Factors Affecting Two Types of Government Bond Global Investors in Emerging Market

Maulana Harris Muhajir, Dhian Pradhita Sari, Januar Hafidz and Theresia Silitonga[1]

Abstract

The market for government bond in emerging markets (EM) is rather attractive for global investors. This fact is because of the attractive return as well as the potentially rapid economic growth in these countries. There are two types of global investors for government bond in this study, the benchmark-driven and unconstrained investors, which are measured using the methodology introduced by Balston and Melin (2013). In general, the result of this study concludes that under global economic uncertainty, the portion of benchmark-driven investors keeps increasing vis-à-vis the unconstrained investors. This situation is, in fact, more profound after the period of the Fed Rate increase in 2015Q4 until 2017Q4, where the global investors of government bond tend to follow the trend of strategy index (benchmark-driven). Next, using a panel of 18 EM countries from 2010 to 2017, the result of the study shows that in the period of post-taper-tantrum, almost all country-determining factors significantly affect the benchmark-driven investors (except for balance-to-GDP). Meanwhile, the unconstrained investors are more affected by inflation, balance-to-GDP and market size.

I. INTRODUCTION

Emerging markets are expected to grow two to three times faster than developed nations like the US, according to International Monetary Fund (IMF) estimates. In a world with low growth, low returns and higher debt levels, emerging markets are offering high growth, high returns, and have less debt[2]. Moreover, market for government bond in emerging markets (EM) is rather attractive for global investors because of the attractive return as well as the potentially rapid economic growth in these countries.

A change in a country's level of bond ownership is, amongst other affected by the change in the type of investors for government bond at a global level. Data from the International Monetary Fund in 2017Q4, showed that the average of foreign ownership of government bond in Emerging Market (EM) countries is around 40%.

---

[1] Researcher, research fellow, senior researcher, and expert researcher in Research Group and Macroprudential Policy, Department of Macroprudential Policy, Bank Indonesia. E-mail: maulana_hm@bi.go.id, dhianpradhita@yahoo.com, januar@bi.go.id, dan theresia_s@bi.go.id.

[2] Siboniso Nxumalo, co-head of Old Mutual Investment Group's Global Emerging Markets boutique.

The high portion of foreign ownership could cause movements in government bond, which is profoundly affected by capital flows from respective foreign investors. The flows of global investors for government bond rely on the investor's portfolios strategy. One of the investment strategies that are commonly used by investors is by referring to a specific performance index to be used as a benchmark. This benchmark is arranged based on the portfolio allocation of government bonds that is managed by a particular investment institution, which aims to generate return and the risk involved is expected not to diverge far from the targeted portfolio condition. Some examples of indexes used as a benchmark for investors in the market of government bond in emerging markets are J.P. Morgan Government Bond-Index Emerging Market (JPM GBI EM), The Barclays Emerging Market Local Currency Government Index, and The City Emerging Markets Government Bond Index (EMGBI).

Miyajima and Shim (2014) find that the use of a benchmark index is related to the behaviour of the investment manager. The evaluation of the investment managers depends whether it is more or less the same with the performance of the benchmark index. For this reasoning, although it is not necessary to allocate their portfolio consistent with the portfolio building up the benchmark index, indirectly, the investment managers have allocated their portfolio to synergize with the performance of the benchmark index. The finding contributes to the portion of the portfolio allocation of investors to be categorized as two, which are those who are actively acting to have the performance equivalent with specific indexes, and those acting differently with the indexes. The result of the research by Miyajima and Shim (2014) concludes that the fund allocation that is invested in the portfolio of government bond relatively follows that of the benchmark index, which becomes the benchmark for investment managers and is referred to as benchmark-driven investors.

Arslanalp and Tsuda (2015) identified the benchmark-driven investors as government bond investors who allocate their funds by adjusting to a specified benchmark index. In this study, the index that is used as the benchmark is the J.P. Morgan GBI EM Global Diversified Index which is calculated based on the weight of the countries and certain bonds. This index is one of the most popular indexes and is widely used by global investors for government bond in determining the strategic allocation of their portfolio. Next, investors who allocate their funds with no limit or do not refer to specific indexes are known as the unconstrained investors. Using a parametric methodology applied by Balston and Melin (2013), Arslanalp and Tsuda (2015) find that the group of benchmark-driven investors in EM is around the figure of USD 200 trillion in 2015Q2, while for the unconstrained group is around the figure of USD 400 trillion within the same period.

Some factors cause the flows of global investors as the owner of a country's government bond. One of which is the country-specific factors. Fratzscher (2011) gives the examples of country-specific factors, such as trade balance, GDP growth, production index and unemployment level. A more comprehensive example of variables is outlined by Bae (2012) in his research that analyses the determinant factors affecting the foreign ownership of government bond in China. These factors are GDP per capita, fiscal policy, export-to-GDP ratio, exchange rate volatility, credit

growth, lending rates, and stock market capitalisation. A country's fundamental factor has a significant impact, which according to Bellas et al. (2010), country-specific factors tend to affect the price of government bond in EM countries over the long-term period, in addition to other factors such as political stability, corruption and asymmetric information.

Some researches on government bond have been conducted, both at domestic and international level. However, there is yet a study that analyses the determining factors for the flows between the two types of investors (benchmark-driven and unconstrained) in EM countries. For this reasoning, this study is aimed to contribute to the discussion on the determining factors affecting the two types of foreign investors in EM countries.

Against this backdrop, this study will first analyse the portion of foreign investors (benchmark-driven and unconstrained) against the ownership of government bond in EM region. Moreover, onto the country-specific factors that could determine the inflows of the two types of government bond foreign investors in EM countries during the period of pre-taper-tantrum, taper-tantrum, and post-taper-tantrum.

The scope of this study is limited to foreign ownership data of government bond, and especially for countries categorized as Emerging Countries (EM's), which are: Brazil, China, Colombia, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, and Turkey.

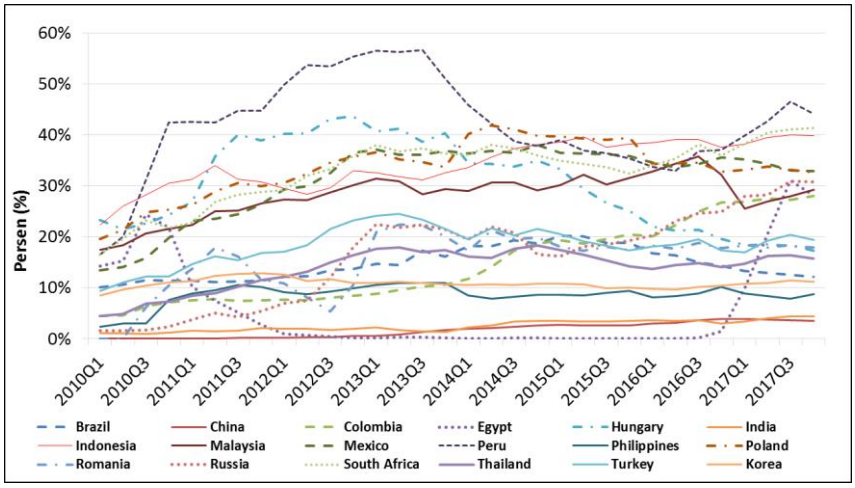
As for the period of observation is divided into three periods, which are: (i) pre-taper-tantrum 2010Q1-2013Q1, (ii) taper-tantrum 2013Q2-2014Q1, and (iii) post-taper-tantrum 2014Q2-2017Q4. The division based on the taper-tantrum period is because since May of 2013 until the beginning of 2014, there have been changes in the behaviour of foreign investors for government bond in EM's, both during the period of taper-tantrum and after (Ratna Sahay et al., 2014).

