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**A quantitative analysis of the effects
of capital controls: Spain, 1986-1990**

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DOCUMENTO DE TRABAJO 95-10R

Septiembre, 1995

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A quantitative analysis of the effects of capital controls: Spain, 1986-1990*

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Abstract

This paper offers a quantitative assessment of the effectiveness of capital controls in Spain during the 1986-1990 period. The analysis is based on a portfolio-balance model previously estimated for the Spanish economy, where the complete elimination of capital controls is simulated. Our results suggest that capital controls would have avoided a net capital outflow leading to a 4 per cent increase in the Spanish net foreign asset position during the first five years of Spain's membership into the EC.

JEL Codes: C32, F21, F36

*Part of this work was completed during the authors' stay at the 1994 Warwick Summer Research Workshop, held at the Department of Economics, University of Warwick, and supported by the Economic and Social Research Council (UK) and the Human Capital and Mobility Programme of the European Community. We are also grateful to participants at the International Symposium on Economic Modelling (Bologna, July 1995) and the 7th World Congress of the Econometric Society (Tokyo, August 1995) for valuable comments.

1 Introduction

It is a well known fact that governments frequently impose in practice some controls on international financial transactions, and this in spite of not being a popular issue in academic literature, more concerned with the case of perfect capital mobility [an exception is Adams and Greenwood (1985)]. These controls are usually justified on two main grounds [see, e. g., Giavazzi and Giovannini (1989)]: (i) trying to isolate domestic interest rates from external developments in a regime of pegged exchange rates, and (ii) avoiding the occurrence of speculative attacks.

Capital controls have been extensively used not only by developing countries, but by industrialized countries as well. In fact, as it has been pointed out by several authors [see, e. g., Rogoff (1985) or Giavazzi and Giovannini (1986)], the use of capital controls by some countries (in particular France and Italy) has been a very important factor behind exchange-rate stability during the first years of functioning of the European Monetary System (EMS), in absence of an effective coordination of monetary policies. Giavazzi and Giovannini (1989) provide an overview on the operation of capital controls in the EMS member countries, whereas Obstfeld (1995) gives an up-to-date survey on the performance of international capital markets and the extent of perfect capital mobility.

The Single European Act envisaged the full elimination of capital controls in the European Community (EC) by July 1st, 1990, except for Spain and Ireland, which were exempted until December 31st, 1992, and Portugal and Greece, which were exempted until December 31st, 1995 (Spain removed them in fact by February 1992). However, as feared by several authors, free capital mobility in a system of pegged exchange rates such as the EMS, in which monetary policy coordination is far from complete and expectations of exchange-rate stability vanish, has led to a severe crisis in the exchange rate mechanism of the EMS after September 1992. Given the size of international capital flows, and the difficulty of setting defensive strategies by central banks against speculative attacks, several authors have proposed the introduction of some kind of capital controls, in the form of an explicit or implicit tax on

short-term foreign exchange transactions [see, e.g., Eichengreen and Wyplosz (1993)].

The Spanish experience between the years 1986 through 1990 can provide an interesting example in order to evaluate the operation of capital controls, for several reasons¹. First of all, until their removal in February 1992 (and despite their transitory and partial reintroduction in September 1992, in the middle of the strong speculative pressures against the peseta), capital controls had been extensively used by the Spanish authorities, in particular on capital outflows and on short-term movements.

On the other hand, the Spanish economy has enjoyed between 1986 and 1990 a period of protracted expansion (see Table 1), characterized by rates of growth above the European average for the Gross Domestic Product (GDP), gross fixed capital formation, and employment. The decrease in inflation and unemployment rates has not prevented, however, a worse performance in Spain regarding these variables as compared to the EC average. Finally, integration into the EC has been associated with an increasing external opening, together with a readdressing of trade flows towards the rest of the EC, and a worsening in both the trade deficit and the current account, the latter being financed by a spectacular increase in capital inflows and in particular in foreign direct investment².

However, this overall highly successful macroeconomic performance has not been free of problems. In particular, the strong increase experienced in capital inflows due to the high domestic interest rates (see Table 1), threatened the objectives of monetary policy through their effect on money supply. As a consequence, several measures to hinder speculative capital inflows were introduced by the Spanish authorities since 1987, at the same time that some kinds of outflows were liberalized [see Viñals (1995a)].

The evidence on capital controls in Spain is rather scarce. Bacchetta (1992) provides a discussion on the likely economic impact derived from the

¹An assessment of the overall performance of the Spanish economy during the 1986-90 period can be found in the different contributions included in Viñals (1995b). The developments in the foreign sector are examined in Bajo-Rubio and Torres (1995).

