External Vulnerability and Financial Fragility in BRICS Countries: Non-Conventional Indicators for a Comparative Analysis[*]

Eliane Cristina de Araujo, Márcio Silva de Araujo and Miguel Antonio Pinho Bruno

Abstract: This article aims to discuss the possible use of other indicators of external vulnerability in addition to traditional ones, showing indications of financial fragility in the international insertion of the economies of emerging countries, specifically the so-called BRICS. The analysis presented for the BRICS (Brazil, Russia, India, China and South Africa) was limited to identifying foreign currency flows, leading to an analysis that can lead to conclusions regarding the greater or lesser degree of exposure of these economies to fluctuation in financing flows. In principle, if the accumulation of reserves is originated using third-party resources, in addition to representing a cost (particularly for countries with much higher domestic than foreign interest rates), their ability to maintain that liquidity inventory is not equal for all BRICS countries. As seen under this aspect, China and Russia seem to have greater autonomy in managing their reserves than the BIS (Brazil, India, and South Africa) countries.

Keywords: BRICS, external vulnerability, international reserves, financing flows

1. Introduction

The concept of external vulnerability in an economy that does not issue internationally accepted currency can be understood under the perspective of the accounting of its foreign transactions, in the sense that the use of external aggregates can bring the financial component into the analysis. For instance, whenever deficit-related imbalances require a *liquidity cushion*, the availability of foreign currency can be a fundamental constraint to the long-term growth rate of these economies, but is the manner in which this cushion is established important? This work in centered on that approach, identifying how the accumulation of reserves has taken place in BRICS countries.

The theoretical inspiration for this approach comes from the balance of payments constrained growth literature. Under that focus, the availability of external financing can be a fundamental constraint to the long-term expansion of economic activity, whether by emphasizing business transactions, as in Thirlwall (1979), or by contemplating capital flows, interest payments and foreign debt accumulation, as developed in theoretical contributions after the original version. When analyzing a set of external vulnerability indications for certain emerging economies, a significant improvement is seen in the most common indicators, such as those associated with international reserves. However, after the 2008 crisis and its developments, evidence emerged that there is room for other indicators that identify vulnerabilities in the external sector of these economies. The need to devise new vulnerability indicators is motivated not only by the intensity of the aforementioned crisis in developed countries, but also by the dependency of some

---

[*] The opinions expressed herein by the authors do not represent the viewpoint of the institutions to which they are affiliated.

emerging economies with regard to their international insertion. Thus, the intensity of short-term financial flows, the exchange rate and the level of insertion of these economies in world markets, whether more or less intense in high added-value products, can indicate their degree of vulnerability to international cycles and crises.

This article then aims to discuss the possible use of other indicators of external vulnerability in addition to traditional ones, showing indications of financial fragility in the international insertion of the economies of emerging countries, specifically the so-called BRICS.[1]

2. External vulnerability indicators

Constraints in the ability of emerging economies to reach more adequate levels in the supply of goods and services can be linked to the international insertion of these economies.[2] In other words, the growth level of a given economy would be limited by its ability to support the payment of its external accounts. Thus, even though a significant share of the population is excluded from the consumer market in some economies – which could be viewed as potentially stimulating market for investments – the path that would allow this inclusion would not be sustainable in the long run.

This counterpoint helps to underline the idea that the concept of external vulnerability is relevant when inserted in a context of economic growth. Or, that the concepts of vulnerability and external constraints can be seen as linked to economic planning, with emphasis on the growing supply of goods and services for a given society. The form of international insertion of that economy – more or less dependent on the importation of higher added-value goods and services – can lead it to demand higher levels of external financing. Under that logic, identifying external vulnerability indicators would have to include relevant variables that not only contemplate real transactions associated mainly with current account flows, but also financial transactions that incorporate inventory figures of those economies. More traditional macroeconomic indicators do not include the financial aspect of international economic relations in a more integrated fashion. Simpler ratios, such as Debt/GDP or Debt/Trade balance only scratch this financial surface, by incorporating only one of the items of the external liability position, without identifying other investment international position components.[3]

