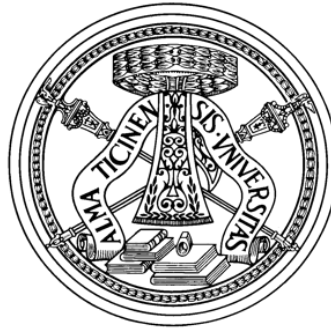


UNIVERSITA DEGLI STUDI DI PAVIA
Department of Economics and Management



Laurea Magistralis in International Business and Economics

**GROWTH FACTORS IN EMERGING MARKETS:
A PANEL DATA ANALYSIS**

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Abstract

Having experienced high economic growth in 2000s, emerging markets, especially BRICs (Brazil, Russia, India, and China), become an appealing topic for researchers. The aim of this dissertation is to address causal factors and to quantify their effects on emerging markets' growth by examining seventeen emerging markets over period of thirteen years (2000–2012). Panel data analysis with either random effects or fixed effects method are employed in our regressions. Our findings show that economic growth in emerging markets are positively affected by growth in trading partners and growth in terms of trade, but seems to be impeded by an improvement in financial openness. Noticeably China's economy has important impacts on other emerging markets' growth. Conversely, growth in trade openness and in international interest rate are found not to contribute significantly to growth in emerging markets. Our research also contains some open issues which might become interesting approaches for future analysis.

Key words: emerging markets, BRICs, growth factors, panel data analysis, fixed effects, random effects.

Abstract in Italiano

I mercati emergenti, soprattutto i BRIC (Brasile, Russia, India e Cina), protagonisti di una crescita economica sostenuta negli anni 2000, sono emersi come interessante terreno di ricerca. L'obiettivo della presente ricerca è quello di individuare i fattori causali di tale crescita e di quantificare i loro effetti sui mercati emergenti, esaminando diciassette mercati emergenti su un periodo di tredici anni (2000-2012). Il metodo usato per le regressioni è l'analisi dei dati di panel sia con effetti casuali che con effetti fissi. La ricerca mostra che la crescita economica dei mercati emergenti è positivamente influenzata dalla crescita dei partners commerciali e dalla crescita in termini commerciali, ma sembra rallentata dall'accrescersi dell'apertura finanziaria. L'economia cinese ha un impatto particolarmente rilevante sulla crescita degli altri mercati emergenti. Al contrario, la crescita nell'apertura commerciale e nel tasso d'interesse internazionale emergono come fattori che non contribuiscono significativamente alla crescita dei mercati emergenti. La presente ricerca comprende anche alcune questioni aperte che potrebbero diventare potenziali approcci d'interesse per ricerche future.

Parole chiave: mercati emergenti, BRIC, fattori di crescita, analisi di dati panel, effetti fissi, effetti casuali.

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Introduction

Over the past two decades emerges the new world order with a southward and eastward shift in economic power. Researchers started paying attention to the new forces and kept wondering if they will be strong enough to turn a bipolar (United States and Europe) into tri-polar world economy. In 2013, they accounts for about 85% world's population and about 50% of global output in term of purchasing power parity (PPP) (World Bank Data). With surprisingly fast paced growth at average 6% per year in GDP per capita during 2000s (IMF report), they become more and more attractive and striking. They are EMERGING MARKETS, leaded by BRICs (Brazil, Russian Federation, India, and China). Various articles and reports have come out to address and analyze mysteries behind growth path in such emerging markets. Some argue the role of favorable external factors such as high commodity prices and cheap external credit on economic growth in emerging markets. Some suppose emerging markets' internal factors such as structural reforms and strong macroeconomic policies play more important roles. Others believe the answer lies somewhere in between. So the question is that which factors significantly contribute to high economic growth in emerging markets.

Here arises another problem. It is found that statistics on emerging markets contradict each other from report to report, sometimes even within the same organization such as in IMF reports. It derives from the fact that there is no generally agreed consensus on either the theoretical or operational definition of emerging markets. Hence various institutions carry out and review the list of emerging markets based on their own different categories and methodologies.

To address the matters above, we choose to follow a simple approach as bellows:

- First we define well the list of emerging markets we would like to analyze. The final list consists of seventeen emerging markets, namely Brazil, Chile, China, Colombia, Czech Republic, Indonesia, India, Jordan, Malaysia, Pakistan, Peru, Philippines, Poland, Russian Federation, Thailand, Turkey, and Venezuela. They are agreed to classify as emerging markets by various institutes such as International Monetary Fund (IMF), the Financial Times Stock Exchange (FTSE), the Hong Kong and Shanghai Banking Corporation (HSBC), and Morgan Stanley Capital International (MSCI).
- We then take into account both internal and external factors, namely trade openness, financial openness, growth in trading partners, commodity price and international interest rate, to see how they interact with economic growth in the emerging markets selected above during the recent period 2000–2012. Noticeably, in some cases we take China out of samples and consider its economy as an exogenous factor to economic growth in other emerging markets.
- To deal with data from seventeen emerging markets on various aspects over a period of thirteen years, we employ panel data analysis with either random effects or fixed effects method to estimate our regressions.

The objectives of this dissertation are twofold:

- i First, it attempts to address factors contributing to economic growth in emerging markets.
- ii Second, it tries to quantify influences of such factors with regards of selected emerging markets in samples.

The remaining of this dissertation shall be organized as follows:

1. Chapter 1, entitled ***Literature Review***, gives a brief overview of emerging markets: how they are defined, how important they are, and what previous articles have discussed about their growth factors.

2. Chapter 2, entitled ***Data and Methodology***, clarifies how we are going to answer the research questions, including describing variable and descriptive statistics, proposing regression models and using software to generate results.
3. Chapter 3, entitled ***Results and discussions***, presents various regression estimations and discussions about the significance of analyzed factors to economic growth in emerging markets in sample. It also includes comparison between results we have obtained and the ones in previous articles and reports from different sources.

Chapter 1

Literature review

1.1 Definition

1.1.1 Emerging markets

The term “emerging markets” was first coined in the 1980s by Antoine Van Agtmael - a World Bank economist ¹. Since then, references to emerging markets have become ubiquitous in the media, foreign policy, economic and financial reports etc, but definitions of the term vary widely. By a Google search, Mody (2004) enumerates a couple of examples about different definitions of emerging markets as such:

- The market of a developing country with high growth expectations.
- Investments in these markets are usually characterized by a high level of risk and possibly of a high return.
- Emerging markets are extremely volatile, but they offer the potential to share in the early stages of a country’s economic growth.

Cavusgil et al. (2008) approach the term “emerging markets” by analyzing the distinction between advanced economies and developing economies.

- Advanced economies are post-industrial countries characterized by high per-capital income, highly competitive industries, and well-developed commer-

¹Encyclopedia of Emerging Markets (2013), <http://ieeca.org/wp-content/uploads/2013/08/Encyclopedia-of-Emerging-Markets-JEECAR-Contributors.pdf>

cial infrastructure.

- On the other hand, developing economies are low-income countries characterized by limited industrialization and stagnant economies.
- Emerging markets then are perceived as a subset of former developing economies that have achieved substantial industrialization, modernization and rapid economic growth since the 1980s.

According to Cavusgil et al. (2008) the most distinguishing characteristic is that emerging countries are enjoying rapidly improving living standards and a growing middle class with rising economic aspirations.

Resulting from the fact that there is no generally agreed consensus on either the theoretical or operational definition of what constitutes an emerging market, the classification of countries as emerging markets is consequently somewhat arbitrary. The emerging country list is carried out and reviewed on a regular basis by a range of international financial institutions using different categories, methodologies and degrees of granularity. Statistics on emerging market countries contradict each other from report to report, sometimes within the same organization ².

Dr. Kvint points out that the list of countries considered to be emerging markets in IMF's reports is not consistent so that the statistics in one table are not comparable to other tables. For example, in one table from the IMF's Global Financial Stability Report, emerging market countries are listed by continent and include "Other emerging markets and developing countries . . . together with Hong Kong, Israel, Korea, Singapore and Taiwan Province of China." In another IMF report, the World Economic and Financial Surveys, the category "Advanced Economies" includes several countries that in the previously mentioned report were considered emerging markets, such as Hong Kong, Taiwan, Korea, Cyprus and Israel. The same category also includes Portugal, Greece, Spain and Ireland, which many agencies still consider to be emerging markets.

²V. Kvint, 2008, Define Emerging Markets, http://www.forbes.com/2008/01/28/kvint-developing-countries-oped-cx_kv_0129kvint.html

This mix of countries arbitrarily blurs the distinctions between emerging market, developing and underdeveloped countries. Inconsistent categorization makes all the statistics from these surveys inaccurate. Actual emerging market economies often appear to be less efficient than they are in reality, mostly due to an over-estimation of their population. This falsely reduces their productivity of labour and gross domestic product per capita.

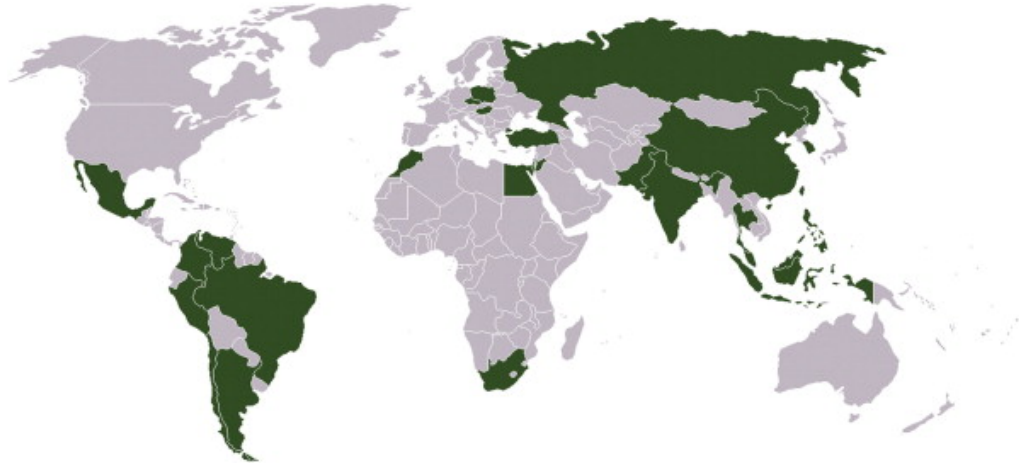


Figure 1.1 The map of emerging markets in 2011

Source: Kearney (2012)

Kearney (2012) combines various classifications to yield a list of 27 emerging markets shaded in Figure 1.1. Those are countries included in the indices of the International Monetary Fund (IMF), the Financial Times Stock Exchange (FTSE), the Hong Kong and Shanghai Banking Corporation (HSBC), and Morgan Stanley Capital International (MSCI) in August 2011. The regional geographic distribution of these emerging markets is as follows:

- Africa (Egypt, Morocco and South Africa)
- Asia (China, India, Indonesia, Israel, Jordan, Malaysia, Pakistan, Philippines, South Korea, Taiwan, Thailand, Turkey and the UAE)
- Europe (the Czech Republic, Hungary, Poland and Russia)
- North and Central America (Mexico)
- South America (Argentina, Brazil, Chile, Colombia, Peru and Venezuela)

However among them there are only seventeen emerging markets analyzed in this dissertation due to lack of available data: Brazil, Chile, China, Colombia, Czech Republic, India, Indonesia, Jordan, Malaysia, Pakistan, Peru, Philippines, Poland, Russian Federation, Thailand, Turkey and Venezuela.

1.1.2 BRICs

The term “BRICs” stands for Brazil, Russia, India and China. It was coined by Goldman Sachs in 2001 (Wilson et al., 2010) to describe the four large emerging countries that Goldman Sachs predict will overtake the G7 (United States, Canada, Japan, United Kingdom, Germany, France, and Italy) in terms of GDP (in US\$) by 2050.

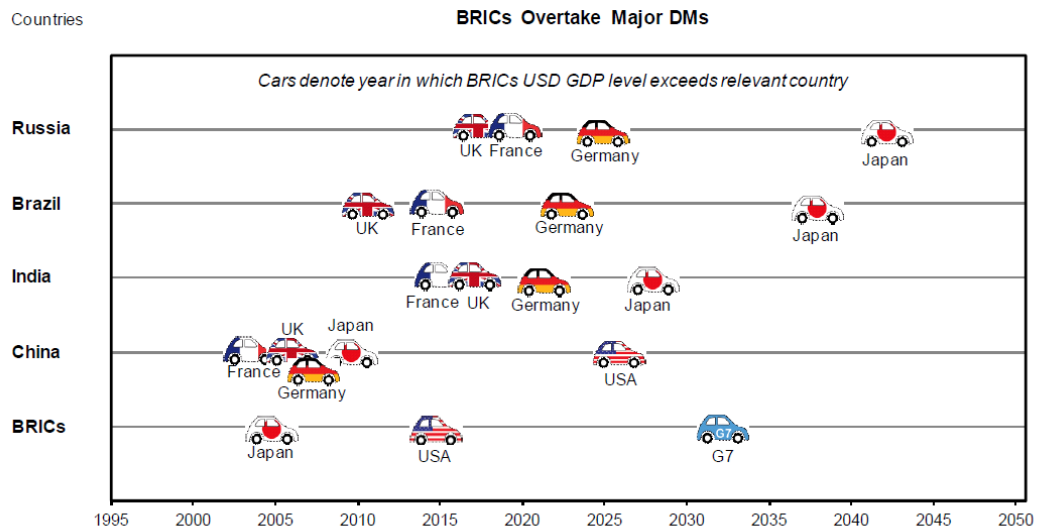


Figure 1.2 BRICs overtake major developed markets

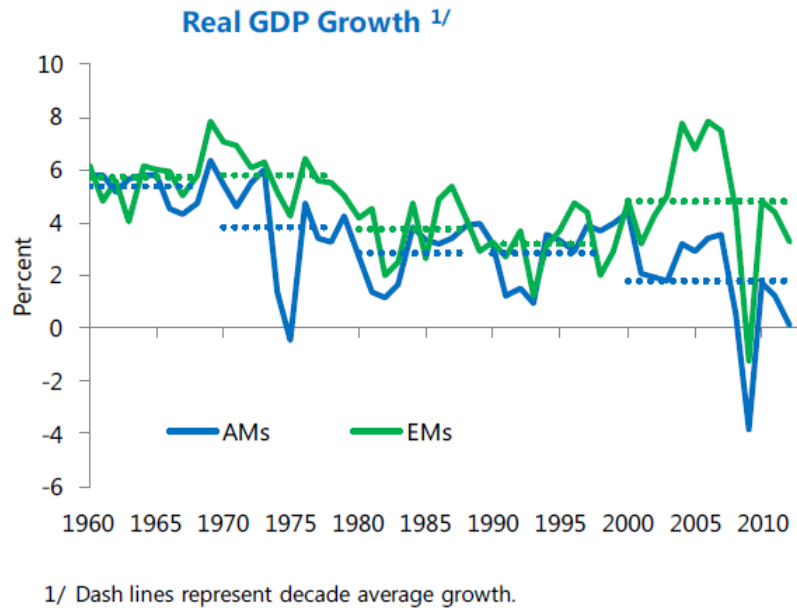
Source: GS Global ECS Research

Figure 1.2 shows that together BRICs economy is expected to surpass GDP of United States and of the G7 respectively by 2015 and 2032. Among the four, China is the most notable economy which already overtook France, United Kingdom, Germany and Japan, and will soon surpass United States to become the world's largest economy. In 2013, in term of PPP, GDP of China overtakes that of United States with the value of 16 trillion US\$ ³.

