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Regional Integration: Economic growth through export diversification?

Gabriela Mordecki Pupko
Universidad de la República
gabriela@iecon.ccee.edu.uy

Matias Piaggio Talice
Universidad de la República
mpiaggio@iecon.ccee.edu.uy

Abstract

This paper analyses the determinants of Uruguayan manufactured exports without agricultural inputs to Argentina and Brazil (where they are principally destined). This was studied through a Vector Error Correction Model (VECM) including these exports to both countries, external demand and bilateral real exchange rates. The empirical analysis suggests that the external demand is the only determinant of this type of exports to the region, according to this model. This means that these exports depend only on Argentina and Brazil growth. Competitiveness seems not to be an important determinant for the performance of these exports to our neighbors.

Keywords: Trade, Regional Integration, Competitiveness, Cointegration.

JEL Code: F10, F15, O24.

Resumen

Este trabajo analiza los determinantes de las exportaciones uruguayas de bienes industriales con insumos sin origen agropecuario a Argentina y Brasil (hacia donde principalmente se destinan). El estudio fue desarrollado a través de un Modelo de Vectores de Corrección de Error (VECM), incluyendo como variables este tipo de exportaciones a ambos países, la demanda externa y el tipo de cambio real bilateral. El análisis empírico sugiere, de acuerdo al modelo estimado, que la demanda externa es el principal *determinante de este tipo de exportaciones. Esto significa que las exportaciones dependen, en el largo plazo, del crecimiento de Argentina y Brasil.*

Palabras clave: Comercio, Integración Regional, Competitividad, Cointegración.

Código JEL: F10, F15, O24.

I. Introduction

Uruguayan commercial insertion is under discussion nowadays. In 1991, Argentina, Brazil, Paraguay and Uruguay created the Mercosur regional block, which was fully consolidated in 1995. But the stabilization problems suffered by the region since 1999, asymmetry problems inside the block, the growth of commodities' international prices and the country access to new markets, led Uruguay to re-discuss its international insertion, strengthening the idea of *open regionalism*.

Uruguayan exports are little diversified, historically based on agricultural and basic products. This implied a poor export performance, in the sense that they are concentrated in few products (commodities) with low technology and low-skilled labor. It also implied low dynamism and high volatility of exports income. Nevertheless, the Uruguayan exports to the region have different characteristics from the ones destined to the rest of the world. Especially, it is well-known the high participation of manufactured exports without agricultural origin. In words of Dalum *et al.* (1999) "In the Keynesian tradition, Kaldor and Thirlwall have argued that exports and trade performance are the main determinants of growth". As a complement to this idea, we can refer to the idea developed by Hausmann *et al.* (2005) declaring that "What you export matters", and concluding that "The clear implication is that the gains from globalization depend on the ability of countries to appropriately position themselves along this spectrum." According to Iglesias (2005) stimulating the diversification of exports structure will denote lower volatility of exports income and positive impacts over the Gross Domestic Product and the employment. In Uruguay, this diversification was led by the development of technological exports, in this case not based on agricultural inputs, mainly based on imported inputs, principally chemical, plastic and metallurgical products. This type of manufactures is classified by Lall (2000) as "high technological manufactures".

According to Lall (2000), “different export structures have different implications for growth and effects on domestic industrial development. Technology intensive structures offer better prospects for future growth because their products tend to grow faster in trade: they tend to be highly income elastic, create new demand, and substitute faster for older products”. Nevertheless, in our country these exports cannot be named as “high technological” because many of them don’t include the complete production process. Several times there are only assemble processes, like the car industry or other similar.

In the early nineties, during the years that the MERCOSUR was consolidated, Uruguayan exports grew rapidly, especially those based on imported inputs, destined principally to the region. But the regional trade decreased since 1998, as a consequence of Brazilian devaluation and the later Argentinean and Uruguayan crisis. Since then, the extra – regional commerce gained importance on Uruguayan’s exports structure, as a consequence of the commodities international prices growth, the access to new markets.

Along the last fifteen years, although around 60% of Uruguayan exports were raw materials and agro-industrial products, approximately 20% were manufactured products based on imported inputs. These goods were principally exported to the region (Argentina and Brazil), mainly chemicals, plastics and products of car industry.

Once Uruguay overcame the crisis, that affected the economy between 1999 and 2002, international insertion got back to debate. Extra regional trade became very attractive since then, as a consequence of the explosive growth of commodity prices, as Uruguay has comparative advantages on many of them. Nevertheless, regional exports started to include a higher share of high technological manufactured products than during the nineties.

As the real exchange rate denotes the competitiveness of the country, it may play a fundamental role as a determinant of the exports. According to Iglesias (2005), the real exchange rate volatility affects the expansion of the exports expected profitability, because it generates uncertainty over the income and the future profits, increasing its risks.

In this way, there are some questions about the determinants of regional manufactured exports based on imported inputs that we intend to answer in this paper. Is the external demand the main explaining factor or are relative prices more important? As these exports are based on imported inputs, what does it weight more, the influence of the real exchange rate decrease cheapening costs or the competitiveness gains over a better income?

Trying to answer these questions this paper analyzes the determinants of regional manufactured exports. In particular, it examines the regional external demand and the role of the real exchange rate as determinants of Uruguayan manufactured exports not based on agricultural inputs. This discussion aims to contribute to the debate of the determinants of this type of exports, as a guide to policy makers.

In the next section we show the evolution of Uruguayan exports over the last fifteen years, studying their structure, analyzing the type of products and their principal destinations. In section three we study the empirical relationship between the manufactured exports without agricultural inputs to the region and their determinants through a Vector Error Correction Model (VECM), and in the last section we present the principal conclusions.

II. Uruguayan Exports: Evolution, structure and main destinations

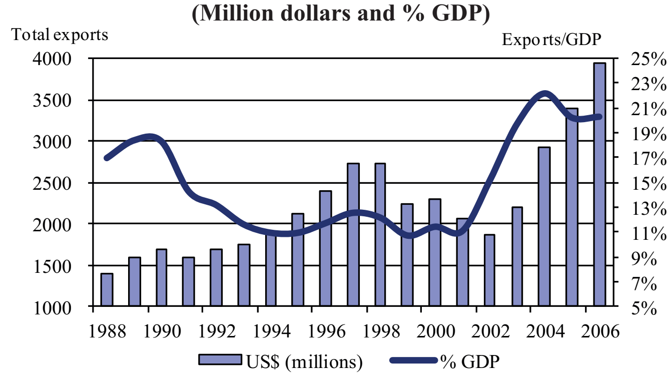
The evolution of Uruguayan economy during the last fifteen years has been characterized by the opening of the country, Mercosur's establishment since 1991 and the stabilization plan applied in the nineties, the crisis suffered by the country from 1999 to 2002 and its fast recover afterwards. Figure 1 shows the fluctuating behavior of total exports between 1988 and 2006, together with the expansion of Uruguayan economy until 1998 and its turning back to the growing path after the crisis.

During this period there have occurred significant changes on the exports behavior, mainly on its destinations. The economic integration process that had begun with the CAUCE and the PEC[1], was consolidate with the Mercosur since the early nineties. These facts, in addition to the similar stabilization plans applied in three of the four countries of the block (Argentina, Brazil and Uruguay) between 1994 and 1999, led to an increasing concentration of Uruguayan exports towards its two big neigh-

1. Economic cooperation agreement between Argentina and Uruguay (CAUCE, for its initials in Spanish) signed in 1974, and Economic Complementation Protocol with Brazil (PEC for it initials in Spanish), signed in 1975.

bors, during this period (Table 1).[2] But the exports structure changed abruptly after Uruguayan crisis, diminishing Uruguayan exports to both countries.

