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External vulnerabilities and economic integration. Is the Union of South American Nations a promising project?

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Abstract

This article addresses the reactions of the Union of South American Nations (UNASUR) economies to external shocks. Unlike the existing economic integration projects, the UNASUR was conceived as a political alliance. Because the recent euro debt crisis confirmed the importance of political agreement for economic integration, the South American plan is likely to be promising. However, economic and political aspects must go hand in hand for an integration project to succeed. Thus, assessing the UNASUR from an economic perspective is essential. Using a structural vector autoregression (SVAR) approach, this paper measures the impact of three external shocks (monetary, commercial and financial) in the real, monetary and fiscal economic sector of seven UNASUR economies, Argentina, Bolivia, Brazil, Chile, Colombia, Peru and Venezuela, and detects for co-movement paths. The results reveal a non-negligible current synchronization level across the studied economies, confirm their high external vulnerability and identify mutual weaknesses to overcome.

Keywords: Economic integration, South America, Structural VAR, UNASUR

JEL classification: C32, E42, F41

1 Introduction

Economic integration appears to be a new global trend. Nations in Asia, Europe, Africa and America have joined forces seeking macroeconomic stability. Thus, the last century has witnessed the formation of several economic unions: the ASEAN+3 (Association of South-East Asian Nations together with China, Japan and Korea – 1997), the Eurozone – 1999, the Economic and Monetary Community of Central Africa (CEMAC-EMCCA – 1998), the West African Economic and Monetary Union (UEMOA-WAEMU – 1994), the Southern African Development Community (SADC – 1992), the East African Community (EAC– 2000) and the Union of South American Nations (UNASUR – 2008). Economic integration as a strategy for macroeconomic stability appeared to work well in Europe after the euro was launched (Sapir, 2011), until the eruption of the European sovereign debt crisis revealed the weaknesses of an economic union without a political union.

The South American case deserves special attention because, unlike the other blocs, the UNASUR emerged as a political alliance. The UNASUR Constitutive Treaty, signed in 2008 and ratified in 2011, formalizes the union as an entity with international juridical character gathering twelve independent nations for regional integration in cultural, social, economic and political fields.[1] Furthermore, the UNASUR is conceived as a strategy for improving the condition of nations with a common history of economic instability and external dependence. Indeed, common concerns and political willingness exist within the group; however, is that enough? Because the recent euro debt crisis confirmed the importance of political agreement (Sapir, 2011), the South American plan could be considered promising. Notwithstanding, this project is likely to fail if the concerned economies do not converge economically. The latest lessons regarding the major role of political issues do not erase the necessity of economic coincidences for integration. On the contrary, economic and political aspects must go hand in hand for an integration project to succeed. Therefore, this study assesses the integration project of the UNASUR from an economic integration perspective. The study focuses on the effects of external shocks on members' economies considering thereby one of the motivations for joining together: the reduction of external vulnerabilities.

Accordingly, this paper measures the impact of three external shocks (monetary, commercial

[1] Arts. 1 and 2 in the UNASUR Constitutive Treaty.

and financial) in the real, monetary and fiscal economic sector of seven UNASUR economies, Argentina, Bolivia, Brazil, Chile, Colombia, Peru and Venezuela, and detects for co-movement paths. Moreover, it quantifies the relative importance of external shocks for each studied country and compares the reactions of monetary and fiscal stabilization tools in order to elucidate future challenges of the UNASUR project. The analysis proceeds in three stages. First, a structural Bayesian vector autoregression (SVAR) model is built for each studied economy (seven UNASUR members) and each retained disturbance (three external shocks). Second, a correlation exercise is performed to detect patterns of real, monetary and fiscal convergence. And third, the forecast error variance decomposition information is used to identify the principal sources of vulnerability and to provide comparative measures.

The modeling strategy relies on structural Bayesian vector autoregression (SVAR) models. This strategy makes it possible to impose identifying restrictions on the relationships between the model's variables, in reference to economic theory (Sims, 1986), and thus ensures a better interpretation of results. Furthermore, the Bayesian estimation techniques avoid any misleading result from an improper treatment of series with unit roots (Sims, 1988) and to provide a robust measure of uncertainty (Sims and Zha, 1999).

As such, the existing literature is extended in three directions. First, this paper covers a considerable number of South American economies, some of them rarely considered by the literature. Despite the fact that researchers have long been intrigued by the topic of similarity in the impact of shocks and convergence, for the South American case, studies have particularly focused on specific subsets of UNASUR economies, notably on MERCOSUR (*i.e.*, Allegret and Sand, 2009a; Busse, Hefeker, and Koopmann, 2006; Camarero, Jr., and Tamarit, 2006; de Andrade, Silva, and Trautwein, 2005; Gimet, 2007a,b). Second, this study incorporates a wide extent of external disturbances for the region. To date, authors have mainly concentrated on the effects of exogenous monetary and commercial shocks (Ahmed, 2003; Canova, 2005; Mackowiak, 2007) leaving the study of external financial disturbances restricted to a few economies (Allegret and Sand, 2009b). This fact is important to the extent that, given the recent sub-prime crisis, international financial disturbances have proven to be crucial for countries belonging to a group (Gimet, 2011). Third, by including fiscal domestic variables, this article considers the lessons of the current European sovereign-debt crisis (Eichengreen, 2012; Issing, 2011) about

the major role of fiscal adjustments regarding integration concerns.

This paper is structured as follows. Section 2 describes the modeling strategy and presents the data and variables. Sections 3 and 4 discuss the results, and section 5 concludes.

2 An Empirical Analysis

The modeling strategy relies on a Bayesian estimation of structural vector autoregressive (SVAR) models to determine the impact of external shocks on the real economies of Argentina, Bolivia, Brazil, Chile, Colombia, Peru and Venezuela. This strategy ensures the reliability of results because of two main aspects. On the one hand, the use of SVAR models makes it possible to impose identifying restrictions on relationships between the model's variables, in reference to economic theory (Sims, 1986), and, therefore, ensures a better interpretation of results. In fact, the SVAR approach has been used extensively in applied macroeconomics in response to Sims's criticism (1980) of unidentified vector autoregression (VAR) models. The SVAR model allows to capture not only the joint dynamics of multiple time series – as the VAR models do – but also the simultaneous interactions between the series, thus constituting a powerful tool to study economic market interactions.

On the other hand, the Bayesian inference provides a gain in accuracy related to the so-called *"frequentist"* or *"classical"* methods (See, *i.e.*, Bewley, 2002; Litterman, 1984, 1986; Ribeiro-Ramos, 2003; Sims, 1988). The Bayesian method not only overcomes the over-parameterization problem associated with the estimation of VAR models, but also corrects the coefficient bias when time series are non-stationary and provides a reliable measure of uncertainty about estimations.[2] In fact, the Bayesian estimation is unaffected by the presence of unit roots (Sims, 1988), typically present in economic time series. Hence, the Bayesian estimation makes it possible to avoid any misleading result from an improper treatment of non-stationary (or cointegrated) variables and to directly identify the impact of shocks in the path of macro-series when working with level series. Furthermore, the Bayesian technique of inference provides a reliable measure of uncertainty for the estimated models (*e.g.*, Litterman, 1986) and enables

[2] As a law, VAR models require a large number of parameters to be estimated. Some of the parameters are not significant resulting in multicollinearity and a loss of degrees of freedom, which could lead to inefficient estimates and large out-of-sample forecasting errors. The Bayesian inference shrinks parameters using priors, thus reducing the problem of over-parameterization (Doan, Litterman, and Sims, 1983; Litterman, 1980, 1986; Tood, 1984)

to compute likelihood-based error bands which have proven to be the best approach to provide error bands in time series models (Sims and Zha, 1999).

The above aspects justify the pertinence of the modeling strategy.

2.1 The Structural VAR Framework

The modeling approach assumes that each UNASUR economy can be described by the linear simultaneous p'th-order difference-equation model of the form[3]

$$A_0 x_t = A_1 x_{t-1} + \cdots + A_p x_{t-p} + \varepsilon_t$$

$$A(L)x_t = \varepsilon_t \tag{1}$$

With

$$\varepsilon_t | x_s, s < t \sim N(0, I) \tag{2}$$

Where x_t is a n x *1* vector of endogenous variables at time t, L is the lag operator and p is a finite-order lag length. A_0 is a n x n matrix that summarizes the contemporaneous relationships between the variables, and ε_t is the n x *1* vector of structural disturbances. A_0 is assumed to be non-singular, such that (1) provides a complete description of the conditional distribution of y_t given $y_s, s < t$ and can be solved by multiplying through on the left by A_0^{-1} to produce the reduced form

$$x_t = B_1 x_{t-1} + \cdots + B_p x_{t-p} + \mu_t$$

$$B(L)x_t = \mu_t \tag{3}$$

in which $B_0 = I$ and μ_t is a white noise representing the vector of canonical disturbances n x 1 whose variance-covariance matrix is not restricted (*i.e.*, while still uncorrelated with past x_t, has a non-diagonal covariance matrix), thus assuming a normal conditional distribution of x_t, $\mu_t \sim iidN(0, \Sigma)$.

The canonical (μ_t) and the structural disturbances (ε_t) are linked by the relationship

$$A_0 \mu_t = \varepsilon_t \tag{4}$$

[3]This representation corresponds to Sims and Zha (1999) parameterization.

Thus, Σ is given by

$$E(\mu_t, \mu_t^{'}) = A_0^{-1} E(\varepsilon_t, \varepsilon_t^{'}) A_0^{T^{-1}} = (A_0 A_0^{'})^{-1} = \Sigma$$

Furthermore, the response functions of x_t to structural shocks ε_t for the model are the coefficients in the lag operator $C(L)$ of the infinite-order polynomial representation

$$x_t = B^{-1}(L)\mu_t = B^{-1}(L)A_0^{-1}\varepsilon_t = C(L)\varepsilon_t$$

This framework implies that n^2 structural parameters need to be recovered from the reduced form. Because Σ is symmetric, this recovery is possible only for $n(n+1)/2$ parameters. Thus, the model identification requires the imposition of at least $n(n\text{-}1)/2$ restrictions. The short-run constraints are imposed directly on A_0 in (4) and correspond to some elements of the matrix set to zero.

Because the purpose is to study the short-run effects of external disturbances in UNASUR economies, only short-run restrictions are used to identify the SVAR models. As detailed later, the model identification will result in over-identified SVARs. Hence, Sims and Zha (1999) parameterization for over-identified systems is retained here to assert a posterior-integrable function and a correct calculation of likelihood-based error bands. Sims and Zha (1999) parameterization corresponds to the following likelihood function:

$$q(B, \Sigma) = |A_0|^T exp\left\{\frac{1}{2} tr(A_0 A_0^{'} S(\widehat{B})) - \frac{1}{2} tr((B - \widehat{B})^{'} X X^{'} (B - \widehat{B}) A_0 A_0^{'})\right\}$$

$$\widehat{\mu}(t, B) = B(L)x_t$$

$$S(B) = \sum_{t=1}^{T} \widehat{\mu}(t, B)\widehat{\mu}(t, B)^{'}$$

2.2 Variables and Data

Quarterly data covering the period from 1993Q1 to 2010Q4 for Argentina, Bolivia, Brazil, Chile, Colombia, Peru and Venezuela is employed to construct individual SVARs models.[4][5] In order to measure the impact of external shocks in the real, monetary and fiscal economic sector of each country, six domestic variables (two real, two monetary and two fiscal) and three external variables are selected.

