International Journal of Economics and Finance; Vol. 8, No. 12; 2016
ISSN 1916-971X E-ISSN 1916-9728
Published by Canadian Center of Science and Education

Portfolio Investment Flows, GDP, and Investment in Brazil

Roberto Meurer[1]

[1] Economics Department, Federal University of Santa Catarina (UFSC), Florianópolis (SC), Brazil

Correspondence: Roberto Meurer, Departamento de Economia–CSE, Campus Universitário–UFSC, 88040-900 Florianópolis (SC), Brazil. Tel: 55-48-3721-9385. E-mail: robertomeurer@yahoo.com

Received: September 23, 2016 Accepted: October 17, 2016 Online Published: November 20, 2016

doi:10.5539/ijef.v8n12p1 URL: http://dx.doi.org/10.5539/ijef.v8n12p1

Abstract

Foreign portfolio investment (FPI) flows have grown substantially in recent decades, following changes in the international financial system. In Brazil, FPI represented 66% of foreign direct investment between 1995 and 2009, which makes it meaningful to analyze these flows. In this paper, the relationships between FPI flows to Brazil, GDP, investment, and financial variables from 1995 to 2009 are analyzed, employing quarterly data and applying descriptive statistics, correlation coefficients, and Granger causality tests. Results show a positive relationship between flows, GDP, and investment. Relationships between flows and financial variables show a strong relationship between FPI and the real effective exchange rate, which could be one of the channels through which the flows are related to real variables by means of changes in relative domestic and foreign production costs. Expectations about future behavior of the economy seem to be an important explanation for the relationship between flows and the real variables. Because FPI is volatile and this volatility relates to real variables through the real effective exchange rate and the interest rate, there is a case to be made for the implementation of capital controls.

Keywords: foreign portfolio investment, GDP, investment, Brazil, capital controls

1. Introduction

Traditional neoclassical theory explains international capital flows to be a consequence of differences in the marginal product of capital between countries. Capital should seek countries with a relatively lower stock of capital and therefor higher marginal productivity, looking for higher returns. This would mean that capital would flow to less developed countries up until productivity and returns equal, eliminating the possibility of arbitrage. However, empirically this theoretical explanation does not fit perfectly the real world (Lucas, 1990; Hall & Jones, 1999). This means that the explanation for capital flows has to go beyond differences in capital productivity.

Foreign direct investment (FDI) and foreign portfolio investment (FPI) are used by developing economies to finance their current account deficits. Since the 1990s, financial liberalization led to the substitution of traditional debt through lending contracts for the issuing of securities. On the other hand, flows from emerging to developed countries became common, meaning that developed countries' current account deficits were financed by emerging countries. This is the reverse of the expected flow from developed countries to ones that have a lower stock of capital per worker. There is a consensus in the literature over the potential beneficial effects of FDI on host countries, but less so for FPI, because of the link of FDI to physical capital (Durham, 2004).

FPI flows from and to developing countries are large. In 2007, these countries received $88 billion, and in 2008 sent $85 billion (WEO, 2009). The amount of FPI flows is less than those of FDI, but the FPI flows are more volatile.

In the case of Brazil, the net amount of FPI observed since the opening of the economy to foreign investments went from almost zero before 1990 to peak inflows close to $50 billion in 2007 and 2009, and outflows of more than $5 billion in 2002 and 2004. FPI made up, on average, 89% of FDI between 1995 and 2009. The accumulated flow of FPI between 1995 and 2009 was 66% of FDI.

Brazil has a relevant presence in the global FPI market, notwithstanding a decline in relative terms. In the 1990s, Brazil reached a share of more than 2% of the global stock of debt securities, but this share went down to 0.3% of the global stock of $27 trillion in 2009. In the stock market, Brazil had a share of 10% of global issues in 2007. In the period 1995-2008, the mean was 1.8% of the announced issues, an amount of $8.4 billion, which is a relevant amount in the external accounts of the country.

Brazilian interaction in the global financial market is influenced by domestic and external factors, and also by structural changes in the financial system. It is necessary to verify whether FPI is a substitute for, a complement with, or independent of FDI. As the volatility of FPI flows is higher, the risk of a growth strategy based on its attraction would also be higher. On the other hand, the effect of this volatility could be lowered because of the effect of the diversification of financing sources.