Figure 1 – Uruguayan total exports
(Million dollars and % GDP)



Source: Instituto de Economía based on Uruguayan Central Bank data.

Table 1
Export destinations (%)

	1991	1994	1998	2005	2006
Argentina	11,80%	20,00%	18,50%	7,80%	7,60%
Brazil	24,00%	25,70%	33,80%	13,50%	14,70%
E.U. (ex EEC)	24,10%	20,80%	16,40%	17,30%	16,70%
U.S.A.	9,70%	6,80%	5,70%	22,40%	13,20%
Rest of the World	30,50%	26,70%	25,60%	39,10%	47,80%
Total	100%	100%	100%	100%	100%

Source: Uruguayan Central Bank.

The economic growth and the integration process stopped due to the regional crisis that took place in the late nineties. The economic recovery that followed took place with an increasing access to more dynamic markets (United States and Mexico, between others). This implied an increase of the exports destined outside the region, diminishing the region's share from 55%

2. Since 1991 Uruguay applied a stabilization Plan based on an exchange rate anchor policy with a flotation band. On December 1992 Argentina's currency board was applied, fixing one Argentinean peso to one dollar. One June 1994 Brazil established the Plan Real, fixing a flotation band for that currency. The Plan Real ended in January 1999 with the Brazilian devaluation on January, 1999, the Argentinean currency board on January 2002, when they abandoned the parity, and the Uruguayan stabilization plan was finished with the abandon of the flotation band on June 2002.

to 23.8% between 1998 and 2006. On the other side, the exports destined to the United States rose from 6% to 13.2% in the same period.

Exports' growth during the 90's was not based on the expansion of manufactured products. By the contrary, this growth was based on the increase of basic product exports, diminishing the participation of the industrial sector on total exports (Table 2). This phenomenon was deepened by the crisis, though it started to reverse during the last years.

Table 2
Total exports by type of products
(million US$ and %)

	1991		**1994**		**1998**	
	US$	**%**	**US$**	**%**	**US$**	**%**
Basic foods	555,6	34,70%	679,7	35,50%	1163,1	42,70%
Raw materials and others	324,2	20,30%	336,2	17,60%	303,3	11,10%
Manuf./ agricultural inputs	479,8	30,00%	432,8	22,60%	626,4	23,00%
Manuf./without agricultural inputs	239,6	15,00%	464,8	24,30%	631,4	23,20%
Total	1599,1	100%	1913,4	100%	2724,1	100%

	2004		**2005**		**2006**	
	US$	**%**	**US$**	**%**	**US$**	**%**
Basic foods	1422,9	48,70%	1549,6	45,50%	1934,4	48,20%
Raw materials and others	441,1	15,10%	619,6	18,20%	925,9	23,10%
Manuf./ agricultural inputs	540,5	18,50%	604,8	17,80%	364,5	9,10%
Manuf./without agricultural inputs	517,5	17,70%	630,4	18,50%	790,6	19,70%
Total	2922	100%	3404,5	100%	4015,4	100%

Source: Instituto de Economía on Uruguayan Central Bank data.

Nevertheless, manufactured exports based on inputs without agricultural origin have been growing since the end of the regional crisis, reaching nowadays their historical maximum, and have been destined principally to the region.

On one side, in 2006 68% of total exports to Argentina were manufactured products, standing out the metal-mechanic, chemist and plastic products.

On the other side, 43% of Uruguayan exports to Brazil were manufactured products based on inputs without agricultural origin, predominating in this relation similar type of products as to Argentina (Table 3).

Table 3
Total Exports to Argentina and Brazil by principal type of products (million US$ and %)

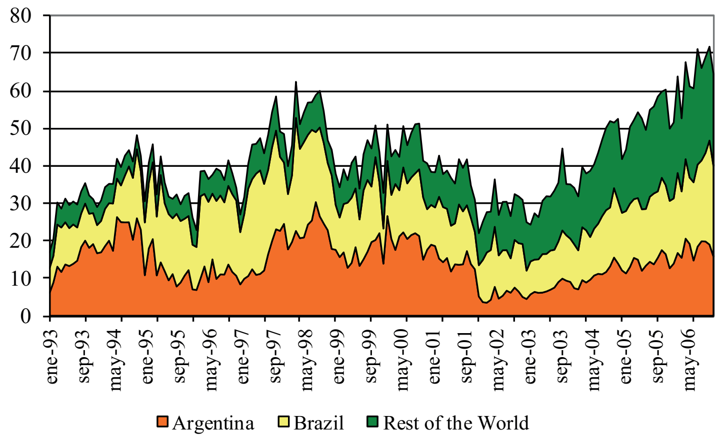
		Basic foods		Raw materials and others		Manuf./ agricultural inputs		Manuf./without agricultural inputs		Total	
		US$	**%**	**US$**	**%**	**US$**	**%**	**US$**	**%**	**US$**	**%**
Argentina	**1991**	27,9	14,9%	28,1	14,9%	49	26,1%	83	44,2%	188	100%
	1994	35,4	9,3%	13	3,4%	74,3	19,4%	259,9	67,9%	382,5	100%
	1998	78,9	15,6%	48,5	9,6%	105,5	20,8%	273,3	54,0%	506,1	100%
	2005	9,9	3,7%	26,5	9,9%	61	22,8%	169,6	63,5%	266,9	100%
	2006	13,4	4,5%	15,4	5,1%	66,6	22,1%	206,1	68,4%	301,5	100%
Brazil	**1991**	215,8	55,0%	22,2	5,7%	51,6	13,1%	102,9	26,2%	392,6	100%
	1994	247,5	96,7%	56,4	22,1%	53,1	20,8%	146,4	57,2%	255,9	100%
	1998	516,1	53,7%	63,5	6,6%	119,2	12,4%	261,5	27,2%	960,3	100%
	2005	197,2	43,0%	14,3	3,1%	44,7	9,8%	202	44,1%	458,2	100%
	2006	267,5	45,9%	13,4	2,3%	48,4	8,3%	253,2	43,5%	582,5	100%

Source: Instituto de Economía on Uruguayan Central Bank data.

Clearly, we can argue that manufactured exports based on non-agricultural inputs are concentrated in the region, while the predominant type of products exported to other destinations are principally primary (no industrialized) basic products (Figure 2).

In conclusion, to study the determinants of manufactured products based on imported inputs, we must examine regional trade, where it is concentrated, taking into account the low influence of the extra regional trade on this type of products.

Figure 2
Manufactured exports without agricultural inputs
(Million dollars)



Source: Instituto de Economía on Uruguayan Central Bank data.

III. Regional impact on the Uruguayan manufactured exports based on imported inputs

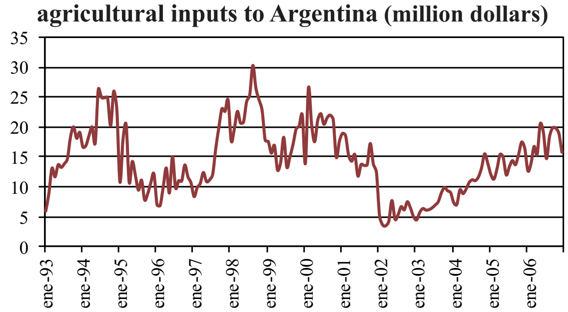
The estimation of demand equations for the Uruguayan manufactured exports not based on agricultural inputs to Argentina and Brazil responds to the purpose of studying the commercial channels through where the external influences become effective. On one hand, total Argentinean imports were used as a proxy of Argentinean demand. On the other hand, Brazilian demand was approximated by Brazilian GDP (in current dollars), because it fitted better in this model. There was also considered the bilateral real exchange rate with each one of the neighboring countries, using the consumer prices (an index 1998-99=100), to reflect the competitiveness in each market of destination of Uruguayan exports not based on agricultural inputs. The period of study is from January 1993 to December 2006, considering monthly data. This period was chosen because of data availability, since between the period that Mercosur started, in 1991 and was fully in force in 1995, a nomenclature change took place, which makes it not possible to link up with previous trade statistics. For the estimations it was considered the logarithmic transformations of the series.