In the model, each studied economy is described by the endogenous variables vector x_t:

$$x_t^{'} = (ext_t, y_t, rer_t, r_t, m_t, def_t, debt_t)$$

The first variable represents the external factor (ext_t) whose impact on the local economies is analyzed. The other six variables capture the domestic reactions. The local real economic sector is represented by the real gross domestic product (y_t) and the real exchange rate (rer_t) (indirect quotation).[6] The monetary variables are the short-run nominal interest rate (r_t) and the money supply M1 (m_t). The inclusion of both interest rate and monetary aggregate M1 allows to capture the monetary policy response of either an inflation or monetary targeting economy. Finally, the public deficit-GDP ratio (def_t) and the external public debt-GDP ratio ($debt_t$) are included to add the fiscal dimension (Bruneau and De Bandt, 2003; Nishigaki, 2009). This variable choice is closely related to the typical choice in an IS-LM-BP framework (*e.g.*, Gali, 1992) augmented with the two fiscal variables. The fiscal variables are included to consider the major role of fiscal policy regarding integration concerns, which has been indicated by the Eurozone crisis (Eichengreen, 2012; Issing, 2011).

To better capture the external vulnerabilities, three external shocks are introduced through the variable ext_t. The U.S. federal funds rate (r_usa_t), the world commodity price index (ext_p_t) and the MSCI index ($msci_t$), which represent the external monetary, commercial and financial environment, respectively.[7]

[4]The data sources are the IMF's International Financial statistic database, the Inter-American Development Bank and several national central banks.

[5]The sample is restricted to Argentina, Bolivia, Brazil, Chile, Colombia, Peru and Venezuela because of the availability of reliable data. This sample is representative to the extent that it accounts for 96.61% of the total UNASUR GDP, according to the World Economic Outlook Database for April 2012.

[6]Indirect quotation: Units of national currency for one unit of US dollar.

[7]The MSCI World Index is a free float-adjusted market-capitalization-weighted index that is designed to measure the equity market performance of developed markets. The Morgan Stanley Capital International (MSCI) World Index consists of the following 24 developed market country indices: Australia, Austria, Belgium,

The inclusion of the monetary dimension through the U.S federal fund rate has been a common exercise in literature. This approach is even more pertinent for the South American region because of its historical dependence on the United States (Bulmer-Thomas, 2003). However, it is worth to mention that, lately, this trend appears to be reversing. Some South American countries – *e.g.*, Brazil (Goldfajn and Minella, 2007) – are reducing their debts from the U.S. and are seeking alternative ways of financing. Moreover, Chinese investment in Latin America has become so influential that it is changing the traditional U.S dependency of the region (Kotschwar, Moran, and Muir, 2012). Notwithstanding, this changing trend is beyond the scope of this analysis, and the U.S. federal fund rate is assumed to be the most influential source of monetary external disturbances for South America.

UNASUR countries are commodity exporting economies (data on this shall be present in the next section), therefore, the world commodity price index is included to analyse the impact of foreign commercial disturbances.[8] In fact, the commodity price disturbances have proven to have a significant influence on the real economic sector of commodity exporters (*e.g.*, Collier and Goderis, 2012; Medina, 2010). Moreover, some commodities, notably gold, act as safe havens in times of crises (Roache and Rossi, 2010), which increases the volatility of the commodity exporters' income, it is thus expected the analyzed economies to be highly vulnerable to a commodity prices innovation.

The selection of the MSCI world index corresponds to the usual choice in the literature to proxy the global financial environment (*e.g.*, Abugri, 2008; Ulku and Ikizlerlic, 2012).

The inclusion not only of monetary and commercial shocks, as traditional in literature (*e.g.*, Canova, 2005; Mackowiak, 2007), but also of financial shocks permits this study to go beyond the traditional approach and thus to capture more appropriately the vulnerability to which the studied economies are exposed to.

Consequently, the correspondent structural disturbances vector is

$$\varepsilon_t^{'} = (\varepsilon_{ext,t}, \varepsilon_{2,t}, \varepsilon_{3,t}, \varepsilon_{4,t}, \varepsilon_{5,t}, \varepsilon_{6,t}, \varepsilon_{7,t})$$

Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

[8]This choice is also usual in literature (*e.g.*, Jiménez-Rodríguez, Morales-Zumaquero, and Égert, 2010; Makin, 2012).

Where ε_{ext} represents consecutively the external monetary policy shock, the international trade shock and the foreign financial shock. The remaining structural disturbances ($\varepsilon_{i,t}$ for $i = 2, ..., 7$) do not need to be economically identified, because the focus is on analyzing the effect of the external disturbance $\varepsilon_{ext,t}$ on domestic variables' dynamics.

All series are logged, except for r_usa_t, r_t, def_t and $debt_t$ that are measured in percent. The variables are seasonally adjusted if required. The models are constructed with level series, regardless of the presence of unit roots or cointegration relationships, which is possible thanks to the Bayesian inference. In fact, the utilization of Bayesian techniques enables us to estimate models that are not affected by the presence of unit roots (Sims, 1988; Sims and Uhlig, 1991) and to make direct behavioral interpretations. The traditional information criteria (Akaike, Schwartz, Hanna-Quinn) are used to test for the appropriate lag order. According to these criteria, the series' dynamics are well described by SVARs(2).[9]

2.3 SVAR Identification: Short-run restrictions

The identification of the model requires the imposition of $n(n\text{-}1)/2$ restrictions (See section 2.1), *i.e.*, twenty-one in this study because seven variables are included. Because of the short-term scope of this study, only contemporaneous restrictions are imposed and the impact of the external disturbances on each UNASUR economy is analyzed in a period of four years after the shock (16 periods).

The following equation summarizes the identification scheme retained which links the canonical (μ_t) and the structural innovations (ε_t).

$$A_0 \mu_t = \varepsilon_t$$

$$\begin{pmatrix} a_{11} & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} & 0 & 0 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} & 0 & 0 \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & a_{66} & 0 \\ a_{71} & a_{72} & a_{73} & a_{74} & a_{75} & a_{76} & a_{77} \end{pmatrix} \begin{pmatrix} \mu_{ext,t} \\ \mu_{y,t} \\ \mu_{rer,t} \\ \mu_{r,t} \\ \mu_{m,t} \\ \mu_{def,t} \\ \mu_{debt,t} \end{pmatrix} = \begin{pmatrix} \varepsilon_{ext,t} \\ \varepsilon_{2,t} \\ \varepsilon_{3,t} \\ \varepsilon_{4,t} \\ \varepsilon_{5,t} \\ \varepsilon_{6,t} \\ \varepsilon_{7,t} \end{pmatrix}$$

As only the external shock needs to be identified, the only assumption retained for our purposes is that the studied UNASUR economies are small open economies. Thus, the external

[9] All the tests are available upon request to the author.

variable is exogenous $a_{12} = a_{13} = a_{14} = a_{15} = a_{16} = a_{17} = 0$ (Gimet, 2011; Mackowiak, 2007). As 21 restrictions are needed to achieve exact identification of the system, a triangular schema (à la Cholesky) is retained for the matrix of contemporaneous relationships between variables, A_0. The coefficients are estimated using Bayesian techniques and likelihood-based error bands are computed following Sims and Zha (1999).[10] Moreover, alternative identifications of the model have been tested confirming the robustness of results.[11]

3 The Results

The impulse response functions after each external shock are illustrated in Figures 1, 2 and 3. These figures display the responses of domestic variables to a variation of one standard deviation of the external variables. Error bands are computed using a Monte Carlo integration method.[12] A response is significant if its corresponding confidence interval does not include the zero axis. Tables 2, 4 and 5 display the forecast-error variance decomposition.

3.1 Impact of a restrictive U.S. monetary policy shock

Domestic reactions after an external monetary policy shock depend on the exchange regime and the financial integration of each country. Regarding exchange-rate-regime concerns, two subgroups can be identified. The countries that have opted for fixed regimes include Argentina, Bolivia and Venezuela, and the so-called FIT (Floating Inflation Targeters) economies include Brazil, Chile, Colombia and Peru (See Table 1). An increase of the external interest rate is expected to be reflected directly in the local interest rate of the first group (Canova, 2005). On the contrary, floating countries are expected to adjust through the exchange-rate channel (Kim and Roubini, 2000). However, these theoretical expectations are not entirely reflected in the results due to the presence of flexible hybrid systems (dirty float) within the FIT countries and restrictions to free capital movements within the fixed-exchange-rate countries. Chile is the only pure floater, according to the IMS De Facto Classification for 2011; all the other FIT

[10] Sims and Zha's (1999) parameterization assures the obtaining of an integrable posterior function, necessary for computing impulse-responses.

[11] Non-recursive identification schemes for the A_0 matrix do not change results of interest as long as the exogenous character of the external variable is retained as assumption ($a_{12} = a_{13} = a_{14} = a_{15} = a_{16} = a_{17} = 0$).

[12] Computed by montesvar.src procedure. Estima-RATS. Error bands correspond to the 0.16% and 0.84% fractiles, *i.e.*, a confidence interval of 68%. (Sims and Zha 1999)

economies are classified as "managed floaters" (Table 1). Moreover, Argentina and Venezuela legally regulate all transactions in foreign currencies, the theoretical assumption of no capital controls is thus not present.[13]

Insert Table 1 here

The low degree of financial integration of Argentina and Venezuela is confirmed by the Chinn-Ito index.[14] For 2010, the index ranks Venezuela as the most-closed economy (165th) over a total of 165 countries; Argentina ranks 106th. In contrast, the FIT economies are ranked among the most open. Peru is on top (1st) followed by Chile (62th), Brazil (90th) and Colombia (98th). The high degree of capital-account openness of Brazil, Chile, Colombia and Peru is consistent with their exchange rate regimes (managed or pure float) according to the well-known *impossible trinity*.[15] This trilemma justifies Argentina (currency board) and Venezuela's (adjustable peg) necessity to impose capital controls. Bolivia's case is not well defined because even though the country is more open than some FIT countries (89th) and its exchange regime is fixed, Bolivian monetary policy objectives have never been clearly announced. This discretionary monetary policy makes it difficult to anticipate results.

Insert Figure 1 here

The aforementioned is indicated by the different reactions and degrees of vulnerability within the UNASUR after a restrictive monetary policy shock from the United States (Figure 1 and Table 2). Overall, FIT economies appear to stabilize better than countries with fixed regimes (*i.e.*, Argentina, Bolivia and Venezuela). A general examination of Table 2 indicates less impact of the shock on FIT countries' domestic variables.

