Fiscal policy and the real exchange rate: Some evidence from Spain *

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Abstract

The factors influencing the real exchange rate are an important issue for a country's price competitiveness, which is especially relevant to those countries belonging to a monetary union. In this paper, we analyse the relationship between fiscal policy and the real exchange rate for the case of Spain. In particular, we explore how changes in government spending, differentiating between consumption and investment, can affect the long-run evolution of the real exchange rate vis-à-vis the euro area. The distinction between two alternative definitions of the real exchange rate, based on consumption price indices and export prices, respectively, will also prove to be crucial for the results.

Keywords: Real exchange rate, Government consumption, Government investment.

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1. Introduction

The factors influencing the real exchange rate are an important issue for a country's price competitiveness. In addition, for a country belonging to a monetary union, such as the Economic and Monetary Union (EMU) of the European Union (EU), the evolution of the real exchange rate reflects inflation differentials vis-à-vis other countries. Since fiscal policy is the main tool of stabilisation policy available to individual countries in a monetary union, the links between fiscal policy and the real exchange rate become particularly relevant. However, although there is an extensive literature dealing with the macroeconomic effects of fiscal shocks (to name a few, Blanchard and Perotti, 2002; Marcellino, 2006; Mountford and Uhlig, 2009; Afonso and Sousa, 2012; or Burriel et al., 2010), most of these papers fail to assess their impact on real exchange rates.

On the other hand, one of the most visible consequences of the current economic and financial crisis is a great increase in government deficits. This is the case of Spain, a country that had enjoyed a government deficit lower than in the euro area since the start of EMU in 1999. However, as the figures in Table 1 show, the Spanish public budget moved in two years (2007 to 2009) from a surplus of 2%, in terms of GDP, to a deficit above 10%, with the ratio of government debt to GDP more than doubling in the last five years. As a result, and given the commitments under the EU's Pact for Stability and Growth, the Spanish authorities have implemented a series of consolidation measures. These measures have involved cuts in government expenditure, mostly on education, health and social welfare, as well as on the compensation of government employees; together with increases in the rates of the value added tax and some changes in the regulation of the income tax. The main features of the fiscal consolidation strategies currently followed in the EU are discussed at length in Barrios, Langedijk and Pench (2010). As in the other Southern European countries, such austerity policies have resulted in a deeper recession (De Grauwe and Ji, 2013).

[Table 1 here]

Analysing the Spanish case can be relevant, as a good example of a fiscal adjustment that has led to a large GDP fall. Also, and unlike other peripheral European countries (such as Greece, Ireland and Portugal) that had no access to normal market financing and were obliged to implement the adjustment policies imposed by the IMF and the EU, Spain was able to choose the composition of the adjustment measures. In short, a sudden and huge increase in the government deficit, a consolidation strategy that has intensified the recession in the context of a severe financial crisis, and the ability of the authorities to choose the composition of the fiscal adjustment measures

(unlike the cases of Greece, Ireland and Portugal) make Spain an appealing case study when it comes to analyse the economic effects of fiscal consolidation.

The implications of these fiscal consolidation measures on external competitiveness have not been the subject of much empirical research, however; and this despite being of a crucial importance for small open economies such as Spain, suffering the deepest recession in decades. Regarding the Spanish case, there are some studies available on the general effects of fiscal policies. For instance, the impact of fiscal policy changes on the main macroeconomic variables under a VAR framework has been explored in De Castro (2006) and De Castro and Hernández de Cos (2008); and the long-run sustainability of budget deficits when fiscal policy is conducted as a non-linear process, is analysed in Bajo-Rubio, Díaz-Roldán and Esteve (2004, 2006). As far as we know, the only paper that has examined the effects of government spending on the real exchange rate is De Castro and Fernández (2013), who make use of the VAR methodology.

