The Impact of Trade on Stock Market Integration of Emerging Markets

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Introduction

- IMF highlights increasing importance of emerging market economies in the world economy (2016:58)
- Volume of trade between advanced economies and emerging markets is now bigger/ more than trade between advanced counterparts themselves
- Financial integration has also increased. In 2002 only 7% of all equity allocations from advanced economies went to emerging markets; this increased to 20% in 2012 (IMF 2014:49). The stronger links between advanced and emerging markets has led to increased synchronization of asset price movements (IMF 2014:49-50).
- Trade linkages can explain between 10 and 20 % of equity spill-overs from emerging markets to advanced economies IMF (2016:67). Hereby the link between the financial sector (stock markets) and the real sector (trade flows) is placed under the spotlight
- Thus the aim of the study is to empirically investigate to what extent trade-related determinants have an impact on stock market integration of emerging markets
    - the empirical study considers a direct measure of stock market integration from a global sample and not bi-directional measures, or synchronisation among a group of countries
    - deals with the time-varying nature of integration by calculating an integration measure for every country over different time horizons (previous studies dealt with this issue, mainly in the presence of specific crises, splitting the sample into a pre and post-crisis sample)

Literature review: Emerging markets

- The International Finance Corporation (IFC) introduced the emerging markets category for portfolio investment in 1986 (Mobius 1996:4)
- Attempt to promote capital market development in less developed countries
- Investors traditionally diversified their portfolios by investing in different developed markets: Examples include the rapid growth of the "Asian Tigers" during the 1980s, growth in Latin America during the 1990s and investment opportunities in Eastern Europe after the dismantling of the Soviet Union
- Increased activity contributed to the attractiveness of emerging markets – with turnover ratios (volume to market capitalisation) often exceeding those for developed markets. From the mid-1980s to mid-1990s trading volumes of emerging markets multiplied by 30, while the market capitalisation multiplied by 20 (Solnik 1996:271)
- Different definitions of "emerging" :
  - "'Emerging' implies that change is underway, that a market is growing in size and sophistication in contrast to a market that is relatively small, inactive and gives little appearance of change
  - "refer to a stock market in any developing economy, no matter how well developed the stock market itself may be, with the implication that the stock market's potential to emerge further is strongly linked to the economy's overall development potential" (Mobius 1996:6)
  - other criteria, for example that the market should represent less than 3% of the world's stock market capitalisation or consider the market turnover and/or the number of listed companies (Mobius 1996:8).
- This paper considers all the stock markets that are classified as emerging markets in the March 2011 update of the FTSE Global Equity index Series Country Classification

Literature review: Financial integration

- Integration of financial markets also described as “co-movement” / “synchronisation”
- Different measures of integration:
  - Lemmen and Eijffinger (1996) measure financial integration by the intensity of capital controls
  - Arfaoui and Abaoub (2010) express financial indicators – such as assets, liabilities and FDI flows – as a percentage of GDP, that act as integration indicators
  - Correlation of stock market returns (see Wälti 2005; Pretorius 2002; Tavares 2009; Chen and Zhang 1997) as well as correlation between individual markets and the US (Johnson and Soenen 2003)
  - A further two measures include market capitalization as percentage of GDP used by Yarte (2008) and the Gweke measure of feedback used by Bracker, Docking and Koch (1999).
- Most international studies on stock market integration focus on s specific region, like Europe, East Asia or Latin America – or an economic grouping, like emerging market countries or the OECD
- Pukthuanthong and Roll (2009) from a global sample of stock markets conclude that global markets are more integrated than before
- At least three emerging market studies confirm that the level of integration changes over time and that it is increasing for this specific group of countries: Frijns, Tourani-Rad and Indriawan (2012); Arouri and Foulquier (2012); Yang, Kolari and Min (2003)
- Studies on co-movement of stock markets usually ask three questions: if markets are integrated, if the level of integration changes over time and why markets are integrated
- Therefore the focus falls on the determinants of financial/ stock market integration

Literature review: Determinants of integration

Broad financial market integration

- Gelos and Sahay (2000): financial spill-overs for 12 transition economies, trade linkages are important in transmitting spillovers
- Forbes and Chinn (2004): bilateral trade flow as significant determinant of linkages in stock and bond markets – and effect has increased since 1996
- Vo (2005): capital controls, trade openness, the level of domestic credit and economic growth to be successful in explaining variation in international financial integration
- Arfaoui and Abaoub (2010) attribute increasing levels of international financial integration to global factors as well as domestic factors like economic stability, trade openness, the level of investment, economic growth and the local tax regime.