III.1. Definition and description of the series

***1.** Uruguayan manufactured exports not based on agricultural inputs to Argentina*

Frequency: monthly
Period: 1993:01 – 2006.12
Source:Instituto de Economía (IECON) on Uruguayan Central Bank data.

Figure 3
Uruguayan manufactured exports not based on agricultural inputs to Argentina (million dollars)

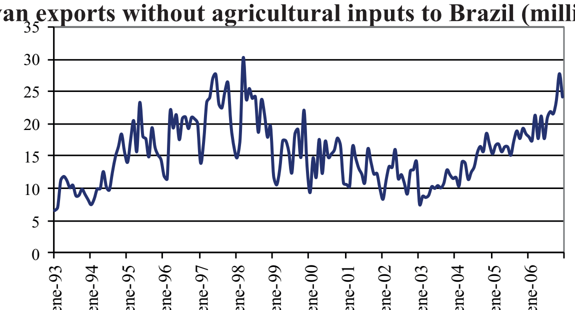


These exports show a fluctuant path, with higher peaks in June 1994, August 1998 (reaching its maximum, at 30.3 million dollars), February 2000 and turning back to a growing path since April 2002, after the crisis that affected the region, growing up in a smoother way than before. The decreasing on 1995 was due to the Mexican crisis of 1994, and the last one in 2002 was the answer to the Argentinean crisis and devaluation of December 2001.

***2.**Uruguayan manufactured exports not based on agricultural inputs to Brazil*

Frequency: monthly
Period: 1993.01–2006.12
Source: Instituto de Economía on Uruguayan Central Bank data.

Figure 4
Uruguayan exports without agricultural inputs to Brazil (million dollars)

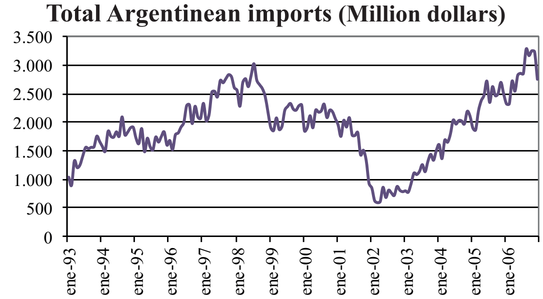


The behavior of these exports to Brazil is similar to previous. They grew since 1993 until October 1997, when they started to fluctuate and entered in a decreasing path (in spite of that the maximum was reached in March 1998, at 30.7 million dollars), as a consequence of the impact of the South-East Asian crisis and the Russian moratorium. The growing path was taken again since January 2003, almost reaching at the end of the period considered similar values to the maximum reached before.

3. Total Argentinean imports

Frequency: monthly
Period: 1993.01–2006.12
Source: Argentinean Ministry of Economy (MECON)

Figure 5
Total Argentinean imports (Million dollars)



4. Brazilian GDP

Frequency: monthly
Period: 1980.01–2006.03
Source: Central Bank of Brazil (BCB)

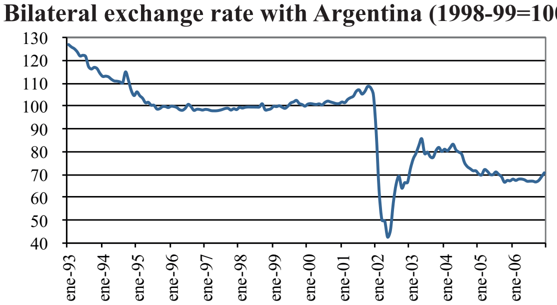
Figure 6
Brazil GDP (million dollars)

External demand of both countries shows a growing path along the decade of the nineties until the Brazilian devaluation in 1999 and the following crisis. At the end of the period they were in a growing path again, that started in 2003, reaching new historical maximums.

5.Bilateral real exchange rate with Argentina (with consumer prices)

Frequency: monthly
Period: 1993.01–2006.12
Source: Instituto de Economía (IECON)

Figure 7
Bilateral exchange rate with Argentina (1998-99=100)

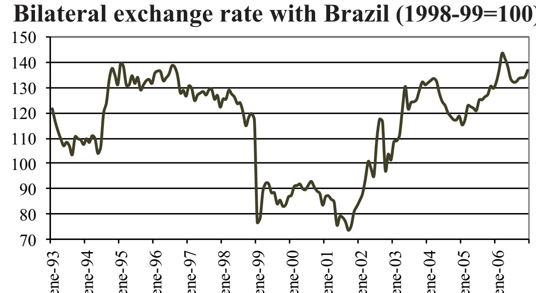


The bilateral real exchange rate with Argentina shows a decreasing path until May 1995, when it stabilized around 100. This behavior was maintained until December 2001, when it abruptly fell as a consequence of Argentinean crisis (the fall down was about 160% between December 2001 and May 2002, when it reached the minimum value). It started to grow again since that moment in a fluctuating way, until September 2003, when it stabilized again, 30% below the base year.

6. Bilateral real exchange rate with Brazil (with consumer prices)

Frequency: monthly
Period: 1993.01–2006.12
Source: Instituto de Economía (IECON)

Figure 8
Bilateral exchange rate with Brazil (1998-99=100)



Bilateral real exchange rate with Brazil path shows an irregular behavior. It is clear the effects of the Brazilian monetary measures in 1999 over it, recovering competitiveness since October 2001.

III.2. Series integration order

The existence of regular unitary roots was contrasted for all the series with the purpose of establishing the appropriate stationary transformation for each of them. The graphics and correlograms of all the series were analyzed and they were carried out the tests of Augmented Dickey-Fuller (ADF) for each one of them.

All the variables resulted integrated of order one. Real exchange rate with both countries and their external demands were integrated of order one without constant, that is to say that the series could be characterized as random walks without drift. On the other side, Uruguayan manufactured exports based on imported inputs to Argentina and Brazil were integrated of order one with drift (Table 4). This behavior was a-priori logical for the real exchange rates, but it wasn't for the external demand. However, from the graphics it can be appreciated that this result could be due to the period of study. While they grew in the nineties, they fell abruptly at the end of the period, and then started to grow again.

Table 4

Test of unitary roots **Augmented Dickey-Fuller (ADF)**

HO = Existence of unitary root

	Statistical valued of the series in levels	Rejection Ho Up to 95%	Value of the statistical of the first difference of the series	Rejection Ho Up to 95%
Manufactured exports based on imported inputs to Argentina (EA)	-21.995 (2 lags)	No	-129.021 (1 lag)	Yes
Manufactured exports based on imported inputs to Brazil (EB)	-18.504 (14 lags)	No	-26.131 (13 lags)	Yes
Real exchange rate with Argentina (TA)	-14.378 (11 lag)	No	-51.471 (10lag)	Yes
Real exchange rate with Brazil (TB)	0.2663 (4 lags)	No	-60.343 (3 lags)	Yes
Total Argentina imports (IA)	-25.657 (12 lags)	No	-29.178 (18 lags)	Yes
Brazilian GDP (GDPBR)	0.637973 (12 lags)	No	-2.102.707 (11 lag)	No*

*Rejects H0 up to 99%, the unit root of the first difference is associated to the seasonality of the serie

III.3. Long-term equilibrium relationships

Test of Johansen

The existence of long term equilibrium relationships among the variables was run under Johansen' methodology (Johansen, 1992). On one hand, it was tested the relationship among Uruguayan manufactured exports non-based on agricultural inputs to Argentina (*EA*), the total Argentinean imports (*IA*) and the bilateral real exchange rate with Argentina (*TA*). On the other hand, it was studied the relationship between Uruguayan manufactured exports non-based on agricultural inputs to Brazil (*EB*), the total Brazilian GDP (*GDPBR*) and the bilateral real exchange rate with Brazil (*TB*). In all the cases, we considered the logarithms of the series. The results indicated that while de external demand and the Uruguayan exports non-based on agricultural inputs with both countries are endogenous variables to the model, the bilateral real exchange rate for both countries did not appear to be significant, neither as endogenous or exogenous. This can be a consequence of the double impact that the real exchange rate has over this type of products: if the real exchange rate improves, it favors the exports, but if the real exchange rate decreases imported inputs costs turn down. This result contrasts with the one reached by Mordecki (2006), who proves that the bilateral real exchange rate of both countries are endogenous in relation to the whole Uruguayan exports to each country.