²See Bajo-Rubio and Sosvilla-Rivero (1994a) for an econometric analysis of foreign direct investment inflows in Spain.

liberalization of the Spanish capital account. The effectiveness of capital controls in Spain between January 1982 and February 1992 is analyzed in Viñals (1995a) by using the traditional method of computing deviations from covered interest parity exceeding 0.5 per cent, who finds that capital controls had been binding 46 per cent of the time, being deviations stronger after the Spanish integration into the EC. In addition, he also uses the more precise method of examining the differential between onshore and offshore interest rates, now for the September 1986-February 1992 period, obtaining that capital controls would have restricted capital flows 83 percent of the cases between both dates. By comparing his results with those from Giavazzi and Giovannini (1989), Viñals (1995a) concludes that the degree of capital mobility in Spain had not been substantially different from that prevailing in France or Italy.

In this paper we try to provide an alternative way of assessing the effectiveness of capital controls in Spain during the 1986-1990 period. In Bajo-Rubio and Sosvilla-Rivero (1994b) a portfolio-balance model was estimated for the Spanish economy, with quarterly data covering the years 1980 through 1990, in which international capital movements were simultaneously determined along with the demand for and supply of money. By simulating the complete elimination of capital controls in that model from 1986 on, we should be able to quantify the degree of success of the Spanish authorities in hindering capital movements during the first years of the Spanish membership into the EC.

The paper is organized as follows. In Section 2 we briefly discuss the theoretical framework of our portfolio-balance model, together with the results derived from its estimation for the above mentioned period. Then, the results from the simulation of the full disappearance of capital controls from 1986 on are presented in Section 3, where some considerations on the applicability of the Lucas critique are also discussed. Section 4 concludes.

2 A portfolio-balance model for the Spanish economy: theoretical issues and empirical results³

Our theoretical framework relies on the portfolio-balance approach, starting from the theory of portfolio selection as developed, among others, by Markowitz (1959) and Tobin (1958, 1969), and first applied to the study of the capital account by Branson (1968)⁴.

We assume a small country, where aggregate demand functions for the three assets in the economy (domestic money, and domestic and foreign bonds) are given, all of them in real terms, by:

$$M^d = m \begin{pmatrix} i, & i^* + \varepsilon, & Y, & W \\ - & - & + & + \end{pmatrix} \quad (1)$$

$$B^d = b \begin{pmatrix} i, & i^* + \varepsilon, & Y, & W \\ + & - & - & + \end{pmatrix} \quad (2)$$

$$EF^d = f \begin{pmatrix} i, & i^* + \varepsilon, & Y, & W \\ - & + & - & + \end{pmatrix} \quad (3)$$

where M^d , B^d and EF^d denote the demands for domestic money, domestically issued bonds, and foreign-issued bonds, respectively (being E the exchange rate, defined as the home currency price of foreign currency); and i, i^*, ε, Y and W are, respectively, the domestic interest rate, the foreign interest rate, the expected rate of depreciation of the home currency, the real level of domestic income, and the real value of domestic wealth. As can be seen from (1), (2) and (3), the demand for each asset would depend positively on its own return, and negatively on other assets' returns, since assets are considered gross substitutes (the return on domestic money is assumed to be zero). On the other hand, asset demands depend also on domestic income, reflecting the assumption that agents hold money for transactions purposes, and positively on total wealth, since assets are assumed to be "normal".

³This section summarizes the main points of Sections 2 and 3 in Bajo-Rubio and Sosvilla-Rivero (1994b)

⁴See Branson and Henderson (1985) for a comprehensive survey on this kind of models in its application to an open economy

From the definition of wealth, this would be allocated among the three assets:

$$W = M^d + B^d + EF^d \quad (4)$$

which implies the familiar restrictions

$$m_i + b_i + f_i = 0$$

$$m_{i^*+\varepsilon} + b_{i^*+\varepsilon} + f_{i^*+\varepsilon} = 0$$

$$m_Y + b_Y + f_Y = 0$$

$$m_W + b_W + f_W = 1$$

The equilibrium conditions in the markets for money and domestic bonds would be:

$$M^d = M^s \quad (5)$$

and

$$B^d + B^{*d} = B^s \quad (6)$$

where M^s and B^s denote the real stocks of money and domestic bonds, respectively. Even though it is assumed that domestic money is not demanded abroad, B^{*d} is the foreign demand for domestically-issued bonds, in real terms and measured in home currency, which depends on similar arguments than domestic demand:

$$B^{*d} = b^* \begin{pmatrix} i - \varepsilon, & i^*, & Y^*, & W^* \\ + & - & - & + \end{pmatrix} \quad (7)$$

being now Y^* and W^* the real level of foreign income, and the real value of foreign wealth, respectively.