³Data from World Bank, <http://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD>

1.2 The importance of emerging markets

The importance of emerging markets in the world economy has grown dramatically in recent years. Emerging markets have had a superior rate of economic growth compared with the older industrial countries. In fact, without emerging markets, the current rate of world economic growth would be much lower than it currently is (Hale, 2012).



**Figure 1.3 Real GDP growth in emerging markets
and advanced markets**

Source: WEO and IMF staff calculation

Note: AMs (Advanced markets), EMs (Emerging markets)

As shown in Figure 1.3, with strong and robust growth in the 2000s, emerging markets have increased by an average of 4.75 percent in real GDP between 2000 and 2012, about 1 percent higher than average observed during the previous two decades while growth in advanced markets remained stable. Therefore emerging markets account for about half of global output in purchasing power parity (PPP) terms (Cubeddu et al., 2014), and have returned to a convergence path to higher income status.

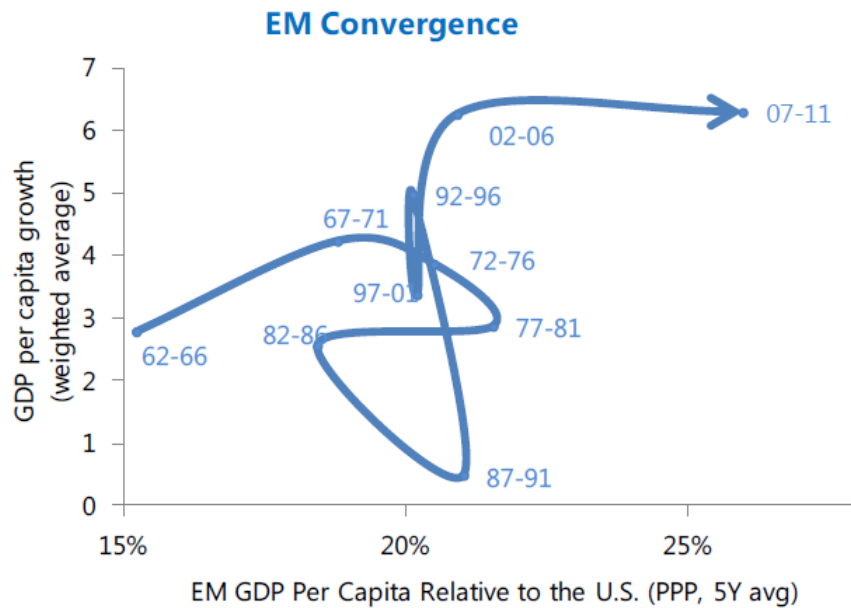


Figure 1.4 Emerging markets convergence

Source: WEO and IMF staff calculation

Figure 1.4 shows that GDP per capita growth of emerging markets during 2000s remains high (6%) and account for 25% of US GDP per capita for period 2007 - 2011 after about 30 years struggling at 20% threshold. Unsurprisingly emerging markets are attractive to world economy as target markets, manufacturing bases, and sourcing destinations (Cavusgil et al., 2008).

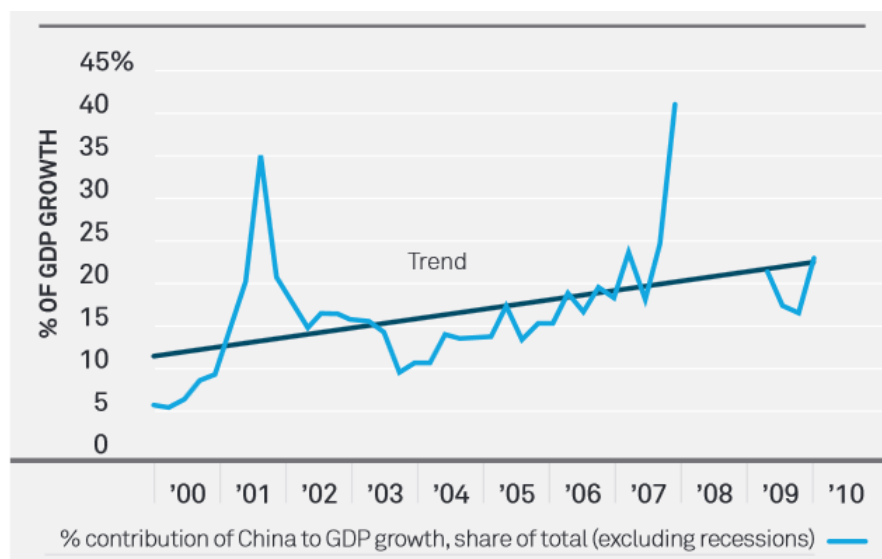


Figure 1.5 China's contribution to world economic growth

Source: UBS

Among emerging markets, China is a significant factor. The phrase “When China sneezes, the world catch a cold” has become such a cliché in recent years. As shown in Figure 1.5, China has been an important engine of global growth, contributing an average of 15% to world GDP growth. Besides, Cubeddu et al. (2014) point out China is also an important contributor to growth for other emerging markets.

1.3 Growth factors

There are two polar views explaining emerging markets’ growth experience.

- One highlights the role of favorable external factors characterized by high commodity prices and cheap external credit (Åslund, 2013; Eichengreen et al., 2012).
- The other supposes high growth in emerging markets comes from structural reforms and strong macroeconomic policies (Abiad et al., 2012).

The reality could indeed lie somewhere between these competing views (Cubeddu et al., 2014). Sánchez (2007) investigates the role of domestic and external factors in explaining business cycle and international trade development in fifteen emerging markets. The result was shown that external shocks on average explain a fraction of no more than 10% of the variation of real output, consumer price, real exchange rates and real imports.

Cubeddu et al. (2014) point out factors helped emerging markets grow robustly. Among them are external tailwinds namely (i) high and rising commodity price; (ii) rising of trading partners and (iii) easy financing conditions, and internal factors namely (i) domestic structural reform and (ii) macroeconomic policies.

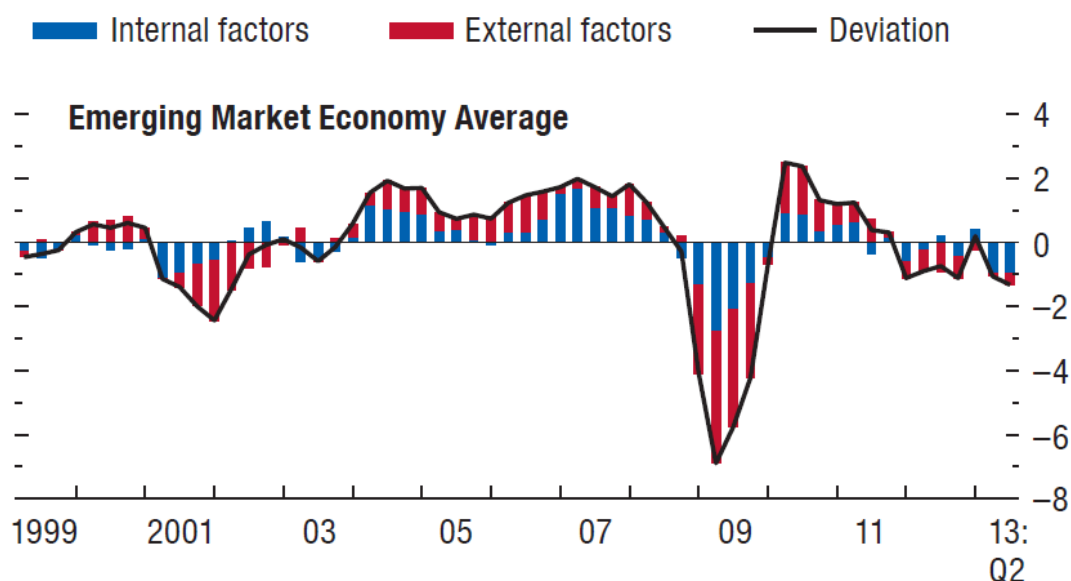


Figure 1.6 Historical decompositions of real GDP growth into internal and external factors (percentage points)⁴

Source: Haver Analytics; Thomson Reuters Data & IMF staff calculations

⁴Average for these 13 sample economies Brazil, Chile, China, Colombia, India, Indonesia, Malaysia, Mexico, Philippines, Poland, South Africa, Thailand and Turkey.

Figure 1.6 shows that external factors tended to explain one-half or more of the deviation in emerging markets' growth. During the last two recessions originating in advanced countries – in early 2000s and during the global financial crisis – external factors have had higher contribution while during emerging markets' expansion, internal factors are of more importance.

1.3.1 External conditions

1.3.1.1 Commodity price

The large and sustained increase in commodity prices raised investment and GDP growth in most commodity-exporting emerging markets ⁵, many of which enjoyed an unprecedented income windfall.

⁵Commodity exporters are defined as countries which have net commodity exports accounting for at least 10% of total goods export

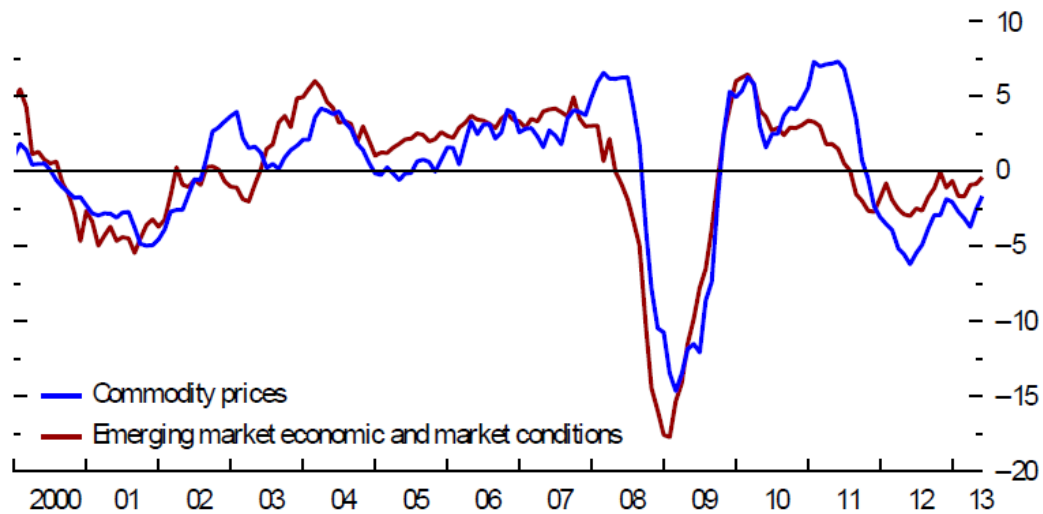


Figure 1.7 Commodity prices and emerging market economic activity

Source: International Monetary Fund (2013)

Figure 1.7 shows that the correlation between growth in commodity prices and growth in macroeconomic activity in emerging markets is very high; the correlation between the first principal components of the two is 0.8 (International Monetary Fund, 2013).

Cubeddu et al. (2014) calculate for the average commodity-exporting emerging markets, the 5.25 percent annual improvement in terms of trade contributed to a 0.75 percentage point increase in growth—about a quarter of the higher growth seen in the 2000s. Besides, growth of commodity exporters are proved to be more elastic to term of trade changes than that of non-commodity ones (Cubeddu et al., 2014).

Among emerging markets analyzed in this dissertation are:

- Commodity exporters: Brazil (29.0%), Chile (51.2%), Colombia (56.1%), Indonesia (49.1%), Malaysia (36%), Philippines (12.2%), Peru (54.3%), Russia (55.5%), Thailand (16%) and Venezuela (59.5%).⁶

⁶Values in blankets are average proportion of net commodity exports in total goods exports over the period 1962–2010. *Data sources: World economic outlook: Growth resuming, dangers remain*, April 2012, IMF

- Non-commodity exporters: China, Czech Republic, India, Jordan, Pakistan, Poland and Turkey.

1.3.1.2 Growth of trading partners

Demand from either advance markets or large emerging markets (such as BRICs) play an important role, especially for commodity exporters.

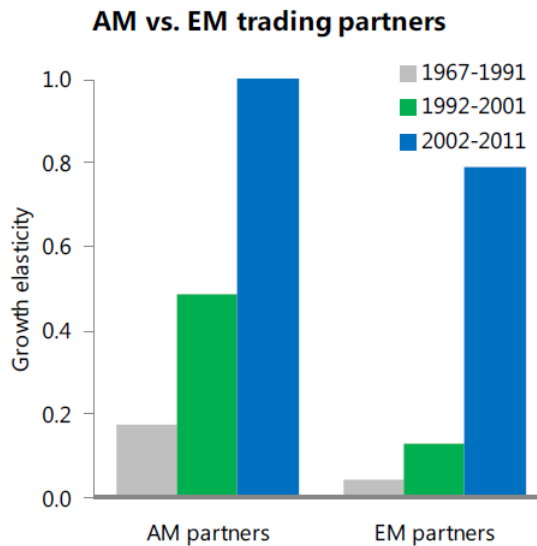


Figure 1.8 Trading partner growth elasticity

Source: WDI and IMF staff calculations

Note: AM (Advanced market), EM (Emerging market)

Figure 1.8 shows the sensitivity of emerging markets growth to their trading partners has been raising rapidly over time. Demand from advanced markets continues to dominate (a one percentage point increase in advanced market trading partners' growth would increase growth by around 1 percentage point), since rising within emerging markets trade partly reflects growing supply chains that ultimately meet final demand from advanced markets (Cubeddu et al., 2014).