In this paper, we will analyse the relationship between fiscal policy and the real exchange rate, from the estimation of an economic model using econometric methods, for the case of Spain. In particular, we will explore how changes in government spending, differentiating between consumption and investment, can affect the long-run evolution of the real exchange rate vis-à-vis the euro area. Unlike most of the available empirical literature, which concentrates on a single measure of the real exchange rate (usually, that based on the consumption price index, CPI), we will differentiate between two alternative definitions of this variable, namely, the real exchange rate computed using CPIs and the real exchange rate computed using export prices, since they can reveal a different story regarding the competitiveness of a particular country. In this way, we would be able to assess the potential implications of the recently implemented fiscal consolidation measures on external competitiveness. The paper is organized as follows: the underlying theoretical framework is discussed in section 2, and the empirical results are presented in section 3; section 4 concludes.

2. Theoretical framework

As mentioned above, there are a number of papers analysing how changes in government expenditure affect the real exchange rate, as a by-product of the literature on the macroeconomic effects of fiscal policy. On the theoretical side, most models predict a real exchange rate appreciation following an increase in government spending. For instance, in the traditional Mundell-Fleming model a higher government spending raises interest rates, which results in higher capital inflows that entail a nominal and real exchange rate appreciation. From another point of view, since government spending is mostly concentrated on home-produced goods, the resulting increase in the demand for nontradables relative to imported goods, also leads to a

real exchange rate appreciation. This is the result obtained in a series of empirical papers; see, among others, Froot and Rogoff (1991), De Gregorio, Giovannini and Wolf (1994), Chinn (1999), Ricci, Milesi-Ferretti and Lee (2008), Galstyan and Lane (2009a,b), De Castro and Garrote (2012), De Castro and Fernández (2013), or Bénétrix and Lane (2013).

However, other empirical studies have found the opposite result, i.e., a higher government spending leading to a real exchange rate depreciation, instead of an appreciation; see, e.g., Kim and Roubini (2008), Monacelli and Perotti (2010), Enders, Müller and Scholl (2011), or Ravn, Schmitt-Grohé and Uribe (2012). This outcome has been rationalised in terms of the model of Obstfeld and Rogoff (1995): a rise in government spending would lead to a fall in private consumption that reduces money demand and, insofar as prices are sticky, depreciates the nominal and real exchange rate.

The above results refer to government consumption. However, as discussed by Galstyan and Lane (2009a,b), the composition of government expenditures could have a differential impact on the long-run behaviour of the real exchange rate. In particular, an increase in government investment would have an ambiguous effect on the real exchange rate. Since, as these authors claim, an expansion in the public capital stock may be expected to enhance productivity, if this increase in productivity goes mostly to the tradables sector the real exchange rate would appreciate according to the Balassa-Samuelson mechanism (see Balassa, 1964, and Samuelson, 1964). On the contrary, if the increase in government investment raises productivity in the nontradables sector a real exchange rate depreciation would appear. The latter result, i.e., a real depreciation following an increase in government investment, is obtained by Galstyan and Lane (2009a,b); whereas other authors, such as De Castro and Garrote (2012), De Castro and Fernández (2013) and Bénétrix and Lane (2013) found the opposite, i.e., a real appreciation as a result of a higher government investment.

In this paper, we will follow Galstyan and Lane (2009a,b) and estimate an equation for the real exchange rate of Spain vis-à-vis the euro area, where the latter will be made to depend, in addition to government consumption and investment, on two other variables. First, we have incorporated the role of the trade balance, so that an increase in consumption will translate into both a trade deficit and an increased demand for nontradables, which would lead to a real exchange rate appreciation. In addition, we have also included in the empirical model the variable GDP per capita: assuming non-homothetic tastes, countries with higher real per capita income will enjoy a stronger demand for nontradables relative to tradables, leading to a real exchange rate appreciation (Bergstrand, 1991).

