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Tamon Asonuma and Gavin Gray

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1. Introduction

This paper develops an empirical model of the drivers of portfolio flows to emerging markets to assess whether recent inflows to South Africa exceed plausible "norms." In particular, it attempts to relate inflows to fundamentals such as country-specific macroeconomic factors or global factors, and discusses whether there is a systematic unexplained residual.

The main conclusion is that the country has indeed received greater bond flows than can be explained by macroeconomic fundamentals. Bond flows in the four quarters through 2010:Q3 not only exceeded the average over the past 10 years, but also deviated significantly from the level implied by explanatory variables, including the fiscal balance, the difference between the country's and world GDP growth rates, and a summary indicator of external vulnerabilities.

Equity flows also appear to be somewhat higher than can be justified by macro fundamentals alone. Some capital market factors specific to South Africa but not related to macro variables, such as the size of capital markets, which are reflected in high fixed effects for South Africa in panel specifications, have contributed to equity inflows. This is the case during the entire sample period under consideration (2000–10), but is especially so during the precrisis subsample (2000–08). As "pull factors," the difference between the country's growth rate and global growth rate, as well as the country's share in world GDP partly explain the equity flow.

The remainder of this Departmental Paper is organized as follows. First, we set out stylized facts of recent capital flows, distinguishing between debt flows (mainly foreign purchases of rand-denominated government bonds) and equities. This is followed by a short review of the extensive literature on the drivers of capital flows, in which we aim to draw out the major themes

relevant to South Africa. In the fourth section of the paper, we develop an empirical model using both cross-sectional and panel approaches to relate portfolio flows to both fundamental (macroeconomic) indicators and more technical (market) factors. The final section offers tentative conclusions.

2. Recent Trends in Capital Flows

Relative to other emerging markets, South Africa has received significant portfolio flows over the past year, but less in the way of direct investment. Portfolio inflows totaled $15 billion, exceeding 4 percent of GDP for the second year in succession. As elsewhere, the majority of portfolio investment went into debt securities, particularly rand-denominated government bonds, with a smaller share invested in portfolio equity. Foreign direct investment (FDI) flows collapsed to less than 0.5 percent of GDP in 2010.

South Africa's large weight in emerging-market benchmark indices may have contributed to the tilt in flows. An increasing share of portfolio flows into emerging markets is coming from passive investors that follow standard portfolio indices, or active measures that steer close to such benchmarks. While only accounting for 1.7 percent of emerging-market (EM) GDP, South Africa has a 7.5 percent weight in the MSCI emerging-market equity index, and has received inflows close to this level for most of 2010 (6.3 percent of the equity flow and 7.8 percent of debt flows into 20 "peer" countries).[1] It also has a significant weight in most emerging-market bond indices, including the Global Emerging Markets Local Currency Bond Index (GEMEX; 10 percent) and the JP Morgan EMBIG (7.5 percent). Focusing on flows into EM "peer countries," while South African share of equity flow is proportional to its share of total peer countries' GDP, its share of bond flows is much higher (Figure A1 in the Appendix).

3. Literature Review

The literature finds that international portfolio flows are influenced by both global and country-specific factors. The global factors identified by Reinhart and Reinhart (2008) as having a systemic effect on the global capital flow cycle include commodity prices, international interest rates, and growth in the world's largest economies. Egly, Johnk, and Liston (2010) relate net

[1] In this paper, we focus on 20 "peer countries" of South Africa (18 emerging countries including South Africa and 2 advanced countries) which are regarded as peer countries for South Africa in terms of GDP and their external openness. These countries are Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine.

foreign portfolio investment *inflows* to the United States (corporate bonds and equities) to two pull factors: investor risk aversion and the U.S. stock market.[2] Santis and Luhrmann (2009) find evidence from a panel of developing and industrial countries that population aging, the quality of institutions, money supply/GDP, and deviations from uncovered interest parity (UIP) influence net flows.[3] Analyzing inward flows to both developed and developing countries, Ghosh and Wolf (2000) note that capital flows increase with the recipient's proximity to "world GDP" together with geographical distance even for similar fundamentals (as captured by GDP per capita) by applying a gravity model involving FDI, loan, and portfolio flows (debt and equity).[4]

A subset of the literature focuses on portfolio flows to emerging and low-income countries. Vita and Kyaw (2008) conclude from a panel of 32 developing countries that domestic money growth is the major "pull factor" for portfolio flows to developing countries. Focusing on flows to countries in the Commonwealth of Independent States (CIS), Amaya and Rowland (2004) identify real GDP growth, sound fiscal policies, and moderate external debt levels as country-specific drivers of portfolio flows into the EM countries. On private inflows in Latin America, Chong and others (2003) postulate that corporate governance is also a key determinant together with external factors and political governance shown in previous research. Lastly, Ahmed, Arezki, and Funke (2007) estimate a dynamic panel for 81 emerging markets and find that growth, better institutions, and lower international interest rates together with well-developed financial markets help create a favorable environment for portfolio inflows.

South African-specific analyses have tended to focus on the composition of capital flows, particularly, the heavy share of portfolio flows. Ahmed, Arezki, and Funke (2007) conclude that the share of FDI can be addressed by policies to promote trade and capital account liberalization.[5] Leape (2009) notes that while South Africa's weight in the emerging-market indices is high relative to

[2] They show that positive shocks to the stock market elicit an insignificant response to the net corporate bond inflow and a significant short-term positive response to the net corporate stock flow. The net corporate stock inflow does not respond to risk aversion, while bond inflows do exhibit a significant mid-term response to an increase in risk aversion.

[3] Portes and Rey (2005) explore a new panel data set on bilateral gross cross-border equity flows between 14 countries during 1989–96 and show that gross equity transaction flows depend on market size in both source and destination country, as well as trading costs, in which information and the transaction technology play a role.

[4] Remoteness is the GDP-weighted average distance to the G-7 and is expected to enter with a positive sign. It aims to capture a dependence of the effect of bilateral distance on the proximity of third trading partners: two countries located close to each other but "distant" from the world output are likely to transact more with each other than two equally distant states closer to world output.

