cases, Vietnam's β values returned to earlier levels within 12–18 months after the initial shock, suggesting that the linkage with other markets strengthened only temporarily and that Vietnam's market partially re-segmented relatively quickly. After 2022, β values became less negative or moved closer to zero, especially relative to the U.S., World, and EMU indices. This indicates that the speed of convergence slowed, and in some cases, may even signal early signs of divergence. These patterns are consistent with broader concerns about weakening global financial linkages following the pandemic and rising geopolitical tensions (Gopinath et al., 2025; Alsdan et al., 2025). By contrast, convergence with Korea, ASEAN, and emerging markets remained relatively strong after the crisis, which may be due to Vietnam's close trade and investment relationships within the region.

These findings can be explained through the lens of capital mobility theory. They clarify why formal openness does not guarantee sustained global convergence. Vietnam may be *de jure* open, but actual integration depends on whether capital flows respond to return differentials and whether domestic markets are sufficiently liquid and trusted. The short-lived nature of global convergence and the re-emergence of regional linkages post-COVID suggest that financial integration is conditional and asymmetric.

5. Conclusions and policy implications

This paper analyses stock market convergence between an open developing economy and major regional and global markets during 2013–2025, using Vietnam as the case, with the COVID-19 pandemic treated as a structural break. Using weekly data and a β -convergence framework, the analysis employs both full-sample estimates and time-varying approaches –