Adding and subtracting B^{*d} in the wealth restriction (4) we get

$$W = M^d + (B^d + B^{*d}) + (EF^d - B^{*d})$$

where the terms on the right-hand side are, respectively, the total demand for money, the total demand for domestic bonds, and the net foreign asset position of the home economy (NFAP), i. e., a measure of the net financial claims on foreigners. Notice that the first difference of NFAP would give us the capital account balance, so that if Δ NFAP is positive a net capital outflow (or a net loan to the rest of the world) would take place, whereas if negative the home country would experience a net capital inflow (or a net loan from the rest of the world).

In virtue of the Walras's Law, only two of the three markets are independent so, omitting the domestic bonds' market, the following two equations would be enough to characterize asset demands:

$$NFAP = \varphi \begin{matrix} (i, & i^*, & \varepsilon, & Y, & Y^*, & W, & W^*) \\ - & + & + & - & + & + & - \end{matrix} \quad (8)$$

and

$$M^d = m \begin{matrix} (i, & i^* + \varepsilon, & Y, & W) \\ - & - & + & + \end{matrix} \quad (1)$$

where (8) is obtained from (3) and (7).

To close the model, we specify an equation for the supply of money. Following the well-known money multiplier approach [see, e. g., Papademos and Modigliani (1990)], the supply of money would be equal to a multiple of the monetary base (i. e., the monetary liabilities of the central bank or "high-powered money"):

$$M^s = \mu \begin{matrix} (h, & z, & i, & i_R, & i_{CB}) \\ - & - & + & - & - \end{matrix} H \quad (9)$$

where H denotes the monetary base and μ is the money multiplier, which is made dependent on the currency-deposits ratio (h), the required reserves ratio (z), the economy's interest rate (i), the rate of return on reserves (i_R), and the effective cost of borrowing from the central bank (i_{CB}), and where the three latter variables affect μ via the excess reserves ratio.

In this way, equations (8), (1), and (9) make up a small model of the financial sector of a small open economy, embodying the equilibrium conditions in assets markets. A noticeable feature of this model specification is that, since the first difference of NFAP amounts to the capital account balance (see above), cointegration analysis will allow us to get estimates of both the *stock* component of capital movements in the long-run (i. e., NFAP) and its *flow* counterpart in the short-run (i. e., the capital account balance)⁵.

We have estimated the above model with quarterly data for the 1980.1 – 1990.4 period (see the Appendix for the definitions and sources of the variables), and by using the two-step method proposed by Engle and Granger (1987)⁶. In this way, we first estimated the long run by means of the procedure developed by Phillips and Hansen (1990), which enables inference in models with non-stationary but cointegrated variables through a class of Wald tests modified by semiparametric corrections for serial correlation and second-order endogeneity bias. Secondly, an error-correction model was estimated using three-stage least squares, to capture the short-run dynamics towards the long-run equilibrium. The results for both the long-run and the short-run are shown in Table 2.

Notice that the short-run equation for NFAP includes the variable KC (see the Appendix for the exact definition), which proxies the effects of capital controls by measuring deviations from covered interest parity. These deviations would signal the presence of unexploited arbitrage profits which can be attributed to the active use of capital controls [see, e. g., Giavazzi and Pagano (1985) or Viñals (1995a)]. Notice that capital controls are not included in the long-run relationship since, as is usually asserted in the literature, even permanent controls would have only temporary effects⁷.

⁵A similar approach is followed by Baulant and Bontillier (1992) who, unlike this paper, adopt a single-equation framework, so not taking into account the interaction between capital movements and the money market.

⁶All the variables used in the estimations have been tested for the presence of unit roots, both at annual and quarterly frequencies. The results reported in Bajo-Rubio and Sosvilla-Rivero (1994b) do not suggest any non-stationarity at both frequencies for all of them, except for our proxy for expected depreciation, which turned to be a stationary variable.

⁷Gros (1987) provides a formal assessment of the argument on the long-run ineffectiveness of capital controls, in terms of a model in which economic agents can evade the controls by incurring some costs: the interest differentials created by capital controls

The estimated equations for the demand for and supply of money use the $M2$ definition. The long-run equation for the former includes, in addition to the alternative interest rate and the income level, a measure of the own rate on $M2$ (i_M), and a dummy variable proxying for the effects of financial innovation (FI) [as in Manzanedo and Sebastián (1990)].

The cointegration tests allow us to reject the null hypothesis of no-cointegration in all cases, so that those equations can be tentatively thought as representing long-run relationships. In addition, the null hypotheses of no error correction are also rejected in all cases, giving further support to those cointegration equations as long-run relationships [see Fry *et al.* (1992)].

3 Quantifying the effectiveness of capital controls: Spain, 1986-1990

As mentioned in Section 1, the Spanish economy experienced a continued increase in capital inflows during the 1986 – 1990 period. This can be linked to the combination of a restrictive monetary policy aimed to fight against inflation, together with an expansionary fiscal policy (motivated by the expansion of social expenditures and public infrastructure programmes), which led to interest rates higher than those prevailing abroad.