3. Empirical results

The State Secretariat for Trade at the Spanish Ministry of Economy and Competitiveness, computes a series of price competitiveness indices, i.e., the so called "índices de tendencia de competitividad" or trend of competitiveness indices (Ministerio de Economía y Competitividad, 2014). These indices are real effective exchange rates, computed for several geographic areas and using two different price indicators, namely, the CPI and an index of export prices. Notice that CPIs include goods that are not tradable abroad, so their evolution may reflect domestic demand pressures. In contrast, export prices involve solely the evolution of the prices of those goods that face international competition, i.e., tradable goods. These trend of competitiveness indices are available on a monthly basis, and are built so that an increase (decrease) means an appreciation (depreciation) of the real exchange rate and, hence, a worsening (improvement) of the economy's external competitiveness vis-à-vis the group of countries analysed.

Figures 1 and 2 show the evolution of the trend of competitiveness indices vis-à-vis the euro area, computed using the CPI and export prices, respectively, from 1995 on. As can be seen, when CPIs are used (Figure 1), the Spanish economy underwent a continuous loss of competitiveness along the period, due to a higher relative increase in Spanish prices. However, when export prices are used (Figure 2), the conclusions are significantly changed, since the loss of competitiveness is much more nuanced, i.e., the appreciation of the real exchange rate is now much lower because the prices of Spanish exports would have experienced a lower relative increase as compared with total prices, measured by the CPI. In other words, the higher relative increase in Spanish prices would be mostly explained by the evolution of the prices of nontradables, which do not face competition in international markets, rather than the prices of internationally traded goods. This in turn would point to the existence of a "dual inflation" in the Spanish economy (Estrada and López-Salido, 2004), and might help to explain to some extent the rather satisfactory evolution of Spanish exports despite the crisis (Myro, 2013).

[Figures 1 and 2 here]

In the rest of this section, we will present the results of the econometric estimation of a long-run equation such as:

$$LREER_t = \alpha + \beta_1 RELGOVCONS_t + \beta_2 RELGOVINV_t + \beta_3 TB_t + \beta_4 LRELYPC_t + \varepsilon_t$$

where:

- *LREER* = (logarithm of the) real effective exchange rate of Spain vis-à-vis the euro area (where an increase in this variable means an appreciation of the real exchange rate)

- *RELGOVCONS* = relative government consumption over GDP, i.e., ratio of government consumption to GDP of Spain divided by ratio of government consumption to GDP of the euro area
- *RELGOVINV* = relative government investment over GDP, i.e., ratio of government investment to GDP of Spain divided by ratio of government investment to GDP of the euro area
- *TB* = Spain's trade balance over GDP
- *LRELYPC* = (logarithm of the) relative real GDP per capita, i.e., real GDP per capita of Spain divided by real GDP per capita of the euro area

and ε_t is an error term. As mentioned above, the relative variables have been computed as the variable for Spain divided by the same variable for the euro area (defined as the 17 countries that had adopted the euro until 2013), which explained around half of the Spanish trade in 2011. We will consider two real exchange rates, according to the price index used in their calculation, namely, the CPI or export prices, denoted as *LREERCP* and *LREERXP*, respectively. These two variables come from the database of the Spanish Ministry of Economy and Competitiveness; and the rest of the data have been taken from Datastream, except for the relative real GDP per capita, taken from Eurostat. The sample period is 1995:1 to 2011:4.

As a first step of the analysis, we tested for the order of integration of the variables by means of two alternative tests. First, the Phillips-Perron test (Phillips and Perron, 1988), which corrects, in a non-parametric way, the possible presence of autocorrelation in the standard Dickey-Fuller test, under the null hypothesis that the variable has a unit root. And, second, given the small power of this test under certain stochastic properties of the series, the KPSS test (Kwiatkowski, Phillips, Schmidt and Shin, 1992), for which the null hypothesis is that of stationarity, unlike the standard Dickey-Fuller-type tests. According to the results shown in Table 2, for the Phillips-Perron test the null hypothesis of a unit root was not rejected in most cases, at the same time that the null of a second unit root was always rejected; in turn, for the KPSS test, the null hypothesis of stationarity was always rejected.