The rest of the paper is organized as follow: Section II provides more background on EM portfolio flows and study on the determining factors affecting the flows of foreign investors for government bond ownership. Section III explains the methodology of this study to test for the two purposes of this study. Next, section IV elaborates the result of the study. Lastly, section V gives the conclusion and policy recommendation.

II. TYPES OF GOVERNMENT BOND GLOBAL INVESTORS: AN OVERVIEW

Graph 1

Foreign Holdings of EM LC Government Bond 2010Q1-2017Q4 (%)



Since 2014, the Bank for International Settlements (BIS) through its research attempts to answer the influence of foreign ownership on the domestic bond market in emerging countries. BIS stated that the world financial economy situation changed significantly after the fall of Lehman Brothers (or the so-called crisis of 2008). This fundamental change encouraged an increase in capital inflows from developed countries to emerging countries through domestic bond channels. Graph 1 shows that in general, foreign ownership of government bond in the EM region has continue to increase.

Empirical evidence.

The discussion on the type of foreign investors was first conducted by Balston and Melin (2013) in the *"Foreign Demand for EM Local Currency Debt"*. The paper aims to build a model to group the foreign ownership of government bond denominated in local currencies into two pools (benchmark-driven and unconstrained). Using monthly observations of foreign ownership of foreign debt from 15 EM countries from 2009 to 2013 and panel regression method. The model and the result of this research could adjust for the actual stock value from non-resident holdings in each sample countries compared to the estimation model that is previously available (based on the market capitalization and J.P. Morgan GBI-EM Global Diversified Index Weight). Moreover, Arslanalp and Tsuda (2015) also adopted this methodology in their research *"Emerging Market Portfolio Flows: The Role of Benchmark-Driven Investors"*. This research aims to measure the quantity of benchmark-driven investors in the market for government bonds denominated in local currencies in EM countries. Using the data on foreign ownership of government bond from 18 EM countries from January 2010 to June 2015, this study applied the panel regression method. This study finds that for the group of benchmark-driven investors in EM's to be approximately USD 200 trillion in 2015Q2, while for the group of unconstrained investors to be around USD 400 trillion within the same period.

Meanwhile, the research analysing the determinant factors affecting the flows of foreign investors has been conducted by Kee-Hong Bae, Young Sup Yun, and Warren Bailey (2006) in *"Determinant Bond Holdings by Foreign Investors"*. The study aims to analyse the factors attracting foreign investors from purchasing debt obligation in local currencies. Using the panel dataset from 67 investor countries and

236 investment recipient countries at the end of 2001. The outcome of the research suggests that for countries with high ownership rights are more attractive for investors, and vice versa.

Furthermore, Fratzscher (2011) in *"Capital Flows, Push versus Pull Factors and The Global Financial Crisis"* attempts to answer the issue of the driving factors of global capital flows during the crisis and recovery period. Using data from Global EPFR containing investment portfolio flows of more than 14.000 stocks of mutual funds and more than 7.000 fixed-income mutual funds. This study finds that the push factors at the global level (crisis event, liquidity-TED, VIX, US macro shocks, and US equity markets) are the main factors of the flows of fund during crisis, while country-specific factors dominate the global fund flows in the year of 2009 and 2010, especially for developing countries.

III. DATA AND METHODOLOGY

This study uses a sample of 18 EM countries to achieve the purposes of the research. There are quarterly data over the period of 2010Q1-2017Q4. Table 1 below presents the list of sample countries used in this study based on their geography:

Table 1
List of Sample Countries

Asia	Amerika Latin	EMEA-EU	EMEA-non EU
China India Indonesia* Korea Malaysia* Philippines* Thailand*	Brazil* Colombia* Mexico* Peru*	Hungary* Poland* Romania*	Egypt Russia* South Africa* Turkey*

*of the 18 countries, 14 are listed on the J.P. Morgan GBI-EM Global Diversified Index. EMEA = Europe, Middle East, and Africa. EU = European Union.

South Korea has now been classified as advanced economies by the IMF, however, investors still, in fact, regard Korea as an emerging economy (Arslanalp and Tsuda, 2015). Meanwhile, China, India, and Egypt are the countries that can be categorized as emerging but are not listed on the J.P. Morgan GBI-EM Global Diversified Index. Nonetheless, they are included in the research sample with the consideration of data heterogeneity.

As for the variables incorporated in this study are as follows:

Table 2
Research Variables

No.	Variable	Explanation	Sources
Quarterly			
1	Foreign Holdings	Foreign holdings of government debt securities denominated in local currency country "*i*" at time "*t*"	IMF

2	Exchange Rate	National currency/USD country "*i*" at time "*t*"	IMF
3	Weight based on Market Capitalization or Market Size	is the stock of local currency government bonds in market "*i*" at time "*t*" as a portion of the total stock of EM local currency bond (18 countries)	Authors' Estimation
4	Weight based on J.P. Morgan GBI-EM Global Diversified Index	is the stock of local currency government bonds in market "*i*" at time "*t*" as a portion of the total stock of EM local currency bond (14 countries) with a 10 per cent country limit[3]	Authors' Estimation
5	Inflation	Real inflation (%, yoy) country "*i*" at time "*t*" using formula ln (100 + inflation rate)	Bloomberg, CEIC, Inflation.eu
6	GDP Growth	Real GDP growth (%, yoy) country "*i*" at time "*t*"	Bloomberg, IMF, World Bank, Investing.com
7	Balance-to-GDP	Current Account Balance per cent of GDP country "*i*" at time "*t*"	Bloomberg
8	Debt-to-GDP	Government Debt Securities per cent of GDP country "*i*" at time "*t*"	IMF

In order to achieve the first aim of the research, that is to decide the portion of the benchmark-driven and unconstrained investors; we are using the method by Balston and Melin (2013) as was previously applied by Arslanalp and Tsuda (2015). As the above method, the equation can be written as follows:

$$F_{i,t} = a_t w_{i,t} + b_t W_{i,t} + \varepsilon_{i,t} \quad (1)$$

subject to regression restrictions of:

$$a_t + b_t = \sum_{i=1}^{N} F_{i,t} \quad (1.1)$$

Where a_t corresponds to the pool of benchmark-driven investor at time t. b_t corresponds to pool of unconstrained investor at time t. $w_{i,t}$ is the weight of country i listed in J.P. Morgan GBI-EM Global Diversified Index at time t. $W_{i,t}$ corresponds to the weight from the market of government bond i at time t based on the market capitalization. $F_{i,t}$ is the nominal total of foreign ownership of the market of government bond i at time t (in USD). $\varepsilon_{i,t}$ is the residual that shows up when the portfolio is above or below the weight of country i at time t.

