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The balance-of-payments constraint on economic growth in a long-term perspective: Spain, 1850-2000^{*}

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Abstract

The balance of payments can act as a constraint to the rate of growth of output, since it puts a limit to the growth of the level of demand to which supply can adapt. In this paper we examine this issue for the case of Spain, using time series data extending over one-and-a-half century, i.e., the period 1850-2000.

Key words: Economic growth, External deficit, Spanish economy

JEL Classification: F41, F43, N10

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1. Introduction

The Spanish economy has experienced a steady process of growth since the beginning of industrialization at the start of the 19th century. However, though following a rather similar evolution to that of the rest of Western Europe, she underwent a relative retardation as compared to those countries. Specifically, the real GDP of Spain multiplied by 40 over the period 1850-2000, with an annual average rate of growth of 2.4 percent; in per capita terms, GDP multiplied by 15 over the same period, and the average rate of growth was 1.7 percent per year. But, despite the intense catching-up that took place in the last fifty years, the per capita GDP of Spain at the end of the 20th century was still around three quarters of Western Europe's, roughly the same than one hundred years before (Prados de la Escosura, 2007).

The important modernizing role played by the foreign sector on the evolution of the whole economy, though limited by its small relative size, has been emphasized elsewhere (Prados de la Escosura, 1988). In fact, the Spanish economy would have experienced a higher growth over those periods characterized by a greater external openness (as in, e.g., the 1960s, or the years after 1986); and, likewise, she fell behind coinciding with periods of a greater isolation against the rest of the world (such as the years 1890-1913, or 1930-1950) (Prados de la Escosura, 2007). On the whole, the lower weight of foreign trade on GDP as compared to the "European norm" (Molinas and Prados de la Escosura, 1989) could explain the relative backwardness of the Spanish economy until the last third of the 20th century.

On the other hand, it has been also argued that the trade deficit had been a chronic problem of the Spanish economy, given the traditional weakness of exports, and the need for essential imports such as energy, raw materials, intermediate products, and equipment goods. This, in turn, would have been translated into a subordination of growth to the evolution of the trade balance; see, e.g., Segura and García-Viñuela (1978).

The recent availability of long time series for both GDP (Prados de la Escosura, 2003) and the foreign sector (Tena, 2007) invites to a re-examination of the relationship between growth and foreign trade for the case of the Spanish economy. In particular, we will analyze whether or not the balance of payments would have meant an impediment

to further GDP growth over the period 1850-2000. If the answer to this question was negative, then a greater exposure of the Spanish economy to international competition would have most probably led to a higher GDP growth and catching-up as regards the rest of Western Europe. The paper is organized as follows: the theoretical framework is briefly discussed in section 2, and the empirical results are presented in section 3; section 4 concludes.

2. Theoretical framework

The balance of payments can act as a constraint to the rate of growth of output, since it puts a limit to the growth in the level of demand to which supply can adapt. So, an increase in domestic output, by increasing imports, can lead to a deficit in the balance of payments, which may require either a fall in demand or an exchange rate depreciation (i.e., a worsening of the terms of trade) in order to assure the sustainability of the foreign deficit. Accordingly, an unsustainable external deficit would require sooner or later a correction, which puts a brake on further output growth.

A customary way of analyzing this issue follows Thirlwall's approach to calculate the balance of payments-constrained growth rate, as the rate of growth of exports divided by the income elasticity of the demand for imports; see Thirlwall (1979) or Thirlwall and Hussain (1982). By comparing such a growth rate with that prevailing in a particular country, it would be possible to assess whether the balance of payments would have worked as a constraint to economic growth in the country analyzed. This approach, on the other hand, is equivalent to the well-known Krugman's (1989) result, so that countries growing faster face a higher income elasticity for their exports than for their imports.

