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1. INTRODUCTION

It is now generally accepted both in the literature and in policy discussions that the authorities should aim at achieving the internal macroeconomic target of non-inflationary high-employment growth. In reality, how high that growth rate is will critically depend on several structural constraints: the attitudes of employers and workers in the wage and price-setting process, the degree of labour mobility, and the size of the capital stock. It seems to be the case, however, that governments also care about the external accounts and that they often invoke the existence of external constraints when designing macroeconomic policies. In spite of this generalized practice, it is not always clearly understood why should there be external targets, and what is the correct notion of the external constraint.

The purpose of this paper is twofold. On the one hand, to analise to what extent and under what conditions the pursuit of external targets is justifiable from a conceptual point of view, and how these targets relate to the ultimate external constraint of the economy. On the other hand, to examine the macroeconomic performance and policy experience in the Spanish economy to find out: (i) how macroeconomic policies have been influenced in the past by the evolution of the external accounts; (ii) whether the economy is currently following a path consistent with meeting the external constraint; (iii) what current account and real-exchange rate targets should the economy aim at in the future to continue to satisfy the external constraint; and finally (iv) what macro policies seem most appropiate for this purpose.

In order to address these issues, the paper is organised as follows: Section 2 starts reviewing the recent performance of the

Spanish economy by focussing on the specific episodes where balance of payments problems have led to significant changes in macro policies. Section 3 defines the external constraint and relates it to the concepts of solvency and deficit sustainability. Sections 4 and 5 empirically test if the Spanish economy is following a path consistent with the fulfilment of the external constraint. Section 6 provides policy guidelines to facilitate the task of ensuring that the future evolution of the Spanish balance of payments and the real exchange rate continue to satisfy both the internal and the external constraint. The final section summarises the conclusions.

2. MACROECONOMIC PERFORMANCE AND POLICIES IN SPAIN

The purpose of this section is to highlight the most salient facts in the evolution of Spanish external accounts and to verify to what extent macroeconomic policy has been responsive to this evolution[1]. For this purpose, Table 1 contains a set of useful indicators of the internal and external Spanish macroeconomic performance and macro policies during the last two decades, while Table 2 gives a more detailed breakdown of the balance of payments.

After having experienced a long period of rapid high-employment growth with a nearly balanced current account and a substantial accummulation of foreign reserves between 1959 and 1973, the economy entered into a stagflationary period following the first oil price shock. This shock coincided with the end of General Franco's regime and with the introduction of the political party system. Between 1974 to 1984, the country suffered a deep, long and severe economic crisis. Three main reasons underlay this crisis: i) the delayed response to the initial negative impact of the shock, so as to avoid political and social confrontations, augmented by a significant world recession; ii) a substantial degree of real wage rigidity in the face of a severe terms of trade loss; and iii) the existence of various other labour market inflexibilities which in conjuction with

SPANISH MACROECONOMIC PERFORMANCE AND POLICY: 1969-1989
(Period averages unless stated the contrary, in percent)

Table 1

	1969-73	1974-77	1978-79	1980-82	1983-85	1986-89
MACRO-PERFORMANCE						
a) EXTERNAL						
Current Account (a)	0.6	-3.1	0.9	-2.6	0.4	-0.7
Nominal Exchange Rate (b)	185.6	179.3	147.1	132.7	101.9	101.5
Real Exchange Rate (c)	90.2	102.1	112.0	111.0	98.0	113.3
Terms of Trade (d)	116.6	105.5	114.5	94.1	90.0	109.3
Foreign Reserves (e) (Net of Gold)	8.4	4.5	6.3	4.1	5.8	9.8
Net Foreign Debt (e) (Gross Debt minus Foreign Reserves)	-2.6	8.0	3.7	12.0	11.5	-1.1
b) INTERNAL						
Inflation (CPI)	7.4	18.4	18.0	15.1	10.5	6.5
Real Growth (GDP)	6.7	3.0	0.6	0.7	2.0	4.7
Unemployment Rate	1.6	4.2	8.3	12.8	20.1	18.5
MACRO-POLICY						
Total Liquid Assets (f)	21.1	19.7	19.3	17.4	15.0	12.6
Budget Balance (a)	0.4	-0.2	-1.7	-4.0	-5.8	-3.6
Real Unit Labour Costs (f)	0.0	0.8	0.3	-0.5	-3.0	-1.3

Notes:

a) As a percentage of GDP.

b) Effective Nominal Exchange Rate vis-à-vis developed countries (Index 1985 = 100).

c) Real effective exchange rate vis-à-vis developed countries using CPI's (Index 1985 = 100).

d) Index.

e) As a percentage of GDP. End of period.

f) Growth rate.

Sources: Banco de España and European Commission.

COMPONENTS OF THE SPANISH BALANCE OF PAYMENTS Table 2
(Period averages, percent of GDP)

	1969–73	1974–77	1978–79	1980–82	1983–85	1986–89
Exports	6.9	8.1	9.2	10.8	13.9	12.0
Imports	11.6	14.9	12.0	16.3	17.3	16.9
Trade Balance	–4.7	–6.8	–2.8	–5.5	–3.4	–4.9
Service Balance	3.6	2.5	2.5	2.1	3.0	3.3
Net Transfers	1.7	1.2	1.0	0.8	0.8	1.0
Current Account	0.6	–3.1	0.9	–2.6	0.4	–0.6
Net long-term capital	1.5	2.4	1.8	2.2	0.8	2.5
Basic Balance	2.1	–0.7	2.7	–0.4	1.2	1.9
Net short-term capital	0.1	0.5	0.2	0.1	0.2	0.6
Change in Foreign Exchange Reserves	2.0	–0.2	2.0	–0.8	1.1	2.4

Source: Secretaría de Estado de Comercio.

the previous factors contributed to a sharp decline in industrial employment by over 20 per cent during the second half of the seventies. Since 1985 however the country has undergone a very strong recovery which has been fostered both by adequate domestic policies, world recovery, and last -but not least- by the opportunities and expectations created by Spain's accession to the European Economic Community.

Both Tables further distinguish among sub-periods based on the external performance of the economy. In this regard, it can be observed that after the foreign exchange reserves accummulation and satisfactory current account performance of the beginning of the seventies, the first oil shock led during 1974-77 to current account deficits, reserve losses, and nominal exchange rate depreciation pressures in the face of a real appreciation of the peseta. The substantial increase in net external debt by 10.6 percentage points of GDP between 1973 and 1977, and the danger of an unstoppable balance of payments crisis prompted the economic authorities of the newly elected Democratic Center Party Government to implement a 15% devaluation of the peseta in July, 1977 together with a series of monetary policy measures aimed at restraining demand growth, and a social agreement on wage moderation known as the Moncloa Pact. As a result, there was a significant improvement in the current account balance, a replenishment of foreign exchange reserves, and a drop in net external debt in 1978-79. On the internal side, although the tightening of monetary policy was not accompanied by a tightening of fiscal policy, there was nevertheless a significant reduction in the growth rate and a reversal of the accelerating inflation trend of the previous period.

However, the insufficient degree of wage and demand moderation combined with the persistence of many rigidities and distorsions in labour markets produced, once the effects of the nominal devaluation disappeared, a new series of current account deficits, a drop in foreign exchange reserves, and a significant

build-up of net external debt, which increased by 8.3 p.p. of GDP between 1979 and 1982. As a result, when the Socialist Party took office by the end of 1982, there was again the danger of a balance of payments crisis. To avoid a crisis, the new economic authorities embarked on a 10% devaluation of the peseta in December, 1982 and implemented a further tightening of monetary –not fiscal– policy. These measures were accompanied by a set of structural supply-side reforms (industrial restructuring, energy savings and labour market flexibility policies) designed to improve the production potential of the economy over the medium-term.

Following this policy shift and helped also by a worlwide economic recovery, there was in 1983-85 a substantial improvement in the current account balance, a recovery of foreign exchange reserves and a slight reduction in net external debt. Moreover, the significant moderation of unit labour costs relative to previous periods allowed aggregate supply to expand thus helping achieve a higher growth rate and a further reduction of inflation.

It was precisely towards the beginning of 1985 that the Spanish economy started the vigorous recovery which marked its entrance into the EEC in the following year, and which has also led to a strong output growth rate and, until 1988, to a gradual disinflation process. However, coinciding with the entry of Spain to the EEC there has also been a marked shift towards a continous widening of the current account deficit, which has gone from a surplus of 1.7% of GDP in 1985 to a deficit of 3.0% in 1989, and to an expected deficit of 3.5% in 1990[2].

Nonetheless, there is an important difference between the present episode and the other two discussed above, in spite of all of them being characterised by persistent current account deficits. While in the previous situations there was a loss of foreign reserves, a significant external debt build-up, and nominal depreciation pressures

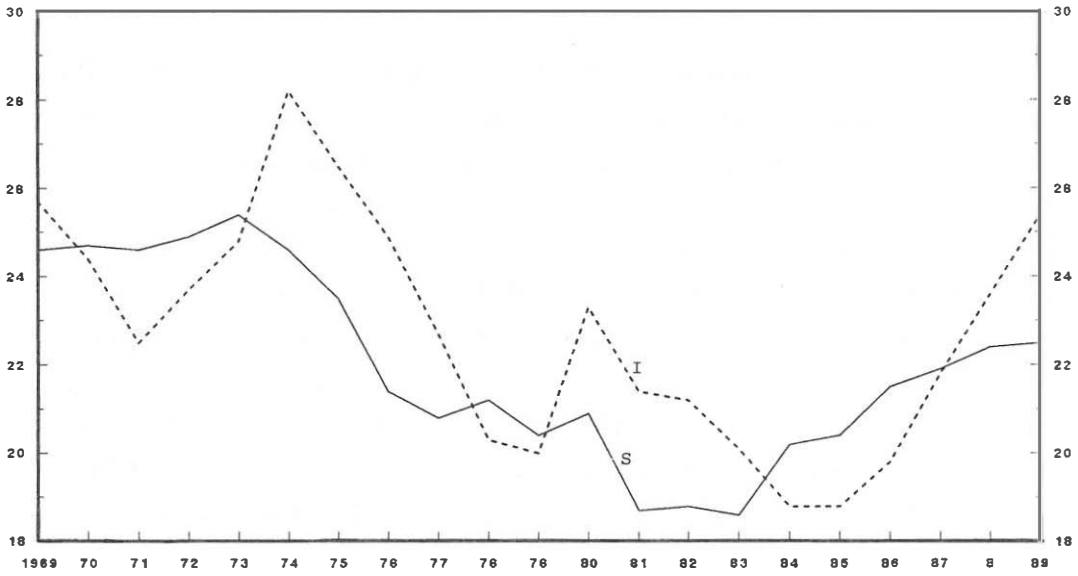
in the peseta market, in the present situation there has been a major accummulation of foreign reserves, a switch from a net debtor to a net creditor position, and an appreciating peseta in both nominal and real terms. In other words, the recent widening current account deficit has been more than financed by capital flows and, specifically, by net foreign investment.