[5] Ahmed, Arezki, and Funke (2007) also indicate that a reduction in exchange rate volatility and an increase in reserves—accumulated at a pace dictated by prevailing market condition—would most likely also lead to changes in the composition of capital flows and increase the share of FDI.

its share of global output, flows were below index weights during the mid-2000s on account of political risk perceptions.

4. Empirical Analysis of Portfolio Flows

4.1. Cross-Sectional Analysis

We use a simple cross-sectional approach to provide a first pass at country-specific factors explaining flows to emerging countries during the recent boom. Our sample comprises 20 countries (mainly emerging markets) which are regarded as peer countries for South Africa in terms of GDP and their external openness. All series are in annual frequency in order to focus on current development of portfolio flow into EMs.[6]

We examine both flows normalized by GDP and each country's share of total flows using the following specification:

$$Y_i = c + x_i\gamma + \varepsilon_i \quad (1)$$

where the dependent variable, Y_i, is either the gross bond flow-to-GDP ratio, gross equity flow-to-GDP ratio, bond flow share, or equity flow share. x_i is a set of country-specific factors and ε_i is the random disturbance term. We use a weighted least squares regression rather than ordinal least square estimator (OLS) as the weighted regression enables us to capture the high degree of variability of gross flow-to-GDP ratios and flow shares.

The regression on equity flows confirms the importance of country fundamentals. Countries attract greater equity flows to the extent they are growing faster than the rest of the world, or (perhaps unsurprisingly) their economies are larger. Another intuitive result is a positive relationship between market capitalization (entering as a lag to avoid endogeneity problems) and the pace of flows.

We apply a partial weighted least square regression to assess whether equity flows to South Africa have exceeded levels implied by the model. In fact, the flows appear to be in line with expectations, as the results for South Africa do not deviate significantly from the regression line (Figure 1).

A similar approach shows that the size of the fiscal balance helps explain the bond flows-to-GDP ratio, although it loses significance in some specifications (Table 2). The intuition is that countries with larger deficits may turn to

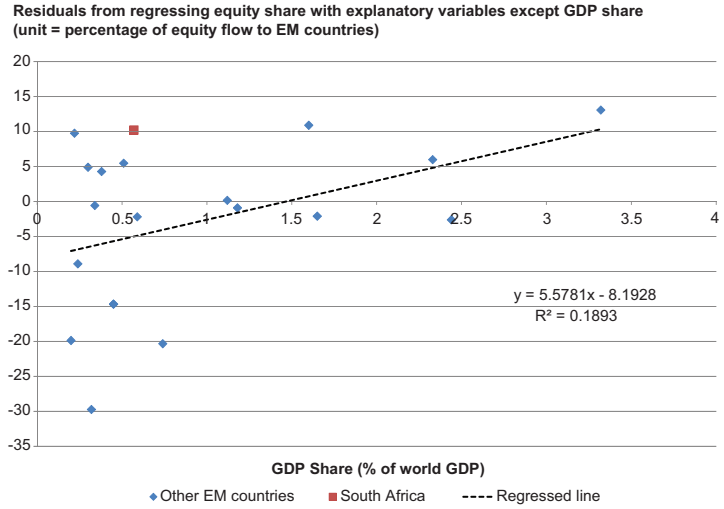
[6] We do not have annual series available for some series, for instance, gross debt flow and equity flow. We calculate annual-frequency data based on quarterly data for periods 2009:Q4 to 2010:Q3.

Table 1. Estimation Results for Equity Flow

	Gross equity flow/GDP	Gross equity flow/GDP	Gross equity flow/GDP	Equity flow share	Equity flow share
Estimation	Weighted Reg.[1]	Weighted Reg.[1]	Weighted Reg.[1]	Weighted Reg.[1]	Weighted Reg.[1]
c (constant)	-5.06E-2**	-5.70E-2**	-4.63E-2	-36.31***	-27.83***
γ_1 (Capitalization - lag)	1.91E-4*	2.29E-4	2.17E-4	0.13***	0.12***
γ_2 (Diff. between country's and world GDP growth rate)	4.84E-3**	5.72E-3*	4.47E-3	3.62***	2.63**
γ_3 (Share in the world GDP)	1.34E-2**	1.42E-2**	1.63E-2**	10.51***	12.13***
γ_4 (Share in the world population)	-	-8.50E-4	-5.61E-4	-1.10*	-0.87
γ_5 (Exchange rate volatility - lag)[2]	1.70*	1.66*	1.13	735.34**	3.11E+2
γ_6 (CPI inflation rate - lag)	-2.19E-3*	-1.61E-3	-2.09E-3	0.41	-0.79
γ_7 (Indicator for External Vulnerability)[3]	-	-	1.63	-	12.92
Adj. *R*-squared	0.66	0.64	0.62	0.86	0.88
Sample	19	19	19	19	19
Root MSE	0.016	0.016	0.017	5.22	4.82

Notes: ***, **, * show significance at 1%, 5%, and 10%. There are 20 countries in the sample: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Equity flow for China is not available.
[1] Weighted regression assigns more weights according to nominal GDP level.
[2] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.
[3] Indicator for external vulnerability is a summary indicator expressed as an index number lying in a [0,1] interval.

Figure 1. Relation of Estimated Residuals on Equity Flow Share with Share in World GDP



Note: Residuals shown are country's residuals obtained from partial regressions. We apply simple regressions on equity flow share with other explanatory variables except one particular macro variable which we are interested in. Then we regress once again the obtained residuals with respect to the variable such as share in world GDP.

Table 2. Estimation Results for Bond Flow

	Gross bond flow/GDP	Gross bond flow/GDP	Gross bond flow/GDP	Bond flow share	Bond flow share
Estimation	Weighted Reg.[1]	Weighted Reg.[1]	Weighted Reg.[1]	Weighted Reg.[1]	Weighted Reg.[1]
c (constant)	1.07E-2	6.98E-3	-2.3E-2	-1.64	-2.07
γ_1 (Spreads - lag)	4.38E-4	9.64E-4	1.59E-3	6.62E-3	1.49E-2
γ_2 (Diff. between country and world GDP growth rate)	-3.26E-3	-4.44E-3	-3.85E-3	-0.20	-0.19
γ_3 (Share in world GDP)	-2.84E-3	2.00E-3	1.05E-3	3.84**	3.82**
γ_4 (Share in world population)	-	-4.78E-3	-5.24E-3	-	-
γ_5 (Exchange rate volatility - lag)[2]	3.32**	3.31**	4.48**	2.40E+2	2.57E+2
γ_6 (CPI inflation rate - lag)	-9.30E-3	-1.01E-2	-8.92E-3	-0.18	-0.16
γ_7 (Indicator for External Vulnerability)[3]			-6.21E-2	-	-0.90
γ_8 (Fiscal balance/GDP ratio)	-3.17E-3***	-3.24E-3**	-3.74E-3**	-7.42E-2	-8.14E-2
Adj. *R*-squared	0.61	0.57	0.56	0.39	0.32
Sample	17	17	17	17	17
Root MSE	0.04	0.04	0.04	3.84	4.04

Notes: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Bond flows for China and Indonesia are not available.