Assume that the demands for exports and imports are described by the standard functions (see Goldstein and Khan, 1985):

$$\begin{aligned}
 X &= X(Y^*, Q) & \frac{\partial X}{\partial Y^*} > 0, \frac{\partial X}{\partial Q} < 0 \\
 M &= M(Y, Q) & \frac{\partial M}{\partial Y} > 0, \frac{\partial M}{\partial Q} > 0
 \end{aligned}$$

where X and M stand for exports and imports volumes, and Y^* and Y for foreign and domestic real output, respectively; Q is the real exchange rate, measured as the price of

domestic goods relative to foreign goods. To close the model, we add the equation for the balance of payments:

$$B = X - \frac{M}{Q} + F$$

where B and F denote, respectively, the balance of payments and capital inflows in real terms, in terms of domestic goods.

In order to keep unchanged the balance of payments, it is required that:

$$\frac{dB}{dt} = X(\varepsilon_{X,Y^*}\hat{Y}^* - \varepsilon_{X,Q}\hat{Q}) - \frac{M}{Q}(\varepsilon_{M,Y}\hat{Y} + \varepsilon_{M,Q}\hat{Q} - \hat{Q}) + F\hat{F} = 0$$

where ε_{X,Y^*} , $\varepsilon_{M,Y}$, $\varepsilon_{X,Q}$, and $\varepsilon_{M,Q}$ are the (absolute values of the) income and price elasticities of exports and imports, respectively; and the symbol $\hat{\cdot}$ over a variable denotes its growth rate. Assuming that initially $B = 0$, so that $X + F = \frac{M}{Q}$, in order to

have the balance of payments in equilibrium we must have:

$$(1 - \varphi)\varepsilon_{X,Y^*}\hat{Y}^* - \varepsilon_{M,Y}\hat{Y} - [(1 - \varphi)\varepsilon_{X,Q} + \varepsilon_{M,Q} - 1]\hat{Q} + \varphi\hat{F} = 0$$

where $\varphi = \frac{F}{M/Q}$.

Assume for a moment there are no capital inflows, so that $\varphi = 0$ and

$$\varepsilon_{X,Y^*}\hat{Y}^* - \varepsilon_{M,Y}\hat{Y} - (\varepsilon_{X,Q} + \varepsilon_{M,Q} - 1)\hat{Q} = 0$$

As can be seen from the above equation, a country growing relatively faster (i.e., when $\hat{Y} > \hat{Y}^*$) should have, other things equal, a depreciating real exchange rate (provided that the Marshall-Lerner condition holds). However, as shown by Krugman (1989), in a context of imperfect competition those countries showing higher growth rates will increase their shares of world markets, not by reducing the relative prices of the goods they produce, but by raising instead the number of varieties. Accordingly, such countries will enjoy more favourable income elasticities (i.e., a higher ε_{X,Y^*} and a lower $\varepsilon_{M,Y}$) and would be able to experience relatively higher growth rates without the need of real exchange rate depreciation in the long run.

Hence, if there is no long-run trend in the real exchange rate, $\hat{Q} = 0$, we would have the following condition:

$$\frac{\varepsilon_{X,Y^*}}{\varepsilon_{M,Y}} = \frac{\hat{Y}}{\hat{Y}^*}$$

i.e., a country growing relatively faster should have a relatively higher income elasticity for exports than for imports; this is Krugman's (1989) "45-degree rule". From here, we can get a related result, by finding the balance of payments-constrained growth rate, \hat{Y}_B , i.e., the maximum growth rate a country can achieve while keeping in equilibrium the balance of payments, and provided that the real exchange rate remains unchanged:

$$\hat{Y}_B = \frac{\varepsilon_{X,Y^*}}{\varepsilon_{M,Y}} \hat{Y}^* \quad (1)$$

This rule, derived by Thirlwall (1979), is the dynamic analogue of the Harrod trade multiplier (Harrod, 1933), and implies that a country growing above \hat{Y}_B will run an external deficit, which would harm its future growth prospects; conversely, a country growing below \hat{Y}_B will run an external surplus.