Furthermore, to achieve the second aim of the research, we are imposing country-specific factors as the determinants affecting the flows of the two types of foreign investors in EM's countries over the sample period (pre-taper-tantrum, taper-tantrum, and post-taper-tantrum). Once again, the division of periods in this study is important to re-examine that there have been changes in the behaviour of foreign investors for government bond in EM's, both during the period of taper-tantrum and after, especially for the behavior of two types of investors. This study incorporates the country-specific determinants that were utilized in the research by Husodo et al.

[3] No country taking more than a 10% weight in the index and the excess weight will be reallocated to another country using multiple iterations.

(2016) with the addition of the variable market size. As for the regression model on this second goal is as follows:

$$F = f\,(country\text{-}specific\ determinants) \quad (2)$$
$$F_{it} = X'_{it}\Gamma + c_i + u_i + \varepsilon_{it} \quad (2.1)$$
$$a_{it} = X'_{it}\Gamma + c_i + u_i + \varepsilon_{it} \quad (2.2)$$
$$b_{it} = X'_{it}\Gamma + c_i + u_i + \varepsilon_{it} \quad (2.3)$$

where F_{it} corresponds to the percentage of foreign holdings with respect to total government securities debt i at time t. a_{it} is benchmark-driven investors type of country i at time t and b_{it} corresponds to the unconstrained investors type of country i at time t[4]. X' corresponds to the country-specific determinants: such as market size, inflation, GDP growth, balance-to-GDP, and debt-to-GDP ratio. c_i is the country fixed effect[5]. u_i corresponds to period fixed effects[6]. In equation 2.1, 2.2, and 2.3, each of the equations will be elaborated into the classification of time period. As for the period classification mentioned are: (i) Full period from 2010Q1-2017Q4, (ii) Pre taper-tantrum from 2010Q1-2013Q1, (iii) taper tantrum from 2013Q2-2014Q1, and (iv) Post Taper-Tantrum from 2014Q2-2017Q4.

As a robustness test, this study also adds a dummy interaction between countries with high level of debt-to-GDP, with the level of above 56%. This threshold is based on research by Pescatori et al. (2014), who conclude that countries with the level of debt-to-GDP ratio above the threshold tend to generate relatively high volatility. High volatility would imply an unattractive government bond for global investors.

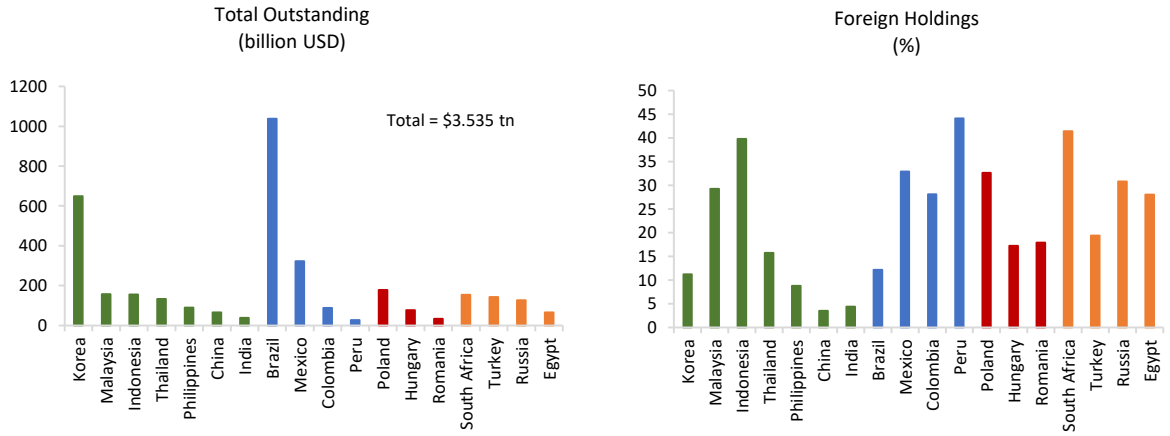
4. RESULTS

4.1. The Decision on Investors Portion

Graph 2 depicts the summary of the total outstanding and the portion of foreign ownership of total outstanding from government bond (denominated in local currencies) in EM's. The data are extracted from the respective national database that is previously gathered by the IMF as outlined in research by Arslanalp and Tsuda (2015). From graph 2, it can be seen that on average, emerging countries have the exposure of government bonds that are owned by foreigners with a portion that is relatively big. That fact has caused the risk of a potentially sudden-stop/reversal that could disrupt the stability of that country.

Graph 2
EM Local-Currency Government Bond Market 2017Q4
(Billion USD, %)

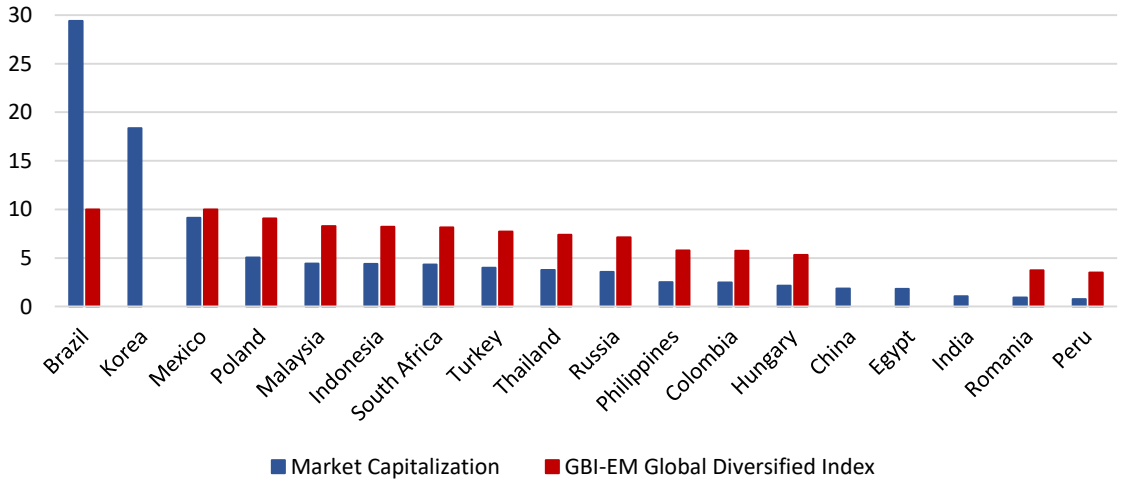
[4] Obtained from the regression analysis of equation 1
[5] Country fixed effect is utilized in order to control for unobservable country-specific factors that could have an impact on the foreign ownership of government bonds in each country, such as investor's risk perception and the country's default history.
[6] The period of fixed effect utilized in order to control for common shock that could have an impact to all countries, such as changes in investors' appetite towards assets in developing countries or the movement of global financial variables such as US interest rates and oil prices (Husodo et al., 2016).