The local interest rates' (i) responses are particularly interesting. The interest rates decrease contemporaneously in the fixed exchange rate countries – contrary to the expected increase. The short-lived and weak reactions (not more than 5% of the contemporaneous fluctuation explained

[13] Argentinean law 19.359 establishes different degrees of constraints for transactions involving currency transfers to and from abroad. Likewise, in Venezuela, the CADIVI (Commission for the Administration of Currency Exchange) regulates all the purchases and sales of foreign currency and administrates the monthly allocation of foreign currency decided by the Central Bank of Venezuela. Moreover, the government bonds in dollars are traded through a public system so-called SITME (Transaction System for Foreign Currency Denominated Securities).

[14] Both measures of financial integration, the volume-based index of Lane and Milesi-Ferreti and the Chinn-Ito index (kaopen), are commonly used in the literature. The Chinn-Ito index was retained because of the availability of updated information for 2010.

[15] The *trilemma* or *impossible trinity* affirms that a country cannot simultaneously have exchange rate stability, monetary independence and full financial integration. A country must give up one of the mentioned goals (See Frankel, 1999).

by the shock – Table 2) indicate the success of rigorous controls of capital flows in attenuating vulnerability despite dollar-pegged regimes. In contrast, domestic interest rates in FIT countries increase after the shock. Peru, as the most financially integrated economy, has the strongest increase in interest rates. Brazil and Chile's reactions, although positive and significant, are weak and fleeting. Literature has attributed Brazilian and Chilean invulnerability to a well-framed and credible monetary policy resulting in their ability to redress the economy and to insulate against shocks (Mackowiak, 2007). The poor sensibility of Brazil and Chile can be also imputed to their actual positioning in global economy. In one hand, Brazil has been catalogued by the IMF as the largest Latin American economy and one of the five most important emerging countries of the world (BRICS member). Moreover, Brazil accounts for more than 50% of the aggregate South American GDP according to the World Bank. On the other hand, Chile is the most stable economy in the region (Edwards, 2007) and the only South American member of the OCDE.

Insert Table 2 here

The monetary variables (r and m) perfectly reflect the monetary policy tools employed by each country according to their monetary policy strategies. FIT economies adjust through interest rates (i), whereas the fixed exchange rate economies adjust through the monetary aggregate (m) (Devereux, 2004). Figure 1 shows a significant reaction of i and non-significant reactions of m and vice versa. The first tactic appears to be superior: Argentina and Bolivia's real sector is much more sensitive than Brazil, Chile, Colombia and Peru's real sector. Strikingly, Venezuela's real sector does not react; in this case, the country's closed borders act as a perfect *anti-external shocks* shield.

Independently of the individual monetary policy strategies, the increase of the external interest rate reduces the capacity of domestic economies to finance their budget. The external public debt-GPD ratio of all countries decreases after the shock. A higher Fed fund rate means a higher U.S. Treasury bonds yield, which, in turn, means a higher EMBI Index and, therefore, higher cost of borrowing for the studied economies. This phenomenon forces the creation of domestic primary surpluses (variable *def* increases for all countries after the shock).[16] Considering the precarious capacity of domestic economies to collect taxes, the surplus is likely

[16] A positive value of the *def* variable refers to a primary surplus situation; likewise, a negative value refers to a primary deficit.

to be created by a reduction in public spending (Ahmad and Brosio, 2008; Gavin and Perotti, 1997). The Brazilian economy is an exception. As the least-indebted country within the UNASUR, Brazil's debt and def-GDP ratios hardly react to the shock. As the sixth-largest economy of the world, Brazil has no problems to finance its budget. Peru appears to have no problems either, thanks to its high level of financial integration. Only 5% of the Peruvian debt-GDP ratio (*debt*) fluctuation is explained by the shock, in contrast to more than 20% for the other countries – including Chile. It is worth noting that in this case, Venezuela is not unaffected. The reduction of Venezuela's debt-GDP ratio (*debt*) is significant (30% explained by the shock). Notwithstanding, Venezuela's primary budget (*def*) is not strongly affected; the country's huge oil reserves ensure the financing of its public budget.

3.2 Impact of a positive international trade shock

Insert Table 3 here

The South American continent is very rich in natural resources. For instance, Venezuela has the second largest oil-reserves in the world.[17] Chile is the main cooper and lithium producer.[18] Bolivia holds the largest salt flat in the world (*i.e.*, an enormous lithium reserve).[19] Brazil is the world's leading exporter of coffee and Argentina is the world's leading exporter of soy vegetable oil, the second producer of soy meal and the third largest producer of soybean.[20] Today, despite the fact that the biggest economies (*i.e.*, Argentina, Brazil, Chile and Colombia) have improved their industrialization sector, the production of the so-called "commodities" continues to play a main role. Table 3 shows the magnitude of the agricultural, fuel and mining sector as share of the export of these sectors to the total export for the studied economies. More than 50% of the export revenue of these economies derives from these two sectors. Therefore, these economies are expected to be sensitive to variations in commodity prices. Specifically, a rise of this price is supposed to increase revenues and employment in the concerned production sectors, boosting, in turn, the real economy (Collier and Goderis 2012). This reasoning leads us to expect a direct impact of commodity price on the real domestic production, which is indeed the case. Figure

[17] According to data on proven reserves of crude oil for 2011 from the CIA World Factbook.

[18] In 2010, Chile remained the world's leading mined copper producer and accounted for 34% of the global production. Moreover, in 2011, Chile reported 31% of the world's lithium market (U.S. Geological Survey).

[19] According to the U.S. Geological Survey and the 2011 Minerals Yearbook.

[20] According to the Food and Agricultural Organization of United Nations, the International Coffee Organization, the World Trade Organization and the American Soybean Association.

2 displays the results. The real output (y) of all countries responds positively and significantly after an increase of commodity prices. Table 4 shows the high impact of the shock, which explains more than 30% of the real GDP (y) variation in the most sensitive economies.

Insert Figure 2 and Table 4 here

Results indicate that some countries are more vulnerable than others depending on their degree of openness and their specialization. Bolivia is the most vulnerable country (more than 35% of its real output variation is explained by the shock). Bolivia's low level of industrial exports and the fact that it is the commercially most-open country within the UNASUR (Table 3) makes it the most exposed economy after an external trade shock. Peru and Colombia also react strongly (approximately 30% and 20%, respectively, of their real output fluctuation is due to the shock) because of the importance of their fuel and mining production in their economic system (Table 3). Brazil's real output reaction is the most persistent reaction (it vanishes 12 periods after the shock), corroborating the relevance of the country's oil and coffee production despite its industrialization level. In contrast, Argentina, Chile and Venezuela appear to be less vulnerable; their real sector reactions are short lived (Figure 2) and barely significant (Table 4). Argentina and Venezuela's strict capital controls could be affecting their export sector. Furthermore, Venezuela, as an OPEC member, cannot change its oil production in response to market prices.[21] Chile's case is particularly interesting; the country is the least hit by the shock despite its 74% of export revenue coming from the primary sector economy. This result could be explained by the fact that before discovering the enormous lithium reserves in South America, Chile's exports of primary products had been decreasing compared to manufacturing exports.

The increase in output causes an appreciation of the real exchange rate (variable *rer* decreases) except for Argentina and Venezuela that control their capital flows and which output barely responds to the external disturbance, as above mentioned. The Bolivian monetary authorities react by injecting money (m increment) to defend the parity. Within the FIT economies, Peru and Colombia raise their nominal interest rates to prevent inflation after a boost of their real supply. Furthermore, Brazil, similar to the former two countries, manipulates the money aggregate to offset the *rer* appreciation confirming the "fear of floating" of Calvo and Reinhart (2002).

[21] This is a main point considering that 95% of the Venezuelan export revenue comes from oil.

The additional domestic wealth leads to budgetary surpluses (variable *def* increases), which reduces the necessity of contracting more external debt (variable *debt* decreases). This impact is stronger for the economies experiencing the biggest real output improvements, Bolivia and Peru, whose primary surplus is 35% and 45%, respectively, due to the shock (Table 4).

3.3 Impact of a positive international financial shock

An international increase in price assets is expected to affect the real sector of the domestic economies at least for three reasons. First, domestic equity holders – firms and households – will experience wealth increases, which in turn enhances the volume of production and spending that they will ultimately desire to undertake; this effect will enhance the real economy. Second, the increase in price assets could affect domestic bank sheet balances resulting in credit expansion and a consequent boost of economic activity. Third, the positive global investment environment could provide incentives for new capital allocations in domestic economic and liquidity surpluses; this phenomenon could impact banks' ability to extend credit and thus real economic activity. The above effects are closely related to the transmission channels between the financial and real sector identified by literature, namely, the *borrower balance sheet channel*, the *bank balance sheet channel*, and the *liquidity channel* (on Banking Supervision, 2011).

Insert Figure 3 and Table 5 here

Figure 3 and Table 5 display the results. Overall, the shock appears to exert a positive impact on the real domestic GDP (y) of most UNASUR economies, as expected. Notwithstanding, the boost of the domestic real sector after the external financial improvement is weak and short-lived.

Except for Argentina and Venezuela, which restrict capital movements, the local real exchange rates appreciate significantly (Figure 3). Approximately 20% of the *rer* appreciation is explicated by the shock for the most sensitive economies (Table 5) evidencing capital inflows. However, these new capital allocations are barely translated into economic expansion (Real GDP (y) responses are weak and fleeting).

Real exchange rate pressures force local domestic economies to react. Bolivia defends its fixed regime by increasing aggregate money (m). Brazil and Peru follow the same strategy to avoid a strong appreciation of their domestic currencies – the shock accounts for approximately

13% and 14% of the rise in m, respectively – confirming the managed float condition. In contrast, Colombia, Chile and Peru's monetary authorities (inflation targeters) augment interest rates (r) to avoid possible inflation expectations generated by a higher level of world asset prices. This rise could explain the weak transfer of liquidity excess to the real economy.

Argentina and Venezuela's case is particularly interesting, indicating that capital controls do not necessarily protect the real sector from external financial shocks. As displayed by Figure 3, their real output (y) is highly impacted, even if they do not experience capital inflows. The financial shock accounts for 20% of Venezuela's and 9% of Argentina's real production improvement (Table 5). In this case, the boost of the real economy could be attributed to domestic wealth effects.

Regarding fiscal concerns, the shock significantly reduces the domestic external debt (*debt*) of most UNASUR economies. The shock explains approximately 20% of the external-debt ratio (debt) fluctuation in the most-affected economies. It appears that the domestic wealth effect reduces the necessity of acquiring new external financing. In fact, Figure 3 indicates that the economies that experience capital inflows (*rer* appreciations) benefit from budget surpluses (*def* contraction) and thereby from less external borrowing.