Noticeably China has been considered as a distinct external factor for other emerging markets' growth since 1990s. A number of recent studies have found significant implication of changes in China's real activity for growth in the rest of the world (Arora and Vamvakidis, 2011; Ahuja and Nabar, 2012). Emerging markets' economic integration with China has provided an offset to other external

factors at key moments (Figure 1.9).

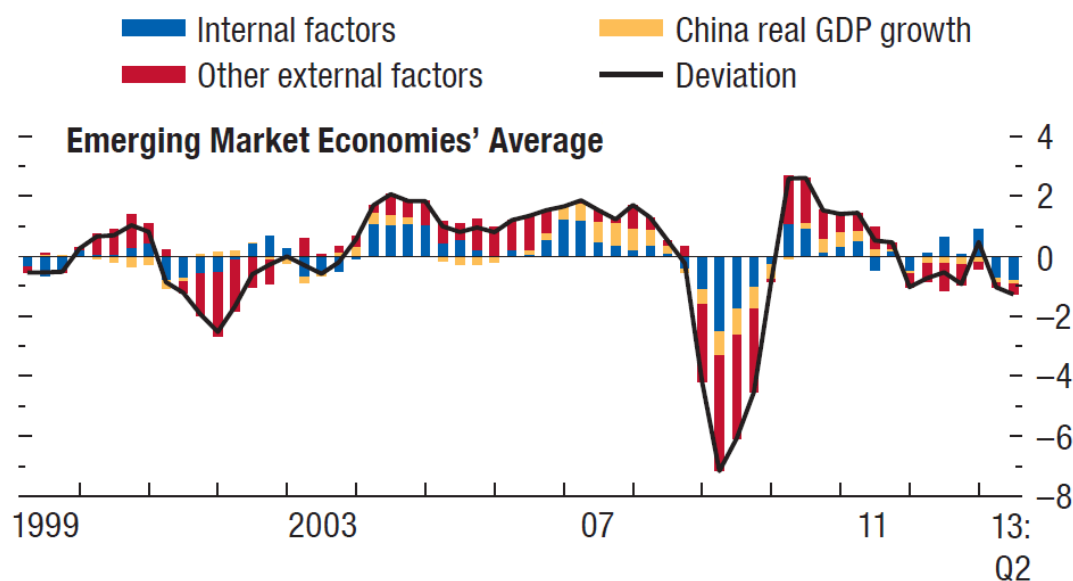


Figure 1.9 Historical decompositions of real GDP growth with China as an explicit external factor (percentage points)⁷

Source: Haver Analytics; Thomson Reuters Data & IMF staff calculations

⁷Average for these 12 sample economies Brazil, Chile, Colombia, India, Indonesia, Malaysia, Mexico, Philippines, Poland, South Africa, Thailand and Turkey.

Cubeddu et al. (2014) explain channels through which China influences growth beyond its borders as follows:

- i The global supply chain: China imports intermediate inputs from elsewhere — especially emerging Asia – to produce final goods for advanced economy markets.
- ii China's own demand: China's investment-oriented growth can boost commodity-exporting emerging markets via higher commodity demand and prices.
- iii Investment: China supports growth elsewhere through higher foreign direct investment flow into those countries.

1.3.1.3 Financing conditions

Easy financing conditions boosted investment and growth in financially open emerging markets. Average annual US long-term interest rate for the 2000–2012

period was around 3.5 percent lower than that of the 1990–1999 period (Cubeddu et al., 2014). It is found that for the median financially open emerging market, the 170 basis point decline in global real interest rates in the 2000s raised GDP growth by 0.25 of a percentage point—about 15 percent of higher growth these countries saw in the 2000s ⁸.

1.3.2 Internal conditions

Internal factors have certain effects on emerging markets’ growth (Abiad et al., 2012). Internal factors analyzed are domestic structural reforms (trade openness and financial openness) and macroeconomic policies (fiscal policy, monetary policy, and industrial policy). Different internal conditions may explain for the heterogeneity among emerging markets.

1.3.2.1 Domestic structural reforms

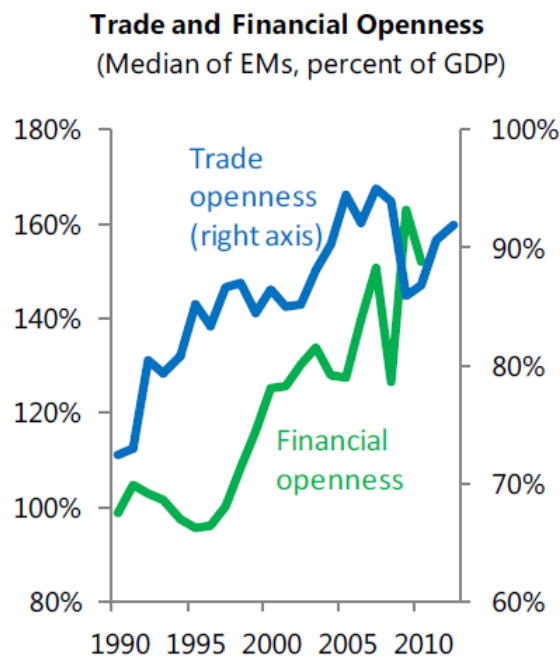


Figure 1.10 Trade ⁹ and financial openness ¹⁰
(median of emerging markets)

Source: WDI and IMF staff calculations

⁹Trade openness is defined as total exports plus imports

¹⁰Financial openness is defined as total external assets plus liabilities

⁸Global real interest rates are proxied by the 10-year U.S. T-bond rate.

Trade openness Trade openness in emerging markets increased substantially over time (Figure 1.10) thanks to the liberalization of trade regimes and lower costs of transportation and communication. Many studies such as Frankel and Romer (1999); Harrison (1996); Dollar and Kraay (2003); Alcalá and Ciccone (2004) shows that trade openness benefits economic growth. Haddad et al. (2013) also point out that trade openness reduces growth volatility when countries are well diversified. Growth in emerging markets is not exceptions. Emerging markets in the top quartile in trade openness grew on average 2 percentage points more in the 1990s (Cubeddu et al., 2014). On the other hand, Yanikkaya (2003) demonstrates that trade barriers have certain positive impacts on growth, especially for developing countries.

However, trade openness measurement in most of these works is still questioned (Huchet-Bourdon et al., 2011). Huchet-Bourdon et al. point out there are three way of measuring based on different trade openness definitions as follows:

- Trade openness measurement is based on trade restrictions/ distortions such as average tariff rates, average coverage of quantitative barriers, and frequency of non-tariff barriers or collected tariff ratios. The disadvantage of these indicators are imperfect and partial measures of overall restriction/ distortions induced by trade policies, and limited data for countries and years.
- Trade openness measurement is based on qualitative indices to classify countries according to their trade and global policy regime. Unfortunately data are not available for many countries and years. Besides, these indices provide only very rough classification.
- Trade openness measurement is based on trade flows. This kind of measure has been used commonly in empirical analyses since data required to compute are available for nearly all countries and over long period. However the disadvantage of these indices is that they are mainly outcome-based measures.

Huchet-Bourdon et al. conclude trade openness is a multidimensional concept that cannot be summarized to a single measure and proposes a new way of mea-

surement by taking into account two additional dimensions: the quality and the variety of the exported basket, which is inspired from the work of Hausmann et al. (2007) and Feenstra and Kee (2008).

Financial openness As with trade, there has been a steady move toward greater financial openness in many emerging markets (Figure 1.10).

Fratzscher and Bussiere (2004) study 45 industrialized and emerging market economies to discover the relationship between financial openness and economic growth. The result was shown that due to investment boom and surge in portfolio and debt inflows, growth accelerates immediately after liberalization. However the main drivers for medium and long term growth are quality of domestic institutions, the size of FDI inflow and the sequencing of the liberalization process. Cubeddu et al. (2014) note the impact on growth varied widely across emerging markets depending on their financial openness. A higher 0.5 percentage point in growth was witnessed in those countries that are at the top quartile of financial openness.

Besides, the effects of financial liberalization depend on country characteristics. Broner and Ventura (2010) show that financial liberalization might lead to different outcomes depending on the level of development, the depth of domestic financial markets, and the quality of institutions in each country. The possible outcomes are (i) ambiguous effects on net capital flows, investment, and growth; (ii) large capital inflows and higher investment and growth; or (iii) volatile capital flows and unstable domestic financial markets. Dell’Ariccia et al. (2008) suggest, for some emerging markets, susceptibility to the volatility of capital flows can be reduced by a change in their composition – toward foreign direct investment (FDI), which is thought to be more stable.

More importantly, there are numerous indicators of financial openness and integration which have yielded significantly different results in research (Quinn et al., 2011). Indicators can be grouped into three broad categories: de jure, de facto and hybrid indicators. Among them is the Chinn-Ito index (KAOPEN). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions AREAER (Chinn

and Ito, 2008). The higher scores indicate greater openness. The advantage of this index is that it covers the broad range of countries and long time periods and is publicly available.

1.3.2.2 Macroeconomic policies

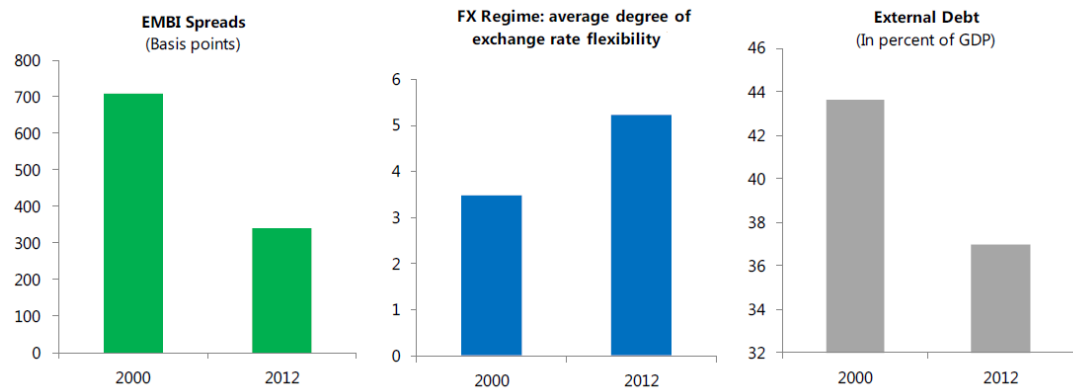


Figure 1.11 Emerging markets fundamentals ¹¹

Source: AREAER database, Bloomberg, WDI and IMF staff calculations

¹¹EMBI (Emerging Market Bond Index) Spreads: The difference between the yields on emerging country sovereign bonds and bonds issued by a government of the industrialized world with identical currency denomination and maturity.

FX (Foreign exchange) regime index is from 1 to 10. No separate legal tender = 1, free floating = 10

Figure 1.11 shows lower public and external debt and sovereign debt, improved international reserve coverage and more flexible exchange rate regimes in a number of emerging markets (Cubeddu et al., 2014). Improved policy frameworks and increased policy space can help explain growth in emerging markets (Kose, 2011). Good policy frameworks have helped emerging market prolong their expansions and hasten their recoveries and appear to provide a cushion (Abiad et al., 2012).

a. Monetary policy

Inflation targeting Table 1.1 below shows inflation targeting in some emerging markets.

Table 1.1 Emerging markets with inflation targeting, 1990-2008

| Country | Date of adoption | Inflation target at the end of 2008 (%) | Inflation targets path |
|----------------|------------------|---|------------------------|
| Brazil | 1999 | 4.50 | Converging |
| Chile | 1991 | 3.00 | Stationary |
| Colombia | 2000 | 4.00 | Converging |
| Czech Republic | 1998 | 3.00 | Stationary |
| Hungary | 2001 | 3.00 | Converging |
| Indonesia | 2005 | 5.00 | Converging |
| Israel | 1992 | 2.00 | Stationary |
| Korea | 1998 | 3.00 | Stationary |
| Mexico | 1995 | 3.00 | Stationary |
| Peru | 1994 | 2.00 | Stationary |
| Philippines | 2002 | 4.00 | Stationary |
| Poland | 1999 | 2.50 | Stationary |
| South Africa | 2000 | 4.50 | Stationary |
| Thailand | 2000 | 1.75 | Stationary |
| Turkey | 2006 | 4.00 | Converging |

Source: Schmidt-Hebbel (2009)

Many emerging markets have adopted inflation targeting since 1990s and as of late 2008 there are some countries have graduated from target convergence by attaining low inflation stationary inflation targets, some are still converging toward stationary targets (Schmidt-Hebbel, 2009).

Exchange rate policies Tsangarides (2010) investigates a sample of 50 emerging market economies to discover whether the exchange rate regime can help explain how emerging markets fared in global financial crisis. The hypothesis is that the more flexible the exchange rate is, the smaller output losses in the face of external shocks. Empirical evidence shows that during crisis period countries with pegged regimes fared no worse than those with floats; however, during recovery period 2010–2011, the former seems to fare worse than the latter.