[Table 2 here]

Next, the empirical model has been estimated using the fully-modified OLS (FM-OLS) method of Phillips and Hansen (1990). This method tries to eliminate the potential biases that could appear when estimating under OLS, by computing a class of Wald tests, modified by semiparametric corrections for serial correlation and endogeneity bias. The results of the estimations appear in Table 3. Notice that the figures in parentheses are the Phillips and Hansen's fully-modified Wald test statistics on the null hypothesis that the estimated coefficients are equal to zero, asymptotically distributed as a χ^2 with one degree of freedom. We also include in the last three lines

of the table the coefficient of determination R^2, and the two cointegration tests $CR\hat{Z}_t$ and $CR\hat{Z}_\alpha$ proposed by Phillips and Ouliaris (1990).

[Table 3 here]

Beginning with the results for the CPI-based real exchange rate in the first column of Table 3, we can see how the composition of the fiscal consolidation measures matters regarding their effect on the real exchange rate. A decrease in government consumption, relative to the euro area, would lead to a depreciation of the real exchange rate, on decreasing the demand for nontradables, although the size of the effect would not be too high. On the other hand, if consolidation takes the form of a reduction in government investment, the real exchange rate would appreciate instead, which would indicate a greater effect of the fall in government investment, on the productivity of nontradables rather than of tradables. This result, which is at variance with that found by De Castro and Fernández (2013), is estimated however with a very small coefficient.

As regards the other two variables, they appear in the estimation with the expected sign, and are both significant. That is, a worsening of the trade balance or a higher real per capita income relative to the euro area, by increasing the relative demand of nontradables, would lead to an appreciation of the real exchange rate.

Turning to the real exchange rate based on export prices in the second column of Table 3, the results are now rather different. Most importantly, the effect of the relative government consumption on the real exchange rate now appears with a negative, rather than positive, coefficient; that is, a decrease in government consumption, relative to the euro area, would lead to an appreciation of the real exchange rate based on export prices. Recall that a fall in government consumption means a lower relative price of nontradables, which led to a depreciation of the CPI-based real exchange rate, since the price of nontradables is included into the CPI. However, in the case of the real exchange rate based on export prices, since the latter refer just to those goods that are traded internationally, a real exchange rate appreciation appears instead according to our results, even though the estimated coefficient is even smaller in size than for the CPI-based real exchange rate.

As before, a decrease in government investment is associated with an appreciation of the real exchange rate. The trade balance appears again with the expected negative sign, with a significant coefficient; but now the effect of the relative real per capita income is not significant.

Finally, the two cointegration tests allow us to reject the null hypothesis of no cointegration at the usual confidence levels, so the two estimated equations would represent long-run relationships between the real exchange rate and its determinants.

4. Conclusions

The factors influencing the real exchange rate are an important issue for a country's price competitiveness. This matters particularly to those countries belonging to a monetary union, for which the real exchange rate reflects inflation differentials vis-à-vis the rest of the world once their nominal exchange rates have been lost. In addition, since fiscal policy is the main tool of stabilisation policy available to individual countries in a monetary union, the links between fiscal policy and the real exchange rate become highly relevant.

In this paper, we have analysed the relationship between fiscal policy and the real exchange rate for the case of Spain. As many of the countries participating in EMU, and following a sudden and strong increase in government deficits, the Spanish authorities have implemented a series of fiscal consolidation measures, given the commitments within the EU under the Pact for Stability and Growth. The Spanish case looks mostly relevant because it is a good example of a fiscal adjustment that has led to a large GDP fall; however (unlike the cases of Greece, Ireland and Portugal) the Spanish authorities were able to choose the composition of the adjustment measures. In particular, we have explored how changes in government spending, differentiating between consumption and investment, can affect the long-run evolution of the real exchange rate vis-à-vis the euro area. Moreover, and unlike most of the available empirical literature, we have dealt with two alternative definitions of the real exchange rate, namely, CPI-based and based on export prices, since they can reveal a different story regarding the competitiveness of a particular country.

