

# Emerging Equity Markets and its Integration

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**Abstract:** The market integration in emerging markets are becoming stronger with the passage of time. This implies that economic and trade ties between emerging markets and developed markets are also becoming stronger. Here, we take two categories such as BRIC's and VISTA. We take three factors such as GDP, Trade Balance, and Foreign Exchange Reserves to see which country is wealthier than others, in other words, which country is much closer to developed country in terms of market integration. As a result, we can confirm that China and Turkey mark the highest principal components points.

**Key Words :** Emerging Equity Market, Market Integration, Factor Analysis

**JEL Classification :** C10, F15

## 1. Introduction

The term of emerging market was not so familiar to until 1980's. Emerging market usually indicate the countries and areas of initial developing stages such as Latin America, East Asia, South Asia, East Europe, Middle East, and Africa. Here, we check the level of market integration of emerging equity markets in time series analysis. Market integration can be represented by correlated coefficients. According to Divecha, Drach, and Stefek (1992), the correlated coefficients among emerging equity markets were 0.07 from January 1986 to March 1991 in U.S. dollar base. It seems that this figure will increase with passage of time due to stronger market integration. In addition, we check the main factors that contribute to the market integration by using the methodology of principal components analysis. The purpose of this short paper is to diffuse the features of emerging equity markets for practitioner audiences.

## 2. Model

We can define correlated coefficient as

$$\rho_{xy} = \frac{COV(x, y)}{\sigma_x \sigma_y} \dots\dots\dots(1)$$

where  $COV(x, y)$  means covariance between  $x$  and  $y$ , and  $\sigma_x$  and  $\sigma_y$  mean the standard deviation in both  $x$  and  $y$ . In addition, principal components analysis is indicated by  $Max: \sigma_z^2 \dots\dots\dots(2)$

where  $Z = \omega_1 X_1 + \omega_2 X_2 + \dots + \omega_k X_k$ . Namely, we must find out each  $\omega_1, \omega_2, \dots, \omega_k$  which maximize  $\sigma_z^2$ . The following analyses are based on these simple formulas (1) and (2).

## 3. Analytical Results

At first, we examine the countries such as Brazil, Russia, India, and China. These countries are often called as "BRIC's" for reference. The following Table1. shows the transitions of correlated coefficients among BRIC's with every five years intervals.

Judging from the above Table 1., we can see that the figures of average are increasing with the elapse of time. We may prove the stronger market integration among BRIC's. Especially, the increases of each correlated coefficients during the period from 2005 to 2007 are noteworthy.

Next, we examine the countries such as Indonesia, South Africa, Turkey, and Argentina. These countries are often called as "VISTA" for reference. Unfortunately, as we can't receive the data of Vietnam before November 2007, we omit the analysis of Vietnam in this case. The following Table2. shows the transitions of correlated coefficients among VISTA with every five years intervals. We can also see the same trend in these countries.

In addition, if we look at the trend between emerging equity markets and G7 (U.S.A., Canada, U.K., France, Germany, Italy, and Japan) in Table 3., we can confirm that this tendency will also hold true between emerging markets and developed countries.

While, we take three factors such as GDP, Trade Balance, and Foreign Exchange Reserves to see which country is wealthier than others, in other words, which

country is much closer to developed country in terms of market integration. We can confirm that China marks the highest principal components points from Table 4.. This implies that China has strong ties in economics and trades in both emerging markets and developed markets from Table 1. and Table 3. Furthermore, We can safely say that Turkey will hold true to China's case from Table 5.

Table 1. Correlated Coefficients of BRIC's (US\$ base)

1995-1999	Brazil	Russia	India	China	
Brazil	1				
Russia	0.5651	1			Average 0.3282
India	0.2292	0.3192	1		
China	0.3584	0.2945	0.2031	1	
2000-2004	Brazil	Russia	India	China	
Brazil	1				
Russia	0.3667	1			Average 0.3277
India	0.4486	0.1076	1		
China	0.4542	0.3153	0.2740	1	
2005-2007	Brazil	Russia	India	China	
Brazil	1				
Russia	0.7379	1			Average 0.6183
India	0.6496	0.4645	1		
China	0.7035	0.5338	0.6204	1	

(source : MSCI Global Investable Market Indices)

Table 2.. Correlated Coefficients of VISTA (US\$ base)

1993-1997	Indonesia	South Africa	Turkey	Argentina	
Indonesia	1				
South Africa	0.231015189	1			Average 0.2202
Turkey	0.229122878	0.12499183	1		
Argentina	0.2999	0.2701	0.1663	1	
1998-2002	Indonesia	South Africa	Turkey	Argentina	
Indonesia	1				
South Africa	0.382646311	1			Average 0.2784
Turkey	0.108463698	0.32912014	1		
Argentina	0.2203	0.3164	0.3135	1	
2003-2007	Indonesia	South Africa	Turkey	Argentina	
Indonesia	1				
South Africa	0.360086263	1			Average 0.4712
Turkey	0.45624968	0.47553962	1		
Argentina	0.4277	0.5761	0.5315	1	

(source : MSCI Global Investable Market Indices)

Table 3. Correlated Coefficients of EM and G7 (US\$ base)

1988-1992	EM	G7
EM	1	
G7	0.4450	1.0000

  

1993-1997	EM	G7
EM	1	
G7	0.5016	1.0000

  

1998-2002	EM	G7
EM	1	
G7	0.7568	1.0000

  

2003-2007	EM	G7
EM	1	
G7	0.7804	1.0000

Average 0.4712

(source : MSCI Global Investable Market Indices)

Table 4. BRIC's Analytical Results (Unit : 0,000 US\$)

	GDP	Trade Balance	Foreign Exchange Reserves	Principal Components Points
Brazil	79,940,000	19,185,900	5,357,400	5,706,362
Russia	76,600,000	33,980,600	29,556,760	-14,349,756
India	80,080,000	24,514,100	17,725,100	-1,916,544
China	262,630,000	176,111,800	104,092,700	10,559,937

(source:weis The World 2007-2008)

Table 5. VISTA's Analytical Results (Unit : 0,000 US\$)

	GDP	Trade Balance	Foreign Exchange Reserves	Principal Components Points
Vietnam	5,320,000	6,911,400	1,190,430	-16,627,765
Indonesia	28,130,000	14,336,100	3,991,600	6,283,571
South Africa	23,880,000	12,068,000	2,374,000	2,063,177
Turkey	36,260,000	190,250	6,090,000	12,331,672
Argentina	18,330,000	6,870,500	2,717,900	-4,050,656

(source:weis The World 2007-2008)

#### 4. Conclusion

We take two popular categories in emerging markets represented by BRIC's and VISTA.

The market integration in both emerging and developed markets is becoming stronger year by year. This can be easily proved by checking the figures of correlated coefficients.

Thus, we take three factors such as GDP, Trade Balance, and Foreign Exchange Reserves as agents' variables of wealth and market integration. Namely, wealth and market integration is positively correlated. So, we believe that the wealthier country becomes, the stronger market integration becomes.

#### Reference

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# エマージング株式市場とその市場統合度について

渡辺泰明

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**要約:**エマージング市場の市場統合度は時の経過とともに強まる傾向がある。このことは、エマージング市場と先進国市場の経済と貿易の絆もまた強くなっていることを示唆する。ここでは、BRIC's と VISTA という範疇でエマージング市場を捉える。そして、国内総生産、貿易収支、および外貨準備高の3つの指標で国の豊かさと先進国との緊密性を把握する。その結果、中国とトルコがそれぞれの範疇で最も高い主成分分析における得点を示した。