Finally, if the real exchange were not constant over the long run, the balance of payments-constrained growth rate would be:

$$\hat{Y}_B = \frac{\varepsilon_{X,Y^*} \hat{Y}^* - (\varepsilon_{X,Q} + \varepsilon_{M,Q} - 1) \hat{Q}}{\varepsilon_{M,Y}} \quad (2)$$

which, in the most general case where capital movements are allowed, becomes (Thirlwall and Hussain, 1982):

$$\hat{Y}_B = \frac{(1-\varphi)\varepsilon_{X,Y^*} \hat{Y}^* - [(1-\varphi)\varepsilon_{X,Q} + \varepsilon_{M,Q} - 1] \hat{Q} + \varphi \hat{F}}{\varepsilon_{M,Y}} \quad (3)$$

In the next section, we will provide estimates of the balance of payments-constrained growth rate for the Spanish case over the period 1850-2000, in its three versions (1), (2) and (3).

3. Empirical results

In order to apply the above theoretical framework, we rely on the foreign sector data of Tena (2007). The period of analysis is 1850-2000. Specifically, we use data on exports and imports, both in real terms (Table 3, series 9 and 10); real exchange rate, measured as the quotient of the price indices of exports and imports (Table 4, series 13); and (minus) the current account balance, as a proxy of capital inflows (Table 8, series 74).

Notice, however, that the latter variable is available from a regular basis only after 1940. The data on real GDP have been taken from Prados de la Escosura (2003). Finally, regarding foreign output, the series on real GDP of the European Union (EU) built by Carreras and Tafunell (2005) has been used, as a proxy for the GDP of Western Europe. Notice that Western Europe was the main market for Spanish exports over the whole period, with a share on total exports always above 50 percent (Tena, 2007).

First of all, we have estimated the exports and imports elasticities using the method of Phillips and Hansen (1990). This method tries to eliminate the potential biases that could appear when estimating under ordinary least squares, by computing a class of Wald tests, modified by semiparametric corrections for serial correlation and endogeneity bias. The values of the estimated elasticities for the whole period appear in the first row of Table 1. Notice that the figures in parentheses are the Phillips and Hansen's fully-modified Wald test statistics, asymptotically distributed as a χ^2 with one degree of freedom; the critical values for these tests are 3.84 and 6.63 for the 5% and 1% significance levels, respectively. In addition, the first row of Table 2 shows, respectively, the annual average growth rates of the GDP of Spain and the EU, and the balance of payments-constrained growth rate according to equations (1) and (2); recall that we can't compute version (3) due to the lack of data for our proxy on capital inflows before 1940.

Table 1. Estimated exports and imports elasticities. Spain, 1850-2000

	ε_{X,Y^*}	$\varepsilon_{M,Y}$	$\varepsilon_{X,Q}$	$\varepsilon_{M,Q}$
1850-2000	1.10 (76.05)	1.20 (255.0)	-0.97 (4.06)	-0.08 (0.08)
1850-1950	0.87 (21.09)	1.07 (47.16)	-0.70 (2.18)	-0.54 (2.54)
1951-1974	1.73 (73.54)	1.57 (1372.1)	-1.87 (10.61)	-0.07 (0.17)
1975-2000	4.18 (224.3)	2.47 (593.8)	-0.35 (1.18)	0.83 (24.94)

Source: Prados de la Escosura (2003), Carreras and Tafunell (2005), Tena (2007), and own elaboration.

**Table 2. Actual and balance of payments-constrained growth rates.
Spain, 1850-2000**

	\hat{Y}	\hat{Y}^*	\hat{Y}_{B1}	\hat{Y}_{B2}	\hat{Y}_{B3}
1850-2000	2.55	2.36	2.17	2.14	–
1850-1950	1.41	1.82	1.48	1.32	–
1951-1974	6.23	4.45	4.93	5.06	5.13
1975-2000	3.02	2.25	3.82	3.79	3.66

Source: Prados de la Escosura (2003), Carreras and Tafunell (2005), Tena (2007), and own elaboration.