[1] Weighted regression assigns more weights according to gross bond flow-to-GDP ratio and bond flow share, respectively.

[2] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.

[3] Indicator for external vulnerability is a summary indicator expressed as an index number lying in a [0,1] interval with 1 as highest degree of vulnerability.

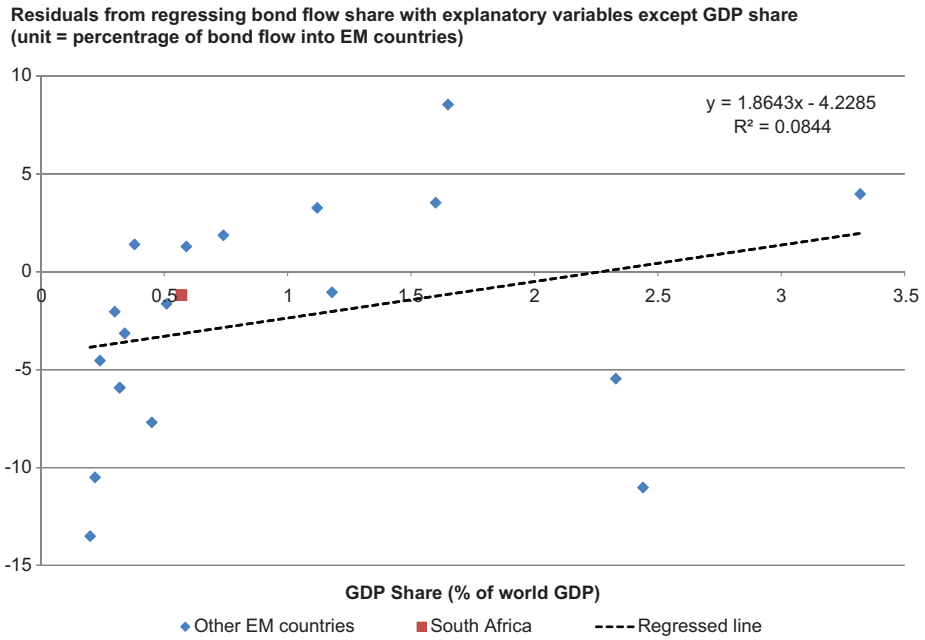
foreign investors for funding. As in the case of equity regressions, large EMs tend to receive a large share of total bond flows.

Similar to bond flow share, we apply a partial weighted least square regression to see the level of bond flow that can be explained by its share in world GDP. The South African bond inflow is close to the level that can be justified by its share in world GDP (Figure 2).

4.2. Panel Analysis

To capture the effect of global factors, we supplement the cross-sectional analysis with a panel data approach. A panel approach allows us to take better account of cross-country heterogeneity, while reducing the impact of omitted (missing or unobservable) time-varying variables that might be correlated

Figure 2. Relationship of Estimated Residuals on Bond Flow Share with Its Share in World GDP



with the explanatory variables. In this section, we use a sample of 2000:Q1 to 2010:Q3 in quarterly frequency, based on 20 countries, mainly EMs.

We estimate gross bond flow-to-GDP and gross equity flow-to-GDP using the following specification:

$$Y_{it} = \alpha_i + z_t\beta + x_{it}\gamma + \varepsilon_{it} \tag{2}$$

and apply the following regression for bond flow share and equity flow share:

$$Y'_{it} = \alpha_i + x_t\gamma + (z_t * \alpha_{SA})\,\delta + \varepsilon'_{it} \tag{3}$$

where Y_{it} is either gross bond flow-to-GDP ratio or gross equity flow-to-GDP ratio, while Y_{it}' is either bond flow share or equity flow share. α_i is a country-specific constant which we regard as fixed, and α_i captures fixed effects for South Africa. x_{it} is a set of country-specific factors and z_t is a set of country-invariant variables that capture global factors. ε_{it} and ε_{it}' are random disturbance terms. The third term in equation (3), $z_t * \alpha_{SA}$ is included to capture the impact of global factors on South African inflow shares.[7] As in

[7] In the specification for flow shares, we do not include country-invariant global factors as explanatory variables as the global factors matter for total amount of flows, not shares of total flows into sample countries. By inserting with interactions with country-specific fixed effects, we attempt to capture the impacts of global factors on the flow shares of particular country, in this case, South Africa.

Table 3. Estimation Results for Gross Equity Flow-to-GDP Ratio

	Gross equity flow/GDP	Gross equity flow/GDP	Gross equity flow/GDP	Gross equity flow/GDP	Gross equity flow/GDP[1]
Estimation	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]
c (Constant)	-	-	-	-	5.45***
β_0 (time trend)	-	-	4.15E-2***	-2.48E-2	2.26E-2
β_1 (U.S. stock price change)	0.18***	0.11***	0.1***	0.15***	9.57E-2***
β_2 (VIX)	7.50E-2***	-0.1***	-0.01***	-9.15E-2***	-8.69E-2***
γ_1 (Capitalization - lag)	-	-	-	2.58E-2**	-
γ_2 (Diff. between country and world GDP growth rates)	0.31***	8.61E-2	5.11E-2	3.26E-2	2.40E-2
γ_3 (Share in world GDP)	-0.67***	1.38***	0.47	1.49	-0.96***
γ_4 (Exchange rate volatility - lag)[3]	-1.90	20.4**	13.0	20.9	-1.62
γ_5 (CPI inflation rate - lag)	-4.85E-2	8.2E-2**	8.66E-2***	0.21***	-0.10***
γ_6 (Indicator for External Vulnerability)[4]	2.08***	3.40***	2.85***	3.22***	-0.41
α_1 (***Fixed effect – South Africa***)	-	-0.56	-0.4	-4.10***	-2.48***
Average fixed effect[5]	-	0.45 (2.76)[6]	0.2 (0.39)[7]	-2.71 (-1.45)[8]	-
Adj. *R*-squared	0.39	0.66	0.67	0.69	0.16
Sample	506	506	506	350	506
Root MSE	3.77	2.81	2.78	2.94	3.34

Note: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Equity flow for China is not available.