Besides, according to Velasco and Chang (2004), that many emerging markets have moved away from hard exchange rate pegs helps them reduce the vulnerability of the public and financial sectors to the sudden and severe currency depreciations characteristic of currency crises.

b. Fiscal policy

Government expenditure Figure 1.12 presents a scatter plot with the 1960–1999 correlation on the horizontal axis and the 2000–2009 correlation on the vertical axis. Frankel et al. (2013) classify analyzed countries into four categories as follows: ¹²

- **Established graduates** (bottom left): Countries have always been countercyclical (Australia, Austria, Belgium, Canada, Denmark, Finland, Ireland, Italy, Japan, Korea, Netherlands, Spain, United Kingdom, United States, and Yemen)
- **Still in school** (top right): Countries have continue to behave procyclically over the last decade (Angola, **Argentina**, Azerbaijan, Bangladesh, Cameroon, **China**, **Colombia**, Rep. of Congo, Dominican Rep., Ecuador, **Egypt**, Gabon, Gambia, Ghana, Guatemala, Haiti, Honduras, **India**, Iran, **Jordan**, Kenya, Madagascar, Mali, **Mexico**, Mozambique, Myanmar, New Zealand, Nicaragua, Niger, **Pakistan**, Panama, **Peru**, Portugal, Qatar, Senegal, Sierra Leone, **South Africa**, Sri Lanka, Tanzania, **Thailand**, Togo, Trinidad and Tobago, Tunisia, Uruguay, and **Venezuela**)
- **Back to school** (top left): Countries were countercyclical during the 1960–1999 period and turned procyclical over the last decade (Dem. Rep. of Congo, France, Greece, Jamaica, Kuwait, Sudan, Sweden, and Switzerland)
- **Recent graduates** (bottom right): Countries used to be procyclical and became countercyclical over the last decade (Algeria, Bahrain, Bolivia, Botswana, **Brazil**, **Chile**, Costa Rica, Côte d’Ivoire, El Salvador, Germany, Hong Kong, **Indonesia**, Libya, **Malaysia**, **Morocco**, Nigeria, Norway,

¹²Emerging markets highlighted in bold

Oman, Paraguay, **Philippines**, Saudi Arabia, Syrian Arab Rep., **Turkey**, Uganda, **United Arab Emirates**, and Zambia)

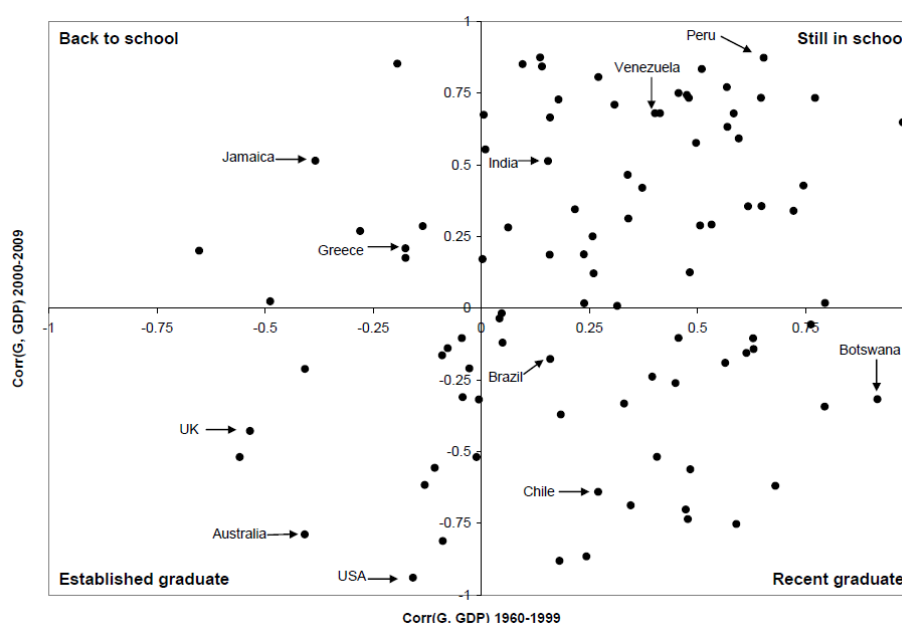


Figure 1.12 Country correlations between the cyclical components of the real government expenditure and real GDP 1960–1999 vs. 2000–2009¹³

Source: Frankel et al. (2013)

¹³The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator.

It comes to highlight two main points as follows:

- All emerging markets were procyclical over period 1960–1999
- There have been a differentiation between them over period 2000–2009. Some of them have been remaining procyclical, but some have become countercyclical.

Fiscal deficit and public debt Many emerging markets have reduced their fiscal deficits and public debt. In 2011, debt/GDP ratio among emerging market countries was estimated at 43 percent (Frankel et al., 2013). As a result of

improved fiscal situations, many emerging markets were able to bounce back from the 2008–2009 global financial crisis more quickly than advanced countries.

c. Industrial policy "Industrial policy is any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention." (Warwick, 2013). The formation of special economic zone (SEZ) is a kind of such intervention.

Akinci and Crittle (2008) define special economic zone (SEZ) as (i) Geographically delimited area, usually physically secured (fenced-in), (ii) Single management/administration, (iii) Eligibility for benefits based upon physical location within the zone, and (iv) Separate customs area (duty-free benefits) and streamlined procedures.

**Table 1.2 Dates of establishment of zone programs
in emerging markets**

| | Before 1970 | 1970s | 1980s | 1990s | 2000-Present |
|------------------------------------|-------------------------------------|-------------------------|--------------------------------|--|--------------|
| Americas | Brazil Colombia Mexico | Chile | Peru | Argentina Venezuela | |
| Asia and the Pacific | India Taiwan (China) Thailand | Malaysia Philippines | China Indonesia Pakistan | Vietnam | |
| Middle East and North Africa | | Israel | Jordan Morocco | | |
| Central and Eastern Europe | | | Hungary | Czech Republic Poland Russian Federation | |
| Sub-Saharan Africa | | | | | South Africa |

Source: Akinci and Crittle (2008)

SEZs have the aim of achieving one or more of the following objectives: (i) Attracting foreign direct investment (FDI); (ii) Increasing foreign exchange earnings; (iii) Creating jobs; (iv) Stimulating domestic economy via spillover and linkage effects, technological and human capital upgrading, and cultivation of non-traditional exports; (v) Experimenting with (or gradual embrace of) liberal economic policies (Cheesman, 2012).

The number of SEZs has grown dramatically in more and more emerging markets. Especially since 1980s, the pace of zone development increased and expanded to new regions such as Sub-Saharan Africa (South Africa), Central and Eastern Europe (Hungary) (Table 1.2).

Table 1.3 Zone development rankings

| | Number of zones | | Employment (thousands) | | Exports (US\$ millions) | |
|-----------|---|-----|--|--------|-------------------------|---------|
| Regions | Asia and the Pacific/ Latin America/ Middle East and North Africa | | Central and Eastern Europe and Central Asia/ | | | |
| Countries | China | 187 | China | 50,000 | China | 145,000 |
| | Vietnam | 185 | Indonesia | 6,000 | Malaysia | 117,013 |
| | Hungary | 160 | Mexico | 1,300 | Hong Kong (China) | 101,500 |
| | Costa Rica | 139 | Vietnam | 950 | Iran, Islamic Rep. of | 87,289 |
| | Mexico | 109 | Pakistan | 888 | Ireland | 82,500 |
| | Czech Republic | 92 | United Arab Emirates | 552 | Czech Republic | 68,626 |
| | Philippines | 83 | Philippines | 545 | India | 49,000 |
| | Dominican Republic | 58 | South Africa | 535 | Algeria | 39,423 |
| | Kenya | 55 | Thailand | 452 | Argentina | 36,478 |
| | Egypt, Arab Rep. of | 53 | Ukraine | 387 | Philippines | 32,030 |
| | Poland | 48 | Malaysia | 369 | Korea, Rep. of | 30,610 |
| | Nicaragua | 34 | Lithuania | 369 | Tunisia | 20,544 |
| | Thailand | 31 | Honduras | 354 | Bangladesh | 11,716 |
| | Jordan | 27 | Hong Kong (China) | 336 | Lithuania | 11,404 |
| | United Arab Emirates | 26 | Tunisia | 260 | Mexico | 10,678 |

Source: Akinci and Crittle (2008)

Table 1.3 shows that SEZs are concentrated in Asia and the Pacific (mainly China), Latin America, and Central and Eastern Europe and Central Asia. According to Akinci and Crittle (2008), less than a dozen countries account for most jobs created within zones and exports generated. Of emerging markets, China has the largest number of SEZs (noticeably the zones of Shenzhen, Zhuhai,

Shantou, and Xiamen created on south-western coast with easy access to world trade and existing conurbations such as Hong Kong), employment and exports value (Table 1.3). This has created significantly positive impacts on its dramatic export-oriented growth, standards of living improvement, and human development (Farole, 2011).

1.4 Remarks

- There is still no clear definition, and therefore, no unified classification of emerging markets between organizations and even within the same organization. Articles and reports about emerging markets should clarify the list of emerging markets going to be analyzed therein.
- Emerging markets, especially the so-called BRICs, play more and more important role in world economy. Besides one should not neglect the China's economy which has significant impact on other emerging markets' growth.
- Empirical analysis show that there are plenty of factors which might explain for growth in emerging markets. Factors are classified into external and internal groups. Of them, commodity price, trading partners' growth, and financing conditions (external factors) together with trade openness and financial openness (internal factors) should be paid more attention.

Chapter 2

Data and Methodology

2.1 Data

In this dissertation, we consider the sample consisting of seventeen emerging markets, which are Brazil(BRA), Chile (CHL), China (CHN), Colombia (COL), Czech Republic (CZE), India (IND), Indonesia (IDN), Jordan (JOR), Malaysia (MYS), Pakistan (PAK), Peru (PER), Philippines (PHL), Poland (POL), Russian Federation (RUS), Thailand (THA), Turkey (TUR), and Venezuela (VEN).

2.1.1 Variable definitions

Y Gross Domestic Product (GDP) is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. In this dissertation, we take into account PPP GDP, which is GDP converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S dollar has in the United States. Data are in constant 2011 international dollars to exclude inflation when considering growth rate.

TOT Terms of trade (TOT) index refers to relative price of exports in terms of imports. TOT reflects changes in commodity price (if any).

PARTNER PARTNER reflects gross domestic product in trading partners. To simplify, we calculate PARTNER by aggregating GDP (PPP, constant 2011) of 27

advanced markets (Australia, Austria, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Ireland, Iceland, Israel, Italy, Japan, Korea Rep., Luxembourg, Netherlands, Norway, New Zealand, Portugal, Slovak Republic, Slovenia, Sweden, and United States). Note that by using this index, we neglect the fact that each emerging market has different trading partners and trades with different proportions.

PARTNER_DIST This index is the PARTNER index adjusted by DIST ¹⁴ which measures bilateral distances (in kilometres) between each emerging market and trading partner. PARTNER_DIST is calculated as follows

$$\text{PARTNER_DIST}_i = \sum_{j=1}^{27} \text{GDP}_j \text{DIST}_{ij}^{-1} \quad (2.1)$$

where GDP_j is GDP (PPP, 2011 constant) of trading partner, DIST_{ij} is distance between emerging market i and trading partner j .

PARTNER_DIST is expected to capture better effects of trading partner's GDP on trade, and hence on emerging markets' GDP since distance still matters in international trade ¹⁵.

CHINA To analyse the role of China to other emerging markets, GDP (PPP, constant 2011) of China is considered as an exogenous variable in model.

CHINA_DIST Similarly to PARTNER_DIST index, CHINA_DIST is calculated as follows

$$\text{CHINA_DIST}_i = \text{GDP}_{\text{China}} \text{DIST}_{i,\text{China}}^{-1} \quad (2.2)$$

where $\text{DIST}_{i,\text{China}}$ is distance between emerging market i and China.

US_BOND Global interest rate is proxied by the 10-year U.S. T-bond rate.

OPEN Trade openness is measured by the sum of exports and imports of goods and services as a share of gross domestic product.

¹⁴See more about DIST in Mayer and Zignago (2011)

¹⁵Empirical evidence of gravity model shows that a 1% increase in the distance between countries is associated with a decrease in the volume of trade of 0.7% to 1%.

KAOPEN This index measures a country's degree of capital account openness. The index was initially introduced in Chinn and Ito (Journal of Development Economics, 2006). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). We use index normalized to range from zero to one (from completely closed to completely open in capital account). The higher of the index, the more open of capital account.

2.1.2 Data sources

Data used in this dissertation is gathered from different sources.

- Y (GDP PPP, constant 2011, international US\$) data from World Bank Database
<http://data.worldbank.org/indicator/NY.GDP.MKTP.PP.KD>
- DIST (Distance) data from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)
http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6
- TOT (Terms of trade) data from World Bank Database
<http://data.worldbank.org/indicator/TT.PRI.MRCH.XD.WD>
- US_BOND (U.S. 10 year bond) data from Federal Reserve Data
<http://www.federalreserve.gov/releases/h15/data.htm>
- OPEN (Trade openness, % GDP) data from World Bank Database
<http://data.worldbank.org/indicator/NE.TRD.GNFS.ZS>
- KAOPEN (Capital account's openness) data from Chinn–Ito Website
http://web.pdx.edu/~ito/Chinn-Ito_website.htm

2.1.3 Descriptive statistics

Table 2.1 presents a quick statistics of variables, including mean, standard deviation, min and max value. We are considering balanced panel data for seventeen

emerging markets in thirteen years (2000–2012); hence, each variable series contains 221 observations ($N = 221$).

Table 2.1 Summary of variable statistics

| Statistic ($N = 221$) | Mean | St. Dev. | Min | Max |
|--------------------------------|------------|-----------|------------|------------|
| Y (billion US\$) | 1,492.048 | 2,278.868 | 36.912 | 14,500.000 |
| PARTNER (billion US\$) | 37,938.461 | 2,249.589 | 34,100.000 | 40,800.000 |
| PARTNER_DIST (billion US\$/km) | 7.485 | 5.013 | 3.152 | 24.190 |
| TOT | 111.539 | 37.399 | 51.021 | 262.084 |
| OPEN | 74.323 | 44.889 | 21.720 | 220.407 |
| KAOPEN | 0.479 | 0.313 | 0.000 | 1.000 |
| US_BOND (%) | 4.029 | 1.052 | 1.800 | 6.030 |

- **Y:** GDP observations vary widely (high standard deviation). There is a big difference between the min and the max value (37 billion US\$ versus 14,500 billion US\$). Noticeably, mean value (1,492 billion US\$) is much closer to the min rather than to the max, which suggests there have been very few observations outperforming most of the others. The better ones may belong to certain year(s) and/ or certain market(s).
- **PARTNER:** GDP of advanced trading partners spread relatively less widely than that of emerging markets above (smaller standard deviation). Besides the mean (37,938 million US\$) is nearly equal to the average of the min and max value (34,100 and 40,800 billion US\$ respectively).
- **PARTNER_DIST:** After adjusting with DIST index, the characteristics of trading partners' GDP series change since distances among markets vary. PARTNER_GDP spreads relatively more widely and has relatively larger gap between the min and max value than PARTNER.
- **TOT:** Terms of trade variable also varies widely with high standard deviation (37 points). The max value (262 points) is about five times larger than the min value (51 points).
- **OPEN:** Trade openness index also varies widely with high standard deviation (74 points). The max value (220 points) is about ten times larger than

the min value (21 points).