In order to better understand how real and financial aggregates work, the net borrowing requirement (BR) is used as a divider between real and financial transactions, as indicated by national accounts (UN, 1993).[4] In addition to balance of payments (BP) accounting, one can also consider inventory accounting, provided

---

[1] The concept of financial fragility herein is linked to the approach by Minsky (1986). The pattern of international insertion of an economy necessarily has positive and negative impacts on financial fragility. The concepts of external vulnerability and financial fragility, although different, have become necessarily interdependent due to the degree of commercial and financial liberalization – particularly in economies that were reinserted in the international context under global financial markets. By aiming to identify the nature of the flows that make up international reserves, this work takes a step in constructing indicators associated with financial fragility.

[2] Immediate references are Thirlwall (1979). Thirlwall & Hussain (1982) and Barbosa Filho (2001).

[3] Feijó et al (2008) presents in chapter 10 a description of the most common economic indicators and their use by some economic agents.

[4] In general,net BR identifies how much an agent has saved or had to borrow over a period of time. Net BR can be identified for different institutional sectors of an economy. In the case of the foreign sector, the basic reference is the balance of payments, but adopting as main balance not the variation in international reserves, but the sum of the balance of current accounts and the capital account. This approach is presented in detail in Feijóet al (2008), chapter 9.

by the statistics on international investment position (IIP). This approach makes it possible to construct indicators that can be consistently linked to the real and financial flows of an economy.[5] However, most aggregate flows of BP do not yet allow the immediate identification of the origin – real or financial – or certain accrued inventories, such as international reserves. To that end, it is necessary to treat this BP statistic. The first problem is how to separate the flows resulting from real transactions from merely financial ones. To formalize that problem, identities are defined based on information published on the BP, using net BR as reference.

The sought aggregate is the net foreign currency flow of the financial account (NFCFFA). More intuitively, if all real transactions of the BP impacted only monetary items (reserve assets, currency and deposits) on the financial side, the NFCFFA would be calculated directly by only deducting the net BR from the total foreign currency flow (TFCF), following adjustments in signal and in errors and omissions. In other words, in case all real-nature operations were offset only with monetary instruments, NFCFFA would be obtained immediately. However, the financing of exports, for instance, is a real piece of data that cannot be disregarded. Thus, it and other financial instruments that are offset by real accounts (OIFCR) must be considered.[6]

Constructing indicators with foreign currency flow can therefore make use not only of the entire foreign currency flow, but also consider the share corresponding to the specific nature of that flow. The first versions of the constrained balance of payments approach did not contemplate the dynamic below the net BR line, clearing that balance. In other terms, they do not contemplate stable trajectories with unbalanced real transactions, with net BR other than zero. However, when the analysis model adopts the hypothesis of Moreno-Brid (1998-1999),[7] there is a clear correspondence between the net BR obtained by identifying the balance of payments and incorporating capital flows (F) as a mechanism to compensate real external imbalances.

When considering the payment of interest and external capital flow, new analysis parameters are sought to make "Thirwall's law"[8] more flexible. In the approach of this text, aggregate F can be understood as the net BR. On one hand, opening this balance into items of the financial accounts makes it possible to identify other financial instruments in addition to foreign currency. On the other hand, identifying the origin of this foreign currency, whether real or financial, can provide other types of indicators for the analysis of BP sustainability or external vulnerability of an economy. The next item analyzes this aspect for BRICS countries.

3. External vulnerability in BRICS countries

The term BRIC was created by Jim O´Neill (2001), a Goldman Sachs economist, in the article "*Building Better Global Economic Brics*" and refers to the four main emerging countries: Brazil, Russia, India and

---

[5] See inFeijó et al (2008), chapter 9.

[6] This statistical treatment is developed initially in Araujo & Forno (2008) and later applied in Araujo, Araujo & Bruno (2010).