Literature review: Determinants of integration

Narrower stock market integration

- Chen and Zhang (1997): Pacific Basin and major developed countries; correlations between stock markets can be linked to trade volumes, GDP growth and volatility of return volatility. Cash flows of countries are linked via their trade activities and therefore equity markets more integrated.
- Bracker, Docking and Koch (1999): nine developed countries to determine why their stock markets are interrelated; factors that have an influence on asset prices: bilateral imports, geographic distance, market size and overlapping trading hours.
- Pretorius (2002): emerging market economies; correlations between two countries at a time; substantial part of co-movement is explained by fundamentals and not so much by contagion; as such bilateral trade, industrial growth differentials and regional indicators are significant.
- Johnson and Soenen (2003): Canada and seven emerging market economies; Stock market integration is measured in correlation with the US market; positive co-movement a high share of trade with the US; lower co-movement is found when the stock market capitalization ratio with US is higher.
- 26 (mostly developed) countries Hooy and Goh (2007) find trade openness and global dividend yields the significant determinants of stock market integration

Literature review: Determinants of integration

Narrower stock market integration

- Yartey (2008): 42 countries; most important determinants of stock market development turn out to be: income, domestic investment, banking sector development, private capital flows and stock market liquidity. He further stresses the importance of good institutions when institutional factors such as political risk, law and order and accountability also proof to be significant.
- Tavares (2009): correlation of stock market returns is explained by trade intensity, having the same export structure, GDP per capita, common colonizers and well developed legal and political institutions.
- Liu (2013) :developed markets information capacity (number of telephone line and cellular phone subscriptions) and similar industrial structures are important determinants, while economic integration, and particularly trade, matters for developing economies
- Stock market interdependence between Australia and its trading partners; Paramati, Gupta and Roca (2015) interdependence is driven by trade intensity.
- Empirical study of this paper will therefore seek to find a significant relationship between trade and stock market integration of emerging market economies, while also considering macroeconomic, financial and institutional measures identified in the literature.

Method and data

- Measure stock market integration as the explanatory power (or the R-square) of a multi-factor model, technique also employed by Emiris (2000), Brooks and DelNegro (2004), Kabundi and Mouchili (2009) and Pukthuanthong and Roll (2009)
- Following the APT of asset returns, common sources of global systematic risk are identified for the global stock market trhough exploratory factor analysis.These latent (common) factors are used as explanatory variables in a regression explaining returns on the stock market of a specific country. The R-square (or variance share) is an indication of the proportion of each country's returns that are explained by global forces – and thus the level of that country's integration into global markets. Much broader measure of integration than the mere co-movement with one other market or a chosen group of markets.
- Global sample of stock market indices, (all share as well as the different equity sub-sectors per country) available from the Datastream database of Thompson Reuters.; market capitalisation in these countries accounted for 95.98% of the world market capitalisation in 2010
- May 1998 until August 2011; daily data for each index is converted into weekly observations; total of 691 weekly observations; 50 countries and 451 stock market indices..
- Two common factors, representing the variation in the global stock markets, are extracted for each week; major advantage that integration can be measured over different time periods.