The macroeconomic effects of FPI through the exchange rate, interest rate, and current account financing, and FPI's effects on investment and GDP make FPI's behavior important for economic policy decisions. Examples are policies aimed to smooth output or whether to implement controls on FPI flows.

The aim of this article is to verify the relationship between Brazilian FPI flows and GDP growth and investment, as well as macroeconomic variables (the exchange rate and the interest rate) from 1995 to 2009. Quarterly data are employed and are analyzed through descriptive statistics, correlation coefficients, and Granger causality tests. This means that contemporaneous and lagged relations between real and financial variables can be detected.

The article is divided into four sections, including this introduction. In section 2 there is a brief review of the literature. Data are analyzed in section 3. Section 4 concludes.

Results show that FPI diversifies the financing of the country, complementing FDI. Flows are related to the real variables of GDP growth and change in investment, and are also influenced by financial variables. A clear relationship is found between the exchange rate and financial markets, meaning that financial flows are important for macroeconomic outcomes. The volatility of flows and their real effects help to make the case for economic policy measures aimed to control FPI flows.

2. Literature review

The literature on FPI emphasizes its effects through microeconomic channels, especially the financial system. However, this does not exclude macroeconomic effects, related to the balance of payments and the exchange rate. An economic policy question involves whether better access to foreign resources leads to better results for the country, given that it will use external finance. Beyond national accounts identities, the intertemporal decisions have to be considered, because after the use of foreign resources they will have to be paid back. The part of output that will be paid to foreign creditors or investors cannot be locally consumed, making external financing decisions important.

The financial opening of developing countries happened at almost the same time as their opening to trade. However, financial opening should happen after trade opening is consolidated, because of increased exposure to the international environment. In particular, capital attraction can lead to an appreciation of the local currency and a negative effect on output (Edwards, 2008). The case for totally free financial flows is far from unanimous. There are solid theoretical and policy reasons for capital controls (Ostry et al., 2010). On the other hand, the local financial market could benefit from the presence of foreign institutions allowed by increased openness (Mishkin, 2007). This could happen through higher savings or better resource allocation (Errunza, 2001). Capital markets and other financial institutions could develop at the same time (Demirgüç-Kunt & Levine, 1996; Levine & Zervos, 1998). Notwithstanding, financial integration does not guarantee high economic growth rates (Schularick & Steger, 2010). Government intervention and taxes are ways to avoid the consequence that the instability of flows generates financial instability (Grabel, 2005).

FPI flowing into stock exchanges could lead to higher efficiency in this market, which could stimulate new issues, and these resources could fund new productive investments. Financial opening would allow for the presence of foreign stockholders and increase the investor base, reducing the cost of capital for companies (Henry, 2000; Merton, 1987). In the long run, the inflow to stock exchanges has to be linked to the ability of companies to generate income, but in the short run speculation is possible and will have real effects.

FPI can have an indirect effect on output and investment through financial system operations, because incoming resources can be transferred by financial market transactions. Domestic resources that are not used by a company or government because they were obtained through FPI can be used by another agent, with a net expansionary effect. As these flows are financial, their transfer between allocations or draining through the foreign exchange market is likely, meaning that the first transaction is not the end of the economic effect of the flow. This can be illustrated by the mechanisms employed to avoid capital controls when they exist, as explained in detail by Edwards (1999) for Chile. Effects of FPI can go far beyond the specific flow, affecting the whole economy.

The relationship between the current account and the financial account in the balance of payments tends to be symmetrical over time. The difference of the balances in current account and financial account is the change in foreign exchange reserves. In the case of current account deficits without capital inflows, the foreign reserves

would be depleted. If there is systematic reserve accumulation, it will reduce external vulnerability in the case of a sudden stop of inflows. On the other hand, there is the fiscal opportunity cost of the reserves, as well as a financial cost, because of the need for sterilization of the inflows through public debt (Cavalcanti & Vonbun, 2008). The exchange rate regime and terms of trade also influence the probability of a balance of payments crisis.