Our results show that the composition of the fiscal consolidation measures matters as regards their effect on external competitiveness, but the definition of the real exchange rate also matters. A decrease in government consumption, relative to the euro area, would cause a depreciation of the CPI-based real exchange rate; unlike the case of the real exchange rate based on export prices, where it would result in an appreciation of the real exchange rate. A decrease in government investment, in turn, would lead to an appreciation of the real exchange rate in both cases. The estimated effect, however, is not quantitatively too high, particularly in the case of government investment. In addition, a worsening of the trade balance and a higher real per capita income relative to the euro area, would also lead to an appreciation of the real exchange rate, in the latter case just for the CPI-based real exchange rate. Accordingly, the way in which fiscal consolidation is achieved (i.e., whether based mainly on either government consumption or government investment cuts) and how the real exchange

rate is defined, matter as regards their effects on the real exchange rate, and hence on price competitiveness.

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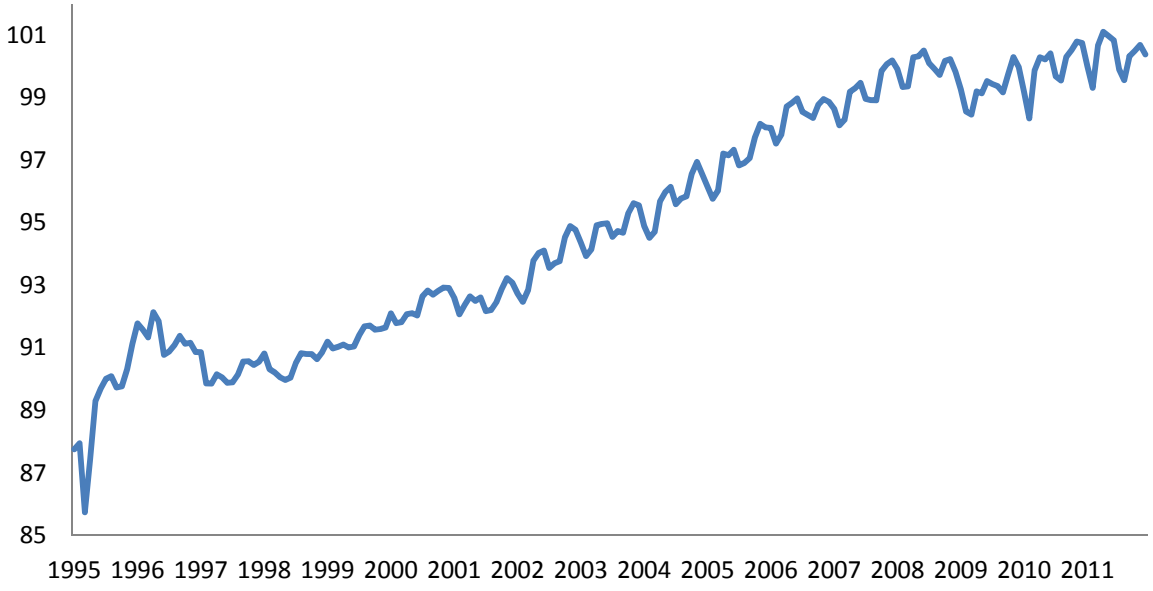
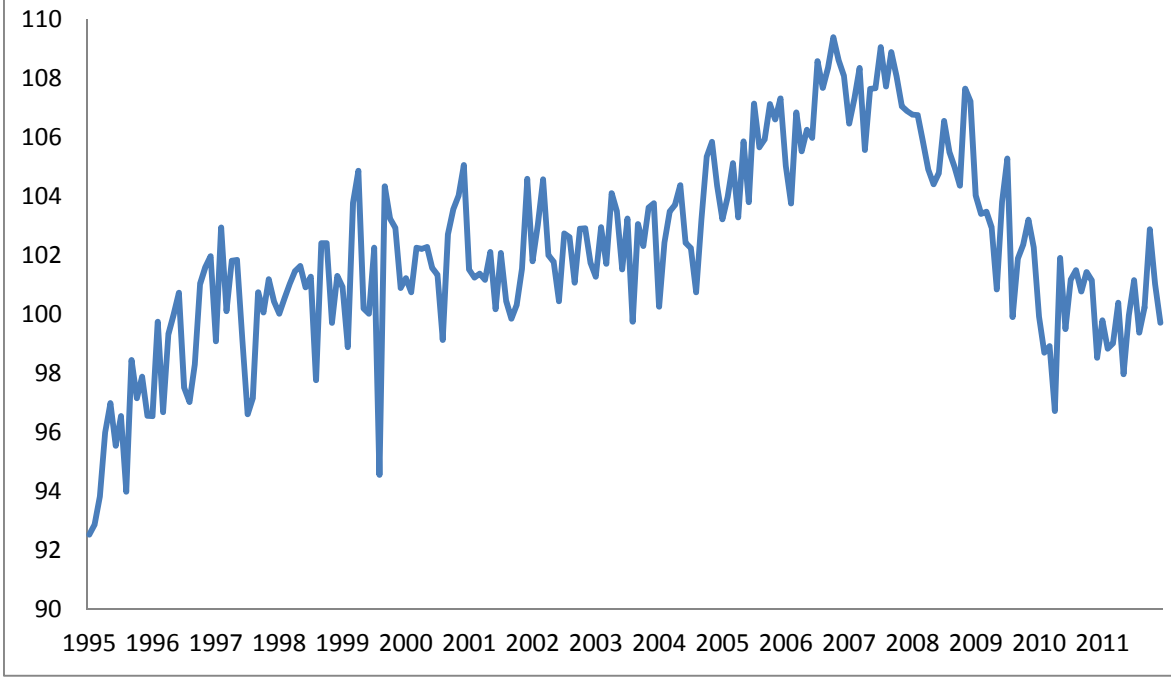
Figure 1
Trend of competitiveness index computed using consumption price indices, vis-à-vis the euro area, 1995-2011
(2010=100)