Figure 1 shows the evolution of the foreign assets held by domestic residents and total liabilities to foreigners, in real terms (denoted by FAP and FLP, respectively). As can be seen, the stock of foreign assets decreased during the 1986 – 1987 period, and steadily increased since then, whereas, on the other hand, liabilities to foreigners showed a strong increasing trend since the second quarter of 1986. As a consequence, the net foreign asset position (i. e., the difference between FAP and FLP, denoted by NFAP), shown in Figure 2, after remaining stable during 1986, experienced a sharp decrease for the rest of the period.

In its turn, the rise in capital inflows resulted in increased foreign reserves which jeopardized the objectives of the anti-inflationary monetary policy.

would provide an incentive for capital flows, which in turn would work to eliminate those differentials in the long-run.

This led to the Spanish authorities to introduce after 1987 several measures aimed to deter speculative capital inflows, at the same time that some kinds of outflows were liberalized. As mentioned above, their effects were analyzed in Viñals (1995a), where it is concluded that this effect had been particularly stronger between the second quarter of 1987 and the third quarter of 1990.

Figure 3 plots our proxy for capital controls, measured as deviations from covered interest parity, together with the 0.5 per cent band, for the 1986.1 – 1991.4 period (i. e., one year ahead our period of analysis). As can be seen, and in line with Viñals’s results, capital controls would seem to be binding from the second quarter of 1987 through the first quarter of 1991 (the exceptions being the first and third quarters of 1988, and the third quarter of 1990). Finally, from the second quarter of 1991 on, the figure would suggest a closer integration of the Spanish capital markets *vis-à-vis* the international ones.

The aim of this section is to evaluate the effectiveness of capital controls imposed by the Spanish authorities. To this end, we simulate a complete elimination of those controls (i. e., setting KC equal to zero) on the behaviour of the system given by equations in Table 2, in which the error-correction terms are allowed to be continuously updated.

Before presenting the results, we will go through an alleged possible shortcoming of this procedure, which has been extensively quoted in the literature. This is the well-known “Lucas critique”, which questions the appropriateness of using econometric models for policy simulation experiments, on the grounds that the model’s parameters would not be invariant following a change in expectations held by economic agents [see Lucas (1976)].

We have tried to address the Lucas critique by analyzing superexogeneity both directly via test of constancy and indirectly via test of structural invariance of the parameters in our model [see Ericsson *et al.* (1991)].

In addition to the standard Chow test shown in Table 2, constancy has been tested by recursive least square estimation and the associated sequence of test statistics. Figure 4 shows the CUSUM tests proposed by Brown *et al.* (1975), together with their ± 2 estimated standard errors. As can be seen,

since the test statistics move inside the critical lines, there seem to be no signs of parameter instability⁸.

On the other hand, structural invariance and policy exogeneity were tested by using the procedure suggested by Charemza and Király (1988), which is based on testing recursive residuals of the model as being statistically independent from the examined variables. After applying this test to the short-run equations for NFAP and money supply, looking at the exogeneity properties of ε and KC , as well as H, z, i_R and i_{CB} , respectively we found F-statistics of $F(2, 31) = 1.47$ and $F(5, 27) = 0.50$. As can be seen, these test statistics are below their critical values and therefore do not suggest the rejection of the invariance hypothesis for those regressors.

The detailed results of the simulation are presented in Table 3 and Figure 5, where we show the change in NFAP, M2 and i , computed as the difference between the simulated and the base series, in percentage for the two first series. The simulation runs from the first quarter of 1986 to the fourth quarter of 1990.

Notice that, although capital controls had been binding on inflows (as shown by the positive value taken by our proxy KC ; see Figure 3), a liberalization of the capital account would increase both inflows and outflows, being on principle the net effect uncertain (Spiegel, 1990). However, as pointed out by some authors [see, e. g., Bacchetta (1992)], there could be presumed in the Spanish case that the effect on outflows would be dominating, since these had been more legally restricted, and given their still low value (being their GDP share quite small as compared to other countries such as France or Italy), specially in some items (e. g., Spanish portfolio investment abroad, or financial loans from abroad).

In fact, as shown in Table 3 and Figure 5, the elimination of capital controls would produce a net capital outflow, leading to an increase in the net foreign asset position or, in other words, net foreign liabilities would be reduced (i. e., the capital account would worsen). The effect would be specially higher from the second quarter of 1987 and during 1989, that is,

⁸Plots of the recursive coefficient estimates together with ± 2 their sequentially estimated standard errors (not reported here, but available from the authors) show that these estimates vary only slightly relative to their *ex ante* standard errors, giving further support to our hypothesis of parameter constancy.

the periods where capital controls had been more binding (see above). This in turn would raise domestic wealth, and hence money demand, the interest rate, and then money supply.