[1] This specification includes a constant and only fixed effect for South Africa.

[2] Weighted regression assigns more weights according to gross equity flow/GDP.

[3] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.

[4] Indicator for external vulnerability is a summary indicator expressed as an index number lying in a [0,1] interval with 1 as the highest degree of vulnerability.

[5] Value inside the parenthesis shows average of fixed effect which are significant at 5% criteria.

[6] Fixed effects for Malaysia and Israel are the highest (6.58***) and the second highest (6.35***), respectively.

[7] Fixed effects for Korea and Malaysia are the highest (2.85***) and the second highest (2.24***), respectively.

[8] Fixed effects for India and Ukraine are the highest (1.28***) and the second highest (1.10), respectively.

the cross-sectional analysis, we also take advantage of weighted least square regressors which enables us to capture a high degree of variability of gross flow-to-GDP ratio and also flow shares.

A weighted regression confirms the importance of both global and country-specific factors (Tables 3 and 4). Two standard explanatory variables enter with the expected signs in explaining the equity flow share, such as the

Table 4. Estimation Results for Equity Flow Share

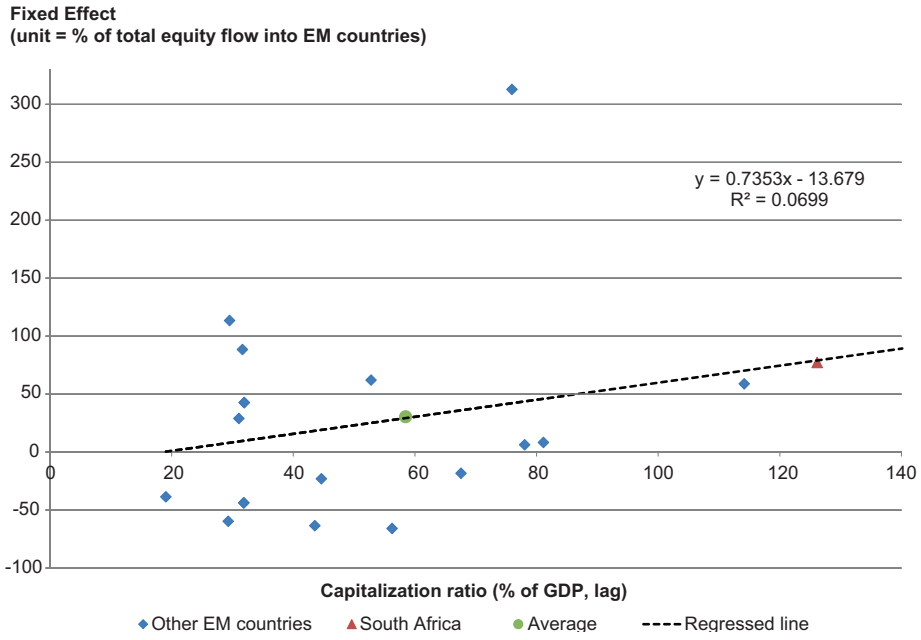
	Equity Flow share	Equity flow share	Equity flow share	Equity flow Share[1]
Estimation	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]
γ_1 (Capitalization - lag)	-	-	1.13***	-
γ_2 (Diff. between country and world GDP growth rates)	26.2***	24.9***	-7.29***	25.0***
γ_3 (Share in world GDP)	90.9***	20.4	37.7*	20.5
γ_4 (Exchange rate volatility - lag)[3]	-884.2	-1.81E+3***	577.9	-1.81E+3***
γ_5 (CPI inflation rate - lag)	-5.14**	-0.62	-6.8***	-0.66
γ_6 (Indicator for External Vulnerability)[4]	-128.9**	-93.9	-128.9***	-92.6
δ_1 (impacts of U.S. stock price change on South African inflow)	-	-		1.15
δ_2 (impacts of VIX on South African inflow)	-	-		0.62
α_1 (***Fixed effect – South Africa***)	-	**77.3**	-40.8	**55.1**
Average of fixed effect[5]	-	**30.6**	16.1	29.1
		(312.9)[6]	(44.3)[7]	(312.7)[6]
Median of fixed effect		18.7	19.0	18.4
Adj. *R*-squared	0.40	0.55	0.58	0.55
Sample	533	533	372	533
Root MSE	249.9	216.0	92.3	216.4

Notes: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Equity flow for China is not available.
[1] This specification includes a constant and only fixed effect for South Africa.
[2] Weighted regression assigns more weights according to equity flow share.
[3] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.
[4] Indicator for external vulnerability is a summary indicator expressed as an index number lying in a [0,1] interval with 1 as the highest degree of vulnerability.
[5] Value inside the parenthesis shows average of fixed effects significant at 5% criteria.
[6] Fixed effects for Korea is the highest (312***) and significant at 5% level.
[7] Fixed effects for India and Turkey are the highest (122.1***) and the second highest (106.3***), respectively.

difference between the country's and the world GDP growth rate, and exchange rate volatility entered as lag. Thus, the higher the growth rate relative to the world GDP growth rate, or the smaller the variation of exchange rate in the previous period, the larger the country's share of equity flows.

The fixed effect for South Africa, which is remarkably higher than the average of fixed effects of emerging-market countries, reflects some capital market factors specific to South Africa, such as size of capital market (Figure 3).

Figure 3. Fixed Effect and Capitalization Ratio (Percent of GDP)



It plays a dominant role for equity flow for the entire period (2000–10), subsample period (2003–10), and also upswing period (2003–08). The difference between fixed effect of South Africa and the average of fixed effect of emerging-market countries explains 30 percent of the equity flow into South Africa throughout the last four quarters, equivalent to 0.5 percent of GDP in South Africa. It can be interpreted as indicating that South Africa has been clearly receiving larger equity flow than can be simply justified by macro fundamentals mostly due to South African-specific capital market structure.

