A Panel Analysis of Foreign Portfolio Investment in Latin America from 2005 to 2014

Investimento em Carteira da América Latina de 2005 a 2014: uma análise utilizando dados em painel

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Resumo: O artigo analisa os fluxos de investimento externo em carteira para a América Latina no período 2005-2014. Fatores globais (push) e domésticos (pull) são utilizados como variáveis explicativas. São estimados modelos em painel para 12 países. Os resultados mostram que entre as variáveis globais o índice S&P500 e a taxa de juros dos Fed Funds são estatisticamente significantes para explicar os fluxos de investimento externo em carteira para os países latino-americanos. A participação do investimento no PIB e o índice MSCI do país de destino também são estatisticamente significantes. As expectativas parecem desempenhar um papel relevante para explicar os fluxos de investimento externo em carteira, dado que as variáveis mais importantes na explicação dos fluxos são influenciadas pelo comportamento futuro da economia.

Palavras-chave: Investimento externo em carteira; América Latina; Fluxos de capital

Abstract: The paper analyzes foreign portfolio investment (FPI) flows to Latin America in the period 2005-2014. Global (push) and domestic (pull) factors are employed as explanatory variables. Panel data models for 12 countries are estimated. Results show that among the global variables, the S&P500 index and Fed Funds rate are significant in explaining FPI flows to Latin American countries, as it is the investment as a share of GDP and the MSCI index of the host country. Expectations seem to play a major role in explaining FPI flows, as the most relevant variables are influenced by the future behavior of the economy.

Keywords: Foreign Portfolio Investment; Latin America; Capital Flows

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1. Introduction

This paper analyzes foreign portfolio investment (FPI) flows to Latin America from 2005 to 2014. FPI is an important part in the world's financial markets. The global stock of FPI went from 26 trillion dollars in 2005 to 48.8 trillion dollars in 2014. During the Global Financial Crisis the stock of FPI fell to 31 trillion dollars, down from the previous peak of 39.3 trillion dollars in 2007, but this value was surpassed as soon as 2012.

The focus of this paper is on Latin America. FPI flows to the Latin America and the Caribbean region fluctuate during the time covered in the analysis. The highest net inflow occurs in 2009, in the aftermath of the global financial crisis, mounting 53.7 billion dollars. The lowest amount is a net outflow of 18 billion dollars, in 2011.

It is expected that financial variables, like FPI flows, have a fast adjustment due to changes in economic fundamentals and expectations. In this sense, the turmoil in the World economy due to the global financial crisis in 2007 and even more in 2008 is an opportunity to evaluate the interplay between financial flows and other financial and fundamental variables in times of stress.

The real effects of foreign financial flows on the local economy may happen through various channels. One would be the availability of funds in the domestic financial system, because local lenders could obtain their funding abroad. Another channel could be through capital markets, because the presence of foreign investors means more potential investors in domestic companies, lowering the cost of capital (CLARK AND BERKO, 1997). The liberalization of the capital account is important to explain flows' behavior (HENRY, 2000). However, the effects of financial flows on economic growth in developing countries are not a settled issue (OBSTFELD, 2009). These real effects are an important reason to understand financial flows.

From the macroeconomic vantage point, financial flows, as a part of the broad financial account, have a close relation with the current account surplus or deficit, as the financial account mirrors the current account. In this sense, as current account and financial accounts are transactions with foreign agents, these transactions will also have impacts on the exchange rate.

Foreign capital flows have implications for economic policy, because the exchange rate is one of the most important prices in the economy, meaning that capital controls may be used to avoid undesired behavior in the exchange rate

(OSTRY *et al*., 2011). Dependence on FPI flows to finance current account deficits also means risks due to outflows of capital, especially in times of crises (GRIFFITH-JONES and OCAMPO, 2009; BRONER *et al*., 2013).

The usual approach to explain FPI flows is to split the explanatory variables between "pull" and "push" factors, where push factors are related to the global economy and pull factors are the variables of the host economy (FRATZCHER, 2011; HOTI, 2004). The main push factors are the world's economic activity, the interest rate or a liquidity measure, and a capital market variable (KOEPKE, 2015). Pull factors include output growth, capital market returns, and country risk (KOEPKE, 2015). Country risk, like the EMBI+, can react do the global scenario and to domestic factors (HILSCHER e NOSBUSCH, 2010; OZATAY, OZMEN and SAHINBEYOGLU, 2009; SIKLOS, 2011).