Moreover, while in the two previous episodes, which placed the economy near a balance of payment crisis situation, the current account deficit came from large reductions in total domestic saving in the presence of decreasing or stagnant investment, in the present episode the current account deficit is coming from an impressive increase in total domestic investment that cannot be fully financed by domestic saving. Indeed, as shown in Figure 1, in the first episode (1974–77) the saving and investment rates came down respectively by 3.8 and 5.7 p.p. of GDP. In the second period (1980–82), the savings rate came down by 2.1 p.p. while the investment rate declined by 3.3. p.p. In contrast, in the current period (1986–89) the saving rate has gone up by 1.0 p.p. while the investment rate has gone up by an impressive 5.6 p.p.

In spite of all the above, there is still a lot of uncertainty and disagreement in Spain nowadays regarding the extent to which the current external situation is sustainable or not. Specifically, if present trends continue will current account deficits become too large to be financed by stable direct investment flows, thus leading to an explosion of external debt in the absence of corrective policy measures? Or, on the contrary, could it be the case that the Spanish economy is not just solvent but dynamically inefficient, and therefore that it could run even larger current account deficits to take advantage of its present net creditor positon? These issues will be addresed later on the paper.

Figure 1

TOTAL SAVING AND INVESTMENT
(As a % of GDP)



S = Total Saving
I = Total Investment
Source: National Accounts

This section has provided some casual evidence in support of the hypothesis that the major policy changes which occurred in Spain during the last twenty years have been triggered by what was regarded as a highly unfavourable evolution of the external accounts. In the following section we try to ascertain what is the nature of the external constraint.

3. SOLVENCY, SUSTAINABILITY AND THE EXTERNAL CONSTRAINT

3.1. The external constraint

As stated in the introduction, while there is a clear meaning attached to internal targets and constraints from a macroeconomic point of view, there is a lot more confusion and ambiguity in the popular definitions of what constitutes external targets and constraints. For instance, standard macroeconomic textbooks have been defining "external balance" as a situation where the balance of payments is zero. At the same time, they have also emphasised that while this balance can be automatically and continuously maintained under flexible exchange rates, it requires of other policy instruments under fixed exchange rates.

It is now widely recognized, however, that a sensible interpretation of external balance should center primarily around the current account balance, which is the determinant of the net asset accumulation process by the economy. Moreover, for a given current account balance, the role played by exchange rate policy is just left to influence the distribution of net asset accummulation between the private and the public sector.

Indeed, the external constraint of the economy should be understood in a long-run sense. Specifically, if a country runs a trade balance deficit in the present it will accumulate net external liabilities that will need to be paid for in the future. Thus, in the

future there will be an equilibrium situation where the country runs a trade balance surplus which is just enough to service the net external debt; namely, the long-run current account balance will be zero.

Consequently, an economy running a series of trade balance deficits in the present must inevitably be ready to run trade balance surpluses in the future that allow servicing the current level of external debt; i.e. that preserve its solvency. If the present value of future expected trade surpluses is not large enough, the economy will not be able to fully service its net debt and therefore will become insolvent. If, on the contrary, the present value of future expected trade surpluses is too large, the economy will be in a situation of dynamic inefficiency since it will not fully exploit its intertemporal consumption possibilities. Accordingly, the path of the current account balance will be sustainable if it is consistent with the long-run external solvency constraint.

Summarising, in a long-run equilibrium situation the economy will satisfy the condition that the present value of its spending —on both domestic and foreign goods— plus the value of its net external debt be equal to the present value of domestic income. Furthermore, this constraint will apply regardless of the evolution of the overall balance of payments and of the specific exchange rate policy followed by the authorities.

It must be pointed out, however, that although the external constraint is a long-run one —i.e. the long-run current account must balance— there may be reasons why govements also worry about the shorter-run evolution of the current account. As explained in Viñals (1986), in a Walrasian world with fully flexible prices and wages, no distortions, no uncertainty, and perfect access to international financial markets, the long-run external constraint will be the only one facing the economy. In such a case the path of the current account and foreign debt levels would be socially and privately optimal and

the policymakers would not feel the need to express concern about them. Unfortunately this is not the world we live in. With markets ridden by imperfections and distortions, the authorities may have have several reasons to be concerned about the short-run behaviour of the current account. Prominent among these reasons are the following: i) Sticky prices and wages, whereby a worsening of the current account is interpreted as a leakage in demand that boosts the foreign economy and slows down domestic growth, when output is demand determined; ii) Divergence between private and social costs of borrowing and lending abroad which may motivate restrictions on capital inflows and outflows, reducing the mobility of capital and correspondingly elevating the current account as a policy goal (see Artis and Bayoumi (1990)); iii) Uncertainty about future flexibility to correct paths that, while satisfying long-run solvency, are excessively profligate today and will imply severe constraints in the future which may be wise to avoid; iv) Influence of the current account on the attitude of financial markets, whereby a deterioration in the current account affects market sentiment with the corresponding speculative attacks against the domestic currency in a world of fixed exchange rates and causes excessive short-run volatility of the nominal and real exchange rates when they are flexible; v) Influence of the current account and external debt paths on the cost of borrowing, whereby an externality is imposed on the country as a whole and on future borrowers by the marginal borrower; vi) Irreversiblity arguments by which once export markets are lost they are not easily regained; and finally vii) Protectionist threats that may emerge from political pressures after an extended period of substantial current account deficits.

As a result, the authorities should always remain vigilant that the net external debt of the country does not grow beyond its ability to pay, while in the case of economies suffering from one or several of the imperfections and distortions just mentioned above they may also want to set -generally upper- limits to the stock of the net external debt at any given point of time.

3.2. The aritmethic of the external constraint

To formalize these ideas, it is convenient to write the balance of payments of an open economy as:

$$CA_t \equiv - CAP_t + \Delta R_t \qquad (1)$$

where CA, CAP and ΔR are respectively the current and capital account balances, and the change in official foreign exchange reserves.

Each of these variables is defined in domestic currency as:

$$CA_t \equiv p_t X_t - p^*_t e_t M_t + TR_t - i^*_{t-1} e_t B^*_{t-1} \qquad (2)$$

$$(CAP_t - \Delta R_t) \equiv e_t(B^*_t - B^*_{t-1}) + IN_t \qquad (3)$$

where p and p* are respectively the domestic and foreign price levels, e the nominal exchange rate, M and X the import and export volumes of goods and services, IN net total foreign investment, TR transfers, and B* the end of period stock of net external debt valued in foreign currency.

Using identities (2) and (3), the balance of payments identity (1) can be rewritten as:

$$\underbrace{p^*_t e_t M_t + i^*_{t-1} e_t B^*_{t-1} + e_t B^*_{t-1}}_{\text{Outflows}} \equiv \underbrace{p_t X_t + IN_t + e_t B^*_t + TR_t}_{\text{Inflows}} \qquad (4)$$

According to (4), the economy obtains in each period a given amount of resources which are used to meet its external payments obligations. Specifically, in each period the economy needs to finance imports of goods and services, and interest payments and principal repayment on the net external debt with the revenues provided by

exports of goods and services, transfers, net foreign investment and new external debt.

In this regard, we wish to emphasize that an important distinction might be made between those movements of net external liabilities associated with total investment (direct, portfolio, real estate) which do not necessarily have to be repaid in the event of a financial crisis, and movements which are proper debt assets or liabilities. Under this latter heading we prefer to include all assets or liabilities bearing an interest-payment obligation, which is the truly relevant definition of "net external debt" in a country like Spain, where steady foreign investment plays a prominent role in the evolution of the external accounts (see Cooper and Sachs (1985)). We thus define the "fundamental" account balance of the economy (Z_t) as the sum of the primary current account balance and the net investments balance excluding the latter from the definition of debt:

$$Z_t \equiv CA_t + i^*_{t-1}\, e_t\, B^*_{t-1} + IN_t \qquad (4')$$

or

$$Z_t \equiv (1+i^*_{t-1})e_t\, B^*_{t-1} - e_t\, B^*_t \qquad (4'')$$

Using an approximate version of (4"), linearized around a steady state situation, where interest rate parity is fulfilled, and where the foreign interest rate, domestic real output growth and inflation are constant, the following standard debt accumulation equation can be obtained:

$$b^*_t = (1+\lambda)\, b^*_{t-1} - z_t \;; \qquad \lambda = (r^*-n)/1+n \qquad (5)$$

where b^* and z are, respectively, the net external debt and the "fundamental"account balance as a percent of GDP, r^* the real foreign interest rate, and n the domestic trend GDP real growth rate.

As pointed out by Cohen (1985), when the real interest rate on the debt is smaller than the domestic growth rate ($\lambda<0$) any stable path of the "fundamental" account balance is consistent with a stable external debt/GDP ratio, and a country is solvent no matter how large is its initial net external debt. In this case, when trying to integrate (5) forward it turns out that the present value of future "fundamental" account surpluses is effectively infinity, no matter how small they are.

However, if the interest rate is higher than than the rate of growth of the economy ($\lambda>0$) expression (5) can be integrated forward, obtaining:

$$b^*_t = \sum_{i=1}^{\infty} \rho^i \, E_t \, z_{t+i} \quad ; \qquad \rho = (1+\lambda)^{-1} \tag{6}$$

assuming that $\lim_{N\to\infty} \rho^N \, E_t \, b^*_{t+N} = 0$; i.e. the transversality condition holds. The requirement for this condition is obviously weaker than that whereby b^*_t should be stable, as will be seen subsequently.

Equation (6) represents the equilibrium intertemporal budget constraint of an open economy when $\lambda>0$. It tells us that the present level of debt as a proportion of GDP must be equal to the present value of the "fundamental" account surpluses. This situation is in contrast to that where $\lambda<0$, where as we mentioned above a debtor country need only stabilize its ratio z_t without having to worry about obtaining future surpluses.

It is possible nevertheless to stabilize the level of net external debt in (6) around a chosen steady-state value (b^*) -both in cases where the interest rate is higher and lower than the growth rate ($\lambda \gtrless 0$)- by selecting a "fundamental" balance target (z) so that

$$z = \frac{r^* - n}{1+n} \, b^* \tag{7}$$

Condition (7), which proves very strong, emphasises that there is a close relationship between the economy's external indebtedness and the "fundamental" balance that must be met on average in order to make the real resource transfer that is required to cope with the financial burden derived from such indebtedness. The level of z which satisfies this condition is generally termed the "sustainable" level.