The vectors of endogenous variables yit are the following:

$$y_{1t} = [EA, IA] \qquad (1)$$
$$y_{2t} = [EB, GDPBR] \qquad (2)$$

The specification used in the Test of Johansen includes a constant, only in the long term relationship in the model with Argentina, and both in the long term and in the short term relationship with Brazil. It was included a group of dummies variables to pick up the seasonality observed in the series and the effects of anomalous events. The period analyzed in the estimation was from January 1993 and until December 2006.

The estimations results shows one cointegration vector for each model proposed (Table 5). The following tables present the results of the Johansen test estimation:

$$y_{1t} = [EA, IA] \qquad (3)$$

Table 5: Johansen test estimation

Cointegration vectors		Variables		Rank Test		Rank Test	
		EB	GDPBR	Eigenvalue	Trace Statistic	Eigenvalue	Max-Eigen Statistic
(H0: r=0)	1	1	-0.967	0.1182	23.05**	0.1182	19.50**
(H0: r=<1)	2	-0.1024	1	0.0225	3541	0.0225	35417

* (**) Denotes rejection of the hypothesis of no cointegration equation at the 5% (1%) level. In accordance with the Akaike criteria, we took the first 3 lags and the 12th for this model estimation.

In this case, as a result of the application of Johansen's test it was also found only one cointegration vector significant at 5%. Also, the signs of the coefficients in the equation are the prospective ones. As in the previous case, when the external demand improves, the Uruguayan manufactured exports based on imported inputs to Brazil also increases.

Exclusion Tests

Estimated model's exclusion tests of the variables were carried out on the cointegration vector to determine if a variable is absent of the long term relationship. This would imply that the long term behavior of the system doesn't depend on that variable. But in both cointegration relationships, both variables coefficient were statistically different from zero (see Statistical Appendix).

Weak exogenity

Variables weak exogenity was studied through the significance of α coefficients of the cointegration matrix, to see if they were significantly different from 0. If one variable is weakly exogenous, then it doesn't react to deviations of the long-term relationship. That is to say, it doesn't adjust endogenously to the equilibrium relationship (see Statistical Appendix, Restricted model). In both estimations the external demand of Uruguayan exports is weak exogenous (it is also strong exogenous analyzing the short term relationship).

Long-term equilibrium relationship

So, the restricted model of the long term relationship is represented through the following equation:

$$EA_t = -5.71 + 1.09\, IA_t \quad (5)$$

$$\begin{array}{cc} (1.5576) & (0.2068) \\ 3.6687 & -5.2908 \end{array}$$

The second model that analyzes manufactured Uruguayan exports without agricultural inputs to Brazil is represented through the following equation:

$$EB_t = -7.01 + \underset{\substack{(0.1701)\\ -5.2282}}{0.89}\, GDPBR_t \qquad (6)$$

In fact, the influence of the external demand is different in both models. While the Brazilian elasticity demand is less than one, implying that these are "normal" goods, Argentinean elasticity demand is more than one, meaning that in this cases these are "luxuries" products.

Short-term dynamism

The short-term dynamism shows different results for each country. They are represented by the following equations:

$$\begin{aligned} d(log(ea)) = & -0.1727*(res(1)) -0.268*d(log(ea(-1))) -0.166*d(log(ea)(-2)) \\ & +0.466*d(log(ia)(-3)) -0.154*ds1 - 0.201*ds2 - 0.115*ds3 \\ & - 0.06*ds4 + 0.02*ds5 - 0.0068*ds7 + 0.0228*ds8 + 0.08*ds9 \\ & + 0.193*ds10 + 0.2065*ds11 + 0.1926*ds12 \qquad (7) \\ & - 0.228*d(fe=199410) -0.339*d(fe>=199509) + 0.554*d(fe>=200002) \\ & + 0.38*d(fe>=200101) + 0.06*d(fe>=200112)- 0.561*d(fe>=200201) \\ & - 0.519*d(fe>=200202)+ 0.695*d(fe>=200205) \end{aligned}$$

where *res1* is the residual of the long-term relationship specified before in equation (5), the error correction mechanism, *d(ia)* represents variations in Argentinean external demand, *ds1, ds2, ds3, ds4, ds5, ds6, ds7, ds8, ds9, ds10* and *ds11* are stationality dummy variables, and *d(fe=199410), d(fe>=199509), d(fe>=200002), d(fe>=200101), d(fe>=200112), d(fe>=200201), d(fe>=200202), d(fe>=200205)* are dummy variables that reflect anomalous facts in the data.

$$\begin{aligned} d(log(eb)) = & - 0.296*(res2) - 0.29*d(log(eb)(-1)) -0.2909*d(log(gdpbr)(-3)) \\ & + 0.729*d(log(gdpbr)(-12)) - 0.2144*ds1 - 0.2632*ds2 \qquad (8) \\ & - 0.1399*ds3 - 0.126*ds4 - 0.0082*ds5 - 0.056*ds7 + 0.0151*ds8 \\ & + 0.0678*ds9 + 0.092*ds10 + 0.149*ds11 + 0.075*ds12 \\ & + 0.359*d(fe>=199603) + 0.3949*d(fe>=199803) \\ & + 0.3177*d(fe=200002) - 0.2538*d(fe=200209) - 0.3402*d(fe>=200405) \end{aligned}$$

3. The null hypothesis that Argentinean elasticity demand is equal to zero was rejected at 95%.

where *res2* is the residual of the long-term relationship specified before in equation (6), the error correction mechanism, *d(ib)* represents variations in Brazilian external demand, *ds1, ds2, ds3, ds4, ds5, ds7, ds8, ds9, ds10, ds11* and *ds12* are stationality dummy variables, and *d(fe>=199603), d(fe>=199803), d(fe=200002), d(fe=200209)* and *d(fe>=200405)* are dummy variables that reflect anomalous facts in the data.

The bilateral real exchange rate with Argentina or Brazil is not significant even in the short term. Because both external demand variables are both, weak and strongly exogenous, the short run dynamic of this variables is not shown here (see Statistical Appendix).

Residuals normality test

Normality test, where H0: residuals are multivariate normal, is not rejected for both models. In the case of the exports to Argentina J*B=8.43 (p-value=0.0771)* while in the case of the exports to Brazil *JB=9.16 (p-value=0.057).*

Impulse Responses

It is also useful to see how the variable under study reacts to one shock of the other variable. Figure 9 shows that when total Argentinean imports (IA) experiment a shock, Uruguayan exports to Argentina (EA) have a positive and permanent effect. In the case of Uruguayan exports to Brazil (EB), first there is an overshooting and a later permanent effect of a Brazilian GDP shock, but in a lower level in comparison to the first reaction (Figure 10).