- **KAOPEN:** KAOPEN varies between 0 and 1. The larger the index, the opener the capital account. The mean (0.479 point) suggests on average, emerging markets are at under middle level of financial openness.
- **US_BOND:** US 10 year bond rate varies widely from 1.80% to 6.03% with the average at 4.03% level during period 2000–2012.

Descriptive statistic above is for pooled observations regardless of panel's country and time dimension.

We then take a closer look at dependent variable (Y) and independent variables (PARTNER, TOT, OPEN, KAOPEN, and US_BOND) in each emerging market by plotting them.

2.1.3.1 Dependent variable

Figure 2.1 shows the density of GDP variable during period (2000–2012) for each emerging market. From Figure 2.1, we highlight some interesting points as follows:

- Among emerging markets stand out BRICs with the highest mean GDP. Specifically, mean GDP of BRICs is calculated as about 4.51 trillion US\$ (PPP), about two times larger than mean of the other emerging markets. China has the highest median (8.18 trillion US\$) as well as mean (8.75 trillion US\$) value of GDP PPP.
- Most of GDP in emerging markets have right skewed distributed data, which does mean a long tail of high GDP value pushing up the mean above the median and a high standard deviation. It may imply strong but fluctuating economic growth in emerging markets.
- Different box plot patterns and positions suggest a diversity among emerging markets. GDP value in emerging markets are not at the same level.

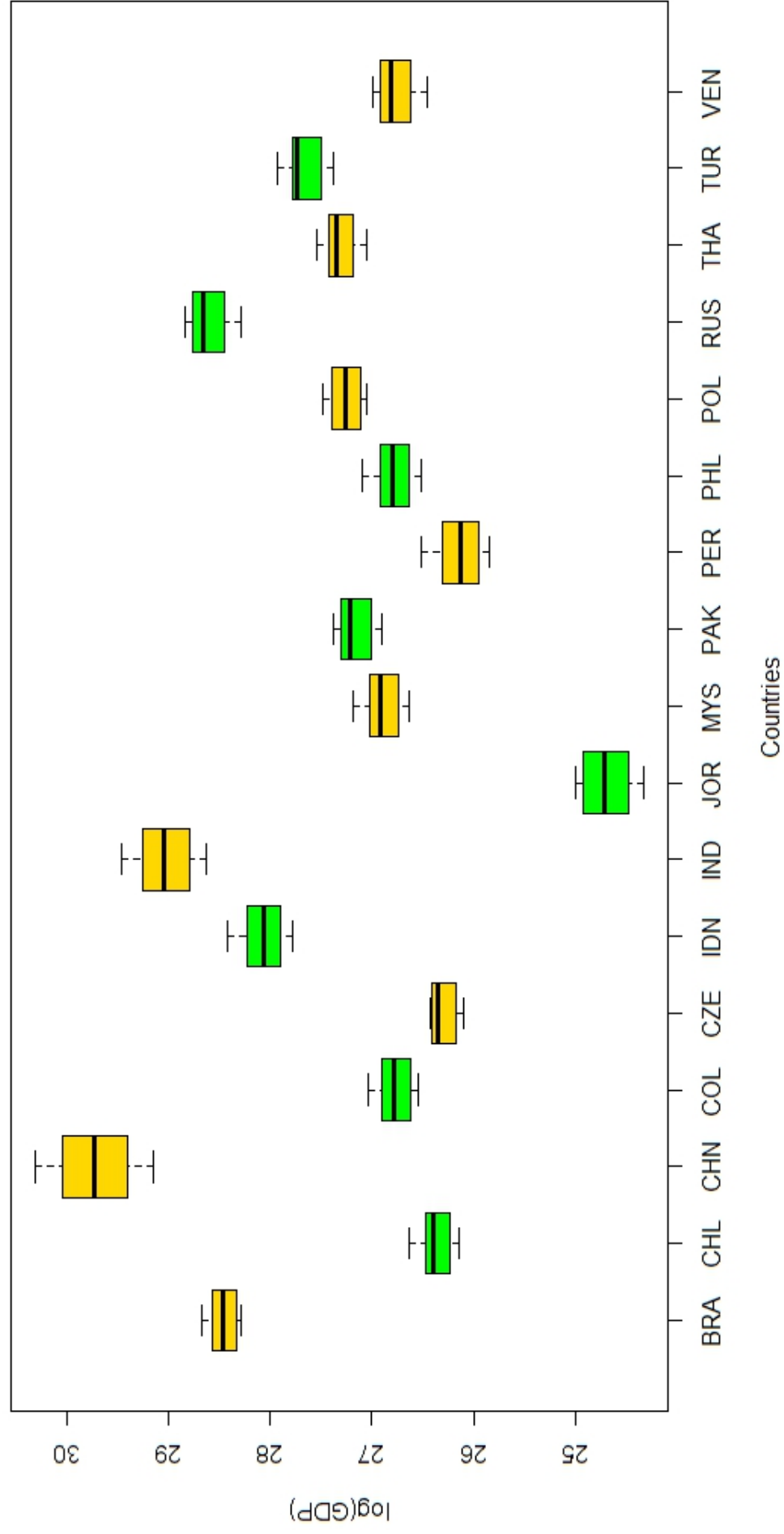
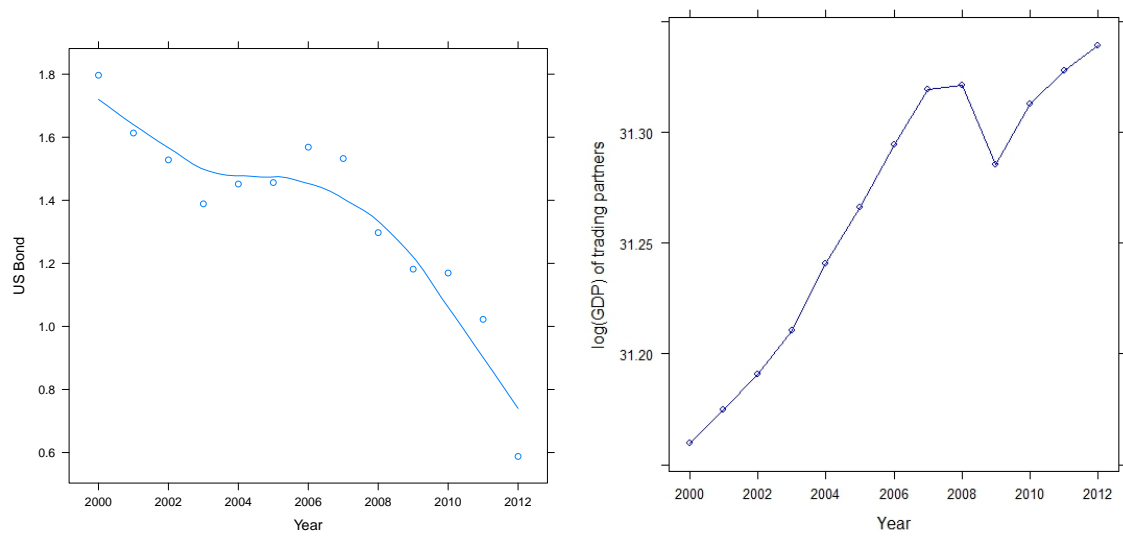


Figure 2.1 Box plot of $\log(\text{GDP})$ in emerging markets (2000–2012)

2.1.3.2 Independent variables

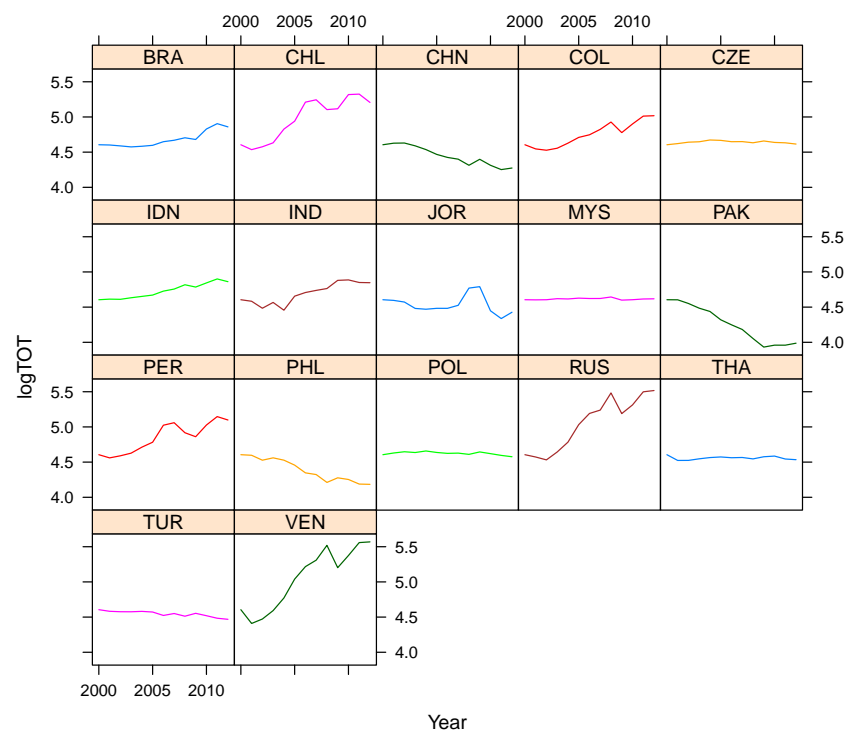
External variables Figure 2.2 plots patterns of external variables which are financing condition (reflected in US_BOND), growth of trading partner (reflected in PARTNER), and commodity prices (reflected in TOT).

- **US_BOND:** From 2000 to 2012, US_BOND has been on downward trend, characterized by three phases: a dramatic decrease by 0.2% during 2000–2003 due to 11/9 attack, followed by a flat pattern fluctuating slightly around the level of 1.5% during 2003–2007, then a sudden drop by 0.7% during 2007–2012 as a reaction to global economic crisis.
- **PARTNER:** On the other hand, GDP of trading partners has been on upward trend with fast growth during 2000–2007 (average GDP growth is 2.1%), then flattening in 2008, followed by a downturn in the year after (GDP growth is negative 3.25%) before dramatically recovering and outperforming that of pre-crisis period (average GDP growth for period 2009–2012 is 1.4%)
- **TOT:** TOT reflects effects of changes in commodity prices on each emerging market. As shown in the graph, the patterns of TOT are quite diverse. For commodity exporters such as Chile, Colombia, Peru, Russian Federation, and Venezuela, TOT has experienced an upward trend, whereas in non-commodity ones, TOT has remained unchanged (Czech Republic, Poland) or even has gone down (China, Jordan, Turkey). The interesting case is Philippines which is categorized into commodity exporters group but has witnessed a decrease in TOT by 50 points from 2000 to 2012



(a) US Bond

(b) Trading partners' growth

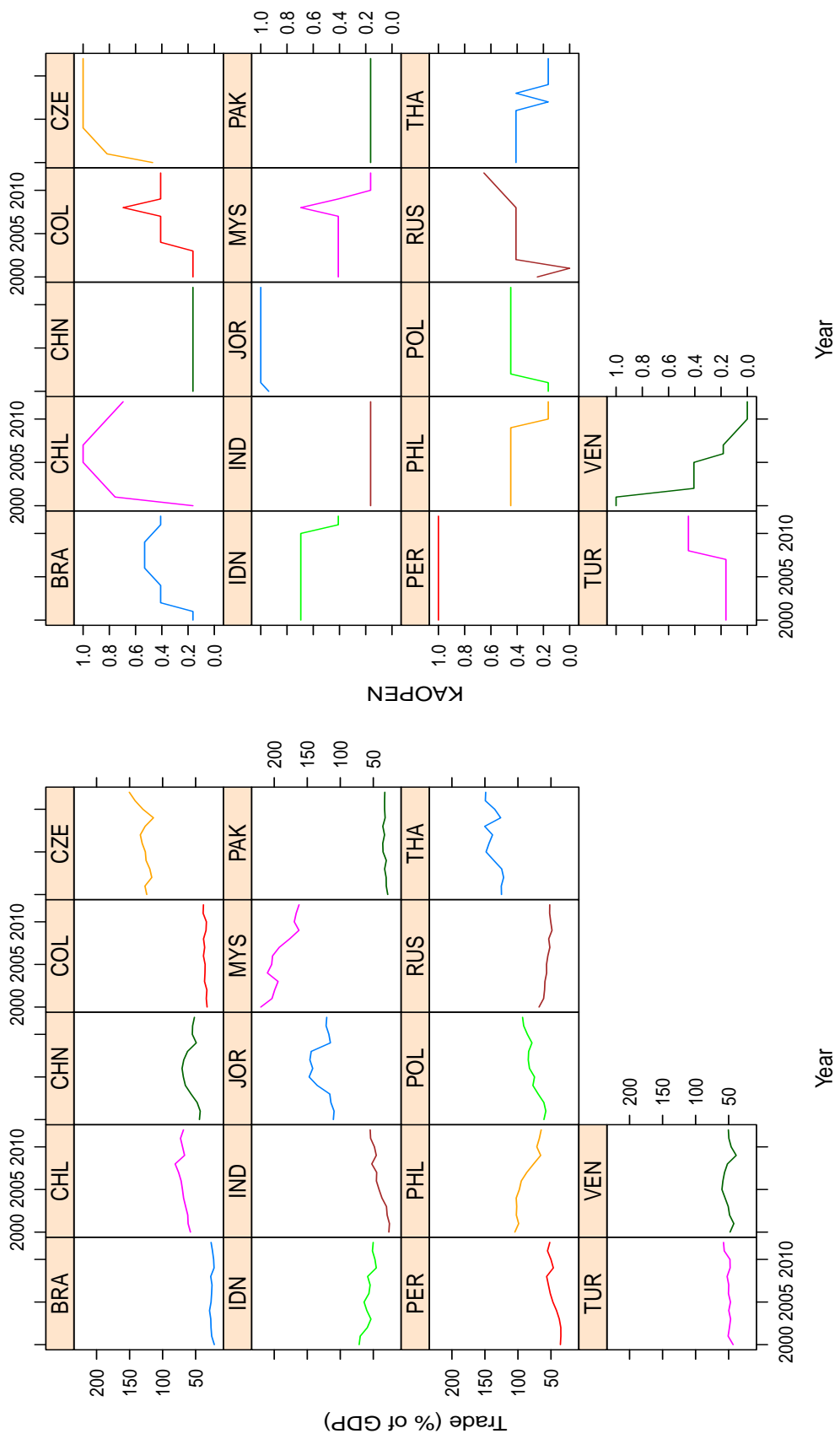


(c) Term of trade

Figure 2.2 Plots of external variables

Internal variables Figure 2.3 shows behaviors of internal factors in each emerging market: trade openness (measured by OPEN), and financial openness (measured by KAOPEN).