3.3. Popular misconceptions

The "steady-state" version of the true intertemporal budget constraint of the economy in (7) is also useful to explain several popular misconceptions about the nature of the external constraint often used in policy discussions.

On the one hand, while it is true in a loose sense that the evolution of foreign variables -prices, output and interest rates- influences domestic economic performance this is not really a constraint, although it does affect the external constraint. Namely, if we think of the "fundamental" balance as being mainly determined, among other variables, by the evolution of domestic (n) and foreign growth (n^*), and the real exchange rate (θ) ($z=z(n,n^*,\theta); z_2>0, z_1, z_3<0$)[3] then a permanent drop in foreign growth tightens the constraint, for a given net external debt, by lowering z, thus requiring a real depreciation to continue satisfying the external contraint; i.e. for z to remain the same. Similarly, a permanent increase in the foreign real interest rate increases the fundamental balance surplus that a debtor country must run, on average, to satisfy the external constraint. However, a neutral change in the foreign price level will not affect the external constraint since the equilibrium real exchange rate remains unchanged.

On the other hand, although it is clear that in a world of complete capital immobility no deficit or surplus is sustainable, it

is often claimed that the influence of external constraints on the domestic economy becomes greater as the country increases its degree of trade and financial openness vis-à-vis the rest of the world. However, this is not necessarily so because while it is certainly the case that as trade openness increases the elasticities of the current account balance relative to output and competitiveness also increases, it is also true that better financial integration allows deficit countries to borrow internationally without exerting as much upward pressure on domestic interest rates.

Finally, it is frequently heard that a credible committment to follow a stable exchange rate policy –like belonging to the European Monetary System (EMS)– increases the weight of external constraints on the domestic economy since the authorities are no longer able to accommodate domestic price increases through nominal exchange rage depreciations, thus fostering policies oriented towards price stability. In this regard, while it is certainly the case that –under certain conditions– a credible committment to exchange rate stability à la EMS will help achieve price stability, this will be neutral in the sense of not affecting any of the underlying real variables –output growth, the real exchange rate, the real interest rate– which appear in (7) as the main determinants of the long-run "external constraint"[4]. Therefore, while EMS-type arrangements constraint the steady-state behavior of nominal variables, they do not necessarily affect the steady-state intertemporal budget constraint of the economy.

After this brief analysis of the nature of the external constraint of an open economy, we test in the next two sections whether the external performance of the Spanish economy is consistent with the solvency and dynamic efficiency principles.

4. TESTING FOR SOLVENCY AND DYNAMIC INEFFICENCY

As shown in expression (6) of section 2, which expresses the external constraint in terms of the expected "fundamental" account

balance, an economy is solvent if the transversality condition guaranteing the non-explosiveness of external debt to GDP ($\lim_{N\to\infty} \rho^{t+N} E_t b^*_{t+N} = 0$) is satisfied. In this section we describe alternative econometric tests for solvency and dynamic inefficiency which although originating in the goverment budget constraint literature can be readily adapted to the present context.

4.1. The Hamilton and Flavin Test

These tests are derived from the methodology proposed by Hamilton and Flavin (1986) and Trehan and Walsh (1988). Assuming that the factor $\rho^{t+N} E_t b^*_{t+N}$ ($=a_0$) is non-stochastic and different from zero, which represents the alternative hypothesis to (6), the expression

$$b^*_t = \rho^N E_t b^*_{t+N} + \sum_{i=1}^{N} \rho^i E_t z_{t+i} \qquad (8)$$

may be written as:

$$b^*_t = a_0 (1+\lambda)^t + \sum_{i=1}^{N} \rho^i E_t z_{t+i} \qquad (9)$$

Thus the solvency constraint holds if $a_0=0$. To test whether $a_0=0$, Hamilton and Flavin propose two tests. First, assuming a univariate process for z_t, the stationarity of the discounted sum of future surpluses is tested (stationarity of the undiscounted surplus being sufficient for the stationarity of the sum of expected discounted surpluses if $\rho<1$). Then, if this sum is stationary, b^*_t will be stationary if and only if $a_0=0$. The second test suggests estimating equation (9) directly, making different assumptions about the information set underlying the formation of expectations about future

surpluses. If it is assumed that these expectations are based on past values of surpluses and debt, by taking an average value of λ, (9) can be replaced by:

$$b^*_t = a_0(1+\lambda)^t + c(L)\, z_t + d(L)\, b^*_{t-1} + \varepsilon_t \qquad (10)$$

where ε_t is an error term that includes the potential variability of interest rates and possible measurement errors. The test involves examining the statistical significance of a_0.

Several restrictive assumptions underlie the construction of these tests. First, it is assumed that factor λ, which is a real interest rate less the rate of growth in real terms of GDP, is non-stochastic – a very strong assumption. Second, it is assumed that violations of the borrowing constraint are also non-stochastic, i.e. $a_0(1+\lambda)^t$. Third, with regard to the first test described above, cointegration theory (see Engle and Granger (1987)) states that the non-stationarity of b^*_t and z_t in (9) is neither a necessary nor a sufficient condition for $a_0=0$. In other words, there is a possibility that z_t and b^*_t are cointegrated[5]. In such case, the above test may lack power.

4.2. The Wickens Test

In a recent paper Wickens (1989) suggests taking the possibility of cointegration into consideration by assuming that b^*_t and z_t are generated by the joint stochastic process

$$\Delta x_t = \mu + \Theta x_{t-1} + u_t \qquad (11)$$

where $x_t' = (b^*_t, z_t)$ and u_t is a stationary disturbance. Equation (11) is derived from the system of two equations formed by the debt accumulation equation (5) and

$$\Delta z_t = \eta + \beta z_{t-1} + \alpha b^*_{t-1} + e_t \qquad (12)$$

where $e_t = \Psi(L)\varepsilon_t$, $\Psi_0 = 1$, $\Sigma \Psi_i^2 < \infty$.

Equation (12) may be interpreted as an automatic or discretional policy rule which includes possible attempts by the authorities to increase the surplus (reduce the deficit) when the proportion of debt in relation to GDP increases ($\alpha>0$)[6]. Therefore, (11) may be written as

$$\begin{pmatrix} \Delta b^*_t \\ \Delta z_t \end{pmatrix} = \begin{pmatrix} -\eta \\ \eta \end{pmatrix} + \begin{pmatrix} \lambda-\alpha & -(1+\beta) \\ \alpha & \beta \end{pmatrix} \begin{pmatrix} b^*_{t-1} \\ z_{t-1} \end{pmatrix} + \begin{pmatrix} -e_t \\ e_t \end{pmatrix} \qquad (13)$$

Solving (13) backwards yields

$$\lim_{N\to\infty} E\, b^*_{t+N} = \lim_{N\to\infty} e'_1 \rho^N [(I+\Theta)^N x_t + \sum_{i=0}^{N-1} (I+\Theta)^i \mu + \sum_{i=0}^{N-1} (I+\Theta)^i E_t u_{t+N-i}] \qquad (14)$$

where $e'_1 = (1,0)$ and $e'_1 x_t = b^*_t$

Note that (14) generalises Hamilton and Flavin's test, allowing for the sum of the three components to be zero - even though some of them may not be null - provided they offset each other. Further, by establishing a stochastic process for u_t, the possibility that deviations with respect to the borrowing constraint are stochastic is allowed for.

For a straightforward analysis of the implications of (13), let us assume first that z_t is a non-stationary process, and, for illustation purposes, that it is governed by the following the IMA(1) process

$$\Delta z_t = \eta + \varepsilon_t - \Psi_1 \varepsilon_{t-1} \; ; \; -1<\Psi_1<1 \qquad (15)$$

This implies that in (12), $\alpha=\beta=0$. Generally, a sufficient condition for the existence of the first two terms of the right side of (14) is that the characteristic roots of the matrix $(I+\Theta)$, $\eta_i (i=1,2)$ should be such that $|\eta_i|<\rho$. In the case at hand, these roots are $(1+\lambda)$ and 1. Thus, diagonalising $(I+\Theta)$ yields

$$I+\Theta = \begin{bmatrix} 1+\lambda & -1 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 0 & \lambda \end{bmatrix} \begin{bmatrix} 1+\lambda & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & -1/\lambda \\ 0 & 1/\lambda \end{bmatrix} \tag{16}$$

Accordingly, assuming that $\lambda>0$

$$\lim_{N\to\infty} e_1' [\rho(I+\Theta)]^N x_t = (\lambda b_t^* - z_t)/\lambda \tag{17}$$

$$\lim_{N\to\infty} e_1' \rho^N \sum_{i=0}^{N-1} (I+\Theta)^i \mu = -\eta (1+1/\lambda)/\lambda \tag{18}$$

$$\lim_{N\to\infty} e_1' \rho^N \sum_{i=0}^{N-1} (I+\Theta)^i E_t u_{t+N-i} = \Psi_1 \varepsilon_t/\lambda \tag{19}$$

Thereafter, substituting (17)-(19) into (14) gives the solvency condition

$$\lim_{N\to\infty} \rho^N E_t b_{t+N}^* = [\lambda b_t^* - z_t - \eta(1+1/\lambda) + \Psi_1 \varepsilon_t] = 0 \tag{20}$$

i.e. either an initial "fundamental" account surplus that offsets the payments for investment less the "fundamental" account balance trend component is needed, or, if the initial position is that of a net creditor, the initial investment income should be sufficiently high to offset future "fundamental" account deficits.

Likewise, on the basis of (5) the process governing b^*_t may be derived as

$$\Delta b^*_t = \eta/\lambda - \Psi_1 \rho \varepsilon_t \tag{21}$$

But since we already know from (5) that

$$\Delta b^*_t = \eta/\lambda - (1-\rho^{-1}L)^{-1}(1-\Psi_1 L)\varepsilon_t \tag{22}$$

comparison of (21) and (22) implies that $\Psi_1=(1+\lambda)$ or, in other words, that the MA(1) lag polynomial has a root at ρ.

The conclusion here is that if z_t is I(1) with drift, then b^*_t will also have to be I(1) with drift. Further, if ε_t is in general MA(m), m>0, Δb^*_t will have a moving average of order m-1 since the MA(m) lag polynomial must have a root at ρ. For example, in our case m=1 and therefore the disturbance in (22) is white noise. Hence in this case z_t and b^*_t will be cointegrated but to verify the transversality condition, z_t must also satisfy the root condition. Notice that in the special case where m=0, i.e. ε_t its a white noise, the previous condition can not hold and hence the transversality condition will not be verified (see Trehan and Walsh (1988)).