The effect of capital inflows and growth can also be negative. For example, Krugman (1993) states that giving the international financial market a role as development generator is an overstatement. Arguments for this are the relatively low amount of capital flows in the world, given the differences in marginal productivity, the absence of convergence in production factors remunerations, and the weight that capital has on growth accounting.

The exchange rate is one of the main channels through which FPI has real effects, not only in the long run. Flows affect the supply and demand of foreign currency, leading to changes in the exchange rate in a floating exchange rate regime. A change in the exchange rate changes the relative cost of tradable goods between domestic and foreign production, fostering or inhibiting local production. If the exchange rate is fixed, interest rates could change instead of the exchange rate to avoid pressures for appreciation or depreciation of the currency. These changes in interest rates could have real effects through several transmission channels. In both cases—fixed or floating exchange rates— the level of capital mobility has to be considered. This is related to the discussion of the impossible trinity, meaning that a country is not able to simultaneously control exchange rate, have an autonomous monetary policy, and allow free capital mobility (see Aizenman, 2010).

FPI tends to be more volatile than FDI (Errunza, 2001). In the case of a crisis, FDI is reduced less intensely or its flows are not reverted, as happens with purely financial flows (Albuquerque, 2003). This volatility may be transferred to real variables. The effects can happen through sudden stops (Calvo, 2003) or current account reversals (Edwards, 2008). If a fast reversion of current account deficits is necessary, a reduction in output will happen. Even if there is not a collapse in the flows, there will be real effects, even if they are less intense.

The volatility of these flows can be amplified if the market overreacts to recent information, whether or not it is related to economic fundamentals (De Bondt & Thaler, 1990), or related to market sentiment (Baek, 2006). The beneficial effects of capital mobility in comparison to the costs of financial crises can justify temporary capital controls on inflows (Fischer, 1999).

3. Results

Between 1995 and 2009, the average yearly inflow of FPI in Brazil was $13.9 billion, in constant 2009 values, which is not negligible in macroeconomic terms. This amounts to an average 1.1% share of GDP. As these assets do not have a direct link to the physical productive structure, their trade is favored due to the existence of secondary markets for securities. This, in turn, means these flows are more likely to be volatile.

Historical data for the Brazilian economy show a strong inverse relationship between the current account balance and investment (measured by gross fixed capital formation), as can be seen in Figure 1. As investment is the way to assure productive capacity expansion, there is an indirect relationship between the current account and economic growth. This means it is interesting to know how current account deficits are financed and the consequences of the financial flows.

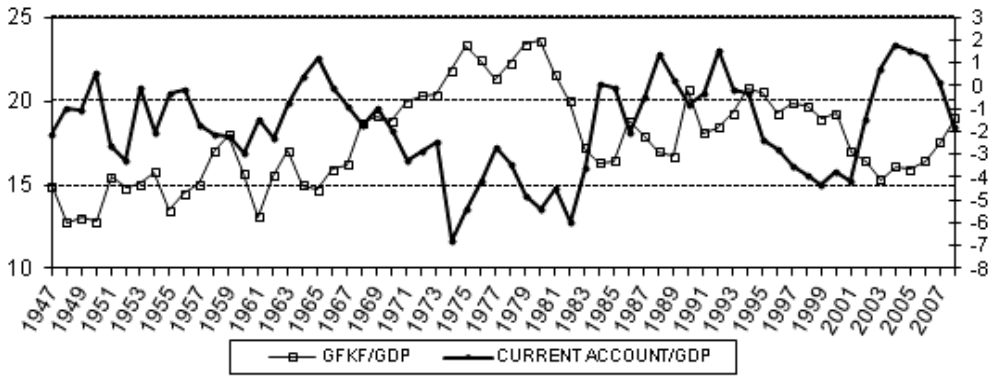

Figure 1. Brazil: Gross fixed capital formation (left axis) and current account (right axis) - % of GDP - 1947 to 2008 (Source: Ipeadata)

Flows employed in this article are the differences between inflows and outflows. Data are quarterly and values are converted into 2009 dollars using the U.S. CPI as the price index. DI is the net direct investment flow, the difference between FDI in Brazil and Brazilian direct investment abroad. PI is the net portfolio investment, or FPI minus Brazilian portfolio investment abroad. FPI is the foreign portfolio investment flow to Brazil, and is divided into FPIE (foreign portfolio investment in equity) and FPIFI (fixed income foreign portfolio investment). FPIE and FPIFI are again divided into assets traded in Brazil, FPIEC and FPIFIC, and outside the country, FPIEO and FPIFIO. Flow data, the real effective exchange rate (REER), and the monetary policy interest rate (called Selic) are from the Brazilian Central Bank time series repository (http://www.bcb.gov.br/en/#!/n/TIMESERIESEN). Seasonally adjusted data for GDP and investment (INV) are from the Ipeadata macroeconomic database (www.ipeadata.gov.br).