Sources: IMF and authors' calculations.
Note: For China and India, outstanding amount reflects the "investable" portion of the market given foreign investment quotas (Arslanalp dan Tsuda, 2015).

From graph 3, it can be seen that each weight in GBI-EM Global Diversified Index is capped at 10% for each country to limit concentration risk. If there are countries that exceed the 10% value, then the excess will be allocated proportionally to other countries that are considered in the GBI-EM Global Diversified Index. The allocation process will be done continuously (iteration process) until the weight of each country is at the level of below 10%. From this result, it can be seen that for countries with high market capitalization such as Brazil, their weight is limited to 10%, while for countries with a market capitalization of less than 10% like Romania and Peru to have a higher weight.

Graph 3
EM Local-Currency Government Bond Markets: Country Shares, 2017Q4 (%)

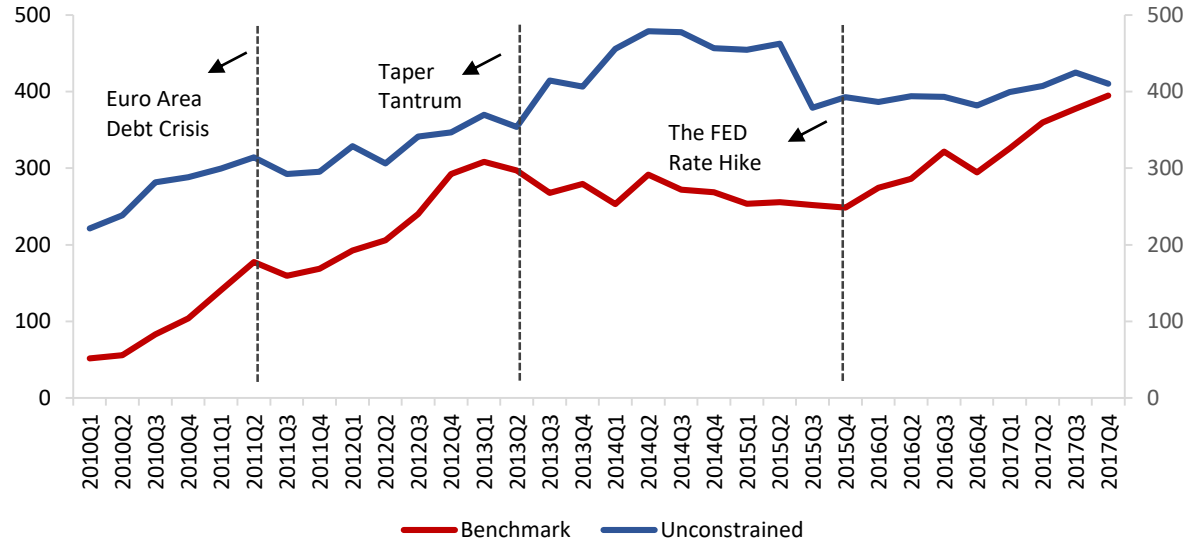


Sources : Authors' calculations.
Note : For China and India, outstanding amount reflects the "investable" portion of the market given foreign investment quotas (Arslanalp dan Tsuda, 2015).

The regression results in method (1) show that in the year 2017Q4, there was the ownership from benchmark-driven investors of value USD 395 trillion (local currencies) in emerging markets, which represents around 49% of total foreign

ownership (USD 805 trillion) in the global market of government bonds. This result, both in level and trend, is consistent with the research of Arslanalp and Tsuda (2015).

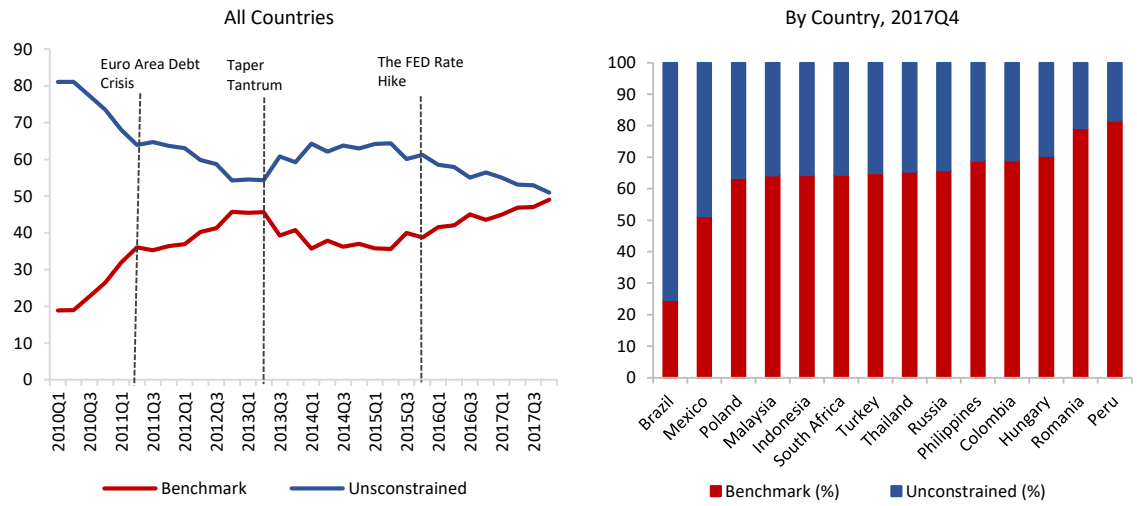
Graph 4
Foreign Holdings of EM LC Government Bond 2010Q1-2017Q4
(Billion USD)



Sources : Authors' estimates and calculations.
Note : The benchmark-driven investor base is estimated using the approach proposed by Balston and Melin (2013).

The left-hand panel of graph 5 shows that the proportion of benchmark-driven investor tends to increase every time there occurs an uncertainty condition that could affect the market for government bond of emerging countries. This condition continued to occur until the period of 2017Q4 since there is still uncertainty at a global level. That finding, in fact, indicates that if the uncertainty condition occurred, then the unconstrained investors tend to follow a certain index as a strategy benchmark rather than establishing their strategies. The majority of foreign investors in each EM countries during the period of 2017Q4 is the benchmark-driven investors (for more detailed based on each country's history could be referred to in Appendix A.).