As can be seen in Table 1, over the whole period 1850-2000 the estimated demand elasticities for both exports and imports are small, and rather similar, so that, according to Krugman's argument, they should correspond to similar growth rates for the two economies, Spain and the EU. In turn, the real exchange rate elasticity was only significant (at the 5% level) for exports, but not for imports (and the coefficient is even estimated with the wrong sign). The above is indeed true since, as shown in Table 2, the annual average rate of growth of the Spanish GDP was only slightly above that of the EU for this 150-year period. Finally, the actual and balance of payments-constrained growth rates look also rather similar, even though somewhat higher for the former. Accordingly, the foreign sector would have worked to some extent, although very mildly, as a constraint to the growth of the Spanish economy in the long run.

However, since the behaviour of the series might be different across different subperiods, we have repeated the above exercise along the three phases analyzed by Prados de la Escosura (2003). After testing for several possible breaks, he detects two structural changes in the trend of the GDP series dated at 1951 and 1975, together with a break in the level at 1936. The estimated exports and imports elasticities, and the resulting actual and balance of payments-constrained growth rates for the three subperiods 1850-1950, 1951-1974, and 1975-2000, appear in the last three rows of Tables 1 and 2.

Beginning by 1850-1950, the picture does not look too different as compared to the whole period. First, we found now very low, and even smaller than before, demand elasticities, at the same that the real exchange rate elasticities were not statistically significant. Overall, this would reflect the predominance of agricultural products in the Spanish foreign trade over the period. In addition, the rate of GDP growth would be

somewhat below that of the EU; and, since the actual and balance of payments-constrained growth rates would be now rather similar, the foreign sector would not appear to have restricted GDP growth. As pointed out elsewhere (e.g., Tena, 1995, 2007), the Spanish economy was a relatively closed one along those years, characterized by a protectionist stance reinforced in some particular events (such as the end of the 19th century, or the years immediately after the Spanish Civil War), and with a revealed comparative advantage in agricultural products, leading to an erratic and even unpredictable foreign trade.

Things seemed to change after the 1950s. The estimated demand elasticities turn to be more favourable according to Krugman's hypothesis, showing a remarkable increase and becoming higher for exports than for imports; the real exchange rate elasticity was only significant for exports. This relates in turn to an average annual rate of GDP growth significantly higher than of the EU (and despite the strong increase experienced by the latter). These results would follow after a process of increasing external opening and structural change, especially intense during the 1960s, where manufactures began to take the leading role within the structure of the Spanish foreign trade. However, the fact that the actual growth rate was well above the balance of payments-constrained one in each of its three versions, means that the foreign sector would have worked as a constraint to the growth of the Spanish economy along this period. This evidence is consistent with the appearance of situations of "stop-and-go" during that time: when the economy grew too fast the balance of payments deteriorated, putting pressure on the exchange rate so foreign reserves fell, and a period of slower growth followed in order to correct the external disequilibrium. Such a state of affairs would have been also related to the structural transformations of the 1960s, with an increase in the needs of imported intermediates due to a change in both the composition of exports and the whole productive structure (Fanjul and Segura, 1977).

Finally, the last quarter of the 20th century has contemplated a new process of external opening of the Spanish economy, especially after joining the EU in 1986. The estimated demand elasticities strongly increased, even more in the case of exports; and now the real exchange rate elasticity was only significant for imports. On the other hand, despite the deceleration in growth rates as compared to the previous period, the rate of GDP growth was still higher than the EU's. In turn, the actual growth rate was

slightly below its balance of payments-constrained counterpart in each of its three versions, suggesting that the foreign sector would not have restrained GDP growth during those years.