Table 1 shows that accumulated net portfolio investment (PI) in the Brazilian economy in the period from 1995 to 2009 amounted to $207 billion, and FPI amounted to $208 billion. This means that Brazilian portfolio investment abroad was only one billion dollars. A share of $114 billion of FPI was allocated in equity, and $94 billion were allocated in fixed income securities. For both equity and fixed income, the amount of inflows through securities traded in Brazil was higher than through securities traded abroad. This predominant role of inflow through locally traded securities is due to events in more recent years, especially since 2005 for stocks and 2006 for fixed income. This change is a reaction to the changes in the macroeconomic fundamentals in the period and, for fixed income, also due to the exemption of nonresidents of income taxes on the earnings of federal public debt securities since 2006.

Table 1. Descriptive statistics of the variables - 1995 to 2009

	PI[1]	FPI[1]	FPIE[1]	FPIEC[1]	FPIEO[1]	FPIFI[1]	FPIFIC[1]
Average	3.47	3.48	1.90	1.15	0.75	1.58	0.83
Maximum	27.39	23.44	19.79	15.05	4.74	11.58	9.38
Minimum	-16.17	-17.97	-8.85	-8.85	-0.21	-10.10	-7.98
Standard deviation	7.42	7.25	4.09	3.96	0.99	4.74	2.63
Coefficient of variation (standard deviation/average)	2.14	2.08	2.15	3.43	1.32	3.00	3.17
Quarters with positive flow	42	43	48	37	52	39	32
Accumulated flow	207	208	114	69	45	94	49
	FPIFIO[1]	DI[1]	GDP[2]	INV[2]	REER[3]	SELIC[4]	
Average	0.75	5.22	118.64	112.31	99.57	21.74	
Maximum	10.23	16.41	149.12	161.96	162.88	69.12	
Minimum	-11.38	-14.51	98.64	92.23	67.24	8.65	
Standard deviation	4.05	4.53	15.07	16.29	25.01	11.42	
Coefficient of variation (standard deviation/average)	5.38	0.87	0.13	0.15	0.25	0.53	
Quarters with positive flow	34	58					
Accumulated flow	45	311	48.4%	38.4%			

Note. [1]In billions of 2009 dollars; [2]Index value, average of 1995 = 100; [3]Index value, June 1995 = 100; [4]In percent per year.

For both equity and fixed income, the standard deviations of the aggregated flows are lower than the disaggregated ones. This means that flows related to trade in the country and outside the country are not perfectly correlated, generating a reduction in the volatility of the aggregated flow due to diversification of the origin of the flows.

FPI has positive and negative values, which is very rare for DI and FPIEO. Even if direct investment, as a rule, does not have negative flows, reductions are not an exception. This has to be considered for a growth strategy that relies on foreign finance.

The flow with the lowest standard deviation is FPIEO. This is explained because small values are quite common, due to the fact that it is not usual to Brazilian companies to issue depositary receipts (DRs, especially American Depositary Receipts, ADRs) as only primary issues are considered in the flow. As a consequence operations are concentrated in time. FPIEO is positive in almost every quarter and, when there are outflows, the volumes are low. This happens because only cancellation of DRs could generate negative values. This also explains the big changes in volumes, because an inflow depends on the decisions of specific companies to get listed in a stock exchange abroad. Positive and negative values in FPIE are due mainly to movements of resources to or from the

Brazilian market.

For fixed income, there is also growth in the volume of flows related to the local market, because of the attractiveness of the market and the income tax exemption. The FPIFIO is positive between 1995 and 2000 and predominantly negative from 2001, when a structural change happened to Brazilian external debt. The public sector paid a big portion of its outstanding securities. At first it happened because of the difficulty and high cost of the issuing of new debt, and later as a deliberate government policy of debt reduction.