As evidenced by results, the studied economies are highly vulnerable to external disturbances. However, some countries are more sensitive than others in some cases and less harmed in others. A while set of cases arise from the former analysis making it hard to distinguish common patterns among UNASUR members. Next section present evidence on coincident reactions to shocks thus dealing with a main issue of Integration, convergence.

4 Co-movements: Correlation Analysis

The core aim of any economic integration process is the elimination of disparities between national economies (Sapir 2011). The South American Integration project is not indifferent to such a fundamental principle. In fact, Article 2 of the UNASUR Constitutive Treaty states that part of the bloc's main objective is *"... to strengthen democracy and* ***reduce asymmetries*** *within the framework of strengthening the sovereignty and independence of the States"*. The reduction of asymmetries is indeed a goal. However, to what extent are the countries already similar?

As aforesaid, a number of common features (*i.a.*, commodity producers, vulnerable to external disturbances) confronts to a number of individual features (*i.a.*, monetary policy independence, financial integration degree) among UNASUR members. A conclusion about their actual state of synchronization is thus not straightforward. To shed some lights on this issue, a correlation exercise is performed next. This traditional approach (*e.g.*, Agénor, McDermott, and Prasad, 1999; Gimet, 2007b; Lee and Koh, 2012) will allow us to detect patterns of real (y and rer), monetary (r and m) and fiscal (def and $debt$) convergence across the seven studied UNASUR members. It is assumed that if the resulting correlation coefficient is positive, the responses are considered to be symmetric, and if the correlation coefficient is negative, the responses are considered to be asymmetric.

Table 6 reports average unconditional correlations coefficients among Argentina, Bolivia, Brazil, Colombia, Peru and Venezuela's series for three periods of time: 1993Q1 to 2010Q4 (whole sample), 1993Q1 to 2008Q3 (the period before the creation of UNASUR) and 2008Q4 to 2010Q4 (the period after UNASUR).[22] Table 7 reports average conditional correlations among the responses of variables after the three external shocks (increase in U.S. fed fund rate, increase in commodity prices, increase of the MSCI financial index) based on the impulse response functions recovered from the SVARs models. The denominations *unconditional* and *conditional*, adopted for the correlation coefficients, refer to correlation coefficients among original series data and correlation coefficients among variables' responses subject to external shocks, respectively.

Insert Table 6 here

Table 6 provides a global panorama of the seven countries' synchronization. Some interesting facts are visible. First, an isolate glance over the entire sample reveals a null level of real output (y) synchronization within the group of countries – the average correlation coefficient of real output among the seven countries is only 0.08. However, such a low level is mostly driven by the behavior of series before September 2008. The fragmentation of the sample reveals a *pre*-UNASUR correlation degree of 0.05 against a *post*-UNASUR correlation degree of 0.43 among real output. Second, contrary to the previous case, fiscal variables (def and $debt$) move more similarly before the creation of UNASUR. However, the correlation levels of the deficit-GDP and debt-GDP ratios are considerably high during the whole period, 0.36 and 0.5 respectively. Third, despite the diversity of exchange rate regimes and monetary policy decisions of the

[22]The UNASUR Constitutive Treaty was signed on September 2008

individual economies, the monetary variables astonishingly co-move among countries, correlation even reach a 0.96 (whole sample) level for aggregate money (m). The previous facts are rather positive for the UNASUR goal. Notwithstanding, the evidence provided by the unconditional correlations in Table 6 cannot be considered conclusive. The economic environment was completely different during the nineties and 2000's for the seven UNASUR countries, several causes can thus be associated to the previous evolution of data. The studied economies were severely touched by the rough economic conditions of the nineties, the Mexican crisis (1995), the Asian and Russian crises (1997-1998), among others (See Frenkel and Rapetti (2012) for a nice historical review). In contrast, most of them passed by the 2007-2009 Global Financial Crisis relatively unharmed (Boonman et al., 2011). Although several explanations for this phenomenon have been postulated – *i.a.*, improvements in external balance sheets (Ocampo, 2009), development of domestic bond markets (Jara et al., 2009) –, the undertaking of the South American integration process cannot be neglected as a possible cause of the change in trend. Then, even if not conclusive, the former evidence gives a good global picture in favor of the UNASUR's aim.

Insert Table 7 here

In order to further investigate the previous global panorama, conditional correlations, reported in Table 7, are presented next. The impulse-response functions (IRF) recovered from the SVAR framework allow us to isolate the effect of the external disturbances in each of the variables for all countries. Therefore, correlation coefficients based on IRF allows us to provide more accurate evidence about the synchronization level among the involved countries.

Average correlations, comparable with those of Table 6, are reported in column (8) of Table 7. Real output (y) reactions after each of the three external shocks (See Panel I) are considerable similar. Synchronization levels of 0.48, 0.25 and 0.30, corresponding to the real output' responses after an external monetary, trade and financial shock, respectively, noticeably contrast to the overall 0.08 unconditional level but are consistent with the 0.43 *post*-UNASUR unconditional level of synchronization. Short-run patterns of real output convergence are thus confirmed in this case.

The same cannot be confirmed for monetary and fiscal variables' reactions (See Panels II and III in Table 7). The SVAR framework does take into account the dynamics provided by

the diversity of monetary policy objectives adopted by the countries in the region. Therefore, the correlations among the reactions of monetary variables' responses after external shocks are not as high as the previous 0.96 level. Even if a path cannot be clearly identified, because of the negative coefficient corresponding to the responses of monetary variables after the external trade disturbance, average coefficients superiors to zero (0.17 and 0.18 for r and m, respectively) are a positive, although weak, signals pro-synchronization. The same is true for fiscal variables co-movements.

Columns (1) to (7) in Table 7 report average conditional correlations by individual country. The coefficients are computed as the average of all the possible pairwise combinations of each country with each one of the rest involved UNASUR members. Results reveal that Brazil is the less synchronized economy. Brazilian real and monetary responses after external shocks are negatively correlated with those of the other UNASUR members (See column 3 – Panels I and II in Table 7). To some extent, Brazil's divergent reaction path is not surprising because of its relative economic superiority, as detailed in sections 3.1 and 3.2. What is noteworthy is that Brazilian monetary reactions are negatively correlated even with those of the other FIT countries under analysis (i.e. Chile, Colombia and Peru). Column (9) in Table 7 reports the degree of similarity between the responses of all FIT countries while Column (10) exclude Brazil. The exclusion of Brazil from the FIT sub-grouping significantly changes the resulting average correlation coefficient. For instance, the interest rate's (r) synchronization degree of FIT countries' reactions after a monetary shock increases from 0.12 to 0.91 after the exclusion of Brazil (See Panel II – Columns (9) and (10)). Moreover, the correlation coefficient of monetary aggregate's (m) responses among FIT economies after the trade and financial disturbances passes from negative to positive when Brazil is taken off. According to Moura and de Carvalho (2010)'s findings, Brazil pursues a "tough" monetary policy, whereas Chile, Peru and Colombia pursue "mild" or "lax" monetary policies against inflation, such an assertion could explain Brazil's divergence with other FIT economies' monetary reactions after shocks. On the other hand, pegged-regime economies' (i.e., Argentina, Bolivia and Venezuela) monetary reactions after external innovations are similar as well (See Column (11) in Table 7). However, an overall convergent behavior is not as manifest as in the previous case. In general, none of the other individual countries shows a divergent reaction path as the Brazilian one, the evidence

supporting similarities in domestic reactions to external shocks is thus strong within the studied UNASUR economies.

Overall, despite the different policy management and the particular conditions of its individual members, the former correlation exercise supports the existence of convergent paths within the UNASUR's key macroeconomic variables. Finally, it is worth to note that, at present, the South American integration project is in its very embryonic stage. Therefore, the evidence about a current considerable synchronization level reveals an enormous integration potential in the region in the future. For instance, thanks to endogeneity concerns (i.e., *post*-similarities can emerge within an integrated group even if *prior*-similarities are not fully manifested), monetary convergence could be easier to achieve in the future if a monetary union arrangement is adopted (*e.g.*, Akiba and Iida, 2009; Frankel and Rose, 1998; Rose and Engel, 2002).

5 Relative Vulnerabilities

Historically, South American countries have been characterized as economic dependent nations. Over time, these countries have taken a number of measures to change this condition (Bulmer-Thomas, 2003). However, as indicated by the previous results (Section 3), despite these measures they are still highly vulnerable to the external economic environment. Today, their strategy is economic integration. To complement the description of the current state of the UNASUR toward such integration, this section identifies the principal sources of fragility by comparing the vulnerabilities of the studied countries.

As aforesaid, UNASUR countries are indeed vulnerable to external shocks. However, how sensitive are these countries to financial relative to monetary or trade shocks? This relative sensitivity matters to the extent that the individual members of the group seek a better way to overcome difficulties through integration. Therefore, it is crucial to analyze what external disturbance – monetary, commercial or financial – affects these countries the most.

Insert Figure 4 here

Figure 4 displays the real output responses of Argentina, Bolivia, Brazil, Colombia, Peru and Venezuela after each of the included external disturbances. Visibly, the boost caused by each of the three external disturbances is not homogeneous. In order to confirm quantitatively any difference on the impact, the percentage of forecast error variance needs to be compared.

Table 8 reports the percentage of forecast error variance explained by each external disturbance: monetary, commercial and financial as an average of significant responses 16 periods after the shock.

Panel I in Table 8 is the quantitative counterpart of Figure 4. In average, the domestic economies appear to be more vulnerable to trade – 16.6% of the real output is explained by the external disturbance – than to monetary and financial external shocks – 10.54% and 10.05%, respectively. This result is not surprising considering that UNASUR economies are mainly commodity producers. What is striking is that the external financial environment ranks as least harmful. After a century with difficult episodes of financial crises in the South American economies, this evidence is positive for the region. Notwithstanding, it is worth noting that the low degree of financial integration in most countries, Venezuela and Argentina being the most extreme cases, has influenced this result. Such a strategy is not sustainable if an economic integration project is envisaged.[23]

Insert Table 8 here

Several interesting country-specific characteristics emerged from the comparative analysis when considering the overall average by country as in Panel II of Table 8. Peru and Chile, the most financially integrated economies, are highly sensitive to external financial disruptions – 11.9% of their vulnerability is accounted for by the financial shock. However, Peru is even more vulnerable to international trade shocks – the trade shock explains 17.9% of Peru's vulnerability. A candidate explanations of such a difference is the considerable level of industry exports (See Table 3) and the high technological capacity attributed to the Chilean economy(Molina-Domene and Pietrobelli, 2012). Notwithstanding, Brazil, the most industrialized economy, is also more vulnerable to trade shocks than to monetary and financial shocks – 19% of Brazil's vulnerability derives from trade disturbances, compared to 6% and 8% associated with monetary and financial shocks, respectively. The former finding reveals two interesting facts. First, even the less synchronized country of the group – *i.e.*, Brazil – share a common relative vulnerability with most of the studied UNASUR members. Second, although it is likely that a plan for the improvement of the industrialization of South American exports (as the one implemented

[23]The integration theory (Balassa 1961) characterizes financial integration as a close complement to economic integration. Moreover, the optimal currency area criteria – related to the fourth phase of economic integration – highlight the importance of financial integration as part of the convergence process (Ingram 1962, Mc Kinnon 2001). More recently, the financial integration has proven to increase growth (Larrain 2011) and welfare (Lee and Shin, 2012).

in Latin America from the 1950's to the 1980's) will not be able to eliminate the group's vulnerability to external commercial conditions by itself, its inclusion as part of the whole integration project of the UNASUR will certainly increase the expectations of reduction of the South American vulnerable condition. Further research on the former will constitute a significant contribution for the South American design.