Source: Ministry of Economy and Competitiveness.

Figure 2
Trend of competitiveness index computed using export prices, vis-à-vis the euro area, 1995-2011
(2010=100)



Source: Ministry of Economy and Competitiveness.

Table 1

Government expenditure, government revenue, government surplus and government debt in Spain and the euro area, 1999-2013 (% of GDP)

	Government expenditure		Government revenue		Government surplus		Government debt	
	Spain	euro area	Spain	euro area	Spain	euro area	Spain	euro area
1999	39.9	48.2	38.6	46.7	−1.3	−1.5	62.4	71.6
2000	39.2	46.2	38.2	46.2	−0.9	−0.1	59.4	69.2
2001	38.7	47.3	38.1	45.3	−0.5	−1.9	55.6	68.1
2002	38.9	47.6	38.6	44.9	−0.3	−2.7	52.6	68.0
2003	38.4	48.1	38.1	44.9	−0.3	−3.1	48.8	69.1
2004	38.9	47.5	38.8	44.6	−0.1	−2.9	46.3	69.6
2005	38.4	47.4	39.7	44.9	1.3	−2.6	43.2	70.2
2006	38.4	46.8	40.7	45.4	2.4	−1.4	39.7	68.5
2007	39.2	46.1	41.1	45.4	2.0	−0.7	36.3	66.2
2008	41.4	47.2	36.9	45.1	−4.5	−2.1	40.2	70.1
2009	46.2	51.2	35.1	44.9	−11.1	−6.3	54.0	80.0
2010	46.3	51.1	36.7	44.8	−9.6	−6.2	61.7	85.5
2011	45.7	49.5	36.2	45.4	−9.6	−4.1	70.5	87.4
2012	47.8	50.0	37.2	46.3	−10.6	−3.7	86.0	90.7
2013	44.8	49.8	37.8	46.8	−7.1	−3.0	93.9	92.6

Source: Eurostat.