Explanatory factors for both bond flows (normalized by GDP) and bond flow shares include the fiscal deficit, the difference between the country's and global GDP growth rates. If the fiscal deficit of an emerging-market country deteriorates, the country tends to issue more bonds, which in turn absorbs more inflows through bond issuance. The higher the growth rate of the country relative to that of the world, the more inflows it receives. In tandem with these two factors, the bond flow share also tends to be negatively affected by inflation and measures of external vulnerabilities.

Some financial market elements specific to South Africa captured by a fixed effect, most probably liquidity of bond market, contributed to attracting more bond flows to other EMs for the most recent seven years (2003–10), particularly during the upswing period (2003–08) before the global financial crisis. By contrast, during the crisis period (2008–09) and subsequent recovery

Table 5. Estimation Results for Equity Flow Share Under Different Sample Periods[1]

	(1) Whole periods	(2) Subsample period	(3) Upswing period	(4) Downswing period	(5) Most recent period
Periods	2000:Q1–2010:Q3	2003:Q1–2010:Q3	2003:Q1–2008:Q2	2008:Q3–2009:Q3	2009:Q4–2010:Q3
γ_1 (Capitalization - lag)	-	-	-	-	-
γ_2 (Diff. between country and world GDP growth rates)	**24.9*****	-3.36	-9.01*	-2.70*	-2.0*
γ_3 (Share in world GDP)	20.4	51.7***	170.3***	-12.0	-17.7
γ_4 (Exchange rate volatility - lag)[2]	-1.81E+3***	317.2	2. 29E+3***	-6.06E+2**	-43.8
γ_5 (CPI inflation rate - lag)	-0.62	-3.36	4.49	4.56*	2.2
γ_6 (Indicator for External Vulnerability)[3]	-93.9	-188.6***	-132.9**	47.9*	-23.0
δ_1 (impacts of U.S. stock price change on South African inflow)	-	-	-	-	-
δ_2 (impacts of VIX on South African inflow)	-	-	-	-	-
α_1 (***Fixed effect – South Africa***)	**77.3**	**111.2*****	**-41.0**	-29.5	20.1
Average fixed effect[4]	**30.6** (312.9)[5]	**66.7** (90.3)[6]	**-98.6** (-256.1)[7]	5.2 (48.1)[8]	30.1 (76.5)[9]
Median of fixed effect	18.7	64.3	-67.6	3.6	26.2
Adj. *R*-squared	0.59	0.55	0.65	0.77	0.95
Sample	533	413	291	73	49
Root MSE	207.3	100.5	98.0	20.5	7.4

Notes: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Equity flow for China is not available.

[1] Weighted regression assigns more weights according to equity flow share.

[2] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.

[3] Indicator for external vulnerability is a summary indicator expressed as an index number lying in a [0,1] interval with 1 as the highest degree of vulnerability.

[4] Value inside the parenthesis shows average of fixed effects that are significant at 5% criteria.

[5] Fixed effects for Korea and Malaysia are the highest (421.0***) and the second highest (177.0***), respectively. Fixed effect for South Africa follows next with 109.4.

[6] Fixed effects for India and Turkey are the highest (165.3***) and the second highest (136.1***), respectively.

[7] Fixed effects for India and Brazil are the highest (1.38E+2***) and the second highest (1.27E+2), respectively.

[8] Fixed effect for Poland is the highest (48.1**) and significant at 5% level.

[9] Fixed effects for Brazil and Poland are the highest (113.5***) and the second highest (39.5***), respectively.

Table 6. Estimation Results for Gross Bond Flow/GDP

	Gross bond flow/GDP	Gross bond flow/GDP	Gross bond flow/GDP	Gross bond flow/GDP[1]
Estimation	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]
c (constant)	-	-	-	1.93
β_0 (time trend)	-	-	1.69E-2	2.93E-2***
β_1 (U.S. Treasury Bill rate - nominal)	0.10**	-0.31*	-0.20	-0.27
β_2 (VIX)	-8.38E-3	-4.10E-2***	-3.95E-2***	-4.27E-2***
γ_1 (Spreads - lag)	-3.18E-2	0.13	-2.38E-3	-0.23***
γ_2 (Diff. between country and world GDP growth rate)	0.12***	5.45E-2**	**4.68E-2***	6.21E-2**
γ_3 (Share in world GDP)	0.19	0.23	0.36	0.37**
γ_4 (Exchange rate volatility - lag)[3]	3.78	-7.00	-7.52	-0.35
γ_5 (CPI inflation rate - lag)	-5.62E-2***	-2.19E-2	-2.31E-2	-5.03E-2***
γ_6 (Indicator for External Vulnerability)[4]	-4.11E-2	0.46	0.53	0.64
γ_7 (Fiscal balance/GDP ratio)	-2.88E-2***	-3.66E-2***	**-3.61E-2*****	-2.37E-2***
α_1 (***Fixed effect – South Africa***)	-	1.81	1.29	-3.89E-2
Average fixed effect	-	2.17 (2.79)[5]	1.53 (1.96)[6]	-
Adj. *R*-squared	0.10	0.21	0.21	0.08
Sample	680	680	680	680
Root MSE	1.87	1.76	1.76	1.84

Notes: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Bond flows for China and Indonesia are not available.

[1] This specification includes a constant and only fixed effect for South Africa.

[2] Weighted regression assigns more weights according to GDP dispersion.

[3] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.

[4] Indicator for external vulnerability is a summary indicator lying in a [0,1] interval with 1 as the highest degree of vulnerability.

[5] Fixed effect for Korea is the highest (4.01) among the sample countries. Hungary follows next with 3.74.

[6] Fixed effects for Korea and Hungary are the highest (3.13) and the second highest (3.00), respectively.