On average, the increase in NFAP due to the higher net capital outflow would have been around 4 per cent above its baseline level for the whole period, hence illustrating the important role played by capital controls in this particular episode, according to our simulation results.

4 Conclusions

In this paper we have tried to evaluate the effectiveness of capital controls in Spain during the 1986-1990 period. To this end, we have simulated the complete elimination of capital controls from an estimated portfolio-balance model of the Spanish economy, in which international capital movements were simultaneously determined along with the demand for and supply of money.

Our results suggest that capital controls would have avoided a net capital outflow leading to a 4 per cent increase in the net foreign asset position of the Spanish economy during the first five years of Spain's membership into the EC. So, and recalling the caution with which our numerical estimates should be taken, it would seem that capital controls would have played a noteworthy role during this crucial period for the Spanish economy.

Therefore, even though capital can flow through channels which are extremely difficult to monitor, so eroding the effectiveness of controls in the long run [see, e. g., Mathieson and Rojas-Suárez (1993)], there can be certain episodes in which capital controls can matter. In its turn, this would have additional effects for the performance of an economy.

For instance, in the case analyzed in this paper, capital controls would have helped to finance the current account deficit registered by the Spanish economy after its accession to the EC, due to the increasing trade deficit coupled with a continuous worsening in the services account (Bajo-Rubio and Torres, 1995). Furthermore, the existence of capital controls would have contributed to insulate domestic financial conditions from those prevailing

abroad and therefore allowing national authorities to conduct an independent monetary policy, as shown e. g. by the high degree of sterilization found for exchange-market interventions (Pérez-Campanero, 1990).

To conclude, notice that the new environment given by the full liberalization of capital movements in the EC would prevent the implementation of capital control measures by individual member states, so limiting the scope for an independent policy response by the Spanish authorities in the face of idiosyncratic shocks. This in turn calls for an increased coordination of economic policies, as well as for a reinforced role for fiscal policy.

Appendix: Definitions of the variables and data sources.

FI = Dummy variable proxying for the effects of financial innovations, taking the value 0 from 1977.1 to 1982.4, 1 from 1983.1 to 1984.4, and 2 from 1985.1 to 1990.4

H = Monetary base (hundreds of billion Pta), in real terms

h = Ratio of currency to banks deposits

i = Yield on long-run government debt

i_{CB} = Bank of Spain's intervention rate

i_M = Interest rate on M2

i_R = Rate of return on required reserves

i^* = Long-run foreign interest rate, computed as a weighted average, according to their share on Spanish foreign debt, of the yields on long-run government bonds from the US, Switzerland, Germany, Japan, the UK and France

KC = Proxy for the effect of capital controls, measured as deviations from covered interest parity, and computed as the difference between the three-month Spanish interbank and Euro-dollar rates and the Pta-US\$ three-month forward premium

$M2$ = M2 definition of money supply (consisting of currency, and sight and saving deposits) (hundreds of billion Pta), in real terms

$NFAP$ = Net foreign asset position of the Spanish economy, computed as the difference between total foreign assets held by domestic residents (net of official reserves) and total liabilities to foreigners (both in hundreds of billion Pta), in real terms

W = Spanish financial wealth, computed as the sum of total liquidity (liquid assets held by the public -ALP), net private claims on government (private ownership of government debt) and NFAP (all in hundreds of billion Pta), in real terms

Y = Spanish Gross Domestic Product (hundreds of billion Pta), in 1980 prices

Y^* = Imports of the industrialized countries (hundreds of billion US \$), in real terms

z = Required reserves ratio

ε = Pta-US\$ three-month forward premium

All the variables in real terms have been deflated by the consumption price index. The Spanish data are taken from the Bank of Spain, except those for the net claims on government, that come from the IMF's *International Financial Statistics* (line 32an minus line 12a). Most of the Bank of Spain's variables appear in its *Boletín Estadístico*, except for i and i_M , taken from Cuenca (1994); i_{CB} , i_R and z , provided by J. L. Escrivá; and Y , provided by P. L'Hotellerie. Regarding the foreign variables, the interest rates and the OECD consumption price index (excluding Turkey) are taken from the OECD's *Main Economic Indicators*, whereas the nominal imports of the industrialized countries come from the IMF's *International Financial Statistics*.

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TABLE 1:
MAIN ECONOMIC INDICATORS 1986-90, SPAIN AND EC-12
 (average of annual figures).

	Spain	EC-12
Gross Domestic Product	4.5	3.2
(at constant prices, % change)		
Gross fixed capital formation	11.7	5.9
(at constant prices, % change)		
Inflation	6.6	4.1
(private consumption deflator, % change)		
Employment	3.1	1.3
(% change)		
Unemployment rate	18.8	9.6
(% of civilian labour force)		
Current balance	-1.3	0.4
(% of GDP)		
Long-term interest rate	12.9	9.5
(%)		

Source: *European Economy* 54, 1993.