Investment, measured by gross fixed capital formation in the Brazilian economy, stagnated up until the first half of the first decade of the 2000s, after which GDP had a more clear growth trend. Accumulated GDP growth between 1995 and 2009 was 48.4%, and 38.4% for investment, which means a yearly rate of 2.9% and 2.3%, respectively. The financial variables, the exchange rate and the Selic interest rate, have strong swings during the period, with effects on relative prices and expectations, both affecting the macroeconomic performance of the country.

As expected, the coefficient of variation, which is the ratio between standard deviation and average of a variable, is higher for portfolio investment than for DI. None of the disaggregated portfolio investment flows has a lower coefficient of variation than DI. The differences between flows are high. The highest coefficient of variation is of FPIFIO, and can be explained by the high values involved when these debt securities are issued, amortized or liquidated, as in the case of public debt. It is the case for most of public debt renegotiated in the first half of the 1990s and liquidated in the period here analyzed. FPIEO has the lowest coefficient of variation because negative values are absent or very low in this series, as delisting of depositary receipts is uncommon.

The coefficients of variation of the real variables GDP and INV are lower than the financial ones, reflecting the instability in the financial variables during the period, with crises coming not only from abroad, but also from within the economy and by domestic economic policy. The exchange rate became more variable since the adoption of the floating exchange regime in 1999. During the semi-fixed exchange rate regime of 1995-1999, the interest rate was used to manage the exchange rate. With the floating exchange rate regime, the interest rate is used to control inflation, while the exchange rate absorbs at least a part of the shocks to which the economy is subject.

Table 2 shows the correlation coefficients between the variables. There is a strong negative correlation between portfolio investment flows and exchange rate changes. These relationships are not statistically significant for FPIEO and FPIFIC. These results indicate the relevance of the relationship between flows and the exchange rate, with impact on real variables. This seems to be one of the main channels through which flows influence the real side of the economy. The absence of a significant correlation between the exchange rate and flows related to stocks traded abroad can be due to the above-discussed concentration of these operations, as only the first issue of the depositary receipt is registered in the balance of payments. For the case of FPIFIC, the result is possibly due to the concentration of the operations in the last four years of the analyzed period and low amounts before, while the exchange rate oscillates during the whole period. It is interesting to see that the correlation between DI and exchange rate changes is positive, but not statistically significant, so the variables seem contemporaneously independent.

Table 2. Correlation coefficients between the variables

	FPI	FPIE	FPIEC	FPIEO	FPIFI	FPIFIC
FPI	1					
FPIE	0.761*	1				
FPIEC	0.708*	0.971*	1			
FPIEO	0.075	-0.072	-0.308**	1		
FPIFI	0.888*	0.379*	0.324**	0.158	1	
FPIFIC	0.560*	0.395*	0.38*	-0.011	0.519*	1
FPIFIO	0.679*	0.189	0.134	0.191	0.835*	-0.036
DI	-0.055	-0.16	-0.222***	0.291**	0.034	-0.053
CINV[1]	0.432*	0.367*	0.321**	0.126	0.357*	0.448*
CGDP[1]	0.236***	0.267**	0.249**	0.024	0.147	0.321**
CREER[1]	-0.494*	-0.357*	-0.338*	-0.011	-0.453*	-0.194
SELIC	-0.055***	-0.155	-0.131	-0.069	0.032	-0.353*

	FPIFIO	DI	CINV[1]	CGDP[1]	CREER[1]	SELIC
FPIFIO	1					
DI	0.074	1				
CINV[1]	0.129	-0.131	1			
CGDP[1]	-0.034	-0.144	0.687*	1		
CREER[1]	-0.406*	0.16	-0.209	-0.208	1	
SELIC	0.264**	-0.13	-0.388*	-0.388*	0.113	1

Note. [1] C in front of the variable means its change in relation to the previous period; *, ** and ***: statistically significant at 1%, 5% and 10% levels, respectively.