Table 7. Estimation Results for Bond Flow Share

	Bond flow share	Bond flow share	Bond flow share[1]
Estimation	Weighted Reg.[2]	Weighted Reg.[2]	Weighted Reg.[2]
γ_1 (Spreads - lag)	-1.21E+3***	-1.79E+3***	-1.84E+3
γ_2 (Diff. between country and world GDP growth rate)	522.4***	298.1***	303.0***
γ_3 (Share in world GDP)	1.79E+3***	-1.26E+3	-1.17E+3
γ_4 (Exchange rate volatility - lag)[3]	1.87E+5***	1.23E+6***	1.25E+5
γ_5 (CPI inflation rate - lag)	-375***	-337.4***	-338.2***
γ_6 (Indicator for External Vulnerability)[4]	-1.47E+3*	-8.54E+3***	-8.86E+3***
γ_7 (Fiscal balance/GDP ratio)	-118.5***	-90.4***	-87.55***
δ_1 (impacts of U.S. stock price change on South African inflow)			84.0
δ_2 (impacts of VIX on South African inflow)			19.0
α_1 (***Fixed effect – South Africa***)	-	4.72E+3***	5.40E+3
Average fixed effect	-	6.50E+3 (7.51E+3)[5]	6.67E+3 (7.23E+3)[6]
Median of fixed effect		5.48E+3	5.23E+3
Adj. *R*-squared	0.92	0.97	0.97
Sample	447	447	447
Root MSE	2528	1695	1693.5

Note: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Bond flows for China and Indonesia are not available.

[1] This specification includes a constant and only fixed effect for South Africa.

[2] Weighted regression assigns more weights according to bond flow share.

[3] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.

[4] Indicator for external vulnerability is a summary indicator lying in a [0,1] interval with 1 as the highest degree of vulnerability.

[5] Fixed effects for Brazil and Russia are the highest (1.50E+4) and the second highest (1.35E+4), respectively.

[6] Fixed effects for Brazil and Russia are the highest (1.51E+4) and the second highest (1.37E+4), respectively.

(2009–10), these impacts on inflow have been somewhat smaller compared with other EMs.

We again use partial regressions to analyze whether South Africa has been receiving proportional bond flow in terms of two "pull factors" such as the difference between the country's and world GDP growth rates, and fiscal balance-to-GDP ratio. Figure 4 shows that South Africa has received a higher share of bond flows than can be explained by the two main pull factors.

Table 8. Estimation Results for Bond Flow during Different Periods[1]

	(1) Whole periods	(2) Subsample period	(3) Upswing period	(4) Downswing period	(5) Most recent period
Periods	2000:Q1–2010:Q3	2003:Q1–2010:Q3	2003:Q1–2008:Q2	2008:Q3–2009:Q3	2009:Q4–2010:Q3
γ_1 (Spreads - lag)	-1.79E+3***	-97.8**	-167.9**	14.8	8.92
γ_2 (Diff. between country and world GDP growth rate)	298.1***	-4.76	14.5	10.5***	-0.29
γ_3 (Share in world GDP)	-1.26E+3	344.3***	659.5***	-242.1**	5.69
γ_4 (Exchange rate volatility - lag)[2]	1.23E+6***	-5.95E+3***	-5.99E+3***	692.4*	82.0
γ_5 (CPI inflation rate - lag)	-338.2***	3.69	-1.63	2.55	0.29
γ_6 (Indicator for External Vulnerability)[3]	-8.54E+3***	-151.3	-8.88	-68.5	10.2
γ_7 (Fiscal balance/GDP ratio)	-90.4***	-4.53**	-10.3***	1.72	0.07
δ_1 (impacts of U.S. stock price change on South African inflow)	-	-	-	-	-
δ_2 (impacts of VIX on South African inflow)	-	-	-	-	-
α_1 (***Fixed effect – South Africa***)	4722***	424***	426.4*	40.0	20.0
Average fixed effect[4]	6499 (7508)[5]	223 (244)[6]	87.9 (32.7)[7]	156 (327)[8]	18.7
Median of fixed effect	5481	244	-67.6	92.2	16.9
Adj. *R*-squared	0.97	0.62	0.65	0.91	0.92
Sample	447	369	247	65	57
Root MSE	1695	245.0	254.3	23.9	3.8

Note: ***, **, * show significance at 1%, 5%, and 10%. Our sample includes 20 countries: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, the Philippines, Russia, South Africa, Thailand, Turkey, and Ukraine. Bond flows for China and Indonesia are not available.

[1] Weighted regression assigns more weights according to bond flow share.

[2] Exchange rate volatility series is standard deviation of daily exchange rate during the previous period normalized with respect to average level of daily exchange rate.

[3] Indicator for external vulnerability is a summary indicator lying in a [0,1] interval with 1 as the highest degree of vulnerability.

[4] Value inside the parenthesis shows average of fixed effects that are significant at 5% criteria.