- **OPEN:** Each emerging market has different pattern of trade openness. Some are fluctuating around flat trend (Brazil, Colombia, Pakistan, Turkey and Venezuela), some are on upward trend (Czech Republic, Peru, and Poland), and some are on downward trend (Malaysia, Philippines). We divide seventeen emerging markets in sample into two groups based on average share of trade in GDP during period 2000-2012: (i) high level of trade openness (trade accounting for more than 50% of GDP), including: Chile, China, Czech Republic, Indonesia, Jordan, Malaysia, Philippines, Poland, Russian Federation, and Thailand; (ii) low level of trade openness, including: Brazil, Colombia, India, Pakistan, Peru, Turkey, and Venezuela.
- **KAOPEN:** Financial openness varies widely in emerging markets. Only three countries (Czech Republic, Jordan, and Peru) ending up the period with perfect openness in capital account. Most emerging markets have average KAOPEN index lower than 0.5, many of them even did not reach that threshold in any year during period analysed, namely China, India, Pakistan, Philippines, Poland, Thailand, and Turkey.



(a) Trade openness

(b) Financial openness

Figure 2.3 Plots of internal variables

2.2 Methodology

2.2.1 Model specifications

2.2.1.1 Unit root tests

To test unit root in panel data, we apply Pesaran (2007)'s method, which is robust against cross-sectional dependence.

Consider the test regression

$$\Delta y_{it} = a_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + \epsilon_{it} \quad (2.3)$$

where y_{it} is the observation of country i at time t ; \bar{y}_t is the average at time t of all observations in N countries ($\bar{y}_t = N^{-1} \sum_{i=1}^N y_{it}$)

The null hypothesis is that panel series has unit root; the alternative hypothesis is that panel series is stationary.

Testing results are reported in Table 2.2.

Table 2.2 Pesaran's Unit Root Tests

| Variable | CIPS tests | | | Note |
|-------------------|-----------------------|----------|---------|------------------------|
| | No trend and constant | Constant | Trend | |
| log(Y) | -1.066 | -2.126 | -5.343 | Non-stationary |
| log(PARTNER) | – | 1.589 | 1.255 | Non-stationary |
| log(PARTNER_DIST) | -0.978 | -1.852 | -2.369 | Non-stationary |
| log(CHINA) | -1.075 | – | 1.839 | Non-stationary |
| log(CHINA_DIST) | 0.28 | -0.03 | -0.08 | Non-stationary |
| log(TOT) | 0.451 | -0.617 | -1.290 | Non-stationary |
| log(OPEN) | -1.351 | -1.334 | -2.063 | Non-stationary |
| US_BOND | – | 0.395 | -0.4836 | Non-stationary |
| KAOPEN | – | – | – | Unknown ^(*) |

(*) We are not able to perform unit root test for KAOPEN index. Therefore, we would use its information to transform it into binary variable.

According to Pesaran (2007), it comes to the conclusion that except KAOPEN, all other variables are non-stationary.

Besides, since PARTNER, CHINA, and US_BOND variables are repeated over countries, we can make use of unit root tests for time series such as Augmented Dickey-Fuller test

$$y_t = \phi y_{t-1} + \sum_{j=1}^{p-1} \varphi_j \Delta y_{t-j} + \theta_0 + a_t, \quad (2.4)$$

with the hypothesis

$$H_0 : \phi = 1 \text{ (} y_t \text{ is nonstationary),}$$

$$H_1 : |\phi| < 1 \text{ (} y_t \text{ is stationary).}$$

Again, their non-stationarity is confirmed. τ statistic in Augmented Dickey-Fuller test for PARTNER, CHINA, and US_BOND series is -1.34, -1.12, and -1.14 respectively, which cannot reject the null hypothesis that time series has unit root.

We then check unit root for the first different natural logarithm of non stationary series above. We run Maddala-Wu tests, and obtain p-value < 0.01 for all first differencing logarithm series. Our results suggest that these transformed series are stationary.

2.2.1.2 Regression models

Since the variables are non-stationary series, we consider the first difference of their natural logarithm, which is stationary series and represents for growth rate. For KAOPEN, we transform it into binary (dummy) variable named KAOPEN_BI. The rule is that if there is any improvement in financial openness (a rise in KAOPEN index), KAOPEN_BI is equal to 1; on the contrary, if there is no improvement (KAOPEN index decreases or remains unchanged), KAOPEN_BI is equal to 0.

We then estimate models to justify impacts of independent variables on growth rate in emerging markets.

1. We estimate model

$$\begin{aligned} \Delta \log(Y) = & \alpha_0 + \beta_1 \Delta \log(\text{PARTNER}) + \beta_2 \Delta \log(\text{TOT}) + \beta_3 \Delta \log(\text{OPEN}) + \\ & + \beta_4 \Delta \log(\text{US_BOND}) + \beta_5 \text{KAOPEN_BI} + \epsilon \end{aligned} \quad (2.5)$$

2. We replace PARTNER variable by PARTNER_DIST in model

$$\Delta \log(Y) = \alpha_0 + \beta_1 \Delta \log(\text{PARTNER_DIST}) + \beta_2 \Delta \log(\text{TOT}) + \beta_3 \Delta \log(\text{OPEN}) + \beta_4 \Delta \log(\text{US_BOND}) + \beta_5 \text{KAOPEN_BI} + \epsilon \quad (2.6)$$

3. We do some robust tests by sub-group emerging markets into (i) commodity and non-commodity exporters, (ii) highly open and less open in trade.

4. We consider China as an exogenous factor, then estimate model

$$\Delta \log(Y) = \alpha_0 + \beta_1 \Delta \log(\text{PARTNER}) + \beta_2 \Delta \log(\text{TOT}) + \beta_3 \Delta \log(\text{OPEN}) + \beta_4 \Delta \log(\text{US_BOND}) + \beta_5 \text{KAOPEN_BI} + \beta_6 \Delta \log(\text{CHINA}) + \epsilon \quad (2.7)$$

$$\Delta \log(Y) = \alpha_0 + \beta_1 \Delta \log(\text{PARTNER_DIST}) + \beta_2 \Delta \log(\text{TOT}) + \beta_3 \Delta \log(\text{OPEN}) + \beta_4 \Delta \log(\text{US_BOND}) + \beta_5 \text{KAOPEN_BI} + \beta_6 \Delta \log(\text{CHINA_DIST}) + \epsilon \quad (2.8)$$

Regression models are summarized in Table 2.3 below.

Table 2.3 Panel models proposal

| Independent variables | China is in samples | | | | | | | | | | China is out of samples | |
|-------------------------------------|---------------------|-----|---------------------|-----|--------------------|-----|---------------------|-----|-------------------------|------|-------------------------|------|
| | 17 EMs | | High trade openness | | Low trade openness | | Commodity exporters | | Non-commodity exporters | | 16 EMs | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| | | | | | | | | | | | | |
| $\Delta \log(\text{PARTNER})$ | x | | x | | x | | x | | x | | x | |
| $\Delta \log(\text{PARTNER_DIST})$ | | x | | x | | x | | x | | x | | x |
| $\Delta \log(\text{CHINA})$ | | | | | | | | | | | x | |
| $\Delta \log(\text{CHINA_DIST})$ | | | | | | | | | | | | x |
| $\Delta \log(\text{TOT})$ | x | x | x | x | x | x | x | x | x | x | x | x |
| $\Delta \log(\text{OPEN})$ | x | x | x | x | x | x | x | x | x | x | x | x |
| $\Delta \log(\text{US_BOND})$ | x | x | x | x | x | x | x | x | x | x | x | x |
| KAOPEN_BI | x | x | x | x | x | x | x | x | x | x | x | x |
| <i>Note:</i> | | | | | | | | | | | EMs: Emerging markets | |

Detailed estimation results and discussions will be presented in the next chapter.

2.2.2 Econometrics software

In this dissertation we present the analysis and regression results with the help of R statistical package.

2.3 Remarks

- Seventeen emerging markets are going to be analyzed in this dissertation. They are Brazil, Chile, China, Colombia, Czech Republic, India, Indonesia, Jordan, Malaysia, Pakistan, Peru, Philippines, Poland, Russian Federation, Thailand, Turkey and Venezuela.
- For analyzing growth factors, time period is from 2000 to 2012, econometric method applied is panel data analysis with different variables taken into account. Remarkably, in some models, China is considered as an external factors towards other emerging markets.
- Due to non-stationarity of variables, we estimate models with growth rate, which is variables' first differencing natural logarithm, instead of their level value. For KAOPEN index, we transform it into dummy variable.
- Econometric results are produced by R – an open source statistical package.

Chapter 3

Results and discussions

In this chapter, we present statistics and estimation results as well as discuss about growth factors in emerging markets. Econometrics results are generated by R statistical package.

3.1 Model estimation

Recall model 2.5 mentioned in Chapter two

$$\begin{aligned}\Delta \log(Y) = & \alpha_0 + \beta_1 \Delta \log(\text{PARTNER}) + \beta_2 \Delta \log(\text{TOT}) + \beta_3 \Delta \log(\text{OPEN}) + \\ & + \beta_4 \Delta \log(\text{US_BOND}) + \beta_5 \text{KAOPEN_BI} + \epsilon\end{aligned}$$

We apply three methods (i) Pooled OLS, (ii) Fixed effects, and (iii) Random effects, then do some tests to choose the most appropriate estimation.

Estimation results for three methods are presented in Table 3.1.

**Table 3.1 Regression results with three methods:
Pooled OLS, Fixed effects and Random effects**

| | <i>Dependent variable:</i> | | |
|--------------------------------|----------------------------|-------------------------|-------------------------|
| | $\Delta \log(\text{GDP})$ | | |
| | Pooled OLS | Fixed effects | Random effects |
| Constant | 0.037*** (0.004) | | 0.036*** (0.005) |
| $\Delta \log(\text{PARTNER})$ | 0.951*** (0.168) | 0.986*** (0.151) | 0.978*** (0.150) |
| $\Delta \log(\text{TOT})$ | 0.055* (0.024) | 0.080*** (0.023) | 0.073** (0.022) |
| $\Delta \log(\text{OPEN})$ | -0.051 (0.030) | -0.069* (0.028) | -0.065* (0.028) |
| $\Delta \log(\text{US_BOND})$ | 0.021 (0.016) | 0.019 (0.014) | 0.020 (0.014) |
| KAOPEN_BI | -0.019** (0.006) | -0.011 (0.006) | -0.013* (0.006) |
| Observations | 204 | 204 | 204 |
| R ² | 0.274 | 0.347 | 0.326 |
| Adjusted R ² | 0.266 | 0.310 | 0.317 |
| F Statistic | 14.918*** (df = 5; 198) | 19.359*** (df = 5; 182) | 19.166*** (df = 5; 198) |

Note:

*p<0.1; **p<0.05; ***p<0.01

3.1.1 Pooled OLS or Panel effects models (Fixed and Random Effects)?

We conduct Chow test and Breusch-Pagan Lagrange Multiplier test to see whether the pooled OLS model is favoured over the other two models. The null hypothesis of both test is that pooled OLS model is appropriate.

For our models, p-value of both test are smaller than 0.05, which suggests to reject the null and accept the alternative hypothesis. There are significant difference across countries in our panel data, favouring the choice of fixed effects or random effects model rather than pooled OLS.

3.1.2 Fixed effects or Random effects model?

We consider two models:

1. **Fixed effects models** Start from error-components model

$$y_{it} = \beta_1 x_{it} + v_i + \epsilon_{it} \quad (3.1)$$

Average equation 3.1 over time for each country i

$$\bar{y}_i = \beta_1 \bar{x}_i + v_i + \bar{\epsilon}_i \quad (3.2)$$

Subtract 3.2 from 3.1, we obtain Fixed effects estimator

$$y_{it} - \bar{y}_i = \beta_1 (x_{it} - \bar{x}_i) + \epsilon_{it} - \bar{\epsilon}_i \quad (3.3)$$

As we may see, in fixed effects model, time-constant unobserved heterogeneity is no longer a problem. We do not need the assumption of $\text{Cov}(x_{it}, v_i) = 0$.

2. **Random effects models** Again, we start from error-components model (with a constant)

$$y_{it} = \beta_0 + \beta_1 x_{it} + v_i + \epsilon_{it} \quad (3.4)$$

We obtain Random effects estimator by the following transformation

$$y_{it} - \theta \bar{y}_i = \beta_0 (1 - \theta) + \beta_1 (x_{it} - \theta \bar{x}_i) + [(1 - \theta)v_i + (\epsilon_{it} - \theta \bar{\epsilon}_i)] \quad (3.5)$$

where

$$\theta = 1 - \sqrt{\frac{\sigma_\epsilon^2}{T\sigma_v^2 + \sigma_\epsilon^2}}$$

We see that if the assumption of $\text{Cov}(x_{it}, v_i)=0$ is violated, the random effects estimator will be biased. The degree of bias depends on the magnitude of θ . If θ is close to 1, the bias will be low.