[7] It regards a stable ratio between net exports and income as a relevant constraint for BP in small economies, by assuming it to be a sufficient condition for a stable ratio between foreign debt and income. Barbosa Filho (2001) shows that, indeed, this is only a necessary condition for stable debt-income ratio in case interest payment is separated from nonfactor importation of good and services.

[8] It is a simple ratio that indicates the growth rate an economy can reach without degrading its balance of payments.

China.[9] The term fell into favor with the media and those countries came to receive even greater attention by some economic agents. Goldman Sachs published two more works: "*Dreaming with BRICs: The Path to 2050*" (Wilson and Purushothaman, 2003) and "*Brics and Beyond*" (Goldman Sachs, 2007). Later, this group of countries formalized as a forum to discuss common interest themes. In 2011, at the 3rd Summit, South Africa was added to the newly named BRICS.

A central concern in this approach is to identify how the different forms of international insertion of BRICS countries fit their patterns of financing and how this can affect their future growth trajectory. In a global economy, in which financial inflows and outflows can be linked to international economic crises, identifying financing patterns translates into how economies can resist and react to these events. In this characterization, countries that are more dependent on external financing would be more vulnerable to drastic changes in international financial flows.

3.1. Nature of international reserves

The accrual of international reserves is usually justified by the need to maintain a liquidity cushion that allows the country to have liquid assets for use in times of greater instability in its external accounts. This accrual of reserves occurs through operations of the central banks and national treasuries, both in the internal market – through operations in the domestic exchange market – and the foreign currency exchange market – through public offerings of sovereign bonds, for instance. The manner in which this occurs in Brazil, with the relevant costs and other aspects, was explored in Araujo, Araujo and Bruno (2010). The analysis presented in an exploratory form in this work aims to expand this approach, which identifies the nature of international reserves, to the other BRICS countries.

To allow a more precise analysis of these standards, this text works with balance of payment (BP) aggregates published by the IMF and interpreted according to domestic accounting. Identifying the nature of international reserves uses as proxy the real and financial foreign currency flows identified in the previous item, accumulating them over a given period. Indeed, the position in reserves of countries reflects the accumulation of reserves over time, with possible alterations due to price changes or other changes in volume that do comprise the BP.[10] When we analyze the data on the items described above for BRICS countries, some observations can be inferred. The figures that accompany this text feature annual series for these countries aim to specify the differences in their reserve financing profiles.

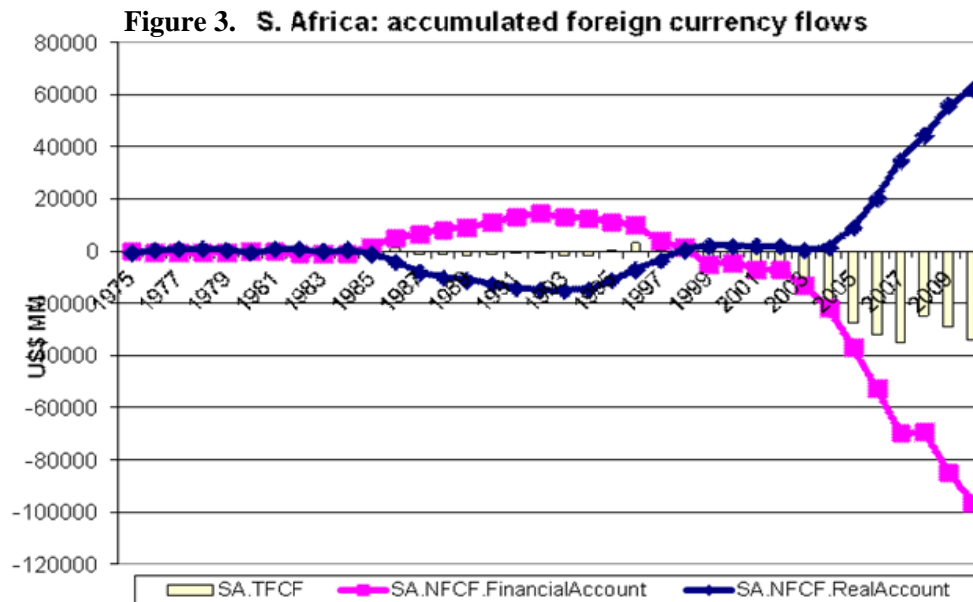## 3.2. Countries with fully financed reserves