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Figure 9
Impulse response function of EA to IA

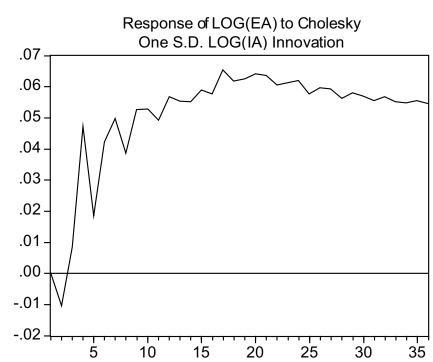
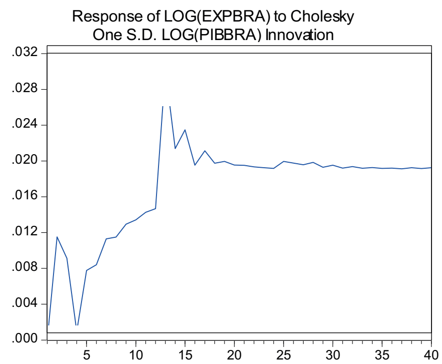


Figure 10
Impulse response function of EB to BraGDP



IV. Final remarks

The aim of this paper is to examine the role of the determinants of Uruguayan manufactured exports not based on agricultural inputs. Being this kind of exports concentrated in the region, the analysis focuses on these types of exports to Argentina and Brazil.

Despite the fact that these exports are not the principal component of Uruguayan exports, they play an important role, in the way that they diversify the exports structure, helping to reach an export structure with more added value and technological content, and consequently, to export more dynamic products to the international market, with less volatility of the income and more impacts on the product and on the employment (Iglesias, 2005).

Also, manufactured exports not based on agricultural inputs have larger spillover effects than other products with more simple productive processes, in terms of developing new skills and knowledge that could be used in other activities.

The classification of the exported goods is based in Lall (2000), which incorporates a traditional analysis of the technological content of the export structure. According to him:

> *"This classification, based on the complexity of technology within each activity, is not meant to suggest that some categories of exports remain competitive without technological effort. All industrial activi-*

ties, regardless of the level of technology, need to constantly upgrade technologies to retain international competitiveness (this also applies to many primary products). The nature of capabilities and the kinds of technological effort needed differ, of course, but there is no activity that is immune to technical change. The same applies to technology upgrading via Foreign Direct Investment. Multinationals transfer technology to developing countries in each category, but their role differs.

Nevertheless, these type of exports does not have much weight on Uruguayan exports structure, so, the country must maintain its effort on increasing traditional exports. In this post crisis scene, the idea of an open regionalism is taking force.

The empirical analysis suggests that the external demand is the only determinant of this type of exports to the region, according to this model. This means that these exports depend only on Argentina and Brazil growth. Competitiveness seems not to be an important determinant for the performance of these exports to our neighbors. The impulse response analysis seems to reaffirm these results.

These conclusions are the result of a first approach to the study of the determinants of these types of exports. This line of research will be deepened exploring other measures of the external demand and trying to capture the different effects of real exchange rate and its volatility. It is also pertinent consider other classifications of manufactured exports to show better the technological content of Uruguayan products.

V. References

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VI. Statistical Appendix

VI.1. Uruguayan High Technological processed exports to Argentina

Unrestricted model

Included observations: 150 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	
LOG(EA(-1))	1000000	
LOG(IA(-1))	-0.920775	
	(0.17674)	
	[-5.20976]	
C	4373311	
	-133119	
	[3.28525]	
Error Correction:	**D(LOG(EXPARG))**	**D(LOG(IMPAR))**
CointEq1	-0.210526	-0.048689
	(0.05374)	(0.02469)
	[-3.91753]	[-1.97200]
D(LOG(EA(-1)))	-0.254729	0.071290
	(0.08623)	(0.03962)
	[-2.95410]	[1.79946]
D(LOG(EA (-2)))	-0.145042	0.041199
	(0.08527)	(0.03918)
	[-1.70104]	[1.05167]
D(LOG(EA (-3)))	0.001049	0.044376
	(0.07760)	(0.03565)
	[0.01352]	[1.24473]
D(LOG(EA (-16)))	0.126011	0.028588
	(0.07480)	(0.03437)
	[1.68465]	[0.83186]
D(LOG(EA (-17)))	0.118482	0.067593
	(0.07439)	(0.03418)
	[1.59265]	[1.97761]
D(LOG(IA(-1)))	-0.273225	-0.380836
	(0.19814)	(0.09103)
	[-1.37894]	[-4.18342]
D(LOG(IA (-2)))	0.029321	0.060313
	(0.20794)	(0.09554)
	[0.14100]	[0.63129]
D(LOG(IA (-3)))	0.438786	0.333961
	(0.18732)	(0.08606)
	[2.34241]	[3.88040]
D(LOG(IA (-16)))	-0.024170	-0.180124
	(0.16849)	(0.07741)
	[-0.14345]	[-2.32688]
D(LOG(IA (-17)))	-0.173833	0.071142
	(0.16556)	(0.07607)
	[-1.04996]	[0.93527]
DS1	-0.157202	-0.147127
	(0.08860)	(0.04071)
	[-1.77432]	[-3.61439]
DS10	0.189214	-0.009080
	(0.08169)	(0.03753)
	[2.31632]	[-0.24194]
DS11	0.199791	-0.016667
	(0.08725)	(0.04009)
	[2.28988]	[-0.41577]
DS12	0.186998	-0.057042
	(0.08972)	(0.04122)
	[2.08435]	[-1.38388]
DS2	-0.206638	-0.212157
	(0.08709)	(0.04001)
	[-2.37279]	[-5.30245]
DS3	-0.126079	-0.096791
	(0.08206)	(0.03770)
	[-1.53647]	[-2.56736]
DS4	-0.076026	-0.042637
	(0.07186)	(0.03302)
	[-1.05796]	[-1.29141]
DS5	0.015648	0.020959
	(0.05165)	(0.02373)
	[0.30297]	[0.88328]
DS7	-0.069460	0.045689
	(0.04774)	(0.02193)
	[-1.45498]	[2.08310]
DS8	0.019551	0.037819
	(0.06080)	(0.02794)
	[0.32155]	[1.35383]
DS9	0.080552	-0.014740
	(0.07297)	(0.03353)
	[1.10383]	[-0.43965]
D(FE=199410)	-0.223005	-0.025341
	(0.11457)	(0.05264)
	[-1.94639]	[-0.48141]
D(FE>=199509)	-0.346474	0.087014
	(0.15790)	(0.07255)
	[-2.19427]	[1.19944]
D(FE>=200002)	0.554415	0.039815
	(0.15914)	(0.07311)
	[3.48387]	[0.54456]
D(FE>=200101)	0.384040	-0.012334
	(0.15846)	(0.07280)
	[2.42353]	[-0.16941]
D(FE>=200202)	-0.558841	-0.124696
	(0.17410)	(0.07999)
	[-3.20987]	[-1.55891]
D(FE>=200112)	0.037216	-0.251625
	(0.15893)	(0.07302)
	[0.23417]	[-3.44606]
D(FE>=200201)	-0.591913	-0.139760
	(0.16653)	(0.07651)
	[-3.55444]	[-1.82670]
D(FE>=200205)	0.635673	0.375206
	(0.17063)	(0.07839)
	[3.72542]	[4.78610]
R-squared	0.662968	0.690279
Adj. R-squared	0.581518	0.615429
Sum sq. resids	2620475	0.553146
S.E. equation	0.147774	0.067894
F-statistic	8139616	9222245
Log likelihood	9070519	2073668
Akaike AIC	-0.809403	-2364891
Schwarz SC	-0.207275	-1762764
Mean dependent	-0.003403	0.002712
S.D. dependent	0.228434	0.109482
Determinant Residual Covariance		9.02E-05
Log Likelihood		3062783
Log Likelihood (d.f. adjusted)		2728067
Akaike Information Criteria		-2797423
Schwarz Criteria		-1532956