TABLE 2: ESTIMATION RESULTS

A) Net foreign asset position

A.1) Long-run

$$NFAP_t = 67.83 - 1.60i_t + 0.35(i+\epsilon)_t - 2.78Y_t + 5.61Y_t^* + 0.14W_t + \hat{u}_{1t} \\ (280.7) \quad (42.4) \quad (15.0) \quad (220.4) \quad (70.6) \quad (13.9)$$

$$R^2 = 0.96, \quad CRDW = 1.37, \quad CRADE = -4.98, \quad CR\hat{Z}_\alpha = -28.26$$

A.2) Short-run

$$\Delta NFAP_t = -1.01 - 0.67\Delta i_{t-4} + 0.45\Delta i_{t-4}^* + 0.07\epsilon_t - 0.62\Delta Y_t + 1.68\Delta Y_{t-3}^* + 0.11\Delta W_t - 0.47KC_t - 0.41\hat{u}_{1t-1} \\ (-4.02) \quad (-6.44) \quad (2.81) \quad (1.92) \quad (-1.99) \quad (3.53) \quad (5.25) \quad (-5.29) \quad (-7.07)$$

$$\overline{R}^2 = 0.83, \quad \sigma = 0.56, \quad DW = 1.98, \quad Q(4) = 4.95, \quad LM(4,27) = 1.01, \quad ARCH(4,27) = 1.21, \quad CHOW(9,22) = 1.31$$

B) Money demand

B.1) Long-run

$$M2_t = -1.00i_t + 4.68i_{Mt} + 1.88Y_t - 6.94FI_t + \hat{u}_{2t} \\ (28.9) \quad (24.3) \quad (346.7) \quad (94.1)$$

$$R^2 = 0.93, \quad CRDW = 1.68, \quad CRADE = -5.86, \quad CR\hat{Z}_\alpha = -34.70$$

B.2) Short-run

$$\Delta M2_t = 1.20 - 5.74D1 - 0.54D2 - 1.97D3 - 0.28\Delta i_t - 0.43\Delta i_t^* + 4.87\Delta i_{Mt} + 1.22\Delta Y_t + \\ (4.26) \quad (-15.40) \quad (-1.69) \quad (-6.37) \quad (-1.85) \quad (-2.27) \quad (5.85) \quad (3.84) \\ + 1.53\Delta Y_{t-4} + 0.06\Delta W_t - 0.18\hat{u}_{2t-1} \\ (4.41) \quad (1.83) \quad (-2.97)$$

$$\overline{R}^2 = 0.94, \quad \sigma = 0.72, \quad DW = 1.94, \quad Q(4) = 2.07, \quad LM(4,25) = 0.40, \quad ARCH(4,25) = 0.47, \quad N(2) = 1.54, \quad CHOW(11,18) = 1.17$$

TABLE 2 (Continued)

C) Money supply

C.1) Long-run

$$M2_t = 61.50 + 1.77i_{t-1} - 2.61i_{Rt} - 0.89i_{CBt} + 0.59H_t + u_{3t} \\ (83.6) \quad (17.8) \quad (193.4) \quad (16.2) \quad (42.0)$$

$$R^2 = 0.81, \quad CRDW = 1.66, \quad CRDF = -6.02, \quad CR\hat{Z}_a = -42.44$$

C.2) Short-run

$$\Delta M2_t = 3.72 - 7.58D1 - 1.14D2 - 3.86D3 - 1.16\Delta h_{t-4} - 0.44\Delta z_t + 0.60\Delta i_t - 0.25\Delta i_{Rt-4} - \\ (19.7) \quad (-27.4) \quad (-4.67) \quad (-14.5) \quad (-5.12) \quad (-8.54) \quad (3.90) \quad (-2.19) \\ - 0.18\Delta i_{CBt} - 0.07\Delta i_{CBt-2} + 0.18\Delta H_{t-4} - 0.13u_{3t-1} \\ (-4.76) \quad (-2.04) \quad (3.39) \quad (-3.12)$$

$$\overline{R}^2 = 0.96, \quad \sigma = 0.61, \quad DW = 1.50, \quad Q(4) = 7.20, \quad LM(4, 24) = 1.59, \quad ARCH(4, 24) = 0.59, \quad N(2) = 0.82, \quad CHOW(12, 16) = 1.95$$

Notes: i) For the long-run regressions, figures in brackets below each coefficient are Phillips-Hansen's modified Wald test statistics with limiting χ^2 distributions. In the bottom line, some cointegration tests are reported: the standard Durbin-Watson and Dickey-Fuller statistics (CRDW and CR(A)DF, respectively), and the Phillips and Ouliaris (1990) semi-parametric modified test ($CR\hat{Z}_a$).

ii) For the short-run regressions, figures in brackets below each coefficient are the standard t-statistics. In the bottom line, some diagnostic statistics for testing against various alternative hypotheses are reported: residual autocorrelation (DW, Ljung-Box Q and LM), autoregressive conditional heteroscedasticity (ARCH), skewness and excess kurtosis (N), and parameter stability (CHOW) taking as the breaking point the date of the Spanish integration into the EC (the first quarter of 1986), which are distributed as $\chi^2(\bullet)$ or $F(\bullet, \bullet)$ (degrees of freedom in parentheses).