This subgroup of BRICS countries that show similar behavior in the process of formation of their international reserves can be called BIS. From the start of the historical series, Brazil and India (figures 1 and 2) feature an inflow of financial-nature foreign currency (negative sign) and an outflow of real-nature foreign currency (positive sign). The final balance, the accrued TFCF, is reflected in the position of international reserves and currency and deposits, which include the deposits made by Brazil financial institutions abroad. That is, this accrued balance shows that the foreign currency that impacts international reserves has a financial nature. In other words, they are financed or borrowed positions.

---

[9] The term BRIC is a clear play on words with the word *brick*.

[10] For a more detailed description of how foreign sector inventory and flow statisticsare constructed, see Feijó et al (2008), chapter 9.

Figure 1. Brazil: accumulated foreign currency flows

**Figure 2. India: accumulated foreign currency flows**
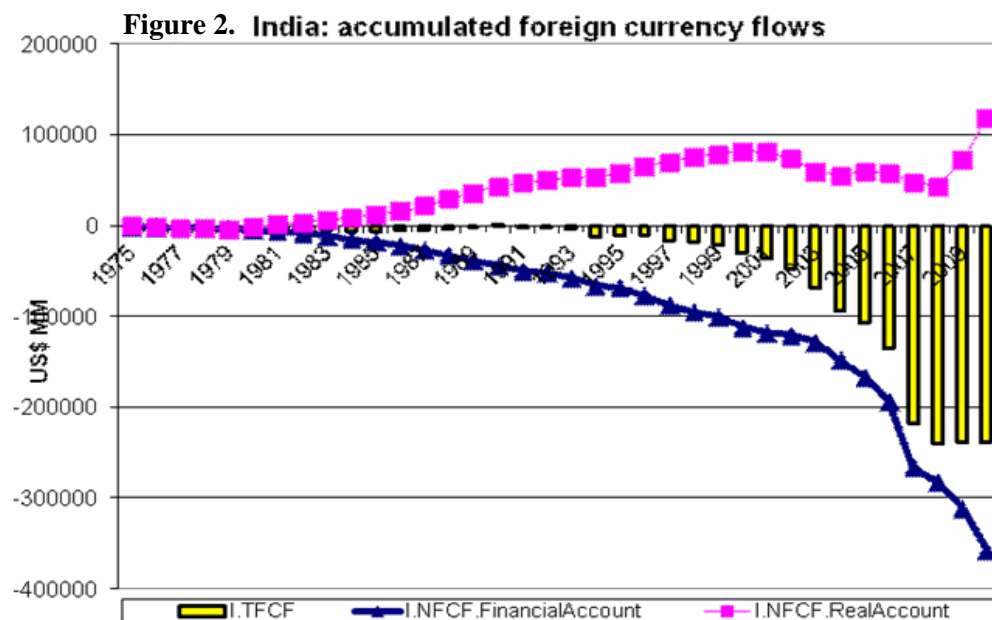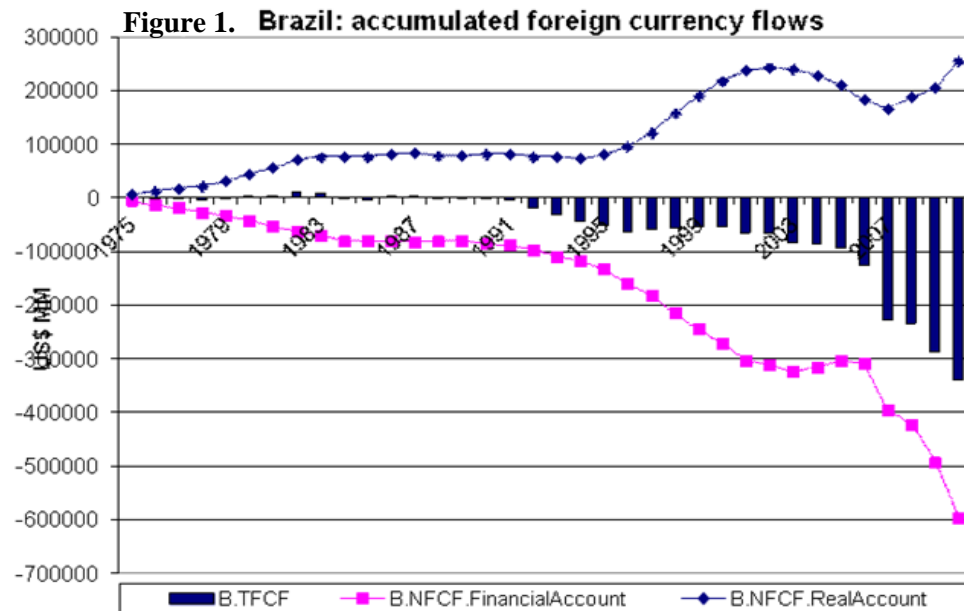
The case of South Africa (figure 3) differs from Brazil and India only because it featured a different behavior during a 14-year period (1985-1998). During those years, the inflow of foreign currency from real transactions offset the outflow through financial accounts, resulting in a balance that did not allow the accumulation of foreign currency to create significant reserves. This was during a period of embargos imposed on South Africa due to the apartheid regime adopted by that country, hindering its process of integration into the international financial system. A reversal in this pattern occurred starting in 1999, with the stabilization of the new democratic regime in that country. From then on, there was an accumulation of reserves, in the pattern already seen for Brazil and India.