The main contribution of this paper to is to shed light on the effects of pull and push factors on FPI flows to Latin American countries. Geography is a main determinant of financial flows, as shown by Portes and Rey (2005). Due to data availability the countries of interest on are the biggest economies of the region.

The paper is organized as follows: after this introduction there is a short literature review; section 3 describes data and results, and section 4 concludes.

2. Literature review

There is a broad and growing literature on FPI flows. Calvo *et al*. (1993) and Fernandez-Arias (1996) are seminal papers explaining FPI, employing the push-pull approach. These papers find that global factors are the most important determinants of flows. This result is also present in Forbes and Warnock (2012), Canela *et al*. (2006), and Koepke (2015), among others.

There is a relationship between FPI flows, country risk, and exchange rate (VARGAS and VARELA, 2008). Lower country risk fosters capital inflows and causes an appreciation of the local currency. The relation between country risk and flows for the Brazilian economy is discussed in Vieira and Holland (2003), who find a strong relationship between the two variables.

Portfolio rebalancing is a main issue in determining flows. On one hand there is the literature on "flight to quality." As shown in Gubareva and Borges (2016), the investors rebalancing their portfolios, leaving riskier assets and investing in safer assets, have impacts on asset prices and volatility. Brunnermeier and Pedersen (2009) show that flight to quality could also mean

flight to liquidity. This means that the ease of selling assets and getting access to funds will influence on the behavior of markets.

The monetary policy of the FED affects FPI flows to emerging markets. Lower interest rates in the United States "push" money into emerging markets (FERNANDEZ ARIAS, 1996). The global flows of FPI are influenced by the interest in central economies, even to developed ones, but the substitutability between outflows and inflows is lower in developing economies (BLUEDORN *et al*., 2013).

On the other hand, it could also be that expectations play an important role to explain flows, as shown in Koepke (2018). Garg and Dua (2014), analyzing portfolio flows to India, find that push and pull factors influence flows. Specifically, domestic growth and the difference between domestic and foreign interest rates have a significant positive impact on these flows. However, the returns of stock markets in other emerging countries have a negative relationship with flows to India, while there is a positive relationship with domestic stock market returns. They also find the expected negative relation with country risk.

The importance of a stable macroeconomic environment for foreign portfolio investors is found by Waqas *et al*. (2015) using monthly data for four Asian countries. The volatility of foreign portfolio flows is lower when the interest rate is high, the currency depreciates, inflation is low, and GDP growth is high. There is also a positive relationship between foreign portfolio investment and foreign direct investment.

The relationship between GDP growth and FPI is also found by Ahmad *et al*. (2015) for India and China, using Granger causality tests, but the effect is indirect, because the causality is detected between growth and FDI, and FDI has a positive correlation with FPI.

3. Data and results

The financial flows analyzed are FPI liabilities. This is defined as a gross flow, reflecting flows generated only by foreign investors, as defined by Broner *et al*. (2013). Gross and net flows will behave differently because foreign and domestic investors react to different variables. Also, for Latin American countries the FPI inflow is more relevant than the investment of residents of these countries abroad, given the use foreign capital to finance current account deficits.

Data employed are described in Table 1, stating each one as "push" or "pull". The S&P500 index and the Fed Funds Rate are global factors, the EMBI spread reflects the global and the domestic environments, and the remaining variables are domestic factors. The last column shows the expected result for the variable on FPI flows.

Table 1 – Data series description

Variable	Description	Source	Push/Pull	Expected result
FPI	Portfolio Investment, Liabilities, inflows minus outflows, as percentage of GDP	IFS/IMF	-	-
LSP500	Natural logarithms of the S&P500 index	GFSR/IMF	Push	+
FF	Fed Funds Rate, in percent	FRED, Federal Reserve of St. Louis	Push	-
EMBI	Spread of the EMBI index, in basis points	GFSR/IMF	Push and pull	-
LMSCI	Natural logarithms of the MSCI stock index, 2005 = 100	MSCI/JPMorgan		+
LGDP	Natural logarithms of the GDP index, 2005 = 100	IFS/IMF	Pull	+
INV	Investment as percentage of GDP	IFS/IMF	Pull	+
FISCSURP	Primary Fiscal Surplus, as percentage of GDP	IFS/IMF	Pull	+
CA	Current account surplus, as percentage of GDP	IFS/IMF	Pull	+
LREER	Natural logarithms of the real effective exchange rate index, 2005 = 100	World Bank	Pull	+-

The Latin American countries in the sample are the ones for which JP Morgan calculates the EMBI: Argentina, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Mexico, Panama, Peru, Uruguay, and Venezuela. Estimations are also carried out with a subsample for the countries for which the MSCI stock exchange index is available: Argentina, Brazil, Chile, Colombia, Mexico, and Peru.