The strategic feature of the commercial aspect is also highlighted by the Venezuelan case. Despite the high dependence of its revenue on primary exports, Venezuela is less affected by trade shocks compared to monetary and financial shocks. On average, only 9.35% of Venezuela's vulnerability is explained by trade shocks, in contrast to 11.17% and 10.33% explained by monetary and financial external disturbances, respectively (See Panel II in Table 8). It appears that the enormous Venezuelan oil resources reduce the country's vulnerability to the external commercial environment instead of increasing it. This phenomenon is not obvious considering the high volatility of the oil market. What makes the difference is the considerable market power of Venezuela (Reynolds and Pippenger, 2010), which empowers the country with a singular advantage. This case of natural resources diminishing vulnerabilities instead of increasing them is, however, not common in the UNASUR. Turning natural resources into an advantage is undoubtedly another sizeable challenge for the integration project of the group.

A final peculiar case to note is the Argentinean one. Argentina is the only economy that is more sensitive to monetary compared to trade and financial shocks. Of Argentina's total vulnerability, 14.8% comes from monetary external aspects, compared to approximately 6% that comes from the commercial and financial external environment. Argentina's pegged exchange rate regime and the lack of confidence its citizens have into the national currency explain this phenomenon. In fact, ten years after the 2001 crisis, the demand for foreign currency has not decreased – an effect that has been amplified by the high inflation levels of the last years – obliging the authorities to impose strict trade barriers.[24] The fact that the monetary aspect is highly sensitive for Argentina is certainly a pro-monetary integration aspect. Achieving the fourth stage of economic integration, a monetary union, will thus be strategically important.

In general, the previous evidence indicate that, despite the fact that each individual UNASUR member has its own weaknesses, they have mutual sources of vulnerability to fight against.

[24]See Frenkel and Rapetti (2007) for details about Argentina's exchange rate policy after the convertibility collapse. See also the CEPAL Work Document (2007) (Crisis, recuperación y nuevos dilemas. La economía argentina 2002-2007) for an evaluation of Argentina's economic state after the 2001 crisis.

Therefore, it is likely that all of these countries will benefit from a higher integration level by reducing their vulnerabilities. This finding suggests that the decrease of vulnerabilities as a way to lessen economic dependence could be an advantage of economic integration, which should be considered by further theoretical research.

6 Conclusion

Three main conclusions are supported by results. First, the studied UNASUR members are highly vulnerable to the external economic environment. Even the most closed (Argentina and Venezuela) and the most industrialized economies (Brazil) are considerably impacted by external disturbances. Therefore, vulnerability is common concern within the group. Second, convergent short-run paths are present within the UNASUR's key macroeconomic variables. The unconditional correlation exercise suggests a higher synchronization degree among the studied countries after the UNASUR inception, while the conditional correlation exercise confirms an important level of common reactions to external disturbances within the group. Considering the multiple specificities of the analyzed countries (*e.g.*, exchange rate regimes, policy objectives, financial and commercial integration degrees, industrialization levels), as well as the embryonic stage of the South American integration project, the evidence about a current considerable synchronization level reveals an enormous integration potential in the future. And third, in average, domestic economies are more vulnerable to external trade disturbances than to monetary and financial disturbances.

In addition to the previous main conclusions, it is worth to mention that, although Brazil ranks as the lest synchronized economy, similarly to the rest of UNASUR members, it appears to be relatively most vulnerable to the external trade environment. In other words, even the country which could be categorized as the less interested to commit in a South American integration plan shares potential gains from a regional plan because of its common relative vulnerabilities with its partner countries. Therefore, the fight against external vulnerabilities is a matter of common concern for UNASUR members and constitutes a main strong point of the group.

The previous results provide a good panorama of the current situation of seven UNASUR members as well as the future challenges and potential aspects of the group's plan. The evidence

presented here does not intent to be a final word on the topic, on the contrary, it is an opening door for further research on the South American regional integration strategy. The UNASUR is an interesting project barely investigated from an economic stand point, there are thus several extensions to the present article. Just to mention a few, two extensions are proposed next. First, a long-run analysis of convergence in the region, adopting a vector error correction approach for instance, will complement the present short-run conclusions. Second, theoretical models could be used to simulate the effects of implementing regional measures, as the adoption of a common South American currency or a regional fiscal management/authority, in the convergence degree of the UNASUR countries.

References

Abugri, B. A. (2008): "Empirical relationship between macroeconomic volatility and stock returns: Evidence from Latin American markets," *International Review of Financial Analysis*, 17(2), 396 – 410.

Agénor, P.-R., C. J. McDermott, and E. S. Prasad (1999): "Macroeconomic Fluctuations in Developing Countries: Some Stylized Facts," Discussion paper, International Monetary Fund.

Ahmad, E., and G. Brosio (2008): "Political Economy of Multi-Level Tax Assignments in Latin American Countries: Earmarked Revenue Versus Tax Autonomy," Discussion paper, International Monetary Fund.

Ahmed, S. (2003): "Sources of economic fluctuations in Latin America and implications for choice of exchange rate regimes," *Journal of Development Economics*, 72(1), 181 – 202.

Akiba, H., and Y. Iida (2009): "Monetary Unions and Endogeneity of the OCA Criteria," *Global Economic Review*, 38(1), 101–116.

Allegret, J.-P., and A. Sand (2009a): "Does a Monetary Union protect against external shocks?: An assessment of Latin American integration," *Journal of Policy Modeling*, 31(1), 102 – 118.

——— (2009b): "Modeling the Impact of Real and Financial Shocks on Mercosur: The Role of the Exchange Rate Regime," *Open Economies Review*, 20(3), 359–384.

Bewley, R. (2002): "Forecast accuracy, coefficient bias and Bayesian vector autoregressions," *Mathematics and Computers in Simulation*, 59, 163–169.

Bruneau, C., and O. De Bandt (2003): "Monetary and fiscal policy in the transition to EMU: what do SVAR models tell us?," *Economic Modelling*, 20(5), 959–985.

Bulmer-Thomas, V. (2003): *The Economic History of Latin America since Independence*. Cambridge University Press.

Busse, M., C. Hefeker, and G. Koopmann (2006): "Between two poles: A dual currency board for Mercosur," *The North American Journal of Economics and Finance*, 17(3), 349–362.

Camarero, M., R. G. F. Jr., and C. R. Tamarit (2006): "Monetary union and productivity differences in Mercosur countries," *Journal of Policy Modeling*, 28(1), 53 – 66.

Canova, F. (2005): "The transmission of US shocks to Latin America," *Journal of Applied Econometrics*, 20(2), 229–251.

Collier, P., and B. Goderis (2012): "Commodity prices and growth: An empirical investigation," *European Economic Review*, 56(6), 1241 – 1260.

de Andrade, J. P., M. L. F. Silva, and H.-M. Trautwein (2005): "Disintegrating effects of monetary policies in the MERCOSUR," *Structural Change and Economic Dynamics*, 16(1), 65 – 89.

Devereux, M. B. (2004): "Monetary policy rules and exchange rate flexibility in a simple dynamic general equilibrium model," *Journal of Macroeconomics*, 26(2), 287 – 308.

Doan, T., R. B. Litterman, and C. A. Sims (1983): "Forecasting and Conditional Projection Using Realistic Prior Distributions," NBER Working Papers 1202, National Bureau of Economic Research, Inc.

Edwards, S. (2007): "Capital controls, capital flow contractions, and macroeconomic vulnerability," *Journal of International Money and Finance*, 26(5), 814 – 840.

Eichengreen, B. (2012): "Implications of the Euro's crisis for international monetary reform," *Journal of Policy Modeling*, 34(4), 541 – 548.

Frankel, J. A. (1999): "No Single Currency Regime is Right for All Countries or At All Times," NBER Working Papers 7338, National Bureau of Economic Research, Inc.

Frankel, J. A., and A. K. Rose (1998): "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, 108(449), 1009–25.

Gali, J. (1992): "How Well Does the IS-LM Model Fit Postwar U.S. Data," *The Quarterly Journal of Economics*, 107(2), 709–38.

Gavin, M., and R. Perotti (1997): "Fiscal Policy in Latin America," *NBER Macroeconomics Annual*, 12, 11–72.

Gimet, C. (2007a): "Conditions necessary for the sustainability of an emerging area: The importance of banking and financial regional criteria," *Journal of Multinational Financial Management*, 17(4), 317–335.

——— (2007b): "Le projet d'Union Monétaire dans le Mercosur: Etude de la position actuelle dans les pays par rapport à une carte de critères de soutenabilité," *Brussels Economic Review*, 50(2), 249–273.

——— (2011): "The Vulnerability of ASEAN+3 Countries to International Financial Crises," *Review of International Economics*, 19(5), 894–908.

Goldfajn, I., and A. Minella (2007): *Capital Flows and Controls in Brazil: What Have We Learned?*pp. 349–419. University of Chicago Press.

Issing, O. (2011): "The crisis of European Monetary Union: Lessons to be drawn," *Journal of Policy Modeling*, 33(5), 737 – 749.

Jiménez-Rodríguez, R., A. Morales-Zumaquero, and B. Égert (2010): "The effect of foreign shocks in Central and Eastern Europe," *Journal of Policy Modeling*, 32(4), 461 – 477.

Kim, S., and N. Roubini (2000): "Exchange rate anomalies in the industrial countries: A solution with a structural VAR approach," *Journal of Monetary Economics*, 45(3), 561 – 586.

Kotschwar, B., T. H. Moran, and J. Muir (2012): "Chinese Investment in Latin American Resources: The Good, the Bad, and the Ugly," Discussion paper, Peterson Institute for International Economics.

Lee, G. H., and S. G. Koh (2012): "The prospects of a monetary union in East Asia," *Economic Modelling*, 29(2), 96 – 102.

Litterman, R. B. (1980): "Techniques for Forecasting with Vector Autoregressions," Ph.D. thesis, University of Minnesota.

——— (1984): "Forecasting and policy analysis with Bayesian vector autoregression models," *Quarterly Review*, (Fall).

Litterman, R. B. (1986): "Forecasting with Bayesian Vector Autoregressions-Five Years of Experience," *Journal of Business & Economic Statistics*, 4(1), 25–38.

Mackowiak, B. (2007): "External shocks, U.S. monetary policy and macroeconomic fluctuations in emerging markets," *Journal of Monetary Economics*, 54(8), 2512–2520.