Johansen Test

Sample(adjusted): 1994:07 2006:12
Included observations: 150 after adjusting endpoints
Trend assumption: No deterministic trend (restricted constant)
Series: LOG(EXPARG) LOG(IMPAR)
Exogenous series: SEAS D(FE=199410) D(FE>=199509) D(FE>=200002) D(FE>=200101) D(FE>=200202) D(FE>=200112) D(FE>=200201)
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 3, 16 to 17

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.117067	2346287	19.96	24.60
At most 1	0.031409	4786895	9.24	12.97

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 1 cointegrating equation(s) at the 5% level
Trace test indicates no cointegration at the 1% level

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.117067	1867598	15.67	20.20
At most 1	0.031409	4786895	9.24	12.97

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 1 cointegrating equation(s) at the 5% level
Max-eigenvalue test indicates no cointegration at the 1% level

Exclusion test

Vector Error Correction Estimates
Date: 03/30/12 Time: 13:01
Sample(adjusted): 1994:07 2006:12
Included observations: 150 after adjusting
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:
B(1,1)=1,B(1,2)=0
Convergence achieved after 4 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(1)	9045062
Probability	0.002634
Cointegrating Eq:	CointEq1
LOG(EA(-1))	1000000
LOG(IA(-1))	0.000000
C	-2597354 (0.14438) [-17.9891]

Restricted model

Sample(adjusted): 1994:07 2006:12
Included observations: 150 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions: A(2,1)=0,B(1,1)=1
Convergence achieved after 5 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

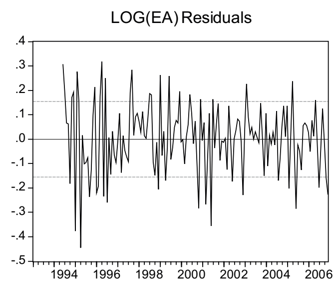
Chi-square(1)	3599734
Probability	0.057789

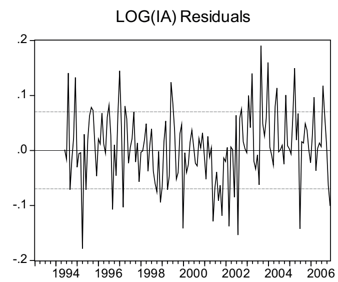
Cointegrating Eq:	CointEq1
LOG(EA(-1))	1000000
LOG(IA(-1))	-1094158
	(0.20681)
	[-5.29076]
C	5714468
	-155764
	[3.66867]

Error Correction:	D(LOG(EA))	D(LOG(IA))
CointEq1	-0.172758	0.000000
	(0.04810)	(0.00000)
	[-3.59189]	[NA]
D(LOG(EA(-1)))	-0.268050	0.060858
	(0.08523)	(0.03939)
	[-3.14517]	[1.54500]
D(LOG(EA(-2)))	-0.166257	0.030737
	(0.08383)	(0.03874)
	[-1.98338]	[0.79335]
D(LOG(EA(-3)))	-0.013487	0.037635
	(0.07699)	(0.03558)
	[-0.17518]	[1.05768]
D(LOG(EA(-16)))	0.120953	0.026599
	(0.07485)	(0.03460)
	[1.61587]	[0.76884]
D(LOG(EA(-17)))	0.116756	0.065558
	(0.07448)	(0.03442)
	[1.56760]	[1.90441]
D(LOG(IA(-1)))	-0.262353	-0.363464
	(0.19783)	(0.09143)
	[-1.32616]	[-3.97512]
D(LOG(IA(-2)))	0.081286	0.088199
	(0.20385)	(0.09422)
	[0.39874]	[0.93610]
D(LOG(IA(-3)))	0.466542	0.352899
	(0.18569)	(0.08583)
	[2.51242]	[4.11179]
D(LOG(IA(-16)))	-0.054294	-0.184157
	(0.16916)	(0.07818)
	[-0.32097]	[-2.35544]
D(LOG(IA(-17)))	-0.201287	0.066392
	(0.16597)	(0.07671)
	[-1.21279]	[0.86550]
DS1	-0.154099	-0.148413
	(0.08883)	(0.04105)
	[-1.73485]	[-3.61505]
DS10	0.193222	-0.009392
	(0.08188)	(0.03785)
	[2.35972]	[-0.24816]
DS11	0.206515	-0.016627
	(0.08751)	(0.04044)
	[2.36001]	[-0.41111]
DS12	0.192619	-0.057578
	(0.08998)	(0.04159)
	[2.14064]	[-1.38445]
DS2	-0.201889	-0.211659
	(0.08726)	(0.04033)
	[-2.31375]	[-5.24832]
DS3	-0.114946	-0.093535
	(0.08204)	(0.03792)
	[-1.40102]	[-2.46663]
DS4	-0.061898	-0.038161
	(0.07164)	(0.03311)
	[-0.86405]	[-1.15255]
DS5	0.021878	0.023684
	(0.05155)	(0.02383)
	[0.42441]	[0.99408]
DS7	-0.068686	0.045340
	(0.04783)	(0.02211)
	[-1.43613]	[2.05111]
DS8	0.022861	0.037747
	(0.06095)	(0.02817)
	[0.37510]	[1.34002]
DS9	0.082287	-0.015499
	(0.07313)	(0.03380)
	[1.12528]	[-0.45858]
D(FE=199410)	-0.228502	-0.027216
	(0.11472)	(0.05302)
	[-1.99178]	[-0.51329]
D(FE>=199509)	-0.339129	0.088614
	(0.15815)	(0.07310)
	[-2.14434]	[1.21230]
D(FE>=200002)	0.553934	0.036682
	(0.15940)	(0.07367)
	[3.47510]	[0.49791]
D(FE>=200101)	0.381251	-0.015783
	(0.15868)	(0.07334)
	[2.40265]	[-0.21520]
D(FE>=200202)	-0.519384	-0.115816
	(0.17415)	(0.08049)
	[-2.98236]	[-1.43886]
D(FE>=200112)	0.061064	-0.247979
	(0.15938)	(0.07366)
	[0.38315]	[-3.36646]
D(FE>=200201)	-0.562127	-0.136035
	(0.16724)	(0.07730)
	[-3.36114]	[-1.75987]
D(FE>=200205)	0.695070	0.392077
	(0.16907)	(0.07814)
	[4.11107]	[5.01738]
R-squared	0.661866	0.685537
Adj. R-squared	0.580150	0.609542
Sum sq. resids	2629040	0.561614
S.E. equation	0.148016	0.068411
F-statistic	8099619	9020807
Log likelihood	9046046	2062274
Akaike AIC	-0.806139	-2349699
Schwarz SC	-0.204012	-1747572
Mean	-0.003403	0.002712
S.D. dependent	0.228434	0.109482

Determinant Residual Covariance	9.09E-05
Log Likelihood	3044784
Log Likelihood (d.f. adjusted)	2722594
Akaike Information Criteria	-2790125
Schwarz Criteria	-1525658

Residuals





Normality test

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
H0: residuals are multivariate normal
Sample: 1993:01 2006:12
Included observations: 151