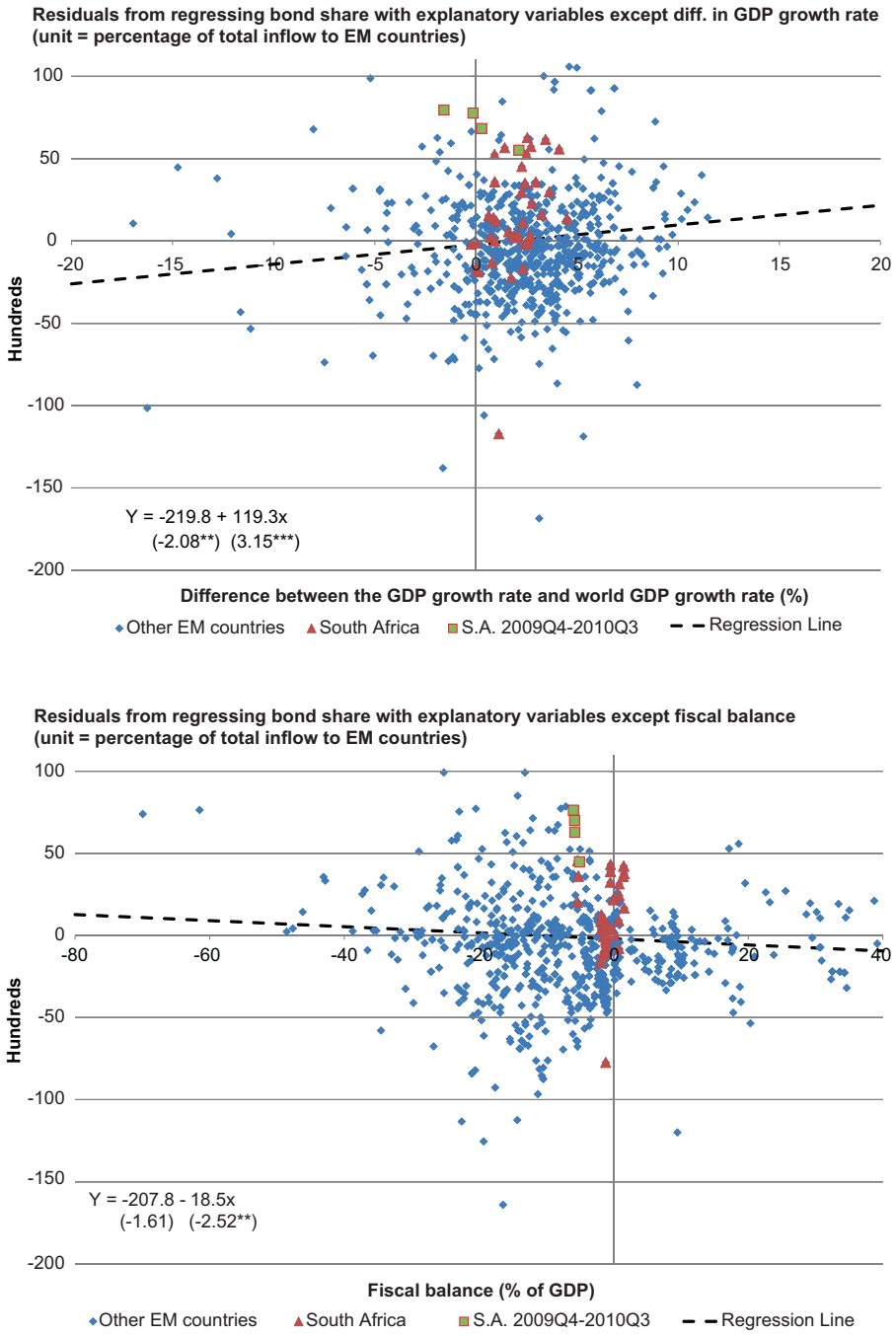
[5] Fixed effects for Brazil and Russia are the highest (1.50E+4) and second highest (1.35E+4), respectively.

[6] Fixed effects for South Africa and Poland are the highest (424) and second highest (306), respectively.

[7] Only fixed effects of Peru (791) and Mexico (-627) are significant.

[8] Only fixed effect of Korea is significant (327).

Figure 4. Relations of Estimated Residuals on Bond Flow Share with "Pull" Factors



Note: Residuals shown in the charts are country's residuals obtained from partial regressions. We apply simple regressions on bond flow share with other explanatory variables except one particular macro variable which we are interested in. Then we regress once again the residuals obtained with respect to the variable such as difference between the country and the world GDP growth rates.

More surprisingly, during 2009:Q4–2010:Q3, its bond shares have not only been higher than values over the entire sample period (2000:Q1–2010:Q3), but deviated significantly from the amounts explained by macroeconomic fundamentals (regressed line), showing that bond flows during the recent periods have been extraordinarily high.[8]

5. Conclusion

Reflecting the current juncture of portfolio flows into South Africa, we analyze the main driving forces of both bond and equity flows using cross-sectional and panel approaches. Our findings indicate that South Africa has clearly received greater bond flows than can be justified by macroeconomic fundamentals. In particular, bond flow in the last four quarters through 2010:Q3 not only exceeded the average over the past 10 years but also deviated remarkably from the amount explained by macroeconomic fundamentals, including the fiscal balance, the difference between the country's and world GDP growth rates, and an indicator of external vulnerabilities.

Equity flows into South Africa also seem to be higher than can be driven by macro fundamentals. Some capital market factors specific to South Africa unrelated to macro variables, such as size of capital market, are shown in high fixed effect relative to other emerging-market countries. This fixed effect has played a role in equity flow for the entire period (2000–10), especially during the subsample period (2000–08). Both differences in the country's and the world growth rate, as well as the share in world GDP, considered "pull factors," help to explain developments in the equity flow.

[8] Figure A2 in the Appendix shows a relationship in terms of average over the entire sample period. It is clear from Figure A2 that the average bond share of South Africa is much higher than that of EM countries and also the amount explained by macroeconomic variables.

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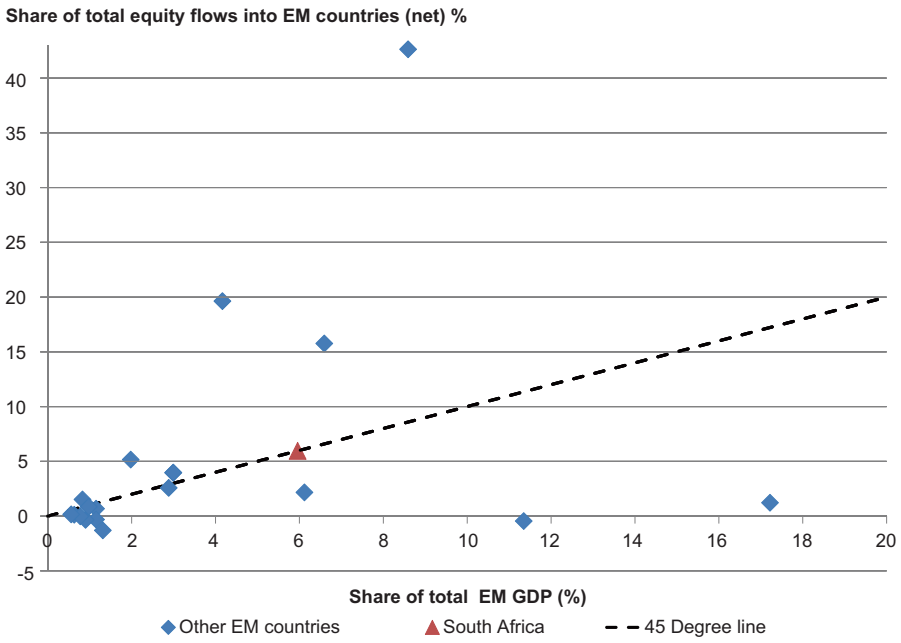
Appendix