Table 3: Effects of an Elimination of Capital Controls			
	NFAP	M2	i
1986.1	0.1618	0.0022	0.0022
1986.2	0.4328	0.0050	0.0046
1986.3	0.2246	0.0008	-0.0008
1986.4	0.3332	0.0018	0.0007
1987.1	0.7286	0.0069	0.0060
1987.2	7.8858	0.1023	0.1100
1987.3	8.8353	0.1002	0.0806
1987.4	8.4689	0.0714	0.0366
1988.1	5.6001	0.0240	-0.0233
1988.2	4.7536	0.0112	-0.0246
1988.3	3.6938	-0.0058	-0.0337
1988.4	4.0667	0.0099	-0.0019
1989.1	6.4943	0.0527	0.0520
1989.2	6.6061	0.0447	0.0332
1989.3	5.3923	0.0190	-0.0053
1989.4	4.1695	-0.0075	-0.0339
1990.1	3.4277	-0.0130	-0.0286
1990.2	3.0166	-0.0109	-0.0181
1990.3	2.4415	-0.0175	-0.0225
1990.4	2.2585	-0.0127	-0.0111
Note: For NFAP and M2, percent deviation from baseline; and for i, deviation from baseline.			

FIGURE 1: Foreign assets held by domestic residents (FAP) and total liabilities to foreigners (FLP)