The correlations between aggregate FPI flows (FPI, FPIE, and FPIFI) and DI are not statistically significant. This reinforces the possibility that FPI and DI are alternatives to diversify the origin of external financing.

Flows and real variables show interesting correlations. FPI has a positive correlation with investment that is significant at the 1% level. For the disaggregated flows, the positive correlations with investment are statistically significant for the flows traded in the country, but not for the ones traded abroad. This result is a consequence of the fact that trades in the country can also happen in secondary markets, allowing for all relevant information to be incorporated into trades and the resource flows. This does not happen in the flows related to trades abroad, where only primary markets operations are registered in the balance of payments. As the operations in primary markets depend on decisions of both the demand and supply sides, they can be avoided in moments in which market conditions are judged as unfavorable. The positive correlations between flows traded in the country and investment can be explained in two not excluding ways. On one hand, the current account deficits financed through the flows may be influenced by the demand for investment goods. On the other hand, the investment decisions and the decision of buying or selling fixed income and equity assets in the country may be influenced by the same expectations about the economy. This would mean that, beyond the macroeconomic fundamentals, the expectations about these fundamentals have an influence on both the flows and investment. For GDP, this relationship is not as strong because of the higher weight of domestic variables. The importance of investment in the ability of GDP to grow along time and for foreign portfolio investment shows that it is necessary to consider the real impact of financial flows when formulating and implementing economic policy.

As the correlation between economic variables is dynamic and has effects beyond the current period, especially in the case of real variables, production and investment decisions have effects over time. Because of the lagged effects, it is necessary to expand the analysis beyond correlation coefficients. This will be done through Granger causality tests, in which the null hypothesis is that a lagged independent variable does not improve the forecast of the dependent variable. The test verifies whether the independent variable anticipates (causes) the behavior of the dependent variable in statistical terms. If the null hypothesis is rejected, the past behavior of the independent variable is statistically significant for explaining the current behavior of the dependent variable. In other words, it is a test of time precedence. It has to be emphasized that Granger causality does not mean economic causation, but just that the independent variable helps to predict the future behavior of the dependent variable.

Table 3 shows statistically significant results of the tests at the 10% level. Tests were run with a lag of four quarters, in order to allow the unfolding of the effect of financial variables on real variables. A C before the name of the variable means it is the first difference of the variable.

Table 3. Granger Causality Tests - 1995Q1 2009Q4 correlation coefficients between the variables title

Null Hypothesis	Prob.
FPIE does not Granger cause CINV	0.0007
FPIE does not Granger cause CPIB	0.0002
SELIC does not Granger cause FPIE	0.0367
FPIEC does not Granger cause FPIEO	0.0018
FPIFIC does not Granger cause FPIEC	0.0192
FPIEC does not Granger cause FPIFIC	0.0002
FPIEC does not Granger cause CINV	0.0001
FPIEC does not Granger cause CGDP	0.0001
SELIC does not Granger cause FPIEC	0.0819
FPIEO does not Granger cause FPIFIC	0.0357
FPIEO does not Granger cause CREER	0.0636

FPIFI does not Granger cause DI	0.0332
FPIFI does not Granger cause CREER	0.0467
FPIFIC does not Granger cause CREER	0.0001
FPIFIO does not Granger cause DI	0.0088
FPIFIO does not Granger cause SELIC	0.0415
CREER does not Granger cause CINV	0.0744
SELIC does not Granger cause CGDP	0.0389
CGDP does not Granger cause SELIC	0.0475

One important point in the results shown in Table 3 is the low number of statistically significant results between all the possible tested combinations, which is evidence of the fast adjustment of the financial variables. As the financial variables have real effects, financial volatility could have an influence on real variables in the short run.

The aggregate FPIE flow and the FPIEC anticipate changes in both GDP and INV. This result reinforces the importance of expectations to explain financial equity flows and also output and investment in the Brazilian economy. As the return from equity and real investments depend on the future performance of the assets, both are driven by expectations. The absence of causality from changes in investment and GDP to the flows means that it is not the observed real variables that anticipate the behavior of the flows, but rather the expectations on the real variables. This result could also mean that the decisions about portfolio investment can react quickly, while the decisions behind GDP and investment changes take a while to show their effects in the national accounts. It is interesting that equity flows anticipate the behavior of the real variables, while the fixed income flows do not.