Characteristics of emerging stock markets

Country	Level of integration	Market Cap	Regulate	Restrict
South Africa	0.6205	129.5	6.0	3.9
Thailand	0.6023	77.7	4.8	4.4
Mexico	0.5992	34.9	3.8	4.9
Hungary	0.5952	13.7	4.5	5.2
Poland	0.5833	26.8	5.0	4.5
Brazil	0.5739	49.6	5.7	4.4
Czech Republic	0.5449	17.8	4.6	5.2
Taiwan	0.5056	140.2	5.2	3.8
Philippines	0.5028	73.8	4.1	4.5
Chile	0.4982	107.6	3.7	5.4
India	0.4597	54.0	5.3	4.4
Russian Federation	0.4304	41.8	3.3	3.4
Turkey	0.3855	26.0	4.6	5.0
Malaysia	0.3500	136.6	5.2	4.4
Peru	0.3449	46.5	3.4	5.3
Colombia	0.1942	60.0	3.5	3.8
China	0.1474	46.3	4.4	3.3
Pakistan	0.0697	15.3	4.0	4.2

Market Cap: Market capitalization as % of GDP in 2011 (Source: World Bank)
Regulate: Global Competitiveness 2011 score for regulation of securities exchange (higher value indicates better regulation)
Restrict: Global Competitiveness 2011 score for the restrictiveness of capital flows to the country (higher value indicates fewer restrictions)

Empirical study

- Step 1: determine level of stock market integration
- Step 2: explanation of integration at the hand of specified variables; combination of macroeconomic fundamentals, financial market indicators and institutional aspects
- Panel data analysis of 16 emerging market countries: Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Malaysia, Pakistan, Peru, Philippines, Poland, Russian Federation, South Africa, Thailand and Turkey for the period 1998-2011. Taiwan and Mexico, omitted from the analysis due to a lack of data for the specified explanatory variables.
- Hausman test: random effects model is preferred to a fixed effects model. Estimated random effects models (not reported here) suffer from cross-section dependence. In the light of these statistical diagnostics the generalized method of moments (GMM) model, as derived by Arellano and Bond (1991), is the preferred specification.

OLS results

Explanatory variable	Estimated coefficient	Probability
Openness	0.0005	0.4931
Budget balance	0.0339	0.0295
Restrict	0.0293	0.5201
Regulate	0.1612	0.0007
C	-0.3903	0.1324
Observations	18	
Adjusted R^2	0.5159	

* Estimated with White-Heteroskedasticity-consistent standard errors and covariance

GMM results estimation of integration

Explanatory variable	Estimated coefficient	Probability
Panel 1		
INTEGRATION(-1)	0.136012	0.0222
CREDIT	0.003508	0.3629
INFLATION	-0.002973	0.2412
MARKETCAP	0.001924	0.0074
XGDP	0.012873	0.0077
Panel 2		
INTEGRATION(-1)	0.048515	0.0000
D(CREDIT)	0.002424	0.0110
INFLATION	0.001895	0.8828
MARKETCAP	0.000674	0.0023
XGDP	0.005351	0.0015
Panel 3		
INTEGRATION(-1)	0.287062	0.0000
D(CREDIT)	0.006017	0.0714
INFLATION	7.64E-05	0.9755
MARKETCAP	0.002546	0.0034
XMGDP	0.009555	0.0116
Panel 4		
INTEGRATION(-1)	0.329181	0.0000
D(CREDIT)	0.004766	0.2876
INFLATION	4.61E-05	0.9892
MARKETCAP	0.002818	0.0075
MGDP	0.018534	0.0614

* The Arellano-Bond Serial Correlation Test (not reported here) confirms that that the model error terms are serially uncorrelated as required

Discussion of results

- Results confirm the significance of market capitalization in explaining stock market integration of emerging market countries
- INFLATION displays the expected negative sign in panel 2, but is not statistically significant
- CREDIT (non-stationary) enters the regression in differenced format; some indication that the level of credit provided by the domestic financial sector impacts on stock market integration
- MGDP not significant when as representative of trade (see panel 4). XGDP proofs to be significant in panels 1 and 2 as well as the combination of exports and imports (XMGDP in panel 3).
- Global financial crisis has highlighted the urgency to better understand the link between the financial and real sectors of the economy; apart from the level of market capitalization (as financial indicator), trade (representative of the real economy) is a significant determinant of stock market integration of emerging market countries
- Importance of financial indicators (market capitalization) and institutions (represented by “regulate”) as determinants of integration
- Findings challenge the narrow/ limited finding of Liu (2013) that emerging market integration is only driven by economic factors