Table 2 shows the results of the panel estimation for the twelve countries sample including all the explanatory variables. The test for redundant fixed effects fails to reject the null hypothesis that the fixed effect model is adequate. There is no autocorrelation in the residuals of the regression. The global factors related to stock markets and interest rates are statistically significant. There is a positive relationship between the S&P500 index and FPI inflows to the countries. One explanation for this result could be the effect of rebalancing portfolios, meaning that investors transfer resources to other markets when one generates positive returns. Another possibility is that expectations that influence FPI flows and the returns of the S&P500 index are the same, generating a positive relationship between these variables.

Table 2 – Panel Data Regression Results – Dependent variable FPI – 2005-2014 – 12 Cross sections 10 periods

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.018258	0.199809	0.091378	0.9274
LSP500	0.045399	0.013722	3.308567	0.0013
EMBI	1.71E-09	3.77E-06	0.000453	0.9996
FF	-0.003102	0.001246	-2.488429	0.0145
LGDP	-0.078379	0.046603	-1.681817	0.0957
INV	0.276085	0.134357	2.054864	0.0425
FISCSURP	-0.029992	0.100126	-0.299542	0.7651
CA	-0.003832	0.123764	-0.030960	0.9754
LREER	-0.002259	0.015019	-0.150400	0.8808
R-squared: 0.385949		Adjusted R-squared: 0.269279		
S.E. of regression: 0.017712		Durbin-Watson stat: 1.966013		
F-statistic: 3.308048		Prob(F-statistic): 0.000052		

Note: White cross-section standard errors and covariance, degrees of freedom corrected; cross-sction fixed effects.

The negative relationship between the Fed Funds Rate and FPI flows can be explained by the opportunity cost and risk-return of different assets in the global market (BLUEDORN *et al*., 2013). As interest rates in the US get higher, the cost of investing in riskier securities in Latin American countries also gets higher, resulting that investments in US assets get more attractive in relative terms.

Of the local variables, investment as a share of GDP has a statistically positive relation with FPI flows. As FPI and investment are both related to returns to be obtained in the future, the channel behind this positive relation are the expectations about the outcomes in the economy. This is an important feature

for the evaluation of the economic prospects of an economy, as FPI flows could function as a predictor of current investment in the economy, given that there is no real time measurement of investment.

GDP is marginally significant in explaining FPI, but the negative sign of the coefficient is not straightforward. This topic needs further investigation, but it is possible that current GDP was accounted for in previous FPI flows, through expectations, and these expectations were overestimated and are contemporaneously adjusted. This could be related to the well-established overreaction that occurs in financial markets, of which FPI is part (DE BONDT and THALER, 1985).

In order to get a parsimonious model, the general-to-specific methodology (HENDRY, 2001) was followed, retaining only the significant variables. Results are shown in Table 3. The coefficients are almost the same as in the first model. The redundant fixed effects test again accepts the adequacy of the cross-section fixed effects. There is no autocorrelation in the residuals. The only relevant difference is the significance at the 5% level of the GDP as an explanatory variable.

Table 3 – Panel Data Regression Results – Dependent variable FPI – 2005-2014 – 12 Cross sections 10 periods

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.001795	0.113746	0.015777	0.9874
LSP500	0.045709	0.010339	4.421157	0.0000
FF	-0.003331	0.001329	-2.506154	0.0138
LGDP	-0.077508	0.036917	-2.099506	0.0382
INV	0.275486	0.136906	2.012227	0.0468
R-squared: 0.385205		Adjusted R-squared: 0.296533		
S.E. of regression: 0.017378		Durbin-Watson stat: 1.958002		
F-statistic: 4.344138		Prob(F-statistic): 0.000003		

Note: White cross-section standard errors and covariance, degrees of freedom corrected; cross-sction fixed effects.

Table 4 shows the results for the estimation of the model including the MSCI index of the host country as an explanatory variable. The sample is reduced to the six countries for which the index is available. The redundant fixed effects test rejected the cross-section fixed effects adequacy. As there are not enough data to test for the random effects, the model is estimated with no effects. Because of this restriction the results shall be interpreted cautiously.