Makin, A. J. (2012): "Commodity prices and the macroeconomy: an extended dependent economy approach," *Journal of Asian Economics*, (0), –.

Medina, L. (2010): "The Dynamic Effects of Commodity Prices on Fiscal Performance in Latin America," Discussion paper, IMF Working paper.

Molina-Domene, M. A., and C. Pietrobelli (2012): "Drivers of technological capabilities in developing countries: An econometric analysis of Argentina, Brazil and Chile," *Structural Change and Economic Dynamics*, 23(4), 504 – 515.

Moura, M. L., and A. de Carvalho (2010): "What can Taylor rules say about monetary policy in Latin America?," *Journal of Macroeconomics*, 32(1), 392 – 404.

Nishigaki, H. (2009): "How will the related variables change if global imbalances unwind?," *Economic Modelling*, 26(1), 206 – 212.

on Banking Supervision, B. C. (2011): "The transmission channels between the financial and real sectors: a critical survey of the literature," Discussion paper, Bank for International Settlements.

Reynolds, D. B., and M. K. Pippenger (2010): "OPEC and Venezuelan oil production: Evidence against a cartel hypothesis," *Energy Policy*, 38(10), 6045 – 6055.

Ribeiro-Ramos, F. F. (2003): "Forecasts of market shares from VAR and BVAR models: a comparison of their accuracy," *International Journal of Forecasting*, 19(1), 95 – 110.

Roache, S. K., and M. Rossi (2010): "The effects of economic news on commodity prices," *The Quarterly Review of Economics and Finance*, 50, 377–385.

Rose, A. K., and C. Engel (2002): "Currency Unions and International Integration," *Journal of Money, Credit and Banking*, 34(4), 1067–89.

Sapir, A. (2011): "European Integration at the Crossroads: A Review Essay on the 50th Anniversary of Bela Balassa's Theory of Economic Integration," *Journal of Economic Literature*, 49(4), 1200–1229.

Sims, C. A. (1986): "Are forecasting models usable for policy analysis?," *Quarterly Review*, (Win), 2–16.

——— (1988): "Bayesian skepticism on unit root econometrics," *Journal of Economic Dynamics and Control*, 12(2-3), 463–474.

Sims, C. A., and H. Uhlig (1991): "Understanding Unit Rooters: A Helicopter Tour," *Econometrica*, 59(6), 1591–99.

Sims, C. A., and T. Zha (1999): "Error Bands for Impulse Responses," *Econometrica*, 67(5), 1113–1156.

Tood, R. (1984): "Improving Economic Forecasting with Bayesian Vector Autoregression," Discussion paper, Federal Reserve Bank of Minneapolis.

Ulku, N., and D. Ikizlerlic (2012): "The interaction between foreigners' trading and emerging stock returns: Evidence from Turkey," *Emerging Markets Review*, 13(3), 381 – 409.

Tables and Figures

Country	**Exchange Rate Regime**	**Monetary Policy Objective**
Argentina	Crowling Bands	Real Exchange Rate targeting
Bolivia	Pegged with horizontal bands	Monetary Aggregate Target
Brazil	Managed Float	Inflation Targeting since 1999
Chile	Pure Float	Inflation Targeting since 1990
Colombia	Managed Float	Inflation Targeting since 1991
Peru	Managed Float	Inflation Targeting since 2002
Venezuela	Conventional fixed peg arrangement	Nominal Exchange Rate targeting

Table 1: *UNASUR Exchange Rate Regime and Monetary Policy Objectives*

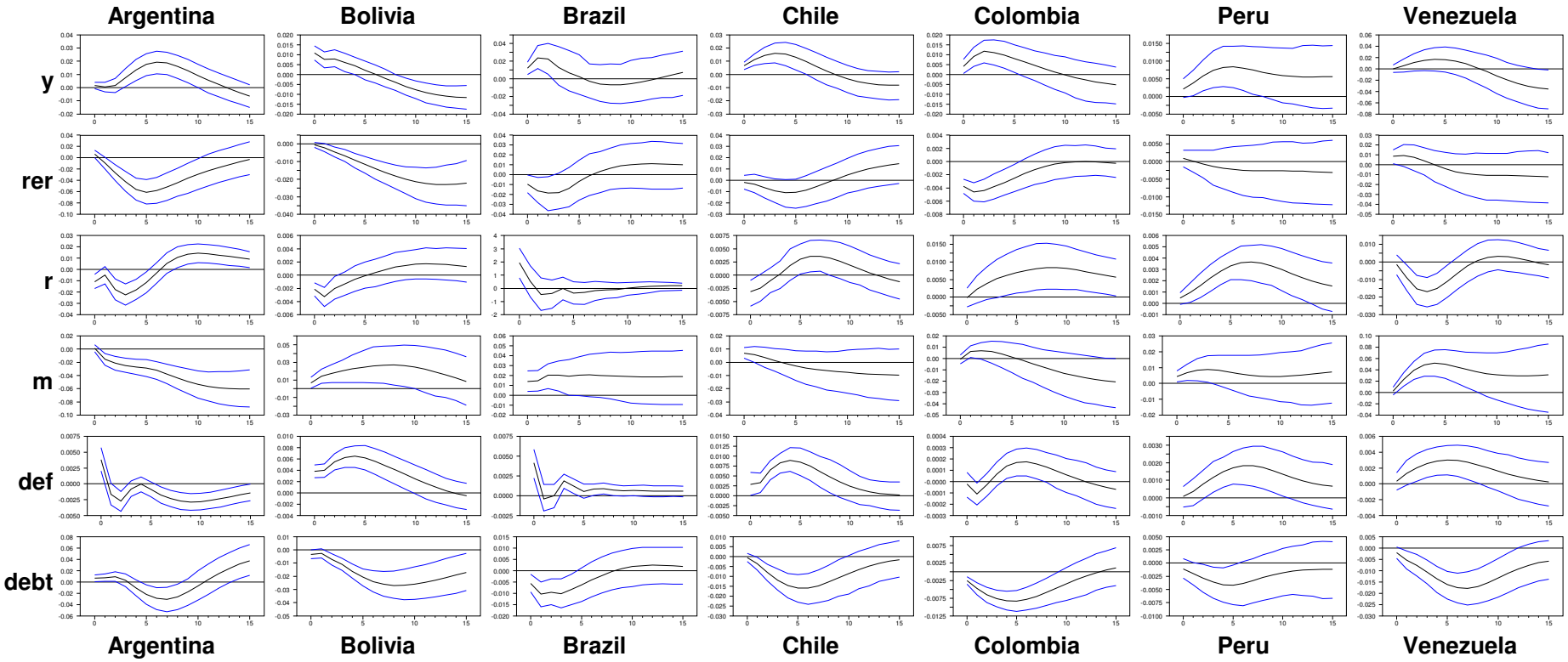

Figure 1: *Impulse response functions to an increase in the U.S. federal fund rate.*

Country	Horizon	Y	RER	R	M	DEF	DEBT
Argentina	1	1.35	2.33	4.32	0.95	6.82	2.19
	2	1.62	3.33	4.09	4.72	7.92	3.21
	3	1.78	6.24	7.67	8.75	10.13	3.70
	4	3.27	10.93	11.60	12.51	10.28	3.37
	8	16.83	24.04	14.20	21.84	11.70	7.55
	12	18.87	22.41	18.34	28.92	16.35	8.48
	16	19.27	20.79	20.17	31.15	17.61	13.15
Bolivia	1	11.77	1.16	5.41	2.36	15.54	1.74
	2	12.25	2.21	8.45	5.41	22.58	2.36
	3	13.02	4.25	7.64	6.83	30.92	4.40
	4	12.89	7.26	7.13	8.07	36.72	8.14
	8	12.39	21.45	7.27	10.31	40.20	29.86
	12	16.62	27.18	8.97	10.25	36.01	32.48
	16	20.79	27.03	9.96	9.28	34.61	29.39
Brazil	1	3.80	2.12	3.51	2.72	12.00	2.43
	2	6.22	3.25	3.71	3.53	11.00	6.43
	3	5.76	4.01	4.44	4.62	9.32	7.46
	4	5.12	4.71	4.81	5.14	10.05	8.37
	8	6.15	5.85	5.86	6.19	10.68	8.16
	12	6.97	7.39	6.27	7.14	11.08	9.12
	16	7.47	8.19	6.50	7.84	11.31	9.54
Chile	1	7.16	1.06	2.26	3.48	1.93	0.96
	2	11.79	1.51	3.29	2.95	4.44	2.76
	3	14.33	2.16	3.72	2.76	9.74	6.99
	4	16.14	2.96	4.19	2.88	15.63	12.02
	8	15.46	4.99	7.89	3.98	26.27	24.41
	12	15.08	7.05	8.98	5.02	25.39	24.02
	16	15.93	9.31	9.81	5.79	24.32	22.40
Colombia	1	2.15	18.96	0.86	0.98	0.97	7.61
	2	6.63	20.92	1.47	2.99	2.70	12.56
	3	10.48	21.45	2.29	2.99	3.06	18.57
	4	11.69	20.76	3.42	2.89	3.83	23.66
	8	10.93	17.18	10.15	4.12	7.87	28.06
	12	11.09	16.85	15.73	7.04	8.10	22.48
	16	12.46	16.83	17.88	9.92	9.45	20.24
Peru	1	1.42	1.03	1.35	2.64	0.94	1.32
	2	2.60	1.36	2.10	3.73	1.71	2.25
	3	3.94	1.71	3.72	4.19	3.01	3.52
	4	5.45	2.07	6.56	4.43	4.94	4.98
	8	9.05	3.67	22.52	5.09	13.82	8.53
	12	10.35	5.45	25.63	6.00	16.96	9.46
	16	11.13	6.93	23.88	6.60	17.24	10.22
Venezuela	1	0.92	2.66	0.90	1.00	0.93	1.33
	2	1.36	3.04	3.09	5.42	2.19	2.92
	3	1.92	3.20	6.87	11.08	3.86	5.07
	4	2.56	3.39	10.38	15.68	5.85	8.78
	8	4.17	4.64	13.57	17.82	11.80	28.22
	12	6.77	6.44	14.44	12.99	11.99	31.46
	16	10.45	8.50	14.60	10.43	12.01	29.04

Table 2: *Forecast Error Variance Decomposition after an increase in the U.S. federal fund rate.*

Sector	Argentina	Bolivia	Brazil	Chile	Colombia	Peru	Venezuela
Agricultural	0.51	0.17	0.34	0.10	0.14	0.17	0.01
Fuel and mining	0.12	0.75	0.28	0.64	0.58	0.50	0.95
Manufactures	0.32	0.07	0.35	0.22	0.22	0.11	0.02
Openness Index	0.40	0.76	0.23	0.70	0.34	0.48	0.46

Notes: Table displays data for 2010 from the World Trade Organization. The Openness Index has been computed as the ratio $(exports + imports)/GPD$.