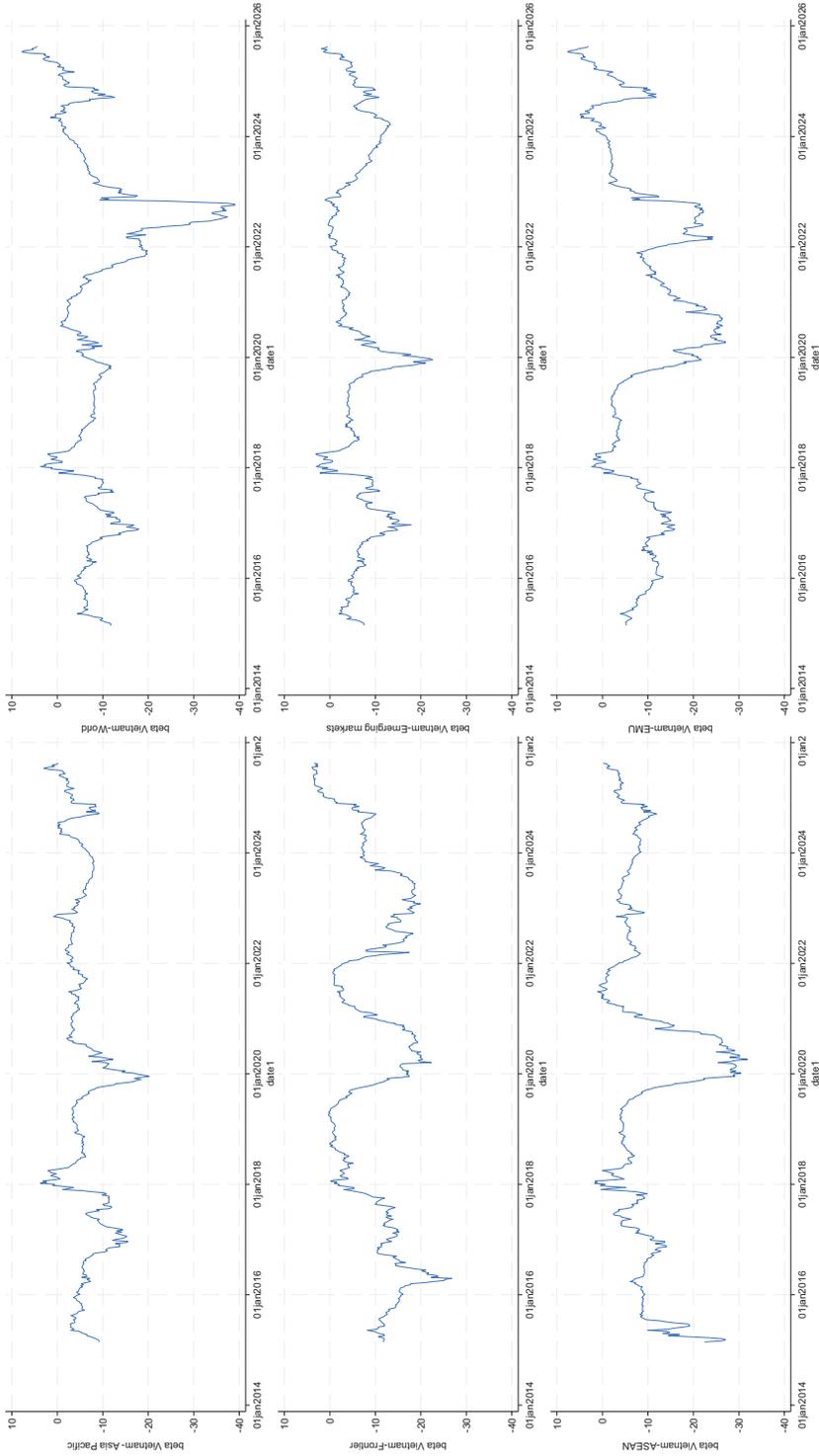


Figure 1. To be continued

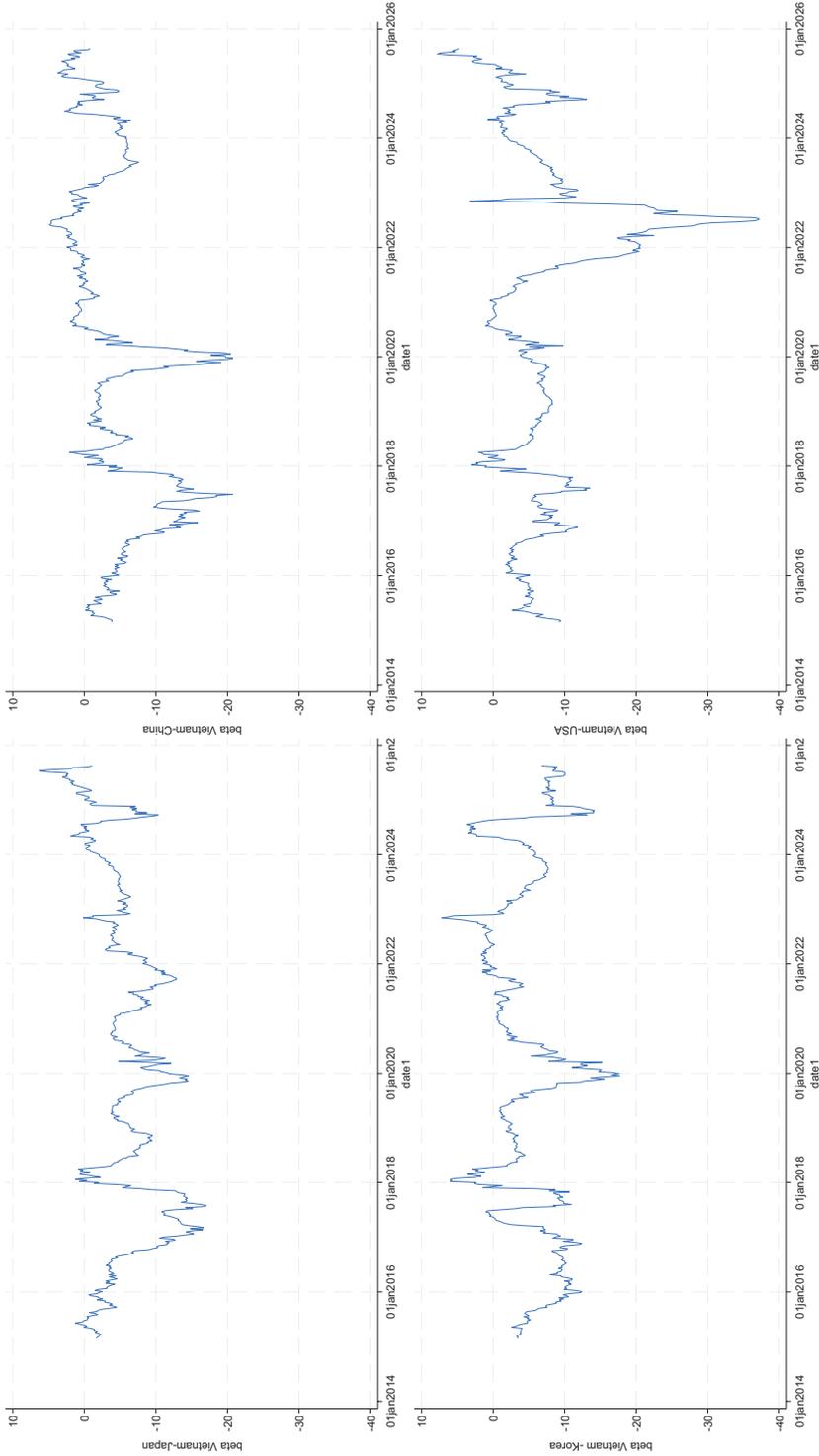


Figure 1. Beta convergence of Vietnam toward regional and global benchmark- 2 years rolling window

including sub-period regressions and a 104-week rolling window – to assess the speed and stability of financial integration over time.

The main findings are threefold. First, full-sample estimates show statistically significant long-run convergence with Korea, emerging markets, and the Asia-Pacific region. In contrast, convergence with advanced markets such as the U.S., EMU, and Japan remains statistically weak or economically slow.

Second, sub-period analysis around the COVID-19 shock reveals that convergence accelerated sharply during the crisis, confirming that global crises act as temporary synchronizers of financial markets. However, this heightened integration proved short-lived, while regional linkages with ASEAN and Frontier remained resilient.

Third, the rolling β -convergence analysis shows a surge in β magnitudes during COVID-19, followed by a relatively fast reversion to pre-shock levels. The re-coupling was swift, and convergence speeds slowed significantly after 2022. These dynamics point to the possibility of financial fragmentation and a reorientation toward regional partners, supporting recent discussions on “slowbalization” and the reshaping of global financial architecture.

These patterns are consistent with ongoing initiatives such as the ASEAN Banking Integration Framework, the Asian Bond Markets Initiative, and the ASEAN Regional Payment Connectivity, which expand local-currency settlement and reduce dependence on the U.S. dollar. Parallel developments within BRICS – through expanded membership and the rollout of BRICS Pay and BRICS Bridge – reinforce this turn toward regional payment systems and trade diversification. The temporary increasing global convergence during the COVID-19 crisis emphasizes the fragility of cross-border financial linkages and reinforces the importance of regional safety nets, including the Chiang Mai Initiative.

The above findings have several implications. For policymakers, deepening regional financial ties and reducing structural frictions can enhance resilience and support long-term capital market development. In addition, policymakers should be cautious in interpreting crisis-induced integration as permanent and instead focus on building institutional foundations that sustain convergence in stable periods. For investors, the evidence of persistent regional convergence but fragile global links suggests that exposure to regional assets may offer more stable co-movement patterns and better predictability in asset pricing and risk management. In contrast, the weakening post-crisis convergence with advanced global markets suggests that diversification strategies relying on global linkages may be less effective in the current environment. Portfolio allocations that emphasize regional exposure could enhance stability during periods of global disruption.

This study is subjected to several limitations. First, the β -convergence framework assumes linearity and stationarity, although rolling estimates capture time variation. Second, the analysis does not explicitly account for transmission channels that may mediate convergence speeds. Further research could adopt nonlinear models for deeper insights and explore the mediating role of macroeconomic variables.

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