Table 4 – Panel Data Regression Results – Dependent variable FPI – 2005-2014 – 6 Cross sections 10 periods

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.150688	0.084071	-1.792396	0.0790
LSP500	0.031340	0.007837	3.998919	0.0002
FF	-0.003610	0.002291	-1.575897	0.1212
EMBI	-2.49E-05	5.49E-06	-4.526004	0.0000
LMSCI	-0.013798	0.012726	-1.084233	0.2834
INV	0.191698	0.070281	2.727595	0.0087
FISCSURP	-0.114375	0.170906	-0.669229	0.5064
CA	0.110787	0.144874	0.764714	0.4480
LREER	-0.003095	0.009165	-0.337655	0.7370
R-squared: 0.498310		Adjusted R-squared: 0.419613		
S.E. of regression: 0.013994		Durbin-Watson stat: 1.784888		
F-statistic: 6.332044		Prob(F-statistic): 0.000011		

Note: White cross-section standard errors and covariance, degrees of freedom corrected.

The positive relationship between the S&P500 index and investment and FPI flows is again observed. However, the negative relation between Fed Fund rates and FPI is not statistically significant. On the other hand, the EMBI spread is now statistically significant, with the expected negative sign, meaning that a higher measured risk is related to lower FPI flows. The MSCI index included in this estimation was not statistically significant. These results could mean that in the countries with more developed stock markets, for which the MSCI index is calculated, the FPI is more sensitive to risk (as measured by the EMBI spread). This can be influenced by the possibility of entering or leaving the countries with more developed financial markets is more feasible given the higher liquidity in these markets.

The results following the general-to-specific methodology, shown in Table 5, have some interesting differences in comparison to the broad model. The estimation is carried out without fixed or random cross-section effects. Results for the S&P500 index, EMBI spread, and investment have the same sign and similar magnitudes. The Fed Funds rate is statistically significant in the parsimonious model, with a negative coefficient. The MSCI index also turned significant in the parsimonious model, with a negative sign. This can be related to portfolio rebalancing behavior by foreign investors, buying (higher FPI inflow) in years in which the local stock market falls and selling (FPI outflow or lower inflow) in years in which the local stock market index is higher.

Table 5 – Panel Data Regression Results – Dependent variable FPI – 2005-2014 – 6 Cross sections 10 periods

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.152764	0.050823	-3.005797	0.0040
LSP500	0.034792	0.004404	7.900879	0.0000
FF	-0.004547	0.001620	-2.807333	0.0069
EMBI	-2.33E-05	4.30E-06	-5.419495	0.0000
LMSCI	-0.019860	0.009567	-2.075790	0.0427
INV	0.153204	0.057400	2.669042	0.0100
R-squared: 0.482162		Adjusted R-squared: 0.434214		
S.E. of regression: 0.013817		Durbin-Watson stat: 1.665233		
F-statistic: 10.05593		Prob(F-statistic): 0.000001		

Note: White cross-section standard errors and covariance, degrees of freedom corrected

Comparing the results for the broader sample and the more restricted sample that includes the countries with the MSCI index, the global (push) effects of the stock market index and interest rates show consistent results: a positive relationship between FPI flows and the stock market and a negative relationship between FPI flows and the interest rate. In both samples, the only significant local macroeconomic variable is investment as a share of GDP, showing the importance of expectations for the FPI flows.

4. Conclusion

The results in this paper show that global variables (push factors) are relevant to explain FPI flows to Latin American countries in the period of analysis. As a consequence, the feasibility of relying on FPI to finance current account deficits as part of a growth strategy will be influenced by world economic and financial conditions.

Investment as a share of GDP is the only the local macroeconomic variable that was found to be statistically significant. As this variable is related to expected returns of investment, the relation with FPI is interesting because it shows that one of the main drivers of these financial flows is related to the expected macroeconomic outcome in the host countries.

The local financial market seems to matter to FPI, as there is a positive relationship between FPI and the MSCI stock index of the countries. This, again, supports the role of expectations on flows, as stock prices are a function of future returns. Risk is also important as an explanatory variable, at least for those countries with more developed financial markets.

Further research could explicitly test the effects of expectations, including survey results as the measure of expectations related to macroeconomic variables. This could shed light on the transmission channels among financial flows, expectations and macroeconomic fundamentals.

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