Graph 5
EM Local-Currency Government Bond Markets: Type of Foreign Holdings
(Percent of Total Foreign Holdings)



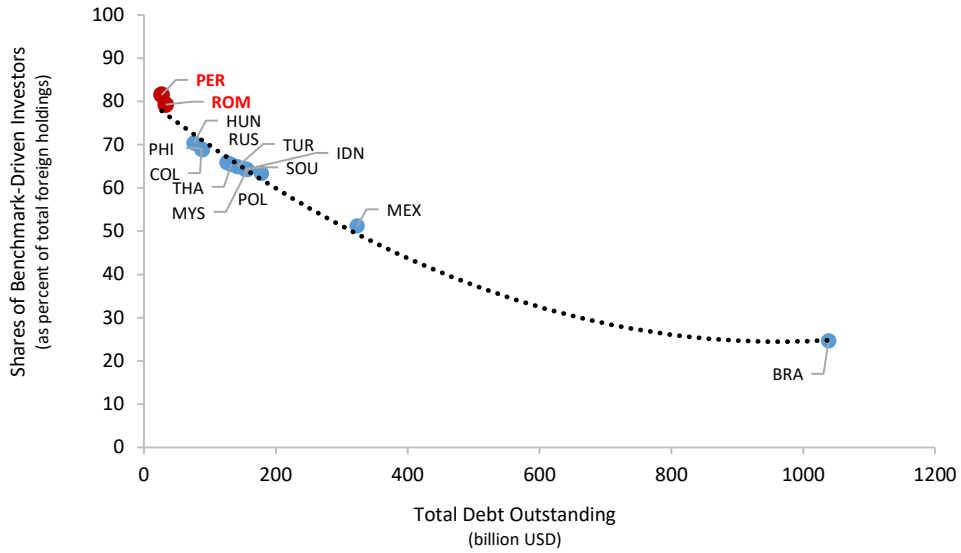
Sources: Authors' calculations.

Note : The benchmark-driven investors base is estimated using the approach proposed by Balston and Melin (2013).

On the right-hand panel of graph 5 shows that Peru and Romania are included in the countries with the highest composition of benchmark-driven investors. The market for government bond in the two countries is classified as small market capitalization (see graph 6). However, the country's government bond remains of interest by the benchmark-driven investors due to the relatively low country risk premium. A low country risk premium indicates that the country is relatively stable (Azoulay, 2007)[7]. In table 3, Peru has the lowest country risk premium with a comparison to its neighbouring Latin American nations, while the value of risk premium in Romania is categorized to be relatively low. Besides, the inflows of global investors of a government bond to countries considered as a small market could also occur if the index provider (in this case J.P. Morgan) provides the recommendation for the country's government bond as worthy of investing (Arslanalp and Tsuda, 2015).

Graph 6
Benchmark – Driven investors and Market Size, 2017Q4
(Percent, Billion USD)

[7] A country risk premium can be obtained by using the method utilized by Husodo et al. (2015) such that: : $Yield = f\ (Foreign\ investors + country - specific\ determinants)$, where country risk premium corresponds to the cross-section effect that is used as a proxy from risk premia of government bond (Koijen et al., 2008). The regression makes the use of the yield data, foreign investor, and country specific determinants (market size, inflation, GDP growth, balance-to-GDP, and debt-to-GDP) from 18 sample countries over the period 2010Q1 – 2017Q4.



Sources: Authors' calculations

Table 3
Risk Premium in Emerging Countries

No.	Country	Country Risk Premium
1	Brazil	6.44
2	China	-1.75
3	Colombia	0.46
4	Egypt	1.72
5	Hungary	-6.02
6	India	-1.98
7	Indonesia	3.15
8	Korea	0.92
9	Malaysia	-2.44
10	Mexico	2.23
11	Peru	0.16
12	Philippines	0.36
13	Poland	-3.58
14	Romania	-1.31
15	Russia	2.36
16	South Africa	-2.44
17	Thailand	-0.87
18	Turkey	2.61

Sources: Cross-section effect as a proxy for country risk premium by authors' calculation

4.2. Determining Factors Affecting the Inflows of the Two Types of Foreign Investors

Concerning the second aim of this research, that is to look at the determining factors affecting the inflows of the two types of foreign investors, it is shown by the result of the regression estimation summarized in Table 4. Table 4 provides the information that, in general, when compared to the pre-taper-tantrum and post-taper-tantrum period, there have been changes in investors' behaviour regarding the

determining factors in EM countries. One of the factors is the variable inflation during the period of pre-taper-tantrum, which is found to be positive and significant correlated with the two groups of investors (benchmark-driven and unconstrained). However, in the period of post-taper-tantrum, there have been changes in the behaviour of, especially the benchmark-driven type, such that it is negatively correlated (at 1% significance value). This condition indicates that this group of investors type tends to be more careful when the inflation in the country increases. On the contrary, an increase in inflation could push for the increase in the yield for government bond that is attractive for the unconstrained type of investors (positive and significant at 1% level), which is consistent with the findings by Ebeke and Lu (2014) that an increase in inflation causes the yield of government bond to increase, therefore attracting foreign investors.

For the variable GDP growth, during the period of pre-taper-tantrum, the benchmark-driven investor's group moves in the same direction (positive correlation) with GDP growth. Nevertheless, during the post-taper-tantrum period, this group switches to negatively and significantly correlated with GDP growth (significant at 10% level). This fact, in particular, is mainly caused by the slowdown of the GDP growth in EM countries after the taper-tantrum period. The result is caused the benchmark-driven investors to take advantage of this momentum since it is usually followed by an increase in the yield of government bond.

The variable balance-to-GDP in the period before and during the taper-tantrum is not a significant factor variable. Nonetheless, following the taper-tantrum, this factor holds a vital role in affecting the decision of the unconstrained type of investors with a negative and significant correlation (significance level of 1%). This variable depicts the fiscal deficit of EM countries, meaning that a higher deficit could indicate for even higher country risk.

During the period of taper-tantrum and after, there have been changes in the behaviour of variable debt-to-GDP. During the period of pre-taper-tantrum and taper-tantrum, the correlation is shown to be negative, however, in the period of after taper-tantrum, the coefficient becomes positive. This fact, in particular, is an interesting one the fact that in general, an increase in a country's debt-to-GDP will cause the country to be more vulnerable and the potential of defaulting is now higher. As a robustness check, this study is completed by a robustness test with the addition of dummy variable using a threshold for debt-to-GDP that will be discussed in table 5.

Meanwhile, the variable market size shows that there are changes in the behaviour for the benchmark-driven investors between pre and post taper-tantrum period, such that from a positive correlation, but not significant into positive and significant. The weight calculation mainly caused this condition on the GBI Global Diversified EM Index by taking into account that countries with high market size will receive weight which has been capped at the maximum of 10% so that the increase in the market size will not affect the weight of that country in the index. On the contrary, there is also the potential that the country with a small market capitalization to receive a higher weight, causing the benchmark-driven investors to look for the market of government bond of EM countries that experienced a better

weight increase in the index calculation. The positive and significant correlation on the variable market size (especially caused by the market-size that becomes higher) could attract the flow of unconstrained investors since the market becomes liquid.

To examine the result in the previous table, which shows that the variable debt-to-GDP has, in fact, a positive impact on the group of benchmark-driven investors during the period of post-taper-tantrum, a dummy interaction of threshold debt-to-GDP will later be added to the panel regression (see table 5). The estimation results confirm that with a high level of Debt-to-GDP (>56%), the benchmark-driven and unconstrained investors will move in reverse to that variable (although only the benchmark-driven that shows a significant relationship). That means the benchmark-driven investors type will still take into account the risk on the variable debt-to-GDP that is too high.