Similar, implications can be drawn for other processes followed by the "fundamental" balance, z_t. If, for instance, the process followed by z_t is stationary, and there is stabilization by the authorities, the process governing z_t will be:

$$z_t = \eta + \alpha\, b^*_{t-1} + \varepsilon_t - \Psi_1\, \varepsilon_{t-1} \tag{23}$$

in this case $\beta=-1$, and the roots of $(I+\Theta)$ are $(1+\lambda-\alpha)$ and 0. If $0<\alpha<2(1+\lambda)$, the characteristic roots of $(I+\Theta)$ are less than $(1+\lambda)(=\rho^{-1})$ and, therefore, the solvency constraint is

automatically satisfied, i.e. the three terms of (14) tend to zero. However, when there has been no stabilisation by the authorities, i.e. $\alpha=0$, the characteristic roots of $(I+\Theta)$ are $(1+\lambda)$ and 0. In this case, by a similar argument to the one used above, it is easy to prove that the transversality condition holds provided that

$$b^*_t = \eta/\lambda - \Psi_1 \rho e_t \tag{24}$$

that is, b^*_t follows a similar process to (21) except that b^*_t, like z_t is I(0). Similarly, the root condition has to be verified by the MA lag polynomial of e_t.

Any of the previous conditions of the processes generating b^*_t and z_t are sufficient to ensure that the transversality condition holds. However a necessary and sufficient condition that encompasses the previous ones can be obtained by noticing that both in (21) and (24) Δb^*_t is stationary. Thus, if, for example, in (13), it is assumed that $\lambda=\alpha$ and $\beta=-1$, it follows that

$$\Delta b^*_t = -(\eta+e_t) \tag{25}$$

and

$$\Delta z_t = -\lambda\eta + e_t - (1+\lambda)\, e_{t-1} \tag{26}$$

so that the roots of $(I+\Theta)$ are 0 and -1 which automatically satisfy the solvency constraint, while the MA(1) lag polynomial in (26) satisfies the root condition. Thus, testing for stationarity in Δb^*_t seems to provide the key test, complemented by the same degree of integration in z_t and b^*_t.

In spite of the generality of the analysis, as stated in the comments on the method proposed by Hamilton and Flavin, two problems are left unresolved by this procedure. First, factor λ is

assumed to be positive since otherwise ρ^N would tend to infinity instead of to zero (see the derivation from (17)–(19)). Since λ represents approximately the difference between a real interest rate and the rate of growth of GDP in real terms, this assumption can be very restrictive. Second, it is once more assumed that λ is constant. One possible way of avoiding these difficulties has recently been proposed by Wilcox (1989), whose procedure is discussed in the following section.

4.3. The Wilcox Test

The solution proposed by Wilcox consists of incorporating λ into the definition of the variables, working in terms of present discounted value instead of the original proportions. Indeed, in the light of (5) we can define the real discount factor as

$$q_t = \prod_{j=0}^{t-1} \rho_j \; ; \qquad q_0 = 1 \tag{27}$$

and multiplying both sides of (5) by q_t gives the discounted value of each variable back to period zero, i.e.

$$q_t \, b^*_t = q_t(1+\lambda_{t-1})b^*_{t-1} - q_t \, z_t = q_{t-1} \, b^*_{t-1} - q_t \, z_t \tag{28}$$

where, by assuming that factor λ is variable, dating is suitable.

Representing by F_t the discounted value of b^*_t and by X_t the discounted value of z_t, (28) can be rewritten as

$$\Delta F_t = -X_t \tag{29}$$

Solving (29) forwards yields

$$F_t = F_{t+N} + \sum_{j=1}^{N} X_{t+j}$$

Therefore, the transversality condition in discounted terms, is

$$\lim_{N\to\infty} E_t F_{t+N} = 0 \tag{30}$$

Assuming once more a process similar to (12), expression (11) in discounted terms is governed by the following joint process:

$$\begin{pmatrix} \Delta F_t \\ \Delta X_t \end{pmatrix} = \begin{pmatrix} -\eta \\ \eta \end{pmatrix} + \begin{pmatrix} -\alpha & -(1+\beta) \\ \alpha & \beta \end{pmatrix} \begin{pmatrix} F_{t-1} \\ X_{t-1} \end{pmatrix} + \begin{pmatrix} -e_t \\ e_t \end{pmatrix} \tag{31}$$

Solving (31) backwards gives the condition equivalent to (14), with the exception that the term ρ^N is no longer included in that expression, i.e.

$$\lim_{N\to\infty} E_t F_{t+N} = \lim_{N\to\infty} e_1'[(I+\Theta)^N X_t + \sum_{i=0}^{N-1} (I+\Theta)^i \mu + \sum_{i=0}^{N-1} (I+\Theta)^i E_t u_{t+N-i}] \tag{32}$$

where now $x_t=(F_t,x_t)'$.

Note that here a sufficient condition for the first two terms on the right side of (32) to exist is that the characteristic roots of the matrix $(I+\Theta)$, $\eta_i (i=1,2)$, should satisfy $|\eta_i|<1$, in which case (32) tends automatically to zero. Since, on the basis of (29), we know that F_t is an integrated process I(d) when X_t is I(d-1), a general condition for the solvency condition to hold is that $\eta=0$ and X_t should be stationary with a unit root in its moving average; or, in other words, F_t should be a stationary process with mean zero. The usual unit root tests are the basis for this test, performed directly on F_t.

In short, we consider that the test using the discounted value of the variables is the best means of examining the verification of the solvency or transversality condition. However, for the sake of completeness, we will use all the versions proposed of the solvency tests in the empirical application to the case of the Spanish economy, as described in the following section. Table 3 summarises the null-hypotheses that will be tested.

5. HOW SOLVENT AND EFFICIENT IS THE SPANISH ECONOMY?

Based on data only available since 1969, Table 4 contains the data for the evolution of the current-account balance (column 2), net investment (column 3), and net interest payments (column 4), all as percentages of GDP[7]. From these variables the "fundamental" account balance (column 1) is constructed, as defined in section 3. Also included are net external debt (column 5) and the components of factor λ -the foreign real rate of interest[6] (column 8) and the rate of real GDP growth (column 9)[8].

As can be observed from the sample averages in the lower part of the Table, the average value of n during 1969-89 is 3.5% while the average value of r^* is 2.4%. As a result, $n>r^*$ and, therefore, $\lambda<0$. Accordingly, one of the prerequisites of the tests proposed by Hamilton, Flavin and Wickens would appear not to hold. In other words, the stability of debt seems assured for any stable path of the "fundamental" balance. However, since λ is variable there are periods in which $\lambda>0$ such as in 1978-85. This is why it is worthwhile examining the characteristics of the processes governing the evolution of external debt and the "fundamental" account balance in accordance with the methodology summarised in Table 3. In this connection, we use the unit root tests developed by Dickey and Fuller (1981) in their extended version. The test involves estimating by OLS the regression model

Table 3

SOLVENCY – DYNAMIC EFFICIENCY TESTS

	Hamilton-Flavin	Wickens	Wilcox
Null Hypothesis	$a_0 = 0$ in (10) if $z_t \sim I(0)$	$\Delta b^*_t \sim I(0)$ with b^*_t and $z_t \sim I(d)(d=0,1)$ and moving average satisfies root condition	$F_t \sim I(0)$ without drift in (29)

NET EXTERNAL DEBT AND FUNDAMENTAL BALANCE
(As a % of GDP)

Table 4

Year	z_t	ca_t	in_t	i^*eB^*/PY_t	b^*_t	i^*_t	π_t *	r^*_t	n_t
1969	-0.3	-1.5	0.9	0.3	12.8	7.8	5.2	2.5	8.9
1970	1.7	0.6	0.8	0.3	10.9	8.5	6.2	2.2	4.1
1971	3.4	2.1	1.1	0.2	7.1	7.8	6.8	0.9	4.6
1972	2.5	1.2	1.2	0.1	4.2	7.6	5.9	1.6	8.0
1973	2.2	0.8	1.4	-0.1	1.7	8.8	7.6	1.1	7.7
1974	-3.2	-3.2	0.7	-0.3	4.8	11.0	11.1	-0.1	5.3
1975	-2.4	-2.8	0.4	0.0	7.1	10.2	11.6	-1.3	0.5
1976	-3.2	-3.6	0.1	0.3	10.2	10.0	8.6	1.3	3.3
1977	-1.5	-2.5	0.4	0.6	11.5	9.7	8.5	1.1	3.0
1978	2.2	0.9	0.6	0.7	9.3	9.6	8.1	1.4	1.4
1979	0.5	-0.6	0.6	0.5	8.9	10.6	9.2	1.3	-0.1
1980	-1.8	-3.0	0.6	0.6	10.7	12.7	11.0	1.5	1.2
1981	-1.3	-3.3	0.8	1.2	12.4	15.2	11.0	3.8	-0.2
1982	-1.5	-3.2	0.6	1.2	14.4	13.7	8.6	4.7	1.2
1983	0.1	-2.2	0.9	1.3	14.7	10.8	6.8	3.7	1.8
1984	3.0	0.7	1.0	1.3	12.2	10.6	5.6	4.7	1.8
1985	2.9	0.9	1.1	0.8	9.6	9.6	4.8	4.6	2.3
1986	4.6	2.2	1.8	0.5	5.1	8.5	4.2	4.1	3.3
1987	3.7	0.5	2.7	0.5	1.3	7.4	3.4	3.9	5.5
1988	1.9	-0.9	2.4	0.4	-0.6	6.8	3.6	3.1	5.0
1989	0.6	-3.2	3.6	0.2	-1.2	..	..	5.0	5.0
Averages									
1969-89	0.6	-1.0	1.1	0.5	8.0	..	..	2.4	3.5
1969-73	1.9	0.6	1.1	0.2	7.3	..	..	1.7	6.7
1974-77	-2.5	-3.0	0.4	0.1	8.4	..	..	0.3	3.0
1978-79	1.4	0.2	0.6	0.6	9.1	..	..	1.3	0.7
1980-82	-1.5	-3.2	1.7	1.0	12.5	..	..	3.3	0.7
1983-85	2.0	-0.2	1.0	1.2	12.2	..	..	4.3	2.0
1986-89	2.6	-0.4	2.6	0.4	1.2	..	..	4.0	4.7

Notes: z = "Fundamental" account balance (= ca + in + i*eB*/PY)
ca = Current-account balance.
in = Total net investment.
i*eB = Net interest payments on the external debt. Interests payed -or received- net of interest for direct investment income, dividends and share subscription rights and property.
b* = Net external assets - Net external liabilities. Net Assets and Liabilities are obtained by subtracting from total assets and liabilities the items relating to shares (including direct investment), other holdings and property, and leads and lags in payments and collections. The figures have been adjusted for valuation differences (taking 1988 as the initial condition for consistency with the balance-of-payments identity).
i* = Average rate of interest on debt. Obtained as the ratio between interest payments and the average annual amount of the month-end stock of external debt.
π * = G-7 rate of inflation (external-debt-weighted)
r* = $(1+i^*)/(1+\pi^*)$
n = Rate of growth of real GDP

$$\Delta y_t = \eta + \gamma y_{t-1} + \sum_{i=1}^{l} \phi_i \Delta y_{t-i} + \varepsilon_t$$

to examine the null hypothesis $H_0: \gamma = 0$ against the alternative hypothesis $H_1: \gamma < 0$ in the behaviour of a generic variable y_t. If H_0 is rejected, the process is stationary; if not, the process is only stationary in first differences, i.e. I(1). In agreement with the discussion in the previous section the test is applied to z_t, b^*_t and Δb^*_t.