ComponentS	kewnessC	hi-sqd	fP	rob.
1-	0.266217	17836061		0.1817
2	0.083921	0.1772411		0.6738
Joint		19608472		0.3752
ComponentK	urtosisC	hi-sqd	fP	rob.
1	2278027	32794961		0.0702
2	2288239	31873811		0.0742
Joint		64668772		0.0394
ComponentJ	arque-Bera	df	Prob.	
1	50631022		0.0795	
2	33646222		0.1859	
Joint	84277244		0.0771	

Autocorrelation test

VEC Residual Serial Correlation LM Tests
H0: no serial correlation at lag order h
Sample: 1993:01 2006:12
Included observations: 151

LagsL	M-Stat	Prob
1	8616834	0.0714
2	7478888	0.1126
3	9463293	0.0505
4	5940955	0.2036
5	1593359	0.0031
6	5149649	0.2723
7	9016368	0.0607
8	6882335	0.1422
9	1586926	0.0032
10	4757794	0.3131
11	7360020	0.1180
12	4416093	0.3526

VI.2. Uruguayan High Technological processed exports to Brazil

Unrestricted Model

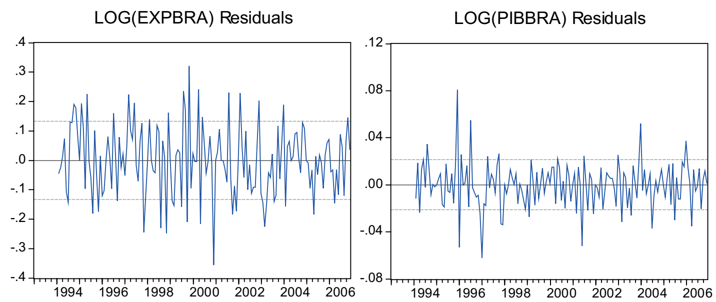
Sample(adjusted): 1994:02 2006:12
Included observations: 155 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LOG(EB(-1))	1000000
LOG(GDPBR(-1))	-0.860207
	(0.16758)
	[-5.13319]
C	6696232

Error Correction:	D(LOG(EB))	D(LOG(GDPBR))
CointEq1	-0.296296	-0.010641
	(0.08015)	(0.01295)
	[-3.69678]	[-0.82169]
D(LOG(EB(-1)))	-0.293105	0.014187
	(0.09351)	(0.01511)
	[-3.13452]	[0.93906]
D(LOG(EB(-2)))	0.021666	0.022300
	(0.09425)	(0.01523)
	[0.22988]	[1.46447]
D(LOG(EB(-3)))	-0.067867	0.010157
	(0.08044)	(0.01300)
	[-0.84372]	[0.78152]
D(LOG(EB(-12)))	-0.089882	-0.024753
	(0.06689)	(0.01081)
	[-1.34369]	[-2.29035]
D(LOG(EB(-1)))	0.287924	-0.066619
	(0.22264)	(0.03597)
	[1.29322]	[-1.85197]
D(LOG(GDPBR(-2)))	-0.301625	-0.022166
	(0.21871)	(0.03534)
	[-1.37909]	[-0.62728]
D(LOG(GDPBR(-3)))	-0.538450	-0.007558
	(0.21712)	(0.03508)
	[-2.47994]	[-0.21546]
D(LOG(GDPBR(-12)))	0.735088	0.143284
	(0.24730)	(0.03996)
	[2.97243]	[3.58603]
C	0.003859	0.009165
	(0.01157)	(0.00187)
	[0.33351]	[4.90176]
DS1	-0.212988	-0.037071
	(0.07398)	(0.01195)
	[-2.87917]	[-3.10166]
DS10	0.092047	0.011569
	(0.06372)	(0.01030)
	[1.44453]	[1.12376]
DS11	0.149861	-0.010786
	(0.06684)	(0.01080)
	[2.24219]	[-0.99885]
DS12	0.076890	-0.058482
	(0.07001)	(0.01131)
	[1.09827]	[-5.17022]
DS2	-0.262016	-0.051096
	(0.07289)	(0.01178)
	[-3.59463]	[-4.33870]
DS3	-0.139763	0.020161
	(0.07043)	(0.01138)
	[-1.98449]	[1.77182]
DS4	-0.125849	0.008379
	(0.06146)	(0.00993)
	[-2.04751]	[0.84376]
DS5	-0.008129	0.018704
	(0.04142)	(0.00669)
	[-0.19626]	[2.79498]
DS7	-0.056939	-0.001550
	(0.03651)	(0.00590)
	[-1.55953]	[-0.26272]
DS8	-0.015163	0.014346
	(0.04983)	(0.00805)
	[-0.30428]	[1.78173]
DS9	0.067896	0.004068
	(0.05867)	(0.00948)
	[1.15718]	[0.42907]
D(FE>=199801)	0.120219	-0.098443
	(0.14692)	(0.02374)
	[0.81824]	[-4.14703]
D(FE>=199603)	0.361508	-0.027164
	(0.14085)	(0.02276)
	[2.56660]	[-1.19367]
D(FE>=199803)	0.397440	0.000622
	(0.14073)	(0.02274)
	[2.82420]	[0.02737]
D(FE=200002)	0.317667	0.035610
	(0.10500)	(0.01696)
	[3.02535]	[2.09903]
D(FE>=200105)	-0.281010	-0.007883
	(0.14358)	(0.02320)
	[-1.95722]	[-0.33984]
D(FE=200209)	-0.253848	-0.010024
	(0.09883)	(0.01597)
	[-2.56861]	[-0.62777]
D(FE>=200405)	-0.340717	0.010533
	(0.13965)	(0.02256)
	[-2.43980]	[0.46682]
D(FE>=199901)	-0.094865	-0.427698
	(0.14666)	(0.02370)
	[-0.64685]	[-18.0501]
D(FE>=200101)	0.069428	-0.251906
	(0.14646)	(0.02366)
	[0.47403]	[-10.6453]
D(fe>=200501)	0.130729	0.176749
	(0.14743)	(0.02382)
	[0.88671]	[7.42018]
D(fe>=199501)	0.097930	0.117022
	(0.14963)	(0.02418)
	[0.65449]	[4.84059]
D(FE>=200201)	0.163711	-0.145317
	(0.15539)	(0.02511)
	[1.05353]	[-5.78806]
R-squared	0.667838	0.892132
Adj. R-squared	0.580713	0.863838
Sum sq. resids	2140390	0.055873
S.E. equation	0.132454	0.021400
F-statistic	7665318	3153153
Log likelihood	1119534	3944921
Akaike AIC	-1018754	-4664414
Schwarz SC	-0.370799	-4016459
Mean	0.007553	0.005124
S.D. dependent	0.204555	0.057995

Determinant Residual Covariance	7.70E-06
Log Likelihood	5097836
Log Likelihood (d.f. adjusted)	4726760
Akaike Information Criteria	-5221625
Schwarz Criteria	-3886445

Residuals



Exclusion Test

Vector Error Correction Estimates
Sample(adjusted): 1994:02 2006:12
Included observations: 155 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:	B(1,1)=1,B(1,2)=0
Convergence achieved after 1 iterations.	
Restrictions identify all cointegrating vectors	
LR test for binding restrictions (rank = 1):	
Chi-square(1)	7711347
Probability	0.005487

Cointegrating Eq:	CointEq1
LOG(EB(-1))	1000000
LOG(GDPBR(-1))	0.000000
C	-2733086

Johansen Test

Sample(adjusted): 1994:02 2006:12
Included observations: 155 after adjusting endpoints
Trend assumption: Linear deterministic trend
Series: LOG(EB) LOG(GDPBR)
Exogenous series: SEAS D(FE>=199801) D(FE>=199603) D(FE>=199803) D(FE=200002) D(FE>=200105) D(FE=200209) D(FE>=200405) INTPIB
Warning: Critical values assume no exogenous series
Lags interval (in first differences): 1 to 3, 12 to 12