Hausman test is usually used to check if random effects estimation is bias. It basically tests whether the unique errors (v_i) are correlated with the regressors (x_{it}).

The null hypothesis is that the preferred model is random effects. The alternative hypothesis is random effects regression is bias, hence we should use fixed effects model instead.

For Fixed effects and Random effects regressions presented in Table 3.1, p-value of Hausman test is 0.591, which implies that we should not reject the null hypothesis of using random effects method. Table 3.7 in Appendix presents Hausman test results for all regressions and the choice between random and fixed effects method. For regressions presented in Table 3.1, we go for Random effects model. However, with cases of choosing random effects model like this, we additionally report fixed effects estimations to see if there is any big difference among coefficients estimated by the two methods.

Besides, we also use robust covariance matrix to take into account the presence of non-spherical errors. Table 3.2 reports regression results estimated by random effects method before and after the adjustment. The coefficients estimated are the same but the standard errors and the significance of variables change. We obtain regression (1a) which is estimated by random effects method with robust standard errors.

Other estimations presented in the next section are obtained in the similar way as regression (1a).

Table 3.2 Random effects and Robust covariance matrix estimation

| | Dependent variable: $\Delta \log(\text{GDP})$ | |
|--------------------------------|---|--|
| | Random effects | Robust covariance matrix estimation (1a) |
| Constant | 0.036*** (0.005) | 0.036*** (0.007) |
| $\Delta \log(\text{PARTNER})$ | 0.978*** (0.150) | 0.978*** (0.220) |
| $\Delta \log(\text{TOT})$ | 0.073** (0.022) | 0.073** (0.024) |
| $\Delta \log(\text{OPEN})$ | -0.065* (0.028) | -0.065 (0.035) |
| $\Delta \log(\text{US_BOND})$ | 0.020 (0.015) | 0.020 (0.014) |
| KAOPEN_BI | -0.013* (0.006) | -0.013*** (0.003) |
| Observations | 204 | 204 |
| R ² | 0.326 | 0.326 |
| Adjusted R ² | 0.317 | 0.317 |
| F Statistic | 19.166*** (df = 5; 198) | 19.166*** (df = 5; 198) |

Note:

*p<0.1; **p<0.05; ***p<0.01

3.2 Results and discussions

3.2.1 Growth factors in emerging markets

Table 3.3 reports random effects and fixed effects model estimation after being adjusted by robust covariance matrix. In estimation (1a), (1b), (2a) and (2b), all seventeen emerging markets are taken into account. While estimation (1a) and (1b) consider real economic growth ($\Delta \log(\text{PARTNER})$), estimation (2a) and (2b) concern distance weighted growth in trading partners ($\Delta \log(\text{PARTNER_DIST})$). It is shown that changes in independent variables of our regressions explain for about 31%–32% changes in GDP growth rate in emerging markets.

We see no big difference between random effects and fixed effects estimations. Our results with either random effects or fixed effects estimation indicate that among internal and external factors analyzed, GDP growth in trading partners, growth in terms of trade and the improvement in KAOPEN index significantly affect growth in emerging markets. We shall go one by one factor for more detailed discussions.

Table 3.3 Growth factors in emerging markets

| | Dependent variable: $\Delta \log(\text{GDP})$ | | | |
|-------------------------------------|---|--------------------------|--------------------------|--------------------------|
| | RE | FE | RE | FE |
| | (1a) | (1b) | (2a) | (2b) |
| Constant | 0.036*** (0.007) | | 0.036*** (0.006) | |
| $\Delta \log(\text{PARTNER})$ | 0.978*** (0.220) | 0.986*** (0.221) | | |
| $\Delta \log(\text{PARTNER_DIST})$ | | | 0.950*** (0.201) | 0.945*** (0.205) |
| $\Delta \log(\text{TOT})$ | 0.073** (0.024) | 0.080** (0.025) | 0.070** (0.022) | 0.079** (0.024) |
| $\Delta \log(\text{OPEN})$ | -0.065 (0.035) | -0.069 (0.038) | -0.067 (0.034) | -0.072 (0.037) |
| $\Delta \log(\text{US_BOND})$ | 0.020 (0.014) | 0.019 (0.014) | 0.018 (0.013) | 0.018 (0.014) |
| KAOPEN_BI | -0.013*** (0.003) | -0.011** (0.003) | -0.013*** (0.003) | -0.010** (0.003) |
| Observations | 204 | 204 | 204 | 204 |
| R ² | 0.326 | 0.347 | 0.330 | 0.353 |
| Adjusted R ² | 0.317 | 0.310 | 0.320 | 0.315 |
| F Statistic | 19.166*** (df=5; 198) | 19.359*** (df=5; 182) | 19.518*** (df=5; 198) | 19.873*** (df=5; 182) |

Note:

*p<0.1; **p<0.05; ***p<0.01

3.2.1.1 GDP growth in trading partners

As expected, GDP growth in trading partner has a significantly positive impact on growth in emerging markets. According to regression (1a) and (1b), 1% increase (decrease) in trading partners' GDP growth will lead to 0.978%–0.986% increase (decrease) in growth of emerging markets. Even when this index is adjusted by distances among markets regarding gravity model, the result is still robust (See regression (2a), (2b)): 1% increase (decrease) in weighted GDP growth of trading partners will cause 0.945%–0.950% increase (decrease) in that of emerging markets.

This finding matches with the result from recent report of IMF (See Cubeddu et al. (2014)). It is reported that 1% point increase in advanced market trading partner's growth would increase growth in emerging markets by around 1% point). We also obtain the same relationship between these two variables.

Even though the improvement in trade openness (Δ OPEN) does not play a significantly statistic role in emerging markets' GDP growth (See Table 3.3), we doubt its implied effects through GDP growth in trading partners. In other words, we would like to look more deeply if trading partners' GDP growth has different impacts on different groups of emerging markets which are classified by their open level in trade. Therefore we divide emerging markets in our samples into two groups:

- High level of trade openness (trade accounting for more than 50% of GDP), including Chile, China, Czech Republic, Indonesia, Jordan, Malaysia, Philippines, Poland, Russian Federation, and Thailand;
- Low level of trade openness, including Brazil, Colombia, India, Pakistan, Peru, Turkey, and Venezuela.

We then run regressions for those two groups of countries above with GDP growth and distance weighted GDP growth of trading partners interchangeable. Results obtained are reported in Table 3.4.

There is not much difference in coefficients estimated by random effects and fixed effects for model (3) (See regression (3a) and (3b)).

Table 3.4 Regression results for high and low trade openness EMs

| Dependent variable: $\Delta \log(\text{GDP})$ | | | | | |
|---|-------------------------|-----------------------|------------------------|---------------------|---------------------|
| | High trade openness EMs | | Low trade openness EMs | | |
| | RE (3a) | FE (3b) | FE (4) | FE (5) | FE (6) |
| Constant | 0.036*** (0.009) | | | | |
| $\Delta \log(\text{PARTNER})$ | 0.970*** (0.239) | 0.970*** (0.239) | | 0.942* (0.363) | |
| $\Delta \log(\text{PARTNER_DIST})$ | | | 0.967*** (0.223) | | 0.861* (0.349) |
| $\Delta \log(\text{TOT})$ | 0.085** (0.030) | 0.087** (0.031) | 0.083** (0.028) | 0.078 (0.047) | 0.082 (0.044) |
| $\Delta \log(\text{OPEN})$ | -0.034 (0.025) | -0.035 (0.026) | -0.041 (0.027) | -0.096 (0.066) | -0.097 (0.069) |
| $\Delta \log(\text{US_BOND})$ | 0.002 (0.020) | 0.002 (0.020) | -0.000 (0.020) | 0.042** (0.014) | 0.043** (0.014) |
| KAOPEN_BI | -0.011* (0.004) | -0.010* (0.004) | -0.008 (0.004) | -0.016* (0.007) | -0.017* (0.007) |
| Observations | 120 | 120 | 120 | 84 | 84 |
| R ² | 0.487 | 0.506 | 0.544 | 0.275 | 0.265 |
| Adjusted R ² | 0.462 | 0.443 | 0.476 | 0.236 | 0.227 |
| F Statistic | 21.628*** (df=5; 114) | 21.485*** (df=5; 105) | 25.095*** (df=5; 105) | 5.462*** (df=5; 72) | 5.184*** (df=5; 72) |

Note: * p<0.1; ** p<0.05; *** p<0.01
EMs: Emerging markets

The results in Table 3.4 show that GDP growth of trading partners (in the case of both $\Delta \log(\text{PARTNER})$ and $\Delta \log(\text{PARTNER_DIST})$ variables) has larger effects on group of high trade openness emerging markets than on the group of low trade openness ones. The difference is 2.8% point in the case of taking into account real GDP growth rate of trading partners (See regression (3a) and (5)), and 10.6% point in case of distance weighted growth rate (See regression (4) and (6)).

We also note that when regressed for high level of trade openness group, the impact of $\Delta \log(\text{PARTNER})$ and $\Delta \log(\text{PARTNER_DIST})$ are relatively the same. The difference in their coefficients is 0.003 point (see regression (3a) and (4)); whereas, in the case of low level trade openness group, the difference is 0.081 point (see regression (5) and (6)).

It implies that geographic distance reduces the effect of trading partners' growth on growth in low trade openness markets much more than in high trade openness ones. In other words, distance seems to matter more to trade in markets where trade openness is low. We find no research in literature mentioning this point. Therefore this finding should be tested and analyzed further in future works.

3.2.1.2 Growth in terms of trade

Regarding regression results in Table 3.3, improvement in terms of trade plays significantly positive role on growth in emerging markets. Accordingly, 1% increase in terms of trade's growth leads to about 0.070%–0.080% increase in GDP growth of emerging markets. Since growth of commodity price is reflected in that of terms of trade index, we would infer that external favorable commodity price has positive impact on emerging markets' GDP growth. However in this dissertation, we do not quantify the direct correlation between commodity price and growth in emerging markets. One of references for this relationship is International Monetary Fund (2013) report, which shows that the correlation between the two is very high 0.8.

According to Cubeddu et al. (2014), there are different effects of terms of trade's improvement on GDP growth of the two groups of emerging markets: commodity exporters and non-commodity exporters. We therefore divide our samples into

two groups based on the share of net commodity exports in total goods export:

- Commodity exporters: Brazil, Chile, Colombia, Indonesia, Malaysia, Philippines, Peru, Russian Federation, Thailand, and Venezuela;
- Non-commodity exporters: China, Czech Republic, India, Jordan, Pakistan, Poland, and Turkey.

Regression results for these two groups are reported in Table 3.5.

Agree with Cubeddu et al. (2014)'s findings, our results show that improvement in terms of trade has positively larger effects on growth in commodity exporters rather than in non-commodity ones. While coefficients of Δ TOT in the regression for commodity exporters group are significant (see regression (7), (8a), and (8b)), those for non commodity exporters are not (see regression (9a), (9b), (10a), and (10b)).

Comparing regression (7) and (1a), we also notice that if growth in terms of trade increases 1 point, commodity exporters would have 0.02 point increase in GDP growth larger than average of emerging markets in general.

Our results suggest that for commodity exporters, 5.25% improvement in terms of trade contributes to about 0.40%–0.50% increase in GDP growth; whereas according to Cubeddu et al. (2014), that may lead to a 0.75% increase.

Table 3.5 Regression results for commodity exporters and non-commodity exporters

| | | Dependent variable: $\Delta \log(\text{GDP})$ | | | | | |
|-------------------------------------|-----------------------|---|-----------------------|----------------------|-------------------------|----------------------|----------------------|
| | | Commodity exporters | | | Non-commodity exporters | | |
| | FE (7) | RE (8a) | FE (8b) | RE (9a) | FE (9b) | RE (10a) | FE (10b) |
| Constant | | 0.024*** (0.006) | | 0.051*** (0.011) | | 0.052*** (0.010) | |
| $\Delta \log(\text{PARTNER})$ | 1.091*** (0.264) | | | 0.842* (0.345) | 0.841* (0.346) | | |
| $\Delta \log(\text{PARTNER_DIST})$ | | 1.118*** (0.252) | 1.089*** (0.257) | | | 0.747* (0.292) | 0.730* (0.291) |
| $\Delta \log(\text{TOT})$ | 0.095** (0.030) | 0.078*** (0.022) | 0.091** (0.029) | 0.083 (0.044) | 0.083 (0.045) | 0.080 (0.041) | 0.080 (0.042) |
| $\Delta \log(\text{OPEN})$ | -0.072 (0.064) | -0.080 (0.057) | -0.078 (0.064) | -0.080* (0.037) | -0.081* (0.037) | -0.075* (0.036) | -0.074* (0.035) |
| $\Delta \log(\text{US_BOND})$ | -0.023* (0.011) | -0.021 (0.011) | -0.022 (0.011) | 0.075*** (0.009) | 0.075*** (0.009) | 0.073*** (0.009) | 0.074*** (0.009) |
| KAOPEN_BI | -0.010** (0.004) | -0.012** (0.004) | -0.010*** (0.003) | -0.011* (0.004) | -0.009 (0.004) | -0.010 (0.005) | -0.007 (0.006) |
| Observations | 120 | 120 | 120 | 84 | 84 | 84 | 84 |
| R ² | 0.352 | 0.348 | 0.364 | 0.443 | 0.464 | 0.427 | 0.450 |
| Adjusted R ² | 0.308 | 0.330 | 0.319 | 0.411 | 0.398 | 0.397 | 0.386 |
| F Statistic | 11.385*** (df=5; 105) | 12.156*** (df=5; 114) | 12.025*** (df=5; 105) | 12.408*** (df=5; 78) | 12.475*** (df=5; 78) | 11.637*** (df=5; 72) | 11.782*** (df=5; 72) |

*p<0.1; **p<0.05; *** p<0.01

Note:

3.2.1.3 Improvement in KAOPEN index

Different from other variables, we consider KAOPEN improvement (improvement in capital account openness) as a binary index. Not as we expected, its coefficient is significantly negative. Our results show that an improvement in capital account openness leads to a decrease of about 0.01 point in growth of emerging markets (See regression (1a) and (2a) in Table 3.3).