Table 4

Determining Factors Affecting the Flows of Two Types of Foreign Investors in Emerging Market (EM) countries (Per Period)

	Full Period			Pra Taper-Tantrum			Taper-Tantrum			Post Taper-Tantrum		
	2010Q1-2017Q4			2010Q1-2013Q1			2013Q2-2014Q1			2014Q2-2017Q4		
	F	a	b	F	A	b	F	a	b	F	a	b
Inflation	0.26***	-0.09	0.36***	0.961***	0.591***	0.371***	0.627**	0.503*	0.123**	0.105	-0.355***	0.459***
GDP Growth	-0.10	0.12	-0.22***	0.348*	0.266*	0.082	0.253	0.189	0.064	-0.281	-0.161*	-0.120
Balance-to-GDP	-0.32***	-0.11*	-0.20***	0.136	0.121	0.015	0.110	0.285	-0.175	-0.448***	-0.068	-0.379***
Debt-to-GDP	0.04	0.09**	-0.05	-0.713***	-0.281***	-0.432***	-0.525**	-0.320***	-0.205	0.279***	0.234***	0.046
Market Size	-0.07	-0.33***	0.26***	0.863**	0.279	0.584***	0.163	0.166	-0.003	-0.326	-0.872***	0.545**
Observations	574	574	574	232	232	232	72	72	72	270	270	270
R-squared	86.23%	88.22%	76.10%	90.77%	91.14%	82.48%	99.07%	98.95%	98.80%	98.46%	98.54%	98.33%
Period Included	32	32	32	13	13	13	4	4	4	15	15	15

Notes: F corresponds to the total foreign ownership, *a* is the benchmark-driven investor, and *b* is the unconstrained investor. The regression model incorporated the country fixed-effect and period fixed-effect.

*Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 5

Robustness Check for Countries with High Value of Debt-to-GDP

	Full Period			Pra Taper-Tantrum			Taper-Tantrum			Post Taper-Tantrum		
	2010Q1-2017Q4			2010Q1-2013Q1			2013Q2-2014Q1			2014Q2-2017Q4		
	F	a	b	F	A	b	F	a	b	F	a	b
Dummy1*Debt-to-GDP	-0.241 ***	-0.145 ***	-0.096 ***	-1.203 ***	-0.153	-1.049 ***	-0.017	-0.006	-0.011	-0.566 ***	-0.359 ***	-0.207
Observations	574	574	574	232	232	232	72	72	72	270	270	270
R-squared	86.68%	88.51%	76.48%	91.55%	91.16%	85.92%	99.08%	98.95%	98.81%	92.64%	97.41%	80,41%
Period Included	32	32	32	13	13	13	4	4	4	15	15	15

Notes: F corresponds to the total foreign ownership, *a* is the benchmark-driven investor, and *b* is the unconstrained investor. The regression model incorporated the country fixed-effect and period fixed-effect. Dummy1 takes the value of 1 for the countries with the value of debt-to-GDP > 56%, and 0 otherwise. The above regression estimation also kept the inclusion of the variables inflation, GDP growth, balance-to-GDP, debt-GDP, and market size as the regressors.

*Significant at 10% level **Significant at 5% level ***Significant at 1% level

5. FINAL REMARKS

In EM countries, the unconstrained investors have a more significant portion compared to the benchmark-driven investors. However, under the circumstances of uncertainty condition, the portion of benchmark-driven tends to increase. The fact is caused, amongst others, by the unconstrained investors, who will begin following a specific index as a benchmark/strategy rather than constructing their strategies when uncertainty condition occurs. This situation is, in fact, more profound after the period of the Fed Rate increase in 2015Q4 until 2017Q4, where the global investors of government bond tend to follow the trend of strategy index (benchmark-driven).

Based on all sample countries, during the period of taper-tantrum, the behaviour of benchmark-driven investors is more affected by factors such as debt-to-GDP ratio and inflation. Meanwhile, for the same period of observation, the unconstrained investors will be more likely to be affected by inflation. This condition changes during the post-taper-tantrum period, where almost all determining factors significantly (expect balance-to-GDP) affect the benchmark-driven investors. Meanwhile, for the unconstrained investors, they are more likely to be affected by inflation, balance-to-GDP, and market size.

References

Arslanalp, S. dan Tsuda, T. (2015), "Emerging Market Portfolio Flows: The Role of Benchmark-Driven Investors," IMF Working Paper, WP/15/263.

Azoulay, Eddy, Menachem Brenner, dan Yoram Landskroner. 2007. "Inflation Expectations Derived From Foreign Exchange Options". Journal of Economic Literature.

Bae, K. H., Yun, Y. S., Bailey, W. (2006), "Determinant Bond Holdings by Foreign Investors," BIS Working Paper, Vol. 30, pp 102-128.

Balston, M. and L. Melin (2013), "Foreign Demand for EM Local Currency Debt," Deutsche Bank EM Monthly: Diverging Markets.

Bellas, Dimitri, Michael G. Papaioannaou, and Iva Petrova. (2010), "Determinants of Emerging Market Sovereign Bond Spreads: Fundamental vs Financial Stress," IMF Working Paper, WP/10/281, pp 7 – 8.

Ebeke, C. dan Lu, Y. (2014), "Emerging Market Local Currency Bond Yields and Foreign Holdings in the Post-Lehman Period: a Fortune or Misfortune?," IMF Working Paper, WP/14/29.

Financial Crisis," NBER Working Paper Series, WP 17357

Fratzscher, M. (2011), "Capital Flows, Push Versus Pull Factors and The Global

Husodo, Zaafri A. et al. (2016), "Analisis Pengaruh Kepemilikan Asing Terhadap Pasar SUN Domestik," Fakultas Ekonomi dan Bisnis, Universitas Indonesia.

Koijen, Ralph S.J, Hanno Lustig, Stijn Van Niuwerburgh. (2008), "The Bond Risk Premium and the Cross-Section of Equity Returns," NBER.

Miyajima, K. and I. Shim, 2014, "Asset Managers in Emerging Market Economies," BIS Quarterly Review, September, 2014.