Figure 3. S. Africa: accumulated foreign currency flows

3.3. Countries with their own or partially financed reserves

The other two countries in the BRICS – Russia and China (figures 4 and 5) – show a different pattern of foreign currency accumulation. Although the Berlin Wall fell in 1989, data for Russia are only available starting in 1994. With the exception of the period between 1997 and 1999, the accrued foreign currency balance is originated basically from real transactions. That is, international reserves are formed as a result of operations above the needed line of financing. China differs in the role played by the financial-based flow over time. From 1982, at the start of the historical series, until 1999, this type of flow represented the totality of accumulated foreign currency in that country. From then on, the flow from real transactions obtained a larger share, surpassing the amounts from financial origin in 2005 and reaching almost ¾ of the accumulated total of US$ 3.2 trillion in 2011. That is, Russia and China obtained the largest share of their accumulated resources in international reserves due to real transactions with the rest of the world.

Figure 4. Russia: accumulated foreign currency flows

Figure 5. China: accumulated foreign currency flows
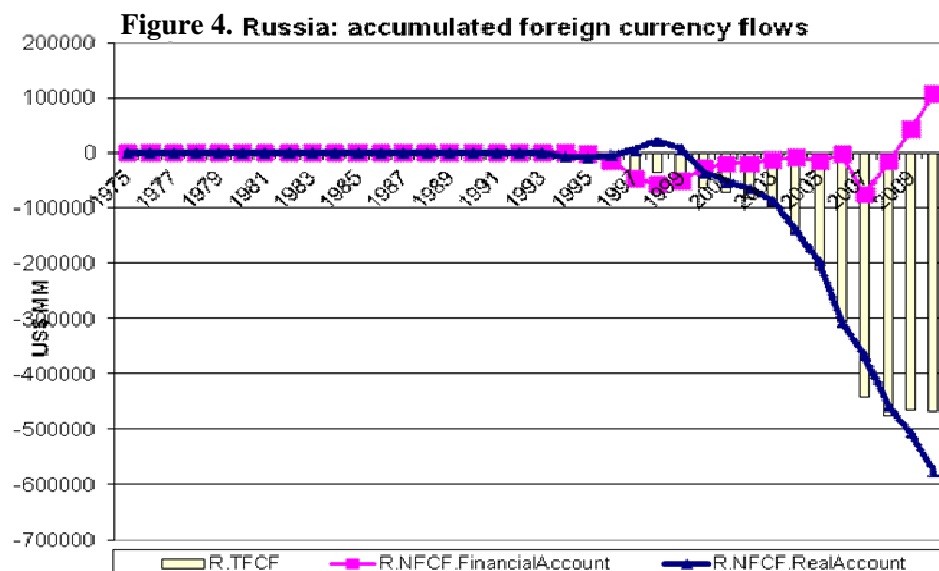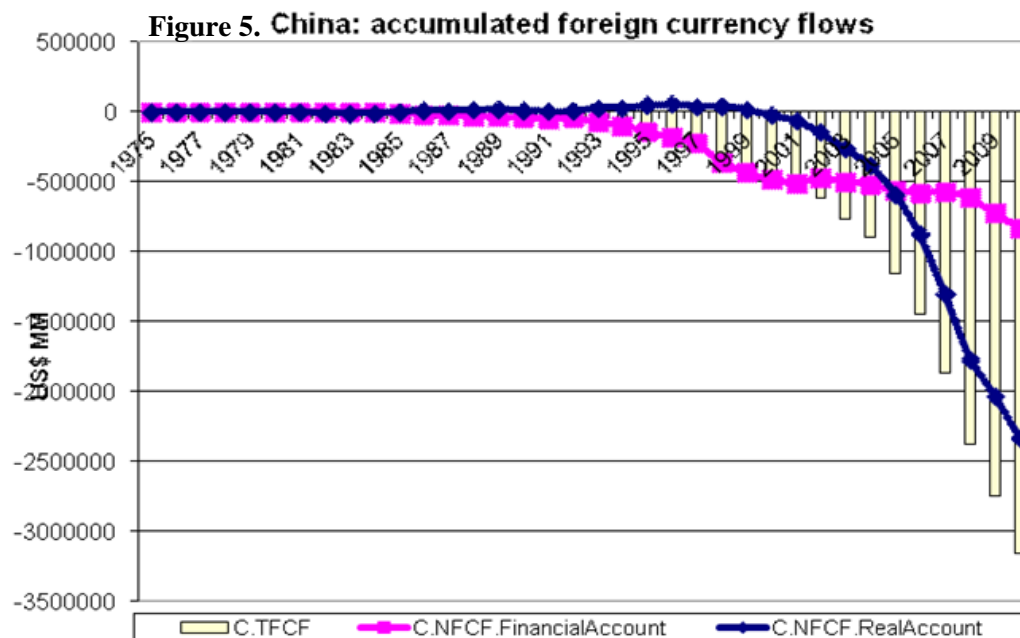
4. Final considerations

The incorporation of the theoretical focus presented by the literature of financial fragility and external vulnerability to construct indicators, with the formulation of macro financial indicators, seems to indicate an advantageous path to follow. The search to incorporate the financial account of the BP and the inventory statistic presented by the international investment position allows not only the consistent inclusion of external financial flows, but also the identification of its origins, whether above or below the line of financing need. The possible calculation of gains and losses due to changes in asset price can also allow an analysis consistent with the inventory-flow approach.

The analysis presented for the BRICS was limited to identifying foreign currency flows, leading to an analysis that can lead to conclusions regarding the greater or lesser degree of exposure of these economies to fluctuation in financing flows. In principle, if the accumulation of reserves is originated using third-party resources, in addition to representing a cost (particularly for countries with much higher domestic than foreign interest rates), their ability to maintain that liquidity inventory is not equal for all BRICS countries. As seen under this aspect, China and Russia seem to have greater autonomy in managing their reserves than BIS countries. More details on the indicators, from this type of approach, can make it possible to verify this hypothesis more assertively.