Table 3: *Exports decomposition by sector as share of total for 2010 and openness index computed from World Trade Organization Data*

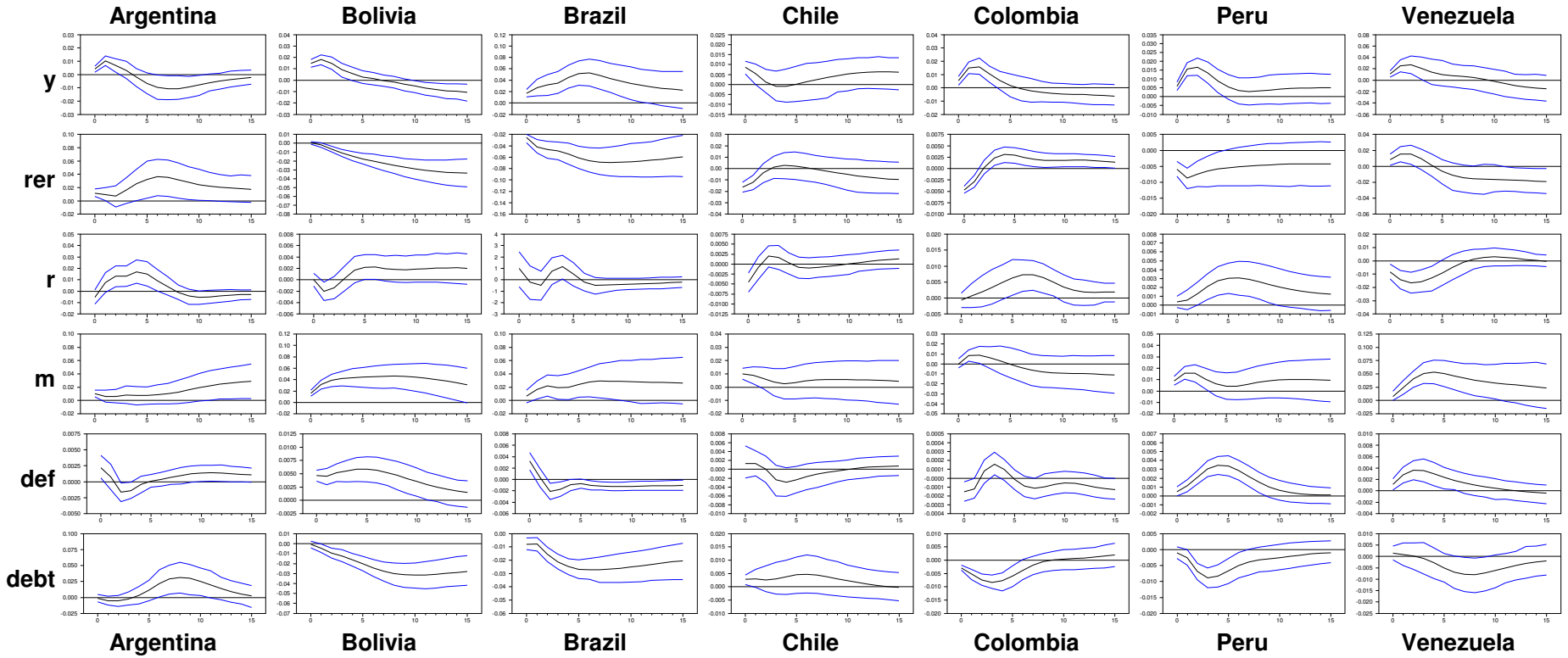

Figure 2: *Impulse response functions to an increase in commodity prices.*

Country	Horizon	Y	RER	R	M	DEF	DEBT
Argentina	1	3.98	5.60	1.46	5.55	2.57	0.82
	2	11.00	3.77	3.42	2.89	3.58	1.89
	3	7.78	2.83	5.15	2.95	4.89	2.29
	4	5.76	3.13	5.97	3.41	5.71	2.38
	8	7.40	7.41	9.62	3.55	5.81	4.90
	12	8.18	8.12	9.89	4.17	6.75	6.96
	16	8.12	8.24	9.82	5.16	7.16	6.84
Bolivia	1	24.27	1.12	0.84	14.80	22.94	0.89
	2	36.57	2.28	3.16	28.80	26.91	3.16
	3	37.83	7.45	3.64	35.53	29.29	7.45
	4	36.05	15.63	4.24	38.51	31.14	12.00
	8	29.09	37.81	8.21	37.85	35.02	30.09
	12	26.64	43.61	9.30	34.39	34.18	37.82
	16	26.72	44.50	10.22	29.66	32.72	39.09
Brazil	1	9.37	10.41	1.39	1.32	5.76	5.56
	2	9.62	18.33	2.35	3.94	6.27	7.97
	3	9.87	22.33	3.14	5.42	7.04	15.29
	4	11.21	25.69	3.97	5.83	8.04	24.50
	8	23.07	40.14	5.58	9.34	9.28	45.00
	12	23.47	46.00	6.34	11.87	10.68	49.87
	16	21.91	47.61	6.72	13.30	11.53	50.55
Chile	1	14.70	17.34	5.05	8.81	0.92	2.62
	2	9.27	12.70	4.80	7.09	2.24	2.51
	3	6.39	9.23	5.94	5.57	2.79	2.43
	4	5.58	8.16	6.64	4.87	3.68	2.51
	8	5.07	6.61	6.97	4.55	5.22	3.89
	12	5.61	6.23	6.94	4.62	5.67	4.70
	16	6.17	6.33	6.82	4.68	5.91	5.03
Colombia	1	3.42	34.44	0.90	0.86	2.86	10.15
	2	15.57	23.26	1.25	3.68	4.49	15.74
	3	19.86	17.15	1.82	3.75	5.94	23.53
	4	18.16	17.32	2.71	3.35	7.91	29.12
	8	12.98	18.69	7.84	4.13	9.06	25.81
	12	11.75	18.30	9.43	4.61	8.67	18.06
	16	11.13	18.12	9.55	4.76	8.71	14.45
Peru	1	9.82	9.47	1.10	8.78	2.04	1.10
	2	29.18	13.00	1.57	14.38	5.86	2.91
	3	31.94	12.58	2.62	13.90	15.06	10.83
	4	29.51	11.92	4.84	11.37	27.12	18.12
	8	19.08	10.38	13.99	7.76	44.56	21.93
	12	16.36	10.42	15.41	7.47	41.84	20.51
	16	15.28	10.78	15.08	7.48	39.47	18.87
Venezuela	1	4.69	2.58	4.41	1.6	1.86	0.98
	2	7.91	4.69	8.93	5.24	6.51	1.22
	3	8.25	5.49	12.47	10.61	11.25	1.63
	4	7.55	5.38	14.87	15.37	14.61	2.11
	8	6.49	6.25	15.06	16.77	15.4	5.24
	12	6.49	7.39	14.11	12.31	12.73	7.03
	16	7.08	8.52	13.44	9.54	11.4	7.2

Table 4: *Forecast Error Variance Decomposition after an increase in commodity prices.*

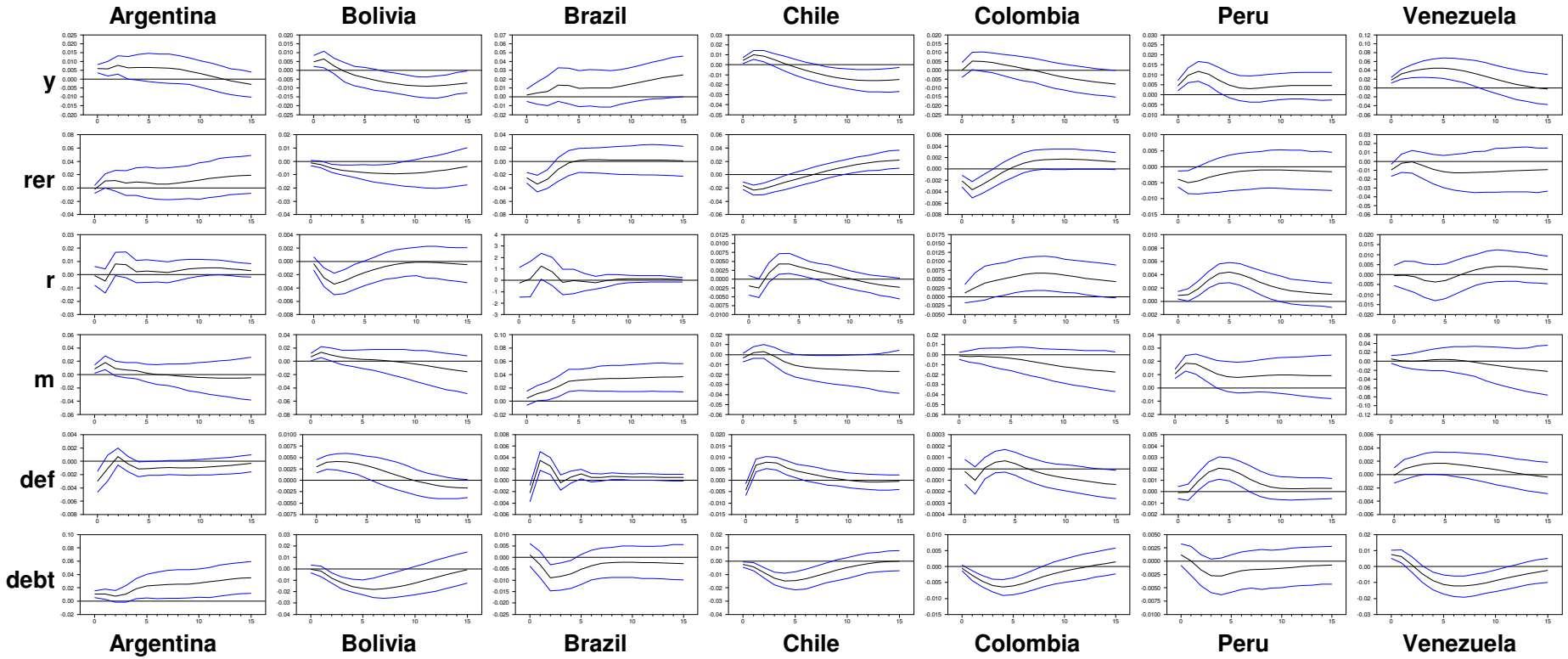

Figure 3: *Impulse response functions to an increase in international asset prices.*