According to Broner and Ventura (2010), capital account liberalization might lead to different outcomes depending on the level of development, the depth of domestic financial markets, and the quality of institutions in each country. This suggests further analysis on emerging markets' characteristics to see impacts of improvement in capital account openness factor.

3.2.1.4 Growth in trade openness and in international interest rate

In regression (1a), (1b), (2a), and (2b) (See Table 3.3), these two variables' coefficients are reported non statistically significant.

$\Delta \log(\text{OPEN})$ We remind the idea from Huchet-Bourdon et al. (2011) that trade openness is a multidimensional concept in which two additional dimensions: (i) the quality, and (ii) the variety of exported basket should be taken into account. This may explain why the coefficient of variable $\Delta \log(\text{OPEN})$ in our model is not significant since we do not consider trade openness properly. Huchet-Bourdon et al. (2011)'s suggestions may be a good approach for future research about the impact of improvement in trade openness on emerging markets' GDP growth.

$\Delta \log(\text{US_BOND})$ Results from regressions in Table 3.3 shows that growth in US_BOND index does not significantly affect GDP growth in emerging markets. In literature, Cubeddu et al. (2014) find that lower global interest rates contribute to higher GDP growth in emerging markets: 170 basis point decline in the former raised 0.25 percentage point in the latter. We, therefore, doubt that the causal effects may exist if we consider US_BOND index instead of $\Delta \text{US_BOND}$. However, as we mentioned, we would not consider US_BOND series

in our regressions due to its non-stationarity. This requires more advanced works to deal with non-stationary series. We shall leave it for future works.

3.2.2 The role of China's economy

We consider economic growth in China as an exogenous variable to growth in other emerging markets. Results are reported in Table 3.6

Again it is confirmed that $\Delta \log(\text{PARTNER})$ (or $\Delta \log(\text{PARTNER_DIST})$), $\Delta \log(\text{TOT})$, and KAOPEN_BI variables significantly contribute to GDP growth in emerging markets. The conclusions do not change with either fixed effects or random effects estimations.

However, what we mainly concern here is the impact of China's GDP growth. All four regressions (11a), (11b), (12a), and (12b) show that the coefficients of $\Delta \log(\text{CHINA})$ and $\Delta \log(\text{CHINA_DIST})$ are positive and significant: One percentage increase in GDP growth of China leads to around 0.33 percentage increase in growth of other emerging markets. In IMF World Economic Outlook 2014 report, the relationship between the two is quantified as that one percentage increase in China's GDP growth contributes to 0.1 percentage increase in that of other emerging markets. Despite there is a difference of 0.23 point in empirical results, the role of China's economy to other emerging markets is apparent.

Table 3.6 Regression results (China is taken out of samples)

| | Dependent variable: $\Delta \log(\text{GDP})$ | | | |
|-------------------------------------|---|--------------------------|--------------------------|--------------------------|
| | RE (11a) | FE (11b) | RE (12a) | FE (12b) |
| Constant | -0.002 (0.010) | | -0.000 (0.010) | |
| $\Delta \log(\text{PARTNER})$ | 0.934*** (0.237) | 0.950*** (0.239) | | |
| $\Delta \log(\text{PARTNER_DIST})$ | | | 0.867*** (0.225) | 0.879*** (0.231) |
| $\Delta \log(\text{CHINA})$ | 0.331*** (0.098) | 0.333** (0.103) | | |
| $\Delta \log(\text{CHINA_DIST})$ | | | 0.330** (0.106) | 0.330** (0.113) |
| $\Delta \log(\text{TOT})$ | 0.070*** (0.020) | 0.076** (0.025) | 0.069*** (0.019) | 0.075** (0.024) |
| $\Delta \log(\text{OPEN})$ | -0.046 (0.037) | -0.054 (0.042) | -0.048 (0.037) | -0.056 (0.042) |
| $\Delta \log(\text{US_BOND})$ | -0.009 (0.014) | -0.010 (0.014) | -0.007 (0.015) | -0.008 (0.015) |
| KAOPEN_BI | -0.012*** (0.003) | -0.008* (0.004) | -0.011*** (0.003) | -0.008* (0.003) |
| Observations | 192 | 192 | 192 | 192 |
| R ² | 0.343 | 0.362 | 0.351 | 0.368 |
| Adjusted R ² | 0.331 | 0.320 | 0.339 | 0.326 |
| F Statistic | 16.122*** (df=6; 185) | 16.056*** (df=6; 170) | 16.708*** (df=6; 185) | 16.488*** (df=6; 170) |

Note:

*p<0.1; **p<0.05; ***p<0.01

3.3 Remarks

1. Our results have addressed factors contributing to economic growth in emerging markets:
 - Growth in trading partners and growth in terms of trade have significantly positive impacts on economic growth in emerging markets; whereas, the improvement in financial openness seems to impede GDP growth. Noticeably, we find that China's economic growth plays an important role in other emerging markets'.
 - On the other hand, growth in trade openness and in international interest rate do not significantly affect growth in emerging markets.
2. We estimate and quantify the causal effects as follows:
 - A 1% increase in trading partners' growth leads to about 1% increase in emerging markets'. Growth in trading partners has larger effects on high trade openness emerging markets than on the low ones.
 - A 1% increase in terms of trade's growth causes about 0.073% increase in GDP growth of emerging markets. We also find that growth in terms of trade does have significant impacts on commodity exporters' growth but does not on non-commodity ones'.
 - An improvement in capital account openness (KAOPEN) leads to a decrease of about 0.01 point in emerging markets' growth.
 - A 1% increase in China's GDP growth contributes about 0.3% increase to GDP growth in other emerging markets.
3. Though the research questions are well answered, our results still contain some limitations and open issues that we may leave to future works, as such:
 - Do geographic distance's impacts on GDP growth vary across different levels of trade openness in emerging markets?
 - Consider each emerging market's characteristics to see how and how much capital account liberalization really affects their GDP growth.

- Analyze trade openness properly with two additional dimensions taken into account: the quality and the variety of exported basket.
- Apply more advanced econometric methods to deal with non-stationary series to see how changes in level of financial condition (in our case, it is US bond 10-year interest rate), not changes in its growth, affect GDP growth in emerging markets.

Conclusion

In this dissertation, we have examined growth factors in seventeen emerging markets over a period of thirteen years (2000–2012). Our sample consists of Brazil, Chile, China, Colombia, Czech Republic, India, Indonesia, Jordan, Malaysia, Pakistan, Peru, Philippines, Poland, Russian Federation, Thailand, Turkey, and Venezuela. Taking into account both internal and external factors, we propose models with stationary data series of variables, then employ panel analysis methodology to estimate and quantify their causal effects.

We find that (i) trading partners' growth has positive impact on emerging markets' growth – the more open in trade, the more emerging markets are benefited from their trading partners; (ii) an increase in terms of trade' growth leads to an increase in emerging market's growth – however, the effect is significant for commodity exporters much more than for non-commodity ones; (iii) an improvement in financial openness seems to impede growth in emerging markets; (iv) China's economic growth significantly contributes to growth in other emerging markets; and (v) growth in trade openness and in international interest rate do not significantly affect growth in emerging markets.

Our findings have three main important implications to the existing literature in emerging market research field: (i) they confirm the significantly positive contributions of trading partners', terms of trade's and China economy's growth to emerging markets' growth; (ii) they challenge the results from some previous articles and reports about the real effects of trade openness and financial openness to growth in emerging markets – trade openness may not be simply measured by percentage share of total export and import in GDP; neither is financial openness, KAOPEN index may not be sufficient and market's specific characteristics should be taken into account; and (iii) they suggest open issues for future works

as such the different impacts of geographic distance across different level of trade openness emerging markets' groups.

However, our research still contains two limitations which should be tackled in future works: (i) due to the availability of data, only seventeen emerging markets are analyzed in the period of thirteen years; and (ii) more advanced econometrics method should have been applied to deal with non-stationary data series like international interest rate (US_BOND variable).

Bibliography

- Abiad, M. A., Bluedorn, M. J. C., Guajardo, J., and Topalova, P. (2012). *The Rising Resilience of Emerging Market and Developing Economies*. Number 12-300. International Monetary Fund.
- Ahuja, M. A. and Nabar, M. M. (2012). *Investment-Led Growth in China: Global Spillovers*. Number 12-267. International Monetary Fund.
- Akinci, G. and Crittle, J. (2008). Special economic zones: Performance, lessons learned, and implications for zone development. *Washington DC: The World Bank*.
- Alcalá, F. and Ciccone, A. (2004). Trade and productivity. *The Quarterly Journal of Economics*, 119(2):613–646.
- Arora, V. and Vamvakidis, A. (2011). China’s economic growth: international spillovers. *China & World Economy*, 19(5):31–46.
- Åslund, A. (2013). Why growth in emerging economies is likely to fall. *Peterson Institute, Washington, Working Paper WP*, pages 13–10.
- Broner, F. A. and Ventura, J. (2010). Rethinking the effects of financial liberalization. Technical report, National Bureau of Economic Research.
- Cavusgil, S., Knight, G., and Riesenberger, J. (2008). *International business: Strategy, management, and the new realities*. Upper Saddle River: Pearson Prentice Hall.
- Cheesman, A. (2012). *Special Economic Zones & Development: Geography and Linkages in the Indian EOU Scheme*. Development Planning Unit, University College London.

- Chinn, M. D. and Ito, H. (2008). A new measure of financial openness. *Journal of comparative policy analysis*, 10(3):309–322.
- Cubeddu, M. L. M., Culiuc, M. A., Fayad, M. G., Gao, Y., Kochhar, M. K., Kyobe, A., Oner, C., Perrelli, M. R., Sanya, S., Tsounta, E., et al. (2014). *Emerging Markets in Transition: Growth Prospects and Challenges*. Number 14-16. International Monetary Fund.
- Dell’Ariccia, M. G., Mauro, M. P., Faria, M. A., Ostry, M. J. D., di Giovanni, J., Schindler, M. M., Kose, M. M. A., and Terrones, M. M. (2008). *Reaping the Benefits of Financial Globalization (EPub)*. Number 264. International Monetary Fund.
- Dollar, D. and Kraay, A. (2003). Institutions, trade, and growth. *Journal of monetary economics*, 50(1):133–162.
- Eichengreen, B., Park, D., and Shin, K. (2012). When fast-growing economies slow down: International evidence and implications for china. *Asian Economic Papers*, 11(1):42–87.
- Farole, T. (2011). Special economic zones: What have we learned? *World Bank-Economic Premise*, (64):1–5.
- Feenstra, R. and Kee, H. L. (2008). Export variety and country productivity: Estimating the monopolistic competition model with endogenous productivity. *Journal of International Economics*, 74(2):500–518.
- Frankel, J. A. and Romer, D. (1999). Does trade cause growth? *American economic review*, pages 379–399.
- Frankel, J. A., Vegh, C. A., and Vuletin, G. (2013). On graduation from fiscal procyclicality. *Journal of Development Economics*, 100(1):32–47.
- Fratzscher, M. and Bussiere, M. (2004). Financial openness and growth: short-run gain, long-run pain?
- Haddad, M., Lim, J. J., Pancaro, C., and Saborowski, C. (2013). Trade openness reduces growth volatility when countries are well diversified. *Canadian Journal of Economics/Revue canadienne d’économique*, 46(2):765–790.

- Hale, D. (2012). The importance of emerging markets. In *CFA Institute Conference Proceedings Quarterly*, volume 29, pages 43–50. CFA Institute.
- Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of development Economics*, 48(2):419–447.
- Hausmann, R., Hwang, J., and Rodrik, D. (2007). What you export matters. *Journal of economic growth*, 12(1):1–25.
- Huchet-Bourdon, M., Le Mouél, C. L. M., Vijil, M., et al. (2011). The relationship between trade openness and economic growth: Some new insights on the openness measurement issue. In *XIIIème Congrès de l’Association Européenne des Economistes Agricoles (EAAE)*.
- International Monetary Fund (2013). *World Economic Outlook - Transitions and Tensions*. World Economic and Financial Surveys.
- Kearney, C. (2012). Emerging markets research: Trends, issues and future directions. *Elsevier*.
- Kose, M. A. (2011). *Emerging markets: Resilience and growth amid global turmoil*. Brookings Institution Press.
- Mayer, T. and Zignago, S. (2011). Notes on cepii’s distances measures: The geodist database.
- Mody, A. (2004). What is an emerging market? Working paper, International Monetary Fund.
- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, 22(2):265–312.
- Quinn, D., Schindler, M., and Toyoda, A. M. (2011). Assessing measures of financial openness and integration. *IMF Economic Review*, 59(3):488–522.
- Sánchez, M. (2007). What drives business cycles and international trade in emerging market economies?

- Schmidt-Hebbel, K. (2009). *Inflation targeting twenty years on: Where, when, why, with what effects, what lies ahead?* Pontificia Universidad Católica de Chile, Instituto de Economía, Oficina de Publicaciones.
- Tsangarides, C. G. (2010). *Crisis and recovery: role of the exchange rate regime in emerging market countries*. International Monetary Fund.
- Velasco, A. and Chang, R. (2004). Monetary policy and the currency denomination of debt: A tale of two equilibria. Technical report, National Bureau of Economic Research.
- Warwick, K. (2013). Beyond industrial policy: emerging issues and new trends. Technical report, OECD Publishing.
- Wilson, D., Kelston, A., and Ahmed, S. (2010). Is this the 'brics decade'? *BRICs Monthly*.
- Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. *Journal of Development economics*, 72(1):57–89.

Appendix

Table 3.7 Hausman test results

| Regression | Hausman p-value | Note |
|------------|-----------------|----------------|
| (1) | 0.591 | Random effects |
| (2) | 0.307 | Random effects |
| (3) | 0.911 | Random effects |
| (4) | 0.026 | Fixed effects |
| (5) | – | Fixed effects* |
| (6) | – | Fixed effects* |
| (7) | – | Fixed effects* |
| (8) | 0.947 | Random effects |
| (9) | 0.172 | Random effects |
| (10) | 0.257 | Random effects |
| (11) | 0.727 | Random effects |
| (12) | 0.695 | Random effects |

Note: * Random effects method is not estimated for regression models (5), (6), (7).