The estimated parameters are the following (t-ratios in brackets)

$$\Delta b^*_t = \underset{(2.41)}{2.26} - \underset{(2.83)}{0.28}\, b^*_{t-1} + \underset{(5.02)}{0.86}\, \Delta b^*_{t-1} \qquad (33)$$

$$LM(4) = 2.8$$

$$\Delta z_t = \underset{(0.52)}{0.25} - \underset{(2.38)}{0.47}\, z_{t-1} + \underset{(2.50)}{0.32}\, \Delta z_{t-1} \qquad (34)$$

$$LM(4) = 3.2$$

$$\Delta^2 b^*_t = - \underset{(2.60)}{0.17}\, \Delta b^*_{t-1} \qquad (35)$$

$$LM(4) = 5.2$$

where LM(4) is the LM-4th order autocorrelation statistic in the residuals, asymptotically distributed as a chi-squared with 4 d.f. The residuals do not appear to have serial correlation on the basis of this test. The critical values of the Dickey and Fuller tests for a sample size of 20 observations are 3.02 at 5% (2.65 at 10%) and 1.96 at 5% (1.63 at 10%) when there is or there is not a constant in the

model (see Mc Kinnon (1990)). In view of (33) and (34), this constant would appear to exist in the b^*_t process and not so in the z_t process. When (34) is estimated without a constant, the t-ratio of the level is 2.85; consequently, on the basis of this test the evidence is not clear on b^*_t being a I(0) or I(1)-with-drift process, while z_t is clearly I(0) without drift[9]. Similarly the evidence is conclusive against Δb^* being I(1).

The possibility of b^*_t being I(1) would, however, appear to be confirmed when the regression of b^*_t on z_t is ran

$$b^*_t = \underset{(1.46)}{-0.26} - \underset{(2.59)}{1.02}\, z_t + \underset{(32.39)}{1.02}\, b^*_{t-1}$$

where it can be seen that the coefficient of b^*_{t-1} is very close to unity. Accordingly, the regression suggests that the appropriate specification is Δb^*_t on z_t, compatible with b^*_t being I(1) and z_t being I(0).

As discussed in the analysis of the Hamilton and Flavin procedure, summarised in the first column of Table 3, the non-stationarity of the non-discounted debt-GDP proportion is not a sufficient condition for the violation of the borrowing constraint. However, the stationarity of the fundamental balance-GDP proportion is indeed a sufficient condition for the violation of the borrowing constraint where the ratio debt-GDP is I(1) as would seem to happen in the case at hand. Thus, according to this test the transversality condition does not seem to hold.

We must ask how this evidence should be interpreted in a country which in 1989 had a net external debt-GDP ratio of -1.2% i.e., was a net creditor rather than a debtor. Evidently, it is not a question of insolvency, but rather the contrary. If a country is initially in a credit position and is not expected to generate

deficits of a sufficiently offsetting size in the future, it will not satisfy the transversality condition either. This can be interpreted as a dynamic inefficiency situation (see Diamond (1965)) where the country's permanent income from its net external assets is greater than its planned spending. To resolve such inefficiency it could increase its present and future consumption.

To gather further evidence on this possibility, we perform the test described in (10) with $\lambda = 0.01$. Naturally, this test must be viewed with the greatest caution since the average sample value of λ is negative. The consequent regression is as follows:

$$b^*_t = \underset{(2.20)}{2.68} - \underset{(2.17)}{3.28}(1+\lambda)^t - \underset{(41.6)}{1.05}\, z_t + \underset{(0.63)}{0.19}\, z_{t-1} + \underset{(4.03)}{1.21}\, b^*_{t-1} - \underset{(0.60)}{0.18}\, b^*_{t-2} \qquad (36)$$

Once again a_0 is marginally significant and negative, in agreement with the dynamic inefficiency interpretation.

With regard to the Wickens test, the fact that Δb^*_t is I(0) seems to satisfy the necessary and sufficient condition for satisfying the solvency constraint according to (25), though z_t being I(0) seems to contradict (26). A possible explanation is that with a small value of λ, it may be difficult to distinguish the I(1) process with drift in (26) from an I(0) process without drift[10]. However we reiterate that a necessary condition for this analysis is that $\lambda > 0$.

Lastly, the results of the Wilcox test are given. This consists of examining the stationarity of the discounted value of external debt in proportion to GDP, in accordance with the analysis in (31). The first column of Table 5 includes the series of discount factors obtained from Table 4. The discount factor for 1969 is normalised to unity. The second column of Table 5 gives this discounted value, which is obtained by multiplying the values of b^* in

Table 4 by the related factors in Table 5. As the values of λ are negative in most cases, the discounted value of the debt stands higher than the non-discounted value.

As shown in Figure 2, regardless of the measure chosen, a similar path is observable: a fall from 1969 to 1973; an explosive increase from 1974 to 1983 with a turning point in 1979 probably due to the effects of the "devaluation cum stabilization" policy package of mid-1977; and an explosive decrease since 1983 as a result of the improvement in the current-account balance up to 1986 and of the sharp increase of net foreign investment after that year. It is this fall in the external net debt that the previous tests appear to be capturing.

The following regression provides formal evidence on the stationarity of F_t, in accordance with the third column of Table 3:

$$\Delta F_t = \underset{(2.14)}{2.52} - \underset{(2.57)}{0.24} F_{t-1} + \underset{(4.78)}{0.86} \Delta F_{t-1} \qquad (37)$$

$$LM(4) = 2.0$$

In the light of (37), the evidence seems similar to that obtained in (33), i.e. the series is I(1) possibly with drift. However, as in the previous case, the small sample size available may hinder the distinction between this process and a I(0) process without drift. Thus the tentative conclusion is that no solvency problems exist in Spain but quite the contrary.

To examine the robustness of this conclusion to the assumption of relative PPP implicit in the construction of factor λ in (5), a new external debt and factors series based on (6) was computed without imposing the aforementioned assumption. The corresponding regression in discounted values is as follows:

Table 5

DISCOUNT FACTORS AND DISCOUNTED DEBT/GDP RATIO

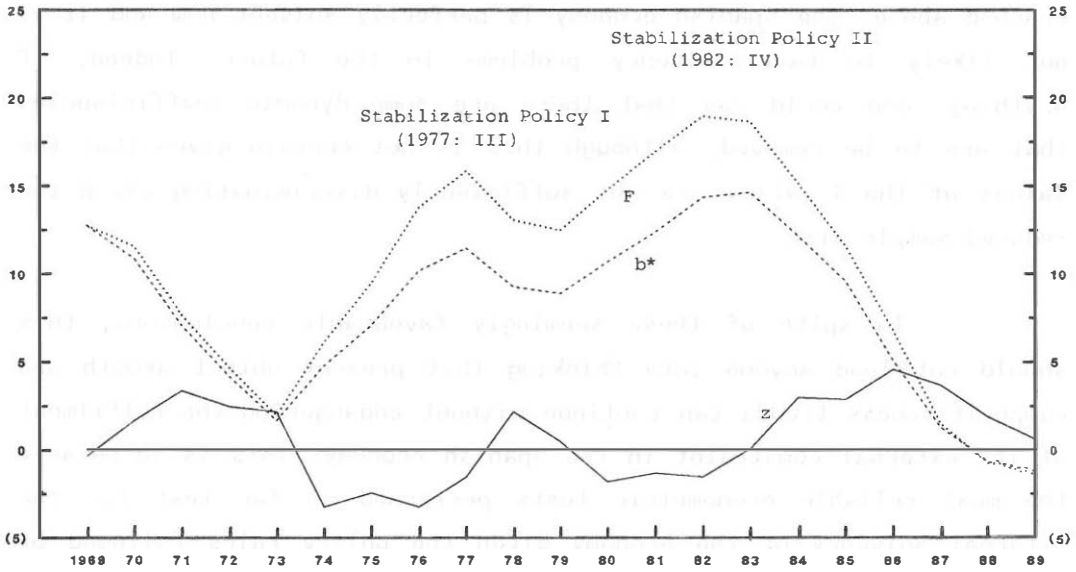
Year	q_t	F_t
1969	1.000	12.8
1970	1.062	11.6
1971	1.080	7.7
1972	1.118	4.7
1973	1.187	2.0
1974	1.263	6.1
1975	1.331	9.5
1976	1.357	13.8
1977	1.382	15.9
1978	1.406	13.1
1979	1.406	12.5
1980	1.406	14.8
1981	1.378	17.0
1982	1.320	19.0
1983	1.270	18.7
1984	1.243	15.2
1985	1.206	11.6
1986	1.178	6.8
1987	1.166	1.5
1988	1.182	-0.7
1989	1.202	-1.4

q_t: discount factor defined in expression (25) of the text.

F_t: discounted value of net external debt defined in expression (27) of the text.

Figure 2

NET DEBT AND FUNDAMENTAL BALANCE
(As a % of GDP)



b*: net external debt
z : 'fundamental' balance
F : discounted net external debt

$$\Delta F_t = \underset{(2.23)}{2.79} - \underset{(2.70)}{0.30}\, F_{t-1} + \underset{(4.56)}{0.81}\, \Delta F_{t-1} \qquad (38)$$

$LM(4) = 2.2$

In the view of (38), the conclusions seem similar to those reached above: the Spanish economy is perfectly solvent now and it is not likely to have solvency problems in the future. Indeed, if anything, one could say that there are some dynamic inefficiencies that are to be removed, although this is not certain given that the values of the t-ratios are not sufficiently discriminating given the reduced sample size.

In spite of these seemingly favourable conclusions, this should not lead anyone into thinking that present output growth and competitiveness trends can continue without endangering the fulfilment of the external constraint in the Spanish economy. This is so because the most reliable econometric tests performed so far test for the external solvency of the economy given the policy rules followed by the authorities in the past directed towards avoiding debt explossions. In fact, Section 2 of the paper suggested that past Spanish macroeconomic policy reacted so as to avoiding situations where the net external debt as a percent of GDP would grow beyond what was considered to be a reasonable level. Therefore, if policy continues behaving this way there will be no future insolvency problems in the Spanish economy.