Country	Horizon	Y	RER	R	M	DEF	DEBT
Argentina	1	8.74	1.02	0.80	4.85	4.32	4.67
	2	6.99	2.78	1.94	7.56	5.41	5.94
	3	6.76	2.57	3.24	6.52	5.68	5.04
	4	5.69	2.44	3.67	5.93	5.88	4.70
	8	5.54	2.99	4.68	4.62	6.61	6.26
	12	6.49	4.16	5.54	3.90	6.84	8.99
	16	7.33	5.69	6.09	3.76	7.09	12.65
Bolivia	1	2.40	1.28	0.95	2.27	7.89	0.84
	2	5.11	2.45	4.85	5.41	14.07	1.90
	3	5.01	5.06	8.72	4.56	15.66	4.75
	4	5.35	7.23	10.35	3.97	16.27	9.30
	8	8.50	9.51	9.92	3.69	13.91	16.23
	12	12.30	8.07	9.60	4.53	14.32	13.01
	16	13.24	7.29	9.59	6.20	16.28	12.19
Brazil	1	1.06	11.80	0.82	1.01	3.67	0.76
	2	1.66	13.86	1.76	2.62	10.01	2.11
	3	1.92	12.65	3.14	3.60	10.81	4.50
	4	2.58	10.65	3.85	5.18	10.68	5.57
	8	4.09	8.92	4.85	11.26	10.94	6.16
	12	5.03	8.44	5.10	13.76	11.26	6.30
	16	6.46	8.19	5.21	15.26	11.43	6.49
Chile	1	2.71	18.08	1.46	1.24	3.85	2.50
	2	7.62	22.61	3.07	1.86	11.68	3.86
	3	7.19	21.86	4.28	2.04	16.01	7.95
	4	6.14	19.98	6.51	2.27	18.06	12.78
	8	8.30	15.26	8.81	4.74	16.87	20.04
	12	13.36	17.52	9.29	5.79	16.44	18.62
	16	16.05	21.86	10.95	6.52	16.68	18.04
Colombia	1	0.96	5.98	1.03	1.05	0.9	1.01
	2	2.88	10.93	1.60	1.48	2.69	4.34
	3	3.25	10.21	2.23	1.59	3.11	9.41
	4	3.39	9.16	2.97	1.74	3.62	14.7
	8	4.03	9.82	7.39	2.68	4.42	16.92
	12	5.43	12.00	10.33	4.23	5.46	12.31
	16	7.14	12.65	11.02	5.63	6.83	11.37
Peru	1	4.92	4.11	3.57	11.77	0.83	1.19
	2	11.52	4.97	3.36	18.77	1.49	1.72
	3	14.38	4.89	6.05	17.66	3.75	2.51
	4	14.47	4.78	12.78	15.3	7.82	3.52
	8	11.93	5.40	27.31	10.36	13.50	5.20
	12	11.26	6.08	23.55	9.00	13.17	6.02
	16	10.9	6.59	20.73	8.07	13.26	6.56
Venezuela	1	12.85	2.87	0.86	1.24	0.92	12.64
	2	15.47	2.52	1.50	1.45	1.94	8.28
	3	17.08	2.62	1.95	1.66	2.86	6.42
	4	18.61	2.85	2.61	1.95	3.90	7.68
	8	20.62	4.53	4.96	3.25	6.73	17.39
	12	17.4	6.15	6.91	4.40	7.65	20.22
	16	16.44	7.66	7.87	5.42	8.44	19.32

Table 5: *Forecast Error Variance Decomposition after an increase in international asset prices.*

	Real		*Monetary*		*Fiscal*	
	y	rer	r	m	def	$debt$
Whole sample	0.08	0.38	0.45	0.96	0.36	0.50
Before UNASUR	0.05	0.41	0.44	0.92	0.40	0.41
After UNASUR	0.43	0.31	0.85	0.71	0.19	0.16

Notes: The table reports unconditional pairwise correlation coefficients among Argentina, Bolivia, Brazil, Chile, Colombia, Peru and Venezuela's log-real output (y), log-real exchange rate (rer), nominal interest rate (r), log-aggregate money (m), public deficit-GDP ratio (def) and external public debt-GDP ratio ($debt$) original series. Coefficients are reported as the average of all the possible pairwise combinations between the seven countries.

Table 6: *Average unconditional correlation coefficients among key macroeconomic variables*

		By Country								*By Exch. Rate**		
		AR	*BO*	*BR*	*CH*	*CO*	*PE*	*VE*	*All*	*FITa*	*FITb*	*FX*
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel I. *Real Responses*												
(y)	Mon	0.34	0.57	0.16	0.69	0.68	0.21	0.68	0.48	0.37	0.53	0.59
	Trade	0.40	0.51	-0.21	-0.40	0.53	0.46	0.48	0.25	-0.14	0.05	0.73
	Fin	0.44	0.44	-0.70	0.54	0.55	0.42	0.41	0.30	0.08	0.78	0.63
	Average	0.39	0.51	-0.25	0.28	0.59	0.36	0.52				
(rer)	Mon	0.23	-0.14	-0.11	0.07	-0.16	0.01	-0.08	-0.03	0.07	-0.19	0.34
	Trade	0.02	-0.03	-0.17	0.15	-0.01	-0.24	-0.05	-0.05	-0.11	0.45	-0.01
	Fin	0.31	-0.31	0.25	0.38	0.29	0.26	-0.42	0.11	0.90	0.91	0.21
	Average	0.18	-0.16	-0.01	0.20	0.04	0.01	-0.18				
Panel II. *Monetary Responses*												
(r)	Mon	0.47	0.52	-0.33	0.33	0.46	0.35	0.43	0.32	0.12	0.91	0.83
	Trade	0.04	0.24	-0.12	0.00	0.31	0.36	-0.07	0.11	0.10	0.35	-0.14
	Fin	0.26	-0.08	-0.05	0.12	0.3	0.09	-0.03	0.09	0.31	0.66	0.31
	Average	0.26	0.23	-0.16	0.15	0.36	0.27	0.11	*0.17*			
(m)	Mon	0.25	0.15	0.16	0.22	0.45	0.3	0.36	0.27	0.26	0.57	0.14
	Trade	-0.18	0.04	0.01	-0.23	-0.13	-0.02	-0.03	-0.08	-0.06	0.37	0.06
	Fin	0.55	0.58	-0.77	0.55	0.57	0.40	0.49	0.34	-0.02	0.75	0.84
	Average	0.21	0.26	-0.20	0.18	0.29	0.23	0.27	*0.18*			
Panel III. *Fiscal Responses*												
(def)	Mon	0.07	0.54	0.13	0.56	0.52	0.34	0.51	0.38	0.35	0.73	0.29
	Trade	-0.31	0.18	0.04	-0.31	-0.02	0.09	0.16	-0.03	-0.20	-0.30	-0.18
	Fin	0.19	0.48	0.25	0.64	0.48	0.51	0.59	0.45	0.43	0.70	0.24
	Average	-0.02	0.40	0.14	0.30	0.33	0.31	0.42	*0.27*			
(debt)	Mon	0.65	0.15	0.18	0.72	0.66	0.67	0.63	0,52	0.73	0.91	0.67
	Trade	-0.25	0.01	0.12	-0.20	-0.10	0.05	-0.01	-0.05	-0.10	-0.12	-0.31
	Fin	0.16	0.59	0.49	0.69	0.67	0.62	0.34	0.51	0.75	0.81	0.12
	Average	0.19	0.25	0.26	0.40	0.41	0.44	0.32	*0.33*			

* (FIT1) Within FIT (Floating Inflation Tarjeters) countries – Brazil, Chile, Colombia, Peru. (FITb) Within FIT excluding Brazil – Chile, Colombia, Peru. (FX) Within Fixed Regimen Economies – Argentina, Bolivia, Venezuela.

Notes: The table reports the correlation coefficient of real output (y), real exchange rate (rer), nominal interest rate (r), aggregate money (m), public deficit-GDP ratio (def) and external public debt-GDP ratio ($debt$) reactions between Argentina (AR), Bolivia (BO), Brazil (BR), Chile (CH), Colombia (CO), Peru(PE) and Venezuela(VE) after three external shocks: i) increase in the US. fed fund rate (Mon), ii) increase in commodity prices (Trade) and iii) increase in international asset prices (Fin).

Table 7: *Average pairwise correlations of responses after external disturbances*

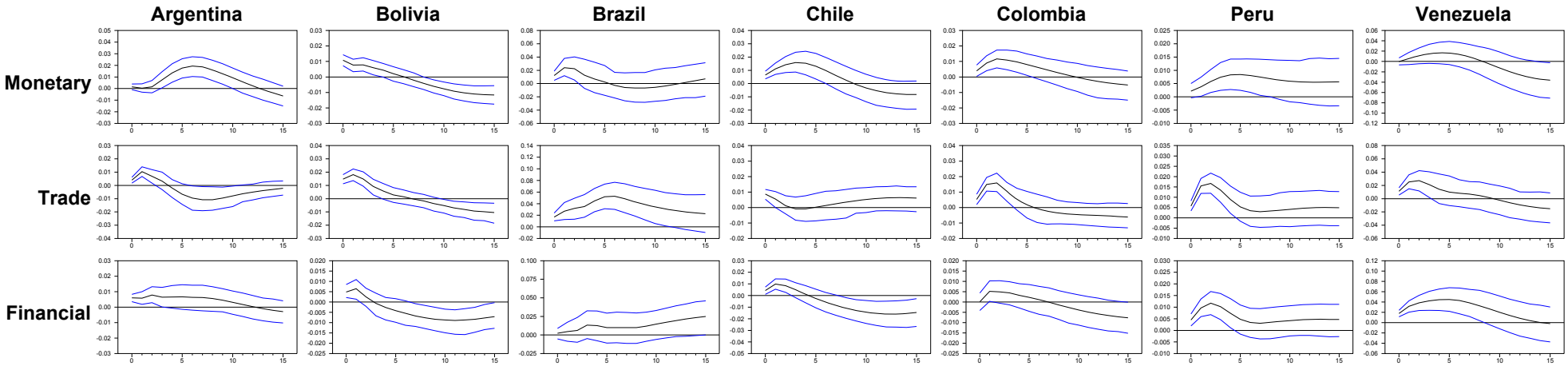

Figure 4: *Real Output responses to external disturbances.*

	Shock	*AR*	*BO*	*BR*	*CH*	*CO*	*PE*	*VE*	*Average*
Panel I. *Real Output*									
(y)	Monetary	13.38	15.56	5.26	14.22	9.05	6.30	10.02	10.54
	Trade	7.62	29.49	17.70	14.70	14.25	25.30	7.10	16.60
	Financial	7.05	10.22	6.46	11.35	5.01	11.79	18.52	10.05
Panel II. *Overall Average*									
	Monetary	14.80	18.64	5.59	11.28	12.27	8.96	11.17	
	Trade	6.29	27.42	19.01	9.07	12.54	17.87	9.35	
	Financial	5.75	9.79	8.09	11.93	8.57	11.98	10.33	

Notes: The table reports the average percentage of the variance of real output (y), real exchange rate (rer), nominal interest rate (r), aggregate money (m), public deficit-GDP ratio (def) and external public debt-GDP ratio ($debt$) in Argentina (AR), Bolivia (BO), Brazil (BR), Chile (CH), Colombia (CO), Peru (PE) and Venezuela(VE) explained by external monetary, trade and financial shocks. The percentage is reported as an average of significant responses 16 periods after the shock.

Table 8: *Relative contribution of external shocks*