To conclude, in order to provide a robustness check of our results, we have repeated our empirical exercise using the recently published, alternative estimation of the Spanish GDP for the period 1850-2000 of Maluquer de Motes (2009). Tables 3 and 4 show, respectively, the estimated elasticities for imports when using this alternative data on Spanish GDP (the corresponding elasticities for exports would be again those in Table 1); and the annual average growth rates of Spain's and the EU's GDP, together with the balance of payments-constrained growth rate according to equations (1), (2) and (3). As can be seen, the estimated elasticities are roughly similar in all cases, except for the last subperiod, where the demand and real exchange rate elasticities for imports are now higher and lower, respectively. Accordingly, the results are virtually unchanged when using this alternative estimation of the Spanish GDP:

Table 3. Alternative estimation of imports elasticities. Spain, 1850-2000

	$\varepsilon_{M,Y}$	$\varepsilon_{M,Q}$
1850-2000	1.24 (223.6)	-0.16 (0.26)
1850-1950	1.08 (47.94)	-0.53 (2.48)
1951-1974	1.61 (775.1)	0.02 (0.01)
1975-2000	3.06 (958.2)	0.57 (17.15)

Source: Maluquer de Motes (2009), Tena (2007), and own elaboration.

Table 4. Actual and balance of payments-constrained growth rates: alternative estimation. Spain, 1850-2000

	\hat{Y}	\hat{Y}^*	\hat{Y}_{B1}	\hat{Y}_{B2}	\hat{Y}_{B3}
1850-2000	2.40	2.36	2.10	2.06	—
1850-1950	1.38	1.82	1.47	1.32	—
1951-1974	6.01	4.45	4.80	4.94	5.01
1975-2000	2.58	2.25	3.08	3.09	3.00

Source: Maluquer de Motes (2009), Carreras and Tafunell (2005), Tena (2007), and own elaboration.

4. Conclusions

The Spanish economy has experienced a steady process of growth through the period 1850-2000, following a similar evolution to that of the rest of Western Europe. However, only in the second half of the 20th century Spain could catch-up with these countries, offsetting, at least partially, her relative retardation dating back to the start of industrialization. Although the periods of higher growth have corresponded with increases in the degree of external opening, some concerns have also been raised about a more open foreign sector as being a constraint to further growth via unsustainable trade deficits. This argument would be justified in terms of the structural problems of the Spanish economy, as shown in the weakness of exports, and the need for some essential imports.

In this paper, we have analyzed whether or not the balance of payments would have meant an impediment to further GDP growth in relation to Western Europe, over the period 1850-2000. To this end, we have followed a simple approach, calculating the so called balance of payments-constrained growth rate from estimated demand and real exchange rate elasticities for exports and imports, and taking into account the role of capital inflows. Then, this balance of payments-constrained growth rate is compared with the actual GDP growth rate. For the whole period, the Spanish rate of GDP growth was slightly above both the EU's growth rate, and the balance of payments-constrained growth rate, so that the foreign sector would have worked to some extent, although very mildly, as a constraint to the growth of the Spanish economy in the long run.

When repeating the same exercise for the three subperiods 1850-1950, 1951-1974, and 1975-2000, the results did not change dramatically for the first one, although the rate of GDP growth was now somewhat below that of the EU, with very low exports and imports elasticities, and quite similar actual and balance of payments-constrained growth rates. Accordingly, the foreign sector would not appear to have restricted GDP growth over the whole century between 1850 and 1950. As regards the other two subperiods, trade elasticities showed much higher values, even higher for exports, which reflected the increased opening of the Spanish economy (in particular during the first 1960s and after 1986) and the change in the pattern of trade, where the revealed comparative advantage started to turn towards manufactures. In turn, these more favourable values of trade elasticities allowed the Spanish economy to grow

significantly above the EU, especially between 1951 and 1974. The foreign sector, however, would have worked as a constraint to growth only during this subperiod, but not after 1975, when growth rates were smaller both in Spain and the EU.

Overall, the evidence in this paper would suggest that an increased external opening had proved to be a relevant factor in the growth of the Spanish economy, and that its potential restrictive role on growth, through a potentially unsustainable trade deficit, would show only in periods of exceptionally high growth rates (such as the “Golden Age”, 1950-1975).

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