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.100761	1716586	15.41	20.04
At most 1	0.004531	0.703890	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 1 cointegrating equation(s) at the 5% level
Trace test indicates no cointegration at the 1% level

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.100761	1646197	14.07	18.63
At most 1	0.004531	0.703890	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 1 cointegrating equation(s) at the 5% level
Max-eigenvalue test indicates no cointegration at the 1% level

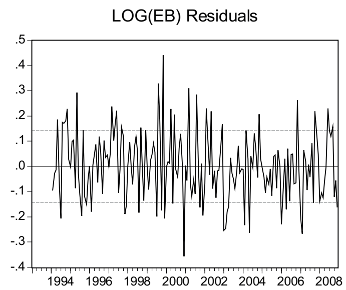
Restricted Model

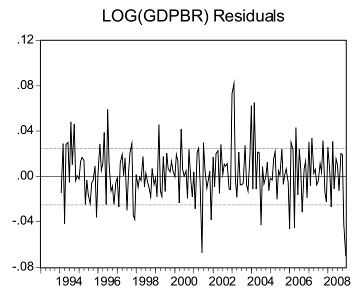
Sample(adjusted): 1994:02 2006:12
Included observations: 155 after adjusting ndpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions: B(1,1)=1,A(2,1)=0
Convergence achieved after 3 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(1)	0.820600	
Probability	0.365005	
Cointegrating Eq:	CointEq1	
LOG(EB(-1))	1000000	
LOG(GDPBR(-1))	-0.889185	
	(0.17008)	
	[-5.22815]	
C	7013893	
Error Correction:	D(LOG(EB))	D(LOG(PIBBRA))
CointEq1	-0.285733	0.000000
	(0.07919)	(0.00000)
	[-3.60828]	[NA]
D(LOG(EB(-1)))	-0.290965	0.013972
	(0.09388)	(0.01517)
	[-3.09942]	[0.92109]
D(LOG(EB(-2)))	0.022938	0.022149
	(0.09440)	(0.01525)
	[0.24298]	[1.45195]
D(LOG(EB(-3)))	-0.066959	0.010064
	(0.08052)	(0.01301)
	[-0.83157]	[0.77349]
D(LOG(EB(-12)))	-0.090127	-0.024768
	(0.06690)	(0.01081)
	[-1.34723]	[-2.29121]
D(LOG(GDPBR(-1)))	0.281629	-0.066573
	(0.22305)	(0.03604)
	[1.26262]	[-1.84707]
D(LOG(GDPBR(-2)))	-0.307631	-0.022235
	(0.21893)	(0.03538)
	[-1.40513]	[-0.62850]
D(LOG(GDPBR(-3)))	-0.543760	-0.007605
	(0.21732)	(0.03512)
	[-2.50213]	[-0.21656]
D(LOG(GDPBR(-12)))	0.729381	0.143190
	(0.24745)	(0.03999)
	[2.94756]	[3.58107]
C	0.003972	0.009170
	(0.01157)	(0.00187)
	[0.34317]	[4.90329]
DS1	-0.214417	-0.037207
	(0.07390)	(0.01194)
	[-2.90131]	[-3.11567]
DS10	0.091704	0.011516
	(0.06372)	(0.01030)
	[1.43924]	[1.11849]
DS11	0.149066	-0.010867
	(0.06681)	(0.01080)
	[2.23108]	[-1.00659]
DS12	0.075485	-0.058606
	(0.06995)	(0.01130)
	[1.07920]	[-5.18526]
DS2	-0.263265	-0.051205
	(0.07284)	(0.01177)
	[-3.61405]	[-4.35013]
DS3	-0.139983	0.020110
	(0.07043)	(0.01138)
	[-1.98759]	[1.76709]
DS4	-0.126029	0.008350
	(0.06147)	(0.00993)
	[-2.05034]	[0.84073]
DS5	-0.008247	0.018706
	(0.04142)	(0.00669)
	[-0.19907]	[2.79455]
DS7	-0.056863	-0.001563
	(0.03652)	(0.00590)
	[-1.55720]	[-0.26490]
DS8	-0.015033	0.014325
	(0.04984)	(0.00805)
	[-0.30162]	[1.77870]
DS9	0.067696	0.004032
	(0.05868)	(0.00948)
	[1.15374]	[0.42526]
D(FE>=199801)	0.118144	-0.098541
	(0.14692)	(0.02374)
	[0.80414]	[-4.15075]
D(FE>=199603)	0.359750	-0.027155
	(0.14091)	(0.02277)
	[2.55303]	[-1.19259]
D(FE>=199803)	0.394903	0.000520
	(0.14073)	(0.02274)
	[2.80613]	[0.02285]
D(FE=200002)	0.317725	0.035640
	(0.10501)	(0.01697)
	[3.02561]	[2.10033]
D(FE>=200105)	-0.278698	-0.007854
	(0.14363)	(0.02321)
	[-1.94035]	[-0.33840]
D(FE=200209)	-0.253784	-0.010058
	(0.09884)	(0.01597)
	[-2.56766]	[-0.62975]
D(FE>=200405)	-0.340297	0.010576
	(0.13966)	(0.02257)
	[-2.43662]	[0.46863]
D(FE>=199901)	-0.096764	-0.427797
	(0.14665)	(0.02370)
	[-0.65983]	[-18.0528]
D(FE>=200101)	0.069807	-0.251872
	(0.14647)	(0.02367)
	[0.47658]	[-10.6417]
D(fe>=200501)	0.131827	0.176737
	(0.14746)	(0.02383)
	[0.89395]	[7.41705]
D(fe>=199501)	0.100753	0.117029
	(0.14973)	(0.02419)
	[0.67289]	[4.83694]
D(FE>=200201)	0.164369	-0.145233
	(0.15540)	(0.02511)
	[1.05775]	[-5.78385]
R-squared	0.667771	0.892083
Adj. R-squared	0.580629	0.863777
Sum sq. resids	2140820	0.055898
S.E. equation	0.132468	0.021405
F-statistic	7663010	3151559
Log likelihood	1119378	3944571
Akaike AIC	-1018553	-4663963
Schwarz SC	-0.370598	-4016008
Mean dependent	0.007553	0.005124
S.D. dependent	0.204555	0.057995
Determinant Residual Covariance		7.70E-06
Log Likelihood		5093733
Log Likelihood (d.f. adjusted)		4726584
Akaike Information Criteria		-5221399
Schwarz Criteria		-3886219

Residuals





Normality Test

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
H0: residuals are multivariate normal
Sample: 1993:01 2008:12
Included observations: 179

ComponentS	kewnessC	hi-sqd	fP	rob.
1	0.199858	11916401		0.2750
2	0.308366	28368391		0.0921
Joint		40284792		0.1334

ComponentK	urtosisC	hi-sqd	fP	rob.
1	2402687	26610021		0.1028
23	575307	24685471		0.1161
Joint		51295492		0.0769

ComponentJ	arque-Bera	df	Prob.
13	8526422		0.1457
25	305386	2	0.0705
Joint	91580274		0.0573

Autocorrelation test

VEC Residual Serial Correlation LM Tests
H0: no serial correlation at lag order h
Sample: 1993:01 2008:12
Included observations: 179

LagsL	M-Stat	Prob
1	6240811	0.1819
2	1152248	0.0213
3	9386528	0.0521
4	4251261	0.3731
5	6869223	0.1430
63	640539	0.4568
7	8122300	0.0872
8	4842381	0.3039
9	4778280	0.3108
10	2189643	0.7009
11	7251881	0.1232
12	3926504	0.4160

Probs from chi-square with 4 df.