However, this is far from making the present situation an ideal one, given the evident overheating of an economy which has been growing at an average rate close to 5% since 1986, and whose international competitiveness has deteriorated by 24% since that year. It can be argued that Spain's present formal committment to preserving exchange-rate stability inside the European Monetary System and its internationally high long and short-term interest rates (shown in

Figure 3) are attracting considerable capital-flows, and therefore that drastic policy corrections like those in the past are no longer needed. Contrary to this, as stated in Viñals (1990a,b) this relaxed attitude may lead over time to a severe loss in competitiveness that by substantially reducing the rate of return earned by foreign direct and portfolio investors, may cause a dry-up in net foreign investment at a time when the current account deficit gets larger.

If such a situation is allowed to happen then it would not be unthinkable that the increased risk-premium on the Spanish economy will precipitate a massive outflow of short-run capital, thus forcing the authorities to take traumatic stabilization policy measures as in past episodes. If this is done as in the past, as our estimated reduced-form equations indicate, then the Spanish economy will not become insolvent. However, the net social and economic costs of acting just at the end rather than at the beginning of the process may be undesirably and unnecessarily large.

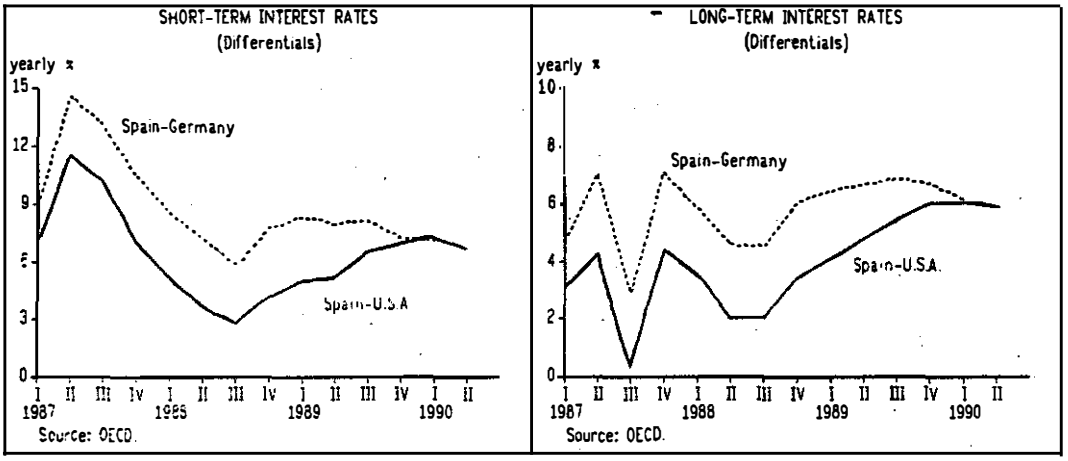
In sum, given the high sensitivity of financial and foreign exchange markets to the evolution of variables like competitiveness and the external accounts it is desirable that the government pursues the internal goal of non-inflationary growth, and at the same time ensures that this is not endangered now and in the future by unfavourable developments in the external accounts, especially with regard to the role of foreign investment which has been so important in balancing the external accounts in the recent past. The next section explores what kind of policy guidelines can be established so that both internal and external equilibrium can be simultaneously achieved in Spain in the future.

6. EXTERNAL TARGETS AND ECONOMIC POLICIES

Based on the analysis of the former sections, a simple rule that a country could follow to satisfy the external constraint would

Figure 3

INTEREST RATES DIFFERENTIALS



be to run, on average, the "fundamental" balance that is consistent with the chosen net external debt-GDP ratio (i.e. which is sustainable). Undoubtedly, what the appropiate size of such a balance should be in practice will depend on the net external debt-GDP ratio specifically chosen as well as on the future path of real interest and output growth rates.

Evidently, deciding what is the socially optimal debt level towards which the economy should converge in long-run equilibrium is not an easy task. However, there may be a simpler criterion based on the effect that external debt levels have on the ratings of the country in international financial markets and, consequently, on the country-risk premium charged when borrowing internationally.

Therefore we assume in what follows that the Spanish economy will approach a net external debt-GDP ratio which is consistent with the highest rating, and thus with the lowest cost of borrowing. Of course, this is a necessary but not a sufficient condition for the highest rating to be obtained since there are several other economic and non-economic criteria used in calculating ratings.

In practice, it turns out to be the case that the net external debt-GDP ratio consistent with the above cost-minimizing strategy ranges from values close to zero to negative values -that is, the country being a net creditor. Nevertheless, to simplify the calculations as much as possible, we assume that in the Spanish case this value can taken to be zero. Consequently, our analysis should be viewed as an example rather than as a general case[11].

Our assumption, while justifiable on practical grounds, also has the advantage of making the results unconditional upon the future -unknown- path followed both by real interest rates and, to certain extent, by the growth rate of the economy. This is so because as indicated by expression (7):

$$z = \frac{r^* - n}{1 + n} b^*$$

when the specific value of external net debt (b^*) is zero, a specific average "fundamental" balance (z) which is consistent with fulfilling the external constraint is also zero[12].

Of course, the above simple rule for achieving external equilibrium is not the only one since as indicated in section 3 when the real growth rate of the economy exceeds the real interest rate on the external debt any stable path of the "fundamental" balance (z) will stabilize the level of net external debt around the chosen steady-state value. Nevertheless, our policy rule has the virtues of simplicity and of few informational requirements.

In sum, a policy of maintaining an <u>average</u> balance for the "fundamental" account approximately equal to zero during long periods of time is consistent both with the exploitation by the Spanish economy of the intertemporal and intergenerational trade opportunities that openness makes available while at the same time obeying the long-run external constraint. In other words, while the "fundamental" balance can be different from zero at any given year, on average it must be zero over a period of many years.

Furthermore, when a country runs a series of "fundamental" balance deficits, the authorities should recognise that a series of "fundamental" balance surpluses must be ran in the future. If there are no specific market mechanisms bringing out theses surpluses then adequate policy actions should be implemented on a timely fashion to avoid last-minute traumatic policy changes.

In connection to the above, the evolution of net external debt and the fundamental balance of the Spanish economy as shown in Figure 2 is very informative. As clearly seen in the Figure, major

–and economically and socially costly– stabilization policies were implemented whenever there was a series of "fundamental" account deficits leading to an excessive net external debt build–up. Besides, looking at the present evolution of the "fundamental" balance it is also evident that, in spite of the impressive foreign investment boom of recent years, the continuous widening of the Spanish current account deficit has led to a gradual reduction in the "fundamental" account surplus, which is now approaching zero.

It is our belief that this shrinking "fundamental" surplus is the ultimate reason why the Spanish economic authorities are becoming increasingly worried nowadays about the evolution of the current account, and why the simple external equilibrium indicator based on a zero "fundamental" balance presented in this section may be useful[13].

However, if we wish the policy guidelines to be fully operational it is not enough to say that an average "fundamental" account balance of zero should be obtained. It is also necessary to make sure that this external equilibrium situation is also fully consistent with internal balance –non–inflationary sustained growth– and, moreover, that the authorities can relate these goals to policy instruments.

For this reason, we estimate a very simple equation for the "fundamental" account balance, using as explanatory variables those variables which could be considered as the main arguments of its different components domestic and foreign GDP growth rates, an index of competitiveness, a real interest rate differential and the degree of openness of the economy. The estimated equation is the following:

$$z_t = \underset{(1.8)}{-0.28} - \underset{(4.4)}{0.62}(y_t - \tilde{y}_t) + \underset{(7.5)}{1.01}(y^*_t - \tilde{y}^*_t) - \underset{(6.6)}{15.18}\,\theta_t + \underset{(2.1)}{0.12}\omega + \underset{(2.2)}{0.10}(r - r^*) \quad (39)$$

$se = 0.82\%$, $R^2 = 0.88$, $DW = 2.43$

where z is the level of the "fundamental" balance as proportion of trend GDP; $(y-\tilde{y})$ is the difference between the logs of actual and trend domestic real GDP; $(y^*-\tilde{y}^*)$ is the difference between the logs actual and trend foreign real GDP[14], ω is an indicator of the degree of openness calculated as the sum of real imports and exports over trend real Spanish GDP; and $(r-r^*)$ is the differential between domestic and international ex-post long-term real interest rates.

As can be observed in equation (39), in spite of some signs of over-fitting with such a small sample size, all the coefficients are significant and their signs are in accordance with theory: excessive domestic growth leads to a worsening of the "fundamental" balance while excessive foreign growth, and a real exchange rate depreciation (θ going down up) lead to an improvement. The real long-term interest rate differential also seems to point out in the rigth direction, partially capturing the foreign investment boom. The estimated equation also indicates that as the Spanish economy has become increasingly more open over the years this has led to an improvement in the "fundamental" account balance, therefore explicitly rejecting the fears of those who claim that the external liberalization of the economy necessarily generates external account problems[15].

Equation (39) can be inverted to find out what was the difference between the actual path and the equilibrium path of the real exchange rate which would have been consistent over the period 1969-89 with the maintenance of a balanced fundamental account (z=0) in a context of internal equilibrium -with output growing at their trend rates both in Spain and abroad- and equality of real interest rates[16].