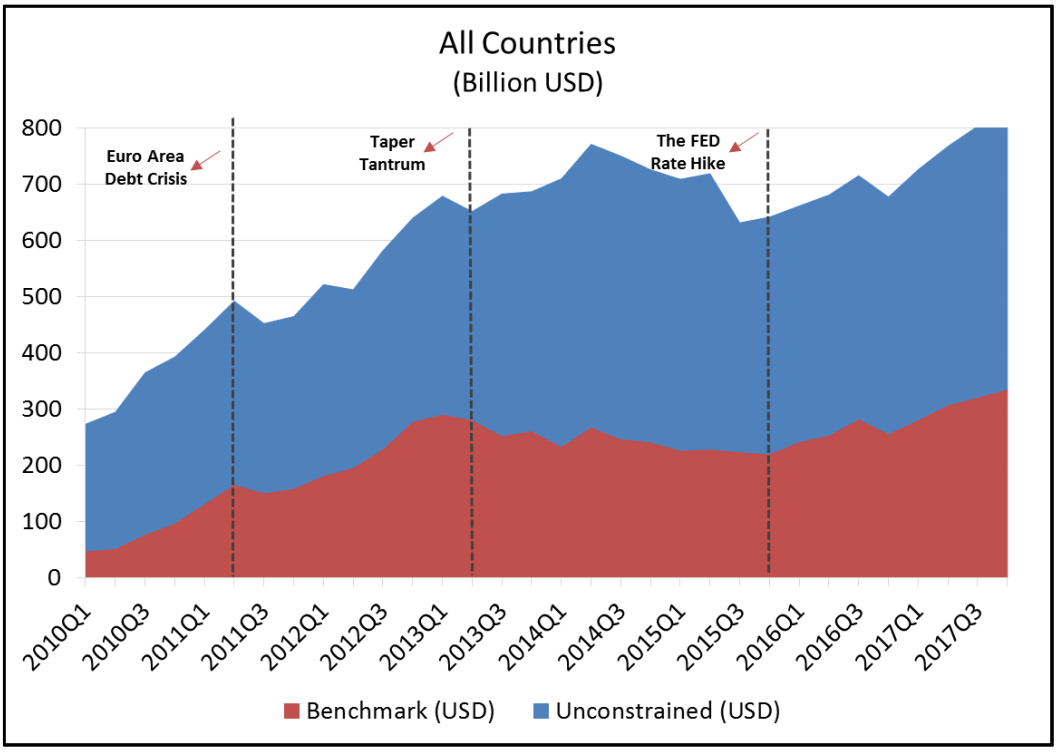
Mohanty, M., 2014. "The Transmission of Unconventional Monetary Policy to the Emerging Markets — an Overview". BIS Papers 78, pp.1–24

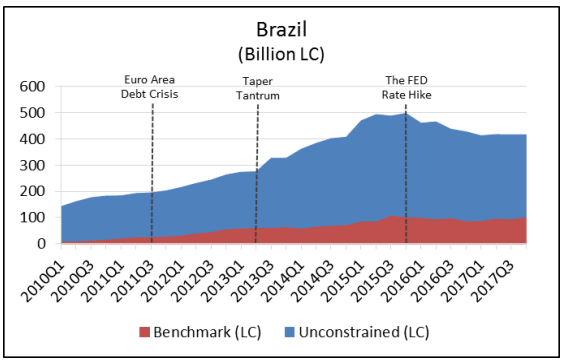
Pescatori, Andrea, Damiano Sandri, and John Simon. (2014), "Debt and Growth: Is There a Magic Threshold?" IMF Working Paper, WP/14/34, pp 14.

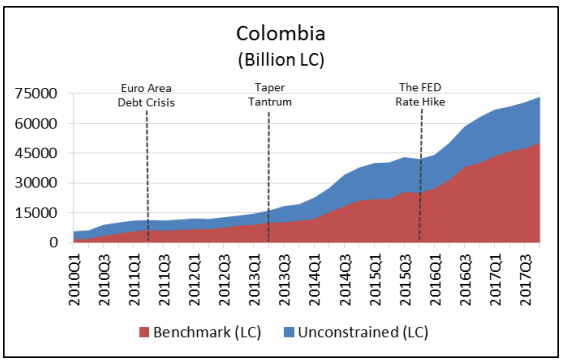
Sahay, Ratna et al. (2014), "Emerging Market Volatility: Lesson from The Taper Tantrum," IMF Staff Discussion Note, SDN/14/09.

Appendix A

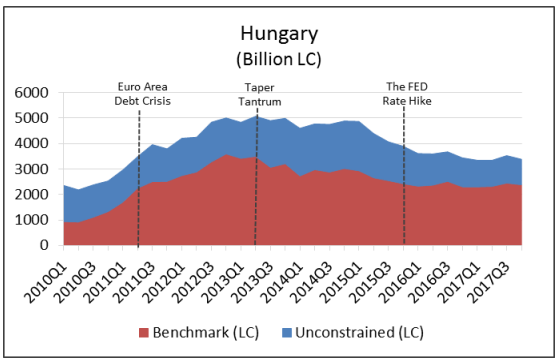
Graph 7
Local-Currency Government Bond: Type of Foreign Holdings (Local Currency)[8]

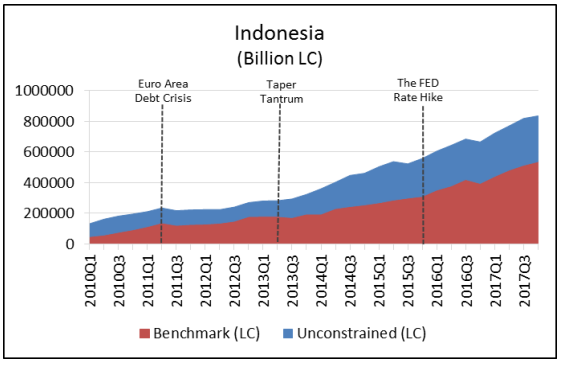


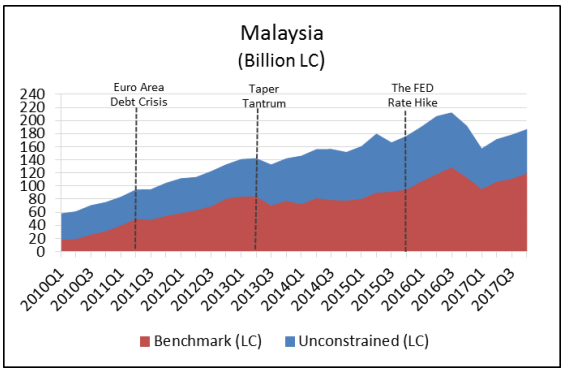


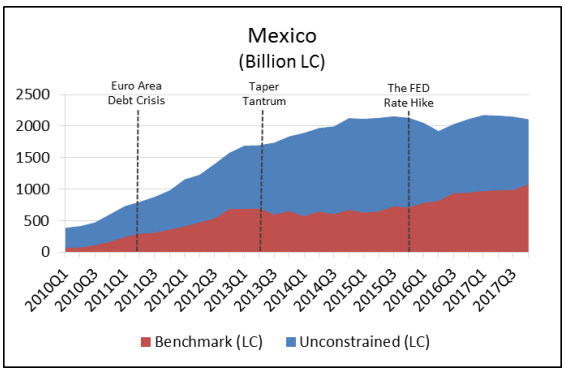


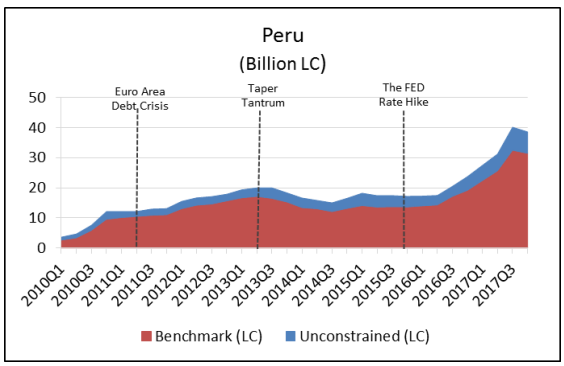
[8] Graph in stacked area

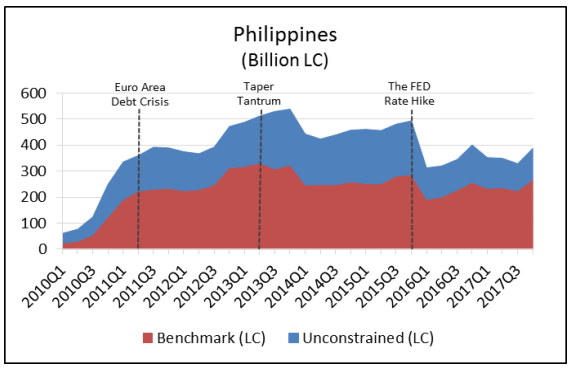

Hungary
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)