The transmission channel through the exchange rate shows up in the causality from the changes in REER to changes in INV, but not to changes in GDP. In this case, the contemporaneous relationship between the flows and the exchange rate that is shown in the correlation coefficients will have a lagged effect on changes in investment. This lag could be due to the time between the decision and its effect on output and income. It also could be due to the effect of the exchange rate on the relative cost of investment and expectations about the exchange rate.

The aggregate flow FPIFI and the disaggregate flows FPIFIC and FPIEO anticipate the behavior of the exchange rate. This could mean that depositary receipts issues are decided based on the exchange rate expectations. In the case of fixed income it probably is due to foreign investors trying to earn the difference between Brazilian and global interest rates. This last movement may amplify the appreciation of the local currency in times of high inflows of money.

The Selic interest rate anticipates the behavior of FPIE, because of the FPIEC flow. This may be due to partial adjustment of this flow to interest rates. The absence of Granger causality between the Selic rate and FPIFIC could mean that the reaction of the flow for fixed income traded in the country is faster than for stocks. The existence of causality from the Selic rate to FPIFIO may represent substitution between domestic or external debt, depending on the relative cost of each. This point could be the subject of further research. The role of the Selic rate on real variables is shown through GDP, but not through investment.

One interesting result is bi-causality between FPIEC and FPIFIC. The contemporaneous correlation between these flows is positive and statistically significant. Besides the differences between the securities behind these flows, the fact that both are traded in the country is important to explain their behavior. Probably equity and fixed income are subject to the same risk analysis, taking into account the economic fundamentals of the country, common to both classes of assets. It can also be influenced by movements not related to fundamentals, such as flight to quality events.

Given the relationship between flows and exchange rate, the instability of the flows could be transmitted to real variables, even if not related to economic fundamentals. As a consequence, flows have to be taken in account for economic policy design or for measures that could smooth flows and also exchange rate, investment, and GDP.

4. Conclusion

FPI flows have an important role in financing Brazil's current account deficits between 1995 and 1999 and for the international reserves accumulation since 2006. The reduction of external vulnerability through higher reserves and the existence of current account deficits show that the country relies on external financing in its macroeconomic management.

FPI is more volatile than DI; the standard deviation and coefficient of variation of the former are higher. The low correlation between DI and FPI may turn them in complementary forms of external finance, with consequences

for economic policy formulation and implementation. If the country uses resources from FPI flows, it is important to make local assets attractive to foreign investors through economic policy measures. These measures could make the flows less volatile, going back to the question of economic fundamentals, inflows, and the cost of these resources.

Even if the economy has steady economic fundamentals, it would not mean that flows will remain stable. On the other hand, flow instability may be related to instability in real variables such as investment and GDP. Bubbles and "herding effects" pose serious questions for policymakers, such as whether to impose controls on FPI flows, because of the instability that can be associated with flows even when fundamentals are unchanged. Some kind of controls on FPI inflows could be justified by the relationship between these flows and the exchange rate.

It seems that expectations are a very important channel to explain the behavior of flows and their relation with real variables. The impact of the exchange rate on the relative prices of the locally produced goods may generate changes in output and investment, and vice-versa, with expectations about future output and investment having an impact on financial flows and the exchange rate.

Acknowledgments

This article was done with support from CNPq, National Council for Scientific and Technological Development, Brazil, (Grant 310572/2015-0).

References

Aizenman, J. (2010). *The Impossible Trinity (aka The Policy Trilemma)*. UCSC Economics Department, Working paper series. Retrieved from https://escholarship.org/uc/item/9k29n6qn

Albuquerque, R. (2003). The Composition of International Capital Flows: Risk Sharing Through Foreign Direct Investment. *Journal of International Economics, 61*, 353-383. http://dx.doi.org/10.1016/S0022-1996(03)00013-8

Baek, I. M. (2006). Portfolio Investment Flows to Asia and Latin America: Pull, push or market sentiment? *Journal of Asian Economics, 17*, 363-373. http://dx.doi.org/10.1016/j.asieco.2006.02.007

Calvo, G. (2003). Explaining Sudden Stops, Growth Collapse and BOP Crises: The case of distortionary output taxes. *IMF Staff Papers, 50*, 1-20.