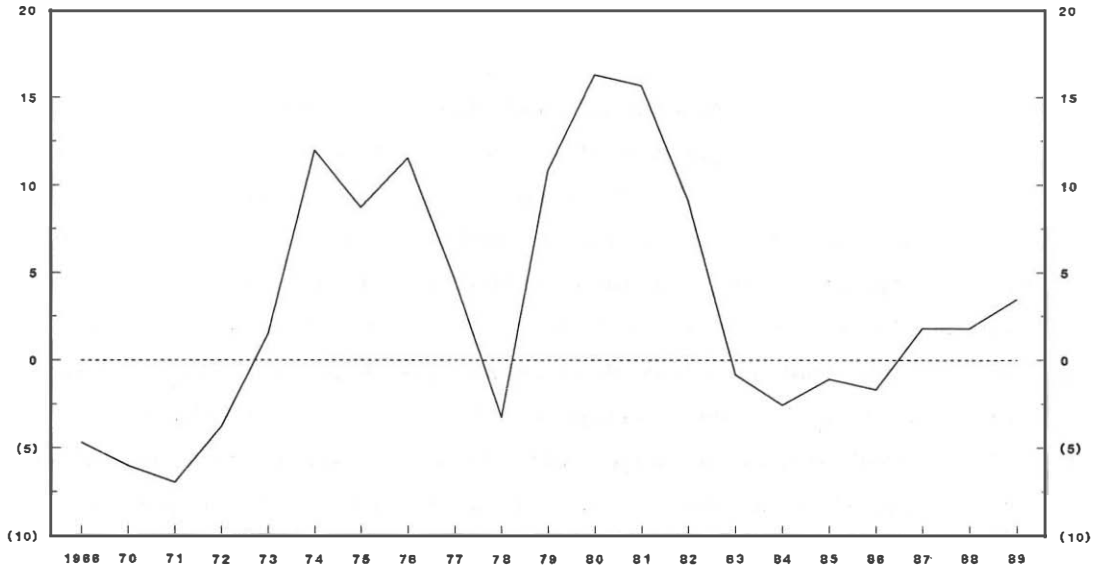
Figure 4 shows the evolution of the "real exchange rate gap" in the Spanish economy, obtained according to the above-described procedure, during the 1969-89 period. Evidently, while it could be

claimed that the exercise violates Lucas' critique we want to argue that there are several reasons why it nevertheless remains useful:

First, Figure 4 shows that over the period there have been several episodes characterized by severe and long-lasting overvaluations of the peseta in real terms. Second, if we compare Figure 2 and 4 it so happens that in each of these episodes (1973-1977 and 1979-1982) there has been a marked deterioration of the "fundamental" balance and a rapid build-up of net external debt. Third, it suggests that to a large extent the recent real appreciation of the peseta in recent years (see Figure 5) has been an equilibrium phenomenon, and that no clear devaluation is called for (even if such a measure where effective nowadays which is highly doubtful, given the high "de facto" degree of wage indexation in Spain). This evolution seems to suggest that the recent real appreciation of the peseta may have been driven by the large inflow of foreign capital, which, in a large proportion, went into financing direct investment in the Spanish industry, implying strong gains in labour productivity in that sector. These large capital inflows have been attracted in part by real interest rate differentials, but when these differentials dissapear, as in the simulation exercise, the equilibrium real appreciation of the peseta remains to a large extent, which can be interpreted in the sense that it is mainly the opening-up of the Spanish market to the rest of the EEC that triggered this equilibrium phenomenon. And fourth, it suggests that great attention should be payed to avoiding further real appreciations of the peseta -that is, further deteriorations in international competitiveness- that may jeoparadize achieving non-inflationary sustained growth in the future because of external difficulties. As observed in the last two years in Figure 4, there are some signs of over-appreciation of the peseta in real terms which suggest that its strengthening may have gone too far and may need some adjustment of economic fundamentals in the future in order to avoid a significant loss of competitiveness of Spanish export industries[17].

Figure 4

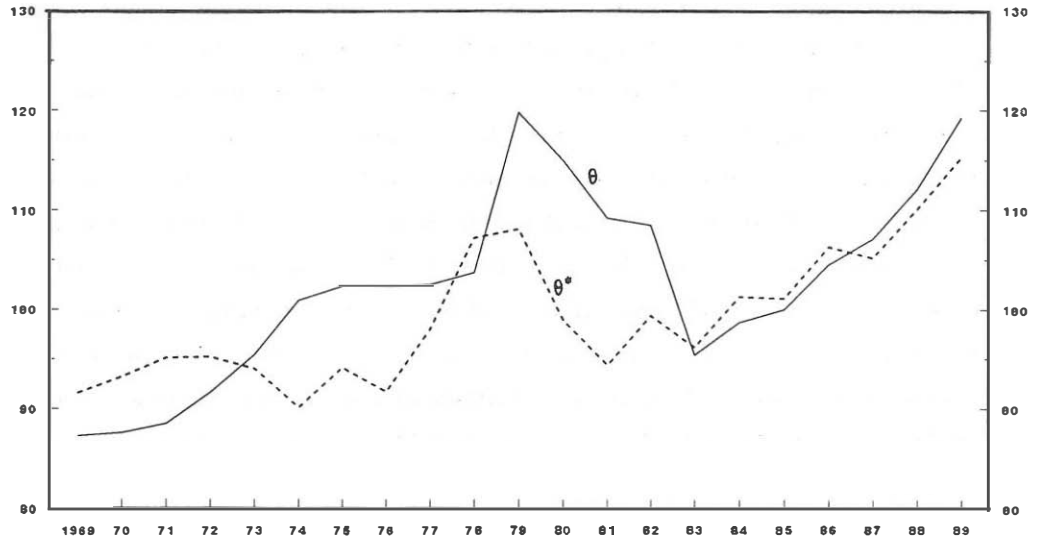
REAL EXCHANGE RATE GAP
(In percentage)



Note: Actual minus "fundamental equilibrium" real exchange rate. Points above the zero line indicate an overvaluation of the real exchange rate; ie, an insufficiently competitive economy.

Figure 5

REAL EXCHANGE RATE
(Observed (θ) and equilibrium values (θ*)



Note: Real effective exchange rate of the peseta vis-à-vis developed countries using CPI's. An upward movement indicates a real appreciation of the peseta.

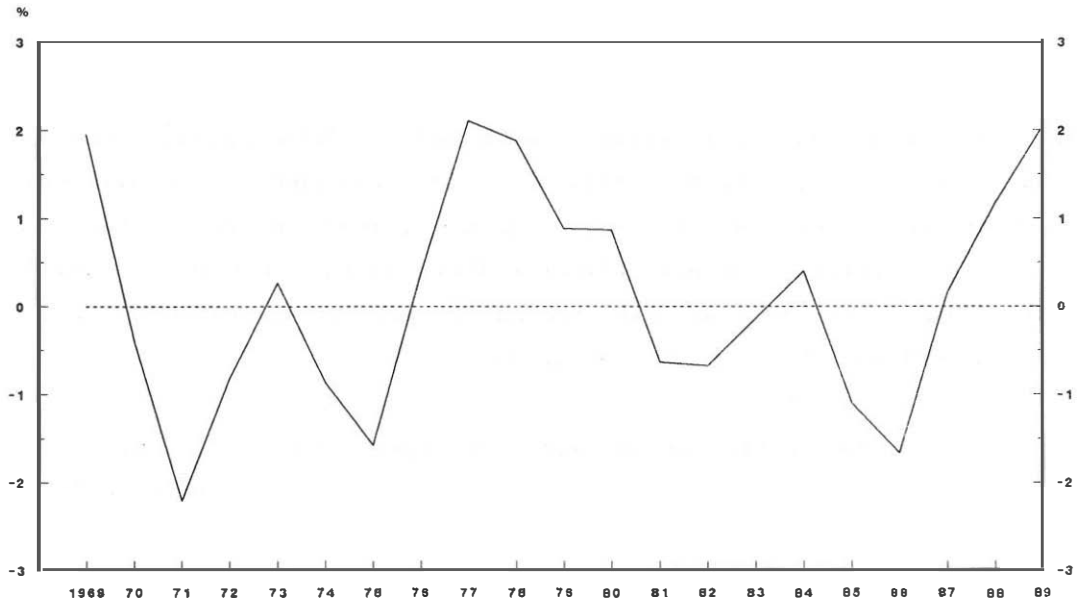
To complete the macroeconomic picture, Figure 6 represents the estimated evolution of the "real output gap" in the Spanish economy, as measured by the percentage difference between actual and trend GDP (Figure 7). As can be seen, there are two periods of significant overheating of the economy in 1976-80 and 1987-89 which again broadly coincide with the periods where Spanish authorities have voiced more loudly their concerns about getting into a messy situation characterized by both internal and external disequilibria. Furthermore, given that the real exchange rate of the peseta tends to appreciate '<u>ceteris paribus</u>' whenever there is excess domestic demand, this shows that internal and external disequilibria are nothing but the two sides of the same macroeconomic coin.

Consequently, if an excessive appreciation of the peseta is to be avoided in the future, it is necessary that the present "real output gap" be eliminated in a permanent way by using demand policies designed to moderate demand growth, and structural supply policies designed to improve potential output growth. Moreover, a more significant contribution of fiscal restraint is needed on the demand side since monetary policy will not be effective in permanently affecting real variables like real output, the "fundamental" balance or the real exchange rate. Monetary policy should rather be oriented towards guaranteeing price and nominal exchange rate stability, specially given the expected timetable for the monetary integration process in the European Community.

Finally, a simple but illustrative excercise could be done in terms of establishing a target level for the net asset accumulation by the private sector (NAp) which would be consistent with the desired levels of the corresponding net asset accumulation by the public sector (NAg) and the "fundamental" current account balance chosen to stabilize the proportions of domestic and foreign debt in terms of GDP. Figure 8 shows the recent evolution of both borrowing requirements, together with an adjusted measure of NAp which will be defined below.

Figure 6

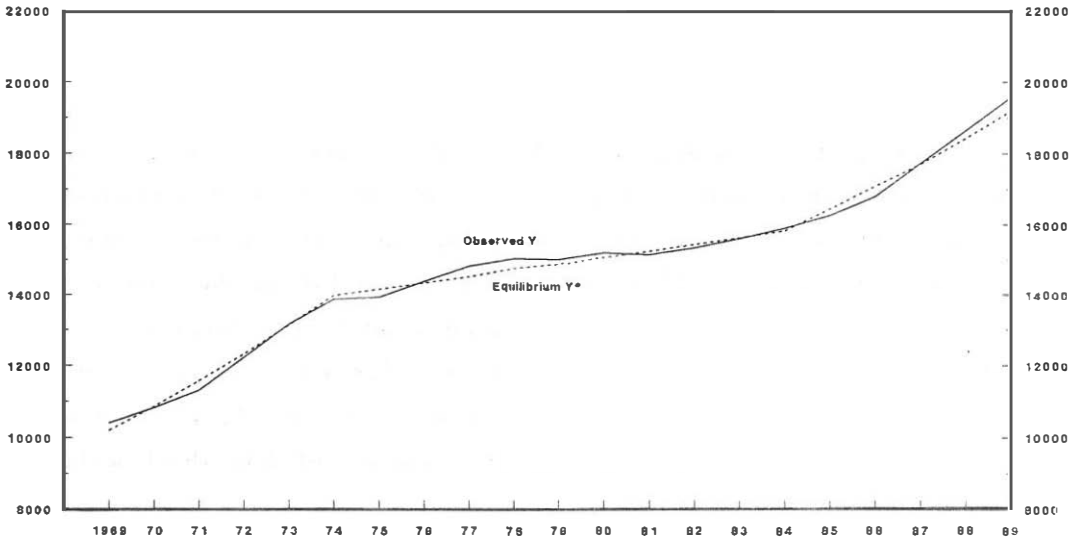
REAL OUTPUT GAP



Note:Actual minus potencial GDP level.Points above the zero line indicate overheating of the economy.