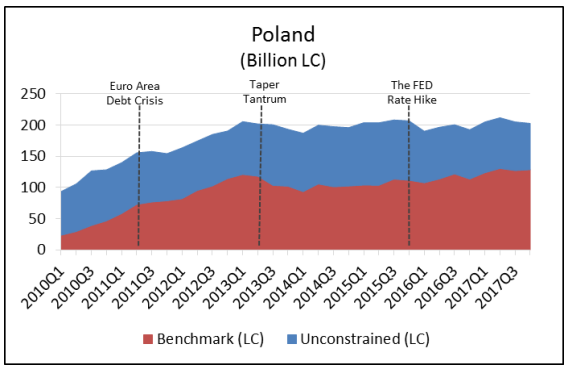

Indonesia
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)

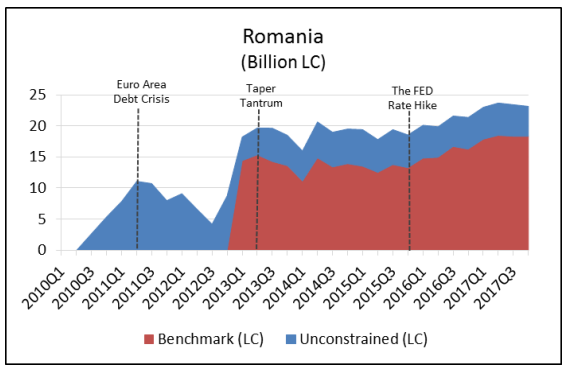

Malaysia
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)

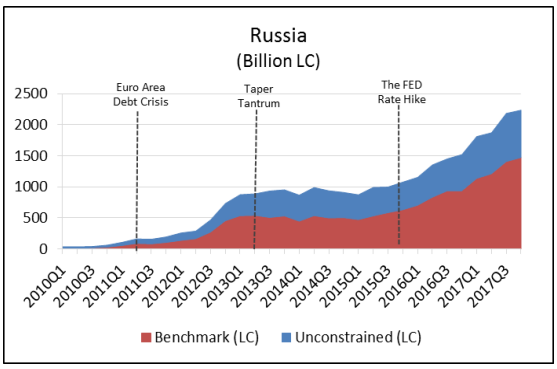

Mexico
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)

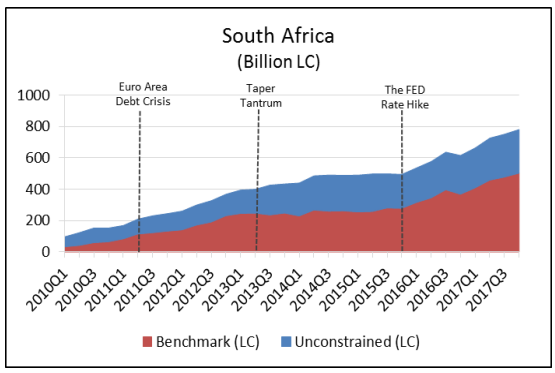

Peru
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)

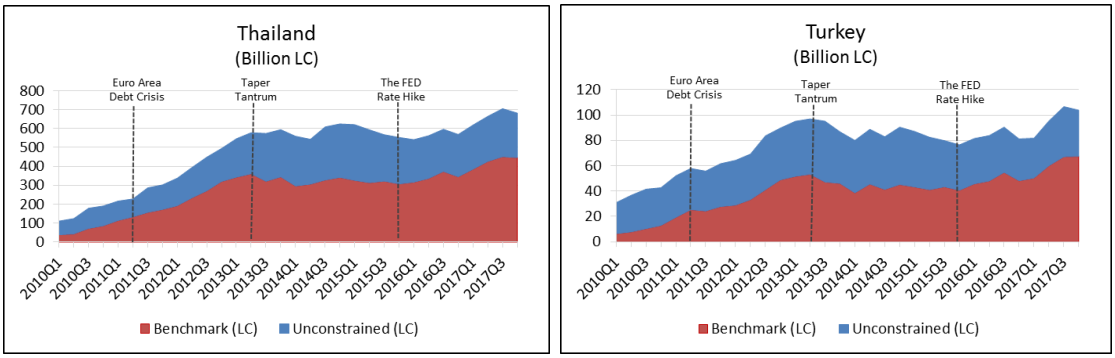

Philippines
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)


Poland
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)


Romania
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)


Russia
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)


South Africa
(Billion LC)
Euro Area Debt Crisis
Taper Tantrum
The FED Rate Hike
Benchmark (LC)
Unconstrained (LC)



Appendix B.

Table 6
Descriptive Statistics

	Obs[9]	Mean	Med	Max	Min	Std. Dev.
Variable Dependent						
Foreign	574	19.93	18.25	56.61	0.01	13.12
Benchmark	574	10.58	9.38	48.72	0.00	9.88
Unconstrained	574	9.34	9.43	31.08	0.01	5.71
Variabel Independen (Country Specific Determinant)						
Inflation Rate	576	4.50	3.66	31.60	-2.98	3.86
GDP Growth	576	4.11	4.09	15.42	-5.58	2.87
Balance-to-GDP	576	-0.36	-1.33	15.14	-8.98	4.08
Debt-to-GDP	576	43.79	38.04	110.62	10.46	19.51
Market Size	574	5.57	3.16	36.15	0.00	7.22

Sources: Authors' calculations

Tabel 7
Pairwase Correlation Matrix

Correlation	Foreign	a	B	Inflation	G_GDP	B_GDP	D_GDP	M_Size
Foreign	1							
a	0.91 ***	1						
b	0.71 ***	0.37 ***	1					
Inflation	-0.17 ***	-0.23 ***	0.01	1				
G_GDP	-0.25 ***	-0.15 ***	-0.32 ***	-0.09	1			
B_GDP	-0.17 ***	-0.14 ***	-0.15 ***	-0.39	0.06	1		
D_GDP	-0.19 ***	-0.25 ***	-0.01	0.28	-0.12	-0.12	1	
M_Size	-0.06	-0.27 ***	0.33 ***	0.00	-0.24	0.00	0.12	1

Sources : Authors' calculations
***significant at 1% level

[9] The total number of observation is not uniformly the same due to data unavailability with respect to the foreign ownership for Romania during the period of 2010Q1-2010Q2 which affects the observation of variable foreign, benchmark, unconstrained and market size.

The table above provides the information that there was no high correlation found between the variables that were simultaneously run, which shows that there is no issue of multicollinearity[10].

[10] Variables *foreign, benchmark*, and *unconstrained* were not run simultaneously.