Table 2
Unit root tests

A) Phillips-Perron test

I(2) vs. I(1)

	$Z(t_{\tilde{\alpha}})$	$Z(t_{\alpha^*})$	$Z(t_{\hat{\alpha}})$
$\Delta LREERCP_t$	−14.30[a]	−14.31[a]	−11.95[a]
$\Delta LREERXP_t$	−13.67[a]	−12.64[a]	−12.64[a]
$\Delta RELGOVCONS_t$	−10.70[a]	−9.96[a]	−9.64[a]
$\Delta RELGOVINV_t$	−6.13[a]	−5.72[a]	−5.60[a]
ΔTB_t	−8.46[a]	−8.32[a]	−8.39[a]
$\Delta LRELYPC_t$	−11.12[a]	−8.16[a]	−8.06[a]

I(1) vs. I(0)

	$Z(t_{\tilde{\alpha}})$	$Z(t_{\alpha^*})$	$Z(t_{\hat{\alpha}})$
$LREERCP_t$	−3.30[c]	−1.72	4.07
$LREERXP_t$	−2.96	−3.39[b]	0.90
$RELGOVCONS_t$	−1.75	0.61	1.69
$RELGOVINV_t$	−1.61	−2.82[c]	−1.70[c]
TB_t	−0.82	−1.36	−0.77
$LRELYPC_t$	2.53	−2.11	−1.44

B) KPSS test

	η_μ	η_τ
$LREERCP_t$	0.12[c]	1.07[a]
$LREERXP_t$	0.18[b]	0.50[b]
$RELGOVCONS_t$	0.26[a]	0.84[a]
$RELGOVINV_t$	0.21[b]	0.92[a]
TB_t	0.17[b]	0.48[b]
$LRELYPC_t$	0.27[a]	0.69[b]

Notes:

(i) $Z(t_{\tilde{\alpha}})$, $Z(t_{\alpha^*})$ and $Z(t_{\hat{\alpha}})$ are the Phillips-Perron statistics with drift and trend, with drift, and without drift, respectively; and η_μ and η_τ are the KPSS statistics with trend, and without trend, respectively.

(ii) [a], [b] and [c] denote significance at the 1%, 5% and 10% levels, respectively. The critical values for the Phillips-Perron test (at the 1%, 5% and 10% levels, respectively) are −4.10, −3.48 and −3.17 for $Z(t_{\tilde{\alpha}})$; −3.53, −2.91 and −2.59 for $Z(t_{\alpha^*})$; and −2.60, −1.95 and −1.61 for $Z(t_{\hat{\alpha}})$. The critical values for the KPSS test (at the 1%, 5% and 10% levels, respectively) are 0.22, 0.15 and 0.12 for η_μ; and 0.74, 0.46 and 0.35 for η_τ. The sources of the critical values are MacKinnon (1996) for the Phillips-Perron test and Kwiatkowski et al. (1992, Table 1) for the KPSS test.

Table 3

Long-run determinants of the real exchange rate

	LREERCP	*LREERXP*
constant	1.829[a]	2.086[a]
	(10367.3)	(8092.7)
RELGOVCONS	0.232[a]	−0.060[a]
	(226.4)	(9.174)
RELGOVINV	−0.011[b]	−0.018[a]
	(5.564)	(8.932)
TB	−0.023[b]	−0.097[a]
	(5.285)	(56.376)
LRELYPC	0.370[a]	−0.060
	(13.344)	(0.209)
R^2	0.940	0.799
$CR\hat{Z}_t$	−4.966[b]	−6.389[a]
$CR\hat{Z}_\alpha$	−42.613[a]	−47.346[a]

Note: [a], [b] and [c] denote significance at the 1%, 5% and 10% levels, respectively. The critical values for the Wald tests (distributed as a χ^2 with one degree of freedom) are 6.63, 3.84 and 2.71 (at the 1%, 5% and 10% levels). The critical values for the Phillips-Ouliaris cointegration tests come from MacKinnon (1996).