Figure 7

REAL OUTPUT



Note: (billion 1980 pesetas)

To address this issue, use is made of the well known open economy identity

$$CA \equiv NAp + NAg \tag{40}$$

which is converted into the "fundamental" account balance by adding external debt interest payments and long-term net investment to CA and NAp, as in (4'), giving rise to the transformed identity

$$Z \equiv ANAp + NAg \tag{41}$$

where ANAp ($\equiv NAp + i^*_{t-1}\ e_t\ B^*_{t-1} + IN_t$) represents the "adjusted" net asset accumulation by the private sector. Expressing (41) a percentage of GDP we obtain

$$z \equiv a + f \tag{42}$$

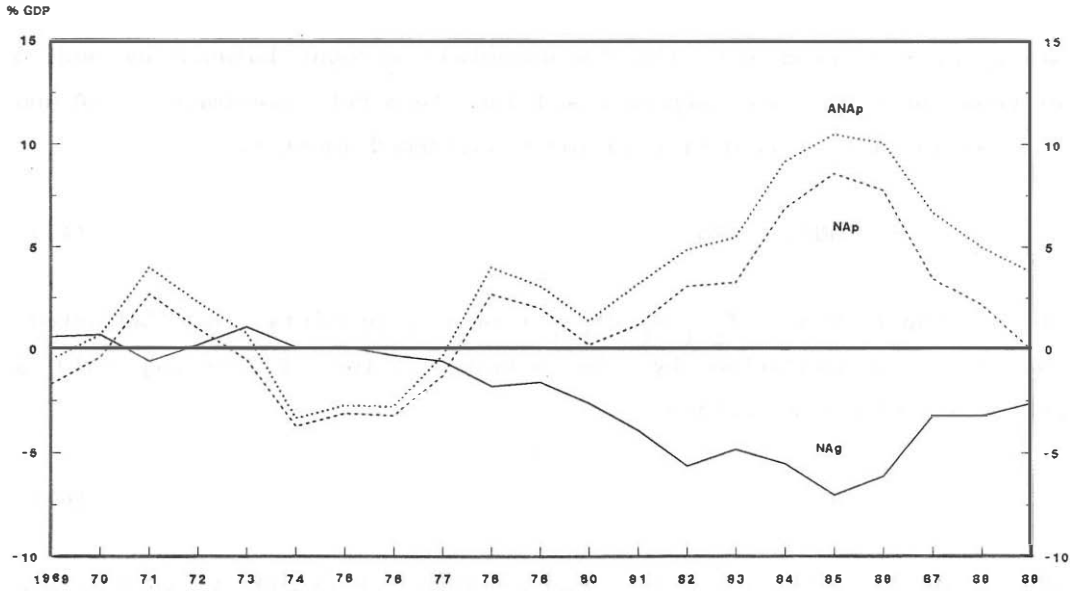
where now $a = ANAp/py$ and $f = NAg/py$. Then, it is will known from the arithmetic of the government intertemporal budget constraint (see Hamilton and Flavin (1986)) that there is a long-run connection between the net asset accumulation by the public sector and the levels of goverment debt and high-power money (all as a proportion of GDP), given by

$$f = \frac{r-n}{1+n}\, b - \frac{\pi' + n}{1+\pi'+n}\, h \tag{43}$$

where expression (43) indicates that in the long-run, a budget deficit ($f<0$) is ultimately financed by the inflation tax collected by the goverment from the holders of its liabilities, namely debt (b) and high-powered money (h). Now, substituting (7) and (43) into (42), it is possible to obtain the long-run target level of the adjusted net asset accumulation by the private sector, given by:

Figure 8

NET ASSET ACCUMULATION
(Private nd Goverment Sectors)



: NAp: net assst accumulation by private sector
ANAp: adjusted NAp
NAg: net asset accumulation by public sector

$$a = z - f = \frac{r^*-n}{1+n} b^* - \frac{r-n}{1+n} b + \frac{\pi + n}{1+\pi+n} h \qquad (44)$$

Table 6 contains some tentative calculations of values of a consistent with different values of b^*, including the previously used value $b^*=0$. The "golden rule" assumption $r=n$ has been made for simplicity as well as in order to avoid the always difficult task of measuring public sector debt. The value of h (=20.8 pp) corresponds to the end of 1989 money base/GDP proportion. The results in the Table show that financial equilibrium in Spain requires, in the long-run, average values of a ranging from 1 pp to 2.5 pp, depending on the values taken by r^*, n and π. Given that the unadjusted and adjusted values of a in 1989 are 0.0 pp and 3.8 pp respectively, the obtained target values seem to point out that the current decline suffered by Spanish net asset accumulation by the private sector is still within the equilibrium bounds defined by the previous calculations, unless foreign investment suffers a severe dry-up. If, for instance, the sum of net foreign investment plus interest payments takes its sample value of 1.6 pp, this means that, in the worst possible situation in Table 6, the target value of a should be around 1pp. Accordingly, given that the goverment borrowing requirement has fallen since 1987 and presumably will continue to fall in the future, the present worsening of the current account can be viewed as the outcome of the decision of the private sector which finds appropiate to invest beyond its means in terms of saving capacity. Thus, even if no radical measures seem necessary in the present situation, it may be sensible that emphasis should be placed on policy measures which promote private and public saving rather than on those restraining investment, so as to avoid problemas from the external side.

7. CONCLUSIONS

This paper explored the conceptual nature of the external constraint and its practical relevance for the Spanish economy. The

Table 6

TARGETS FOR ADJUSTED NET ACQUISITION OF FINANCIAL ASSETS BY THE PRIVATE SECTOR
(As a % of GDP)

		r = n = 2			r = n = 4		
		π = 3	π = 6	π = 8	π = 3	π = 6	π = 8
b* = 0	r* = 2.0	1.0	1.5	1.9	1.4	1.9	2.2
	r* = 6.0	1.0	1.5	1.9	1.4	1.9	2.2
b* = 5	r* = 2.0	1.0	1.5	1.9	1.3	1.8	2.1
	r* = 6.0	1.2	1.7	2.3	1.4	2.0	2.3
b* = 10	r* = 2.0	1.0	1.5	1.9	1.2	1.7	2.0
	r* = 6.0	1.4	1.9	2.3	1.6	2.1	2.4

Note: see expression (44) in the text.

paper has shown that while the true external constraint of the economy is a long-run one in the absence of distortions and market imperfections, it nevertheless may be rational for governments to monitor the shorter-run evolution of the external accounts for the purpose of avoiding future difficulties. Moreover, whenever such distortions and imperfections are important, governments may even be justified in setting specific short-run external targets.

Regarding the specific case of the Spanish economy, we have shown that her economic performance over the last twenty years offers clear and unambiguous examples of major policy changes being prompted by unfavourable external accounts developments. In particular, Spanish economic authorities of very different political persuasions have proceeded to adopt traumatic but nevertheless necessary macroeconomic policy measures in the past to avoid an explossion of the net external debt-GDP ratio.

The various cointegration tests carried out in the paper suggest that the Spanish economy is at present far from facing any problems derived from the fulfilment of the external solvency constraint. Nevertheless, this does not mean that a relaxed or complacent attitude should be taken regarding the future evolution of international competitiveness, especially given the elimination of capital controls in Spain by 1993. Indeed, we advocate further fiscal restraint and supply-side structural policies.

To help establish a simple set of policy guidelines consistent with both internal and external equilibrium, we have proposed targeting the evolution of what we have defined as the "fundamental" account balance to be zero on average over long-periods of time. We have also provided tentative calculations of three variables: the "real exchange rate gap" and "real output gap" and a "target" for the private sector's net acquisition of financial assets. These can be used by the authorities in the future as an approximate indicator of internal and external disequilibria, and as a useful tool for designing suitable macroeconomic policies.

Notes

1. Earlier detailed descriptions of the basic forces underlying the external performance of the Spanish economy can be found in De la Dehesa (1983), and Viñals (1983). A good overview of the current situation can be found in Fernández (1990).

2. For an analysis of the microeconomic and macroeconomic effects of Spain's entry to the EEC see Viñals et al. (1990c). Fernández and Sebastián (1990) test if Spain's accession to the EEC has had an impact on trade flows.

3. A rise in Θ is interpreted as an appreciation.

4. We are abstracting from hysteresis-related effects.

5. Wilcox (1989) provides several examples of this possibility.

6. Although it is arguable that the authorities' reaction function reponds to the "fundamental" balance account instead of to the trade balance account, the steady character of net foreign investment makes it easy to forecast, and therefore we believe that at least, in the case of the Spanish economy, this is a fairly reasonable assumption.

7. Cash-flow data has been used which is only available since 1969.

8. It should be borne in mind, however, that if the interest rates for external assets and liabilities differ, changes in assets and liabilities that leave the level of net external debt unaltered may change the average cost of net external debt. Assets and liabilities are assumed to be homogeneous in the text.

9. It is important to test that there is no constant under the null hypothesis of the existence of a unit root. Were there to be such a constant, the appropriate critical values would be those of the standardised normal, e.g. 1.96% at 5% level (see Dolado et al. (1990)). In all cases studied, the constant was not significant under the null.

10. That is if $\lambda \simeq 0$, (26) would be similar to $z_t = e_t$ while Δb^*_t is still governed by (25).

11. The current Moody's rating of Spain's foreign debt position is AA minus, still three steps below the maximum rating of AAA. In this sense the assumption that b^* should be zero in the long-run does not seem too restrictive.

12. However from a historical perspective, the sustainability of deficits recorded in various sub-periods could be roughly calculated using expression (7). Thus, for example, using the sample averages of the lower part of Table 2, if it had been wished to maintain in the 1974-1977 period the average proportion of debt of the previous sub-period (7.3%), the designed fundamental balance would have been -0.20% of GDP. As the actual proportion was, on average, -2.5%, This indicates non-sustainability in that sub-period. On similar grounds, the 1980-1982 sub-period does not satisfy either the solvency constraint whereas the 1986-1989 period does so comfortably.

13. For example, the sustainability of external deficits is often assessed in terms of alternative definitions of the basic balance. See Ortega et al. (1989) for an analysis of current account positions sustainability in the EEC using a definition of the basic balance which is identical to the "fundamental" account balance used in the present paper.

14. Foreign GDP growth refers to G-7 countries and has been obtained using the same weights as to compute r^* earlier on. Trend GDP growth rates have been obtained through splines in 1974 and 1985.

15. For an analysis of the effects of openness on the Spanish economy after 1986 see Viñals et al. (1990c).

16. Unlike in other analyses of fundamental equilibrium exchange rates, the structural component of foreign capital flows is not assumed but estimated. See, for example, Williamson (1985) and Barrel and Wren-Lewis (1989).

17. De Grauwe (1990) makes a similar point in trying to identify possible causes of the real appreciations in the currencies of the Southern countries in the EEC.

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