Figure A1. Share of Total Equity Flows/Bond Flows into EM Countries



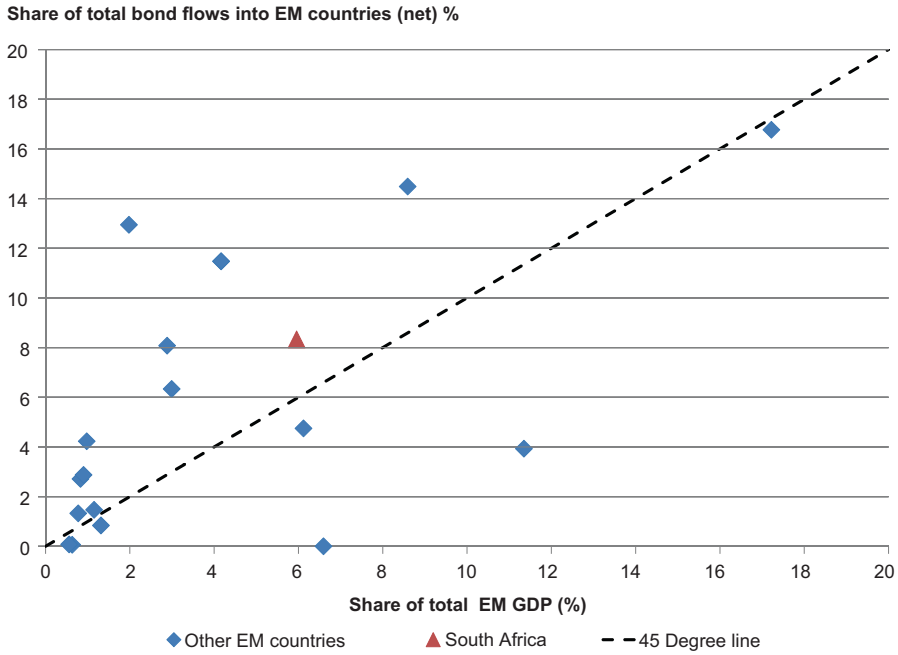
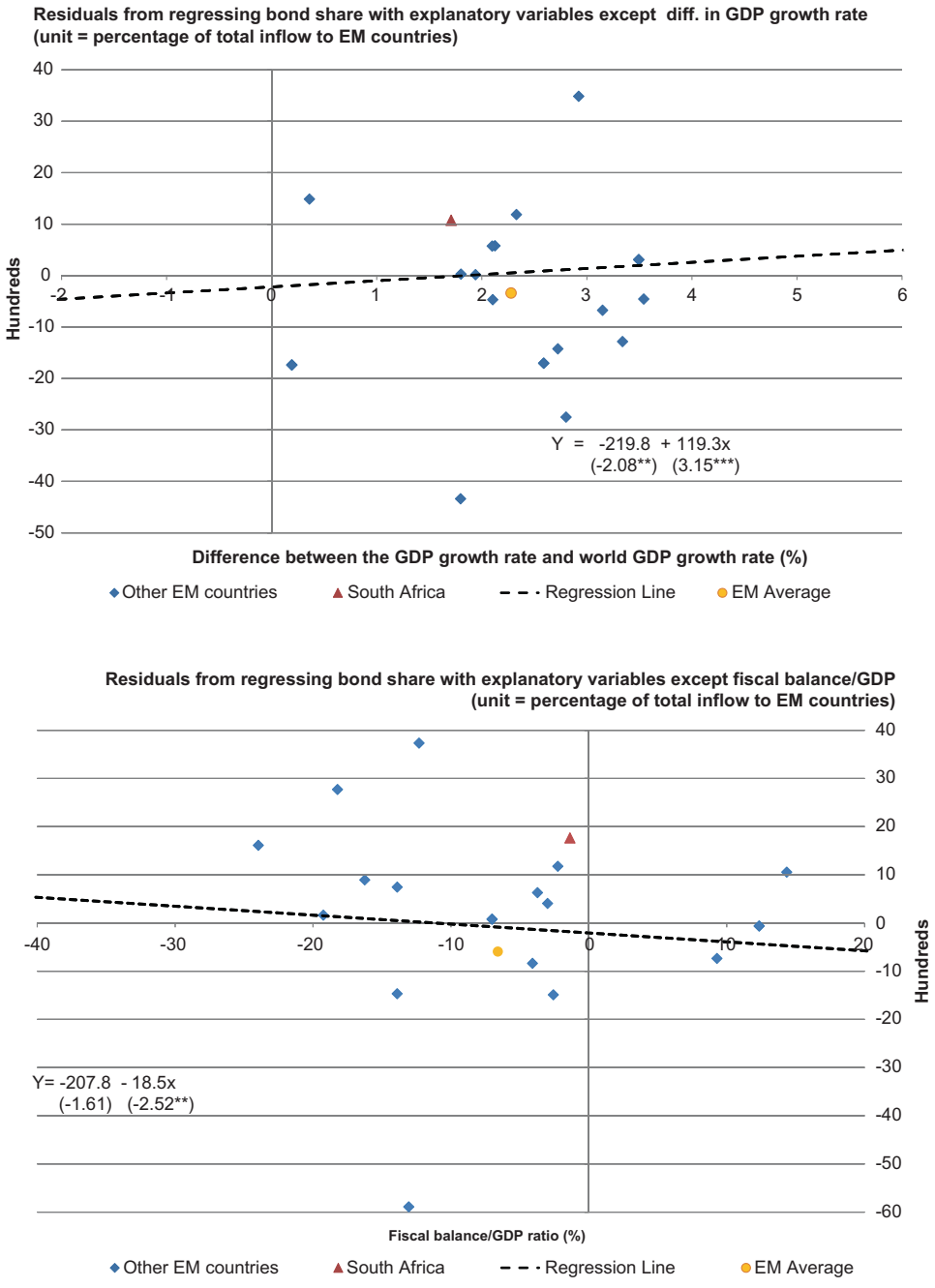


Figure A2. Relation of Average of Estimated Residuals on Bond Flow Share with "Pull Factors"



Is South Africa Receiving More than Its Fair Share of Portfolio Flows?