Cavalcanti, M. A. F. H., & Vonbun, C. (2008). Reservas Internacionais Ótimas para o Brasil: Uma análise simples de custo-benefício para o período 1999-2007. *Economia Aplicada, 12*(3), 463-498. http://dx.doi.org/10.1590/S1413-80502008000300006

De Bondt, W. F. M., & Thaler, R. H. (1990). Do Security Analysts Overreact? *American Economic Review, 80*(2), 52-57.

Demirgüç-Kunt, A., & Levine, R. (1996). Stock Market Development and Financial Intermediaries: Stylized Facts. *World Bank Economic Review, 10*, 291-321. http://dx.doi.org/10.1596/1813-9450-1462

Durham, J. B. (2004). Absorptive Capacity and the Effects of Foreign Direct Investment and Equity Foreign Portfolio Investment on Economic Growth. *European Economic Review, 48*, 285-306. http://dx.doi.org/10.1016/S0014-2921(02)00264-7

Edwards, S. (1999). How Effective are Capital Controls? *Journal of Economic Perspectives, 13*(4), 65-84. http://dx.doi.org/10.1257/jep.13.4.65

Edwards, S. (2008). Sequencing Reforms, Financial Globalization, and Macroeconomic Vulnerability. *Journal of the Japanese and International Economies, 23*(2), 131-148. http://dx.doi.org/10.1016/j.jjie.2008.09.004

Errunza, V. (2001). Foreign Portfolio Equity Investments, Financial Liberalization, and Economic Development. *Review of International Economics, 9*(4), 703-726. http://dx.doi.org/ 10.1111/1467-9396.00308

Fischer, S. (1999). On the Need for an International Lender of Last Resort. *Journal of Economic Perspectives, 13*(4), 85-104. http://dx.doi.org/10.1257/jep.13.4.85

Grabel, I. (2005). Taxation of International Private Capital Flows and Securities Transactions in Developing Countries: Do Public Finance Considerations Augment the Macroeconomic Dividends? *International Review of Applied Economics, 19*(4), 477-497. http://dx.doi.org/10.1080/02692170500213368

Hall, R. E., & Jones, C. I. (1999). Why Do Some Countries Produce So Much More Output Per Worker Than Others? *The Quarterly Journal of Economics, 114*(1), 83-116. http://dx.doi.org/10.1162/003355399555954

Henry, P. B. (2000). Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices.

Journal of Finance, LV(2), 529-564. http://dx.doi.org/10.1111/0022-1082.00219

Ipeadata. (n.d.). *Macroeconomic database.* Retrieved from http://www.ipeadata.gov.br

Krugman, P. (1993). International Finance and Economic Development. In A. Giovanni (Ed.), *Financial Development: Issues and Experience* (pp. 11-23). Cambridge University Press.

Levine, R., & Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *American Economic Review*, *88*(3), 537-558.

Lucas Jr, R. E. (1990). Why Doesn't Capital Flow from Rich to Poor Countries? *American Economic Review*, *80*(2), 92-96.

Merton, R. C. (1987). A Simple Model of Capital Market Equilibrium with Incomplete Information. *Journal of Finance, 42*(3), 483-510. http://dx.doi.org/10.1111/j.1540-6261.1987.tb04565.x

Mishkin, F. S. (2007). Is Financial Globalization Beneficial? *Journal of Money Credit and Banking, 39*(2-3), 259-294. http://dx.doi.org/10.1111/j.0022-2879.2007.00026.x

Ostry, J. D., Ghosh, A. R., Habermeier, K., Chamon, M., Qureshi, M. S., & Reinhardt, D. B. S. (2010). Capital Inflows: The role of controls. *IMF Staff Position Note*, 10/04.

Schularick, M., & Steger, T. M. (2010). Financial Integration, Investment, and Economic Growth: Evidence from Two Eras of Financial Globalization. *Review of Economics and Statistics, 92*(4), 756-768. http://dx.doi.org/10.1162/REST_a_00027

WEO Database. (2009). *International Monetary Fund*. Retrieved from http://www.imf.org/external/ns/cs.aspx?id=28

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).