References

Araujo, M. S. e Forno, H. D. (2008). Evolução do perfil de financiamento externo do Brasil após o Plano Real: o uso da estatística de contrato de câmbio como estimador do fluxo de divisas. *mimeo*.

Araujo, M. S., E. C. Araujo and M. A. P. Bruno (2010). Fluxo de Divisas, Reservas Internacionais e Determinação da Taxa de Câmbio no Brasil: Novas Evidências para o Período 2003-2009. *III Encontro Internacional da Associação Keynesiana Brasileira*, São Paulo.

Barbosa-Filho, N. H. (2001). The balance-of-payments-constraint: From balanced trade to sustainable debt. *Banca Nazionaledel Lavoro*, 219 (December), p381-400.

Feijó, C. A. V. C., E. Valente., F. C. G. C. Lima., M. S. Araujo. and P. G. M. Carvalho (2008). *Para Entender a Conjuntura Econômica*, 1ª ed., Barueri, Ed. Manole.

Goldman, Sachs (2007). *Brics and Beyond*, p271.

Moreno-Brid, J. C. (1998-1999). On capital flows and the balance-of-payments-constrained growth model. *Journal of Post Keynesian Economics*, 21(Winter), p283-298.

Minsky, H. P. (1986). *Stabilizing an Unstable Economy*, Yale University Press, p353.

O´Neill, Jim (2001). Building Better Global Economic BRICS. *Global Economics Paper*, No. 66, November 30.

UN (1993). *System of National Accounts*, EU, IMF, OECD, UN, BIRD.

Thirlwall, A. P. (1979). The balance of payments constraint as an explanation of international growth rates differences. *Banca Nazionaledel Lavoro Quarterly Review*, 128, p45–53.

Thirlwall, A. P. and M. Nureldin Hussain (1982). The balance of payments constraint, capital flows and growth rate differences between developing countries. *Oxford Economic Papers,* Vol. 10, p498-509.

Wilson, D. and R. Purushothaman (2003). Dreaming With BRICs: The Path to 2050. *Global Economics Paper*, No. 99, October.

About the Authors

Eliane Cristina de Araujo is Associate Professor of Maringá State University (Brazil). She received a Ph.D. in Economics from the Federal University of Rio de Janeiro in 2009. Her works have been published in Cambridge Journal of Economics, Brazilian Economic Review, Revista Investigación Económica among others. Her research interests include economic growth, applied econometrics, international trade and exchange rate and monetary policies.

Márcio Silva de Araujois Analystof Banco Central do Brasil (Brazilian Central Bank). He received his D.Sc. in Economics from the Federal University of Rio de Janeiro in 1998. His works were published journals, such as BIS Quarterly Review, Revista de Economia Política, Revista de Economia Contemporânea, and in seminars. His research interests include national account statistics, focused on financial statistics, and government domestic bond development.

Miguel Antonio Pinho Bruno is Professor and Researcher in the post-graduation program of ENCE (National School of Statistical Science) and Associate Professor of UERJ (State University of Rio de Janeiro). He received his D.Sc. in Economics from the Federal University of Rio de Janeiro and also from the École des Hautes Études en Sciences Sociales EHESS (Paris), in 2005. His works were published in the Revue de la Regulation, Revista de Economia Política, etc. His research interests are related to social economic development with focus on macroeconomic and demographic interactions; capital accumulation and income distribution; international insertion, financerization and growth patterns.

Contact Information

Eliane Cristina de Araujo, State University of Maringá, Brazil. Email: elianedearaujo@gmail.com.Márcio Silva de Araujo, Central Bank of Brazil. Email: silvaraujo@gmail.com.Miguel Antonio Pinho Bruno, National School of Statistical Sciences, ENCE, State University of Rio de Janeiro, UERJ, Brazil. Email: miguel.pbruno@gmail.com.