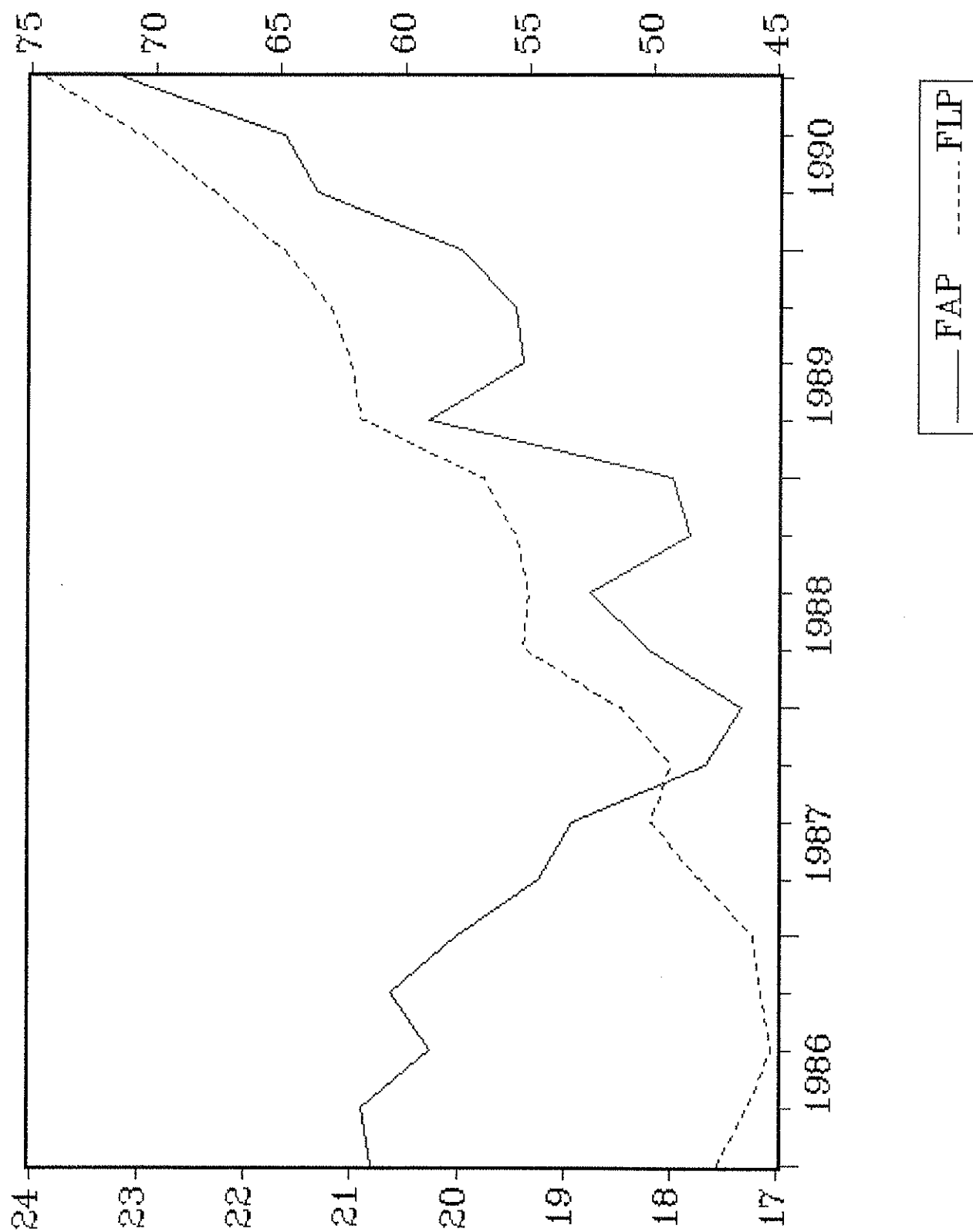


FIGURE 2: Net foreign asset position

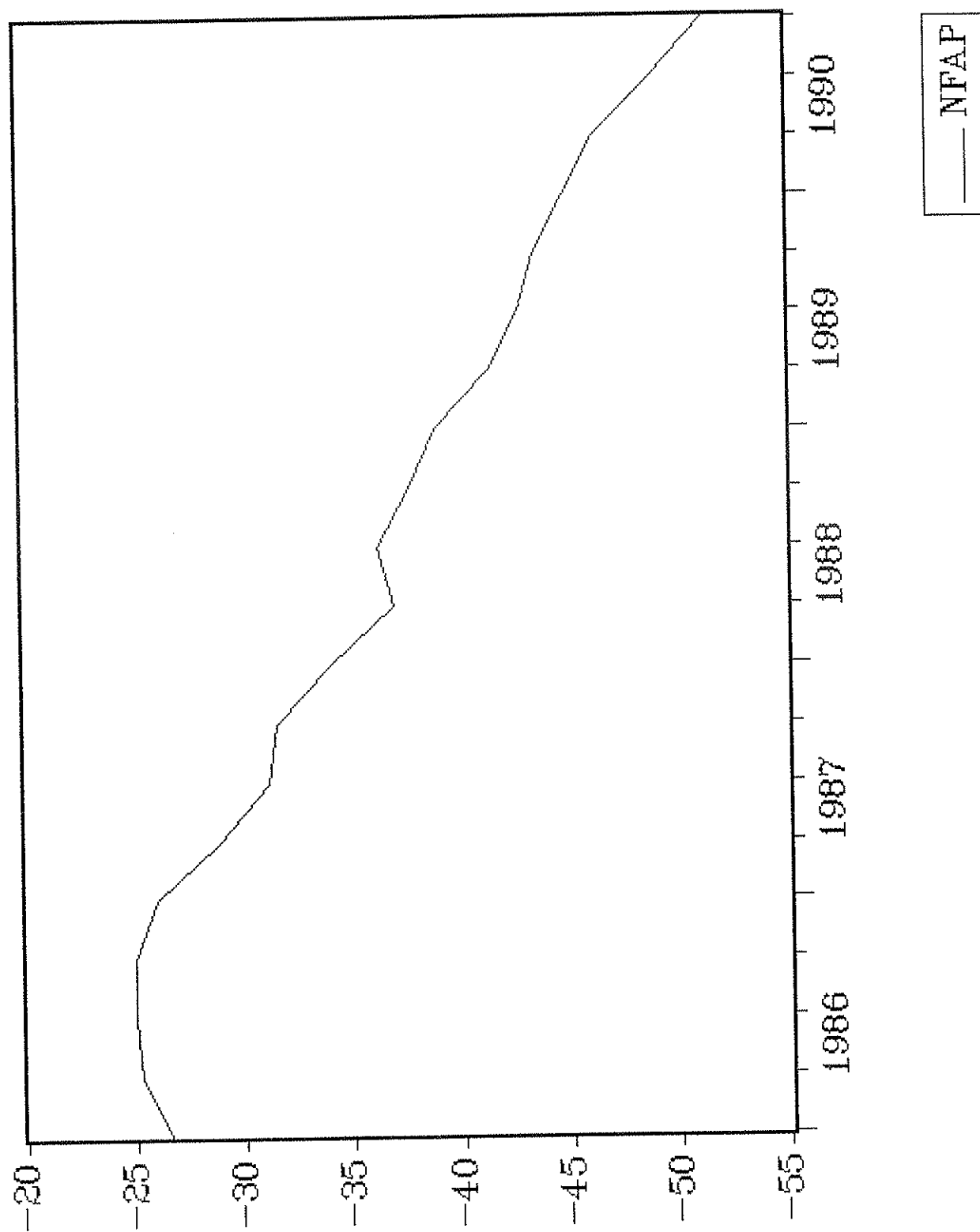


FIGURE 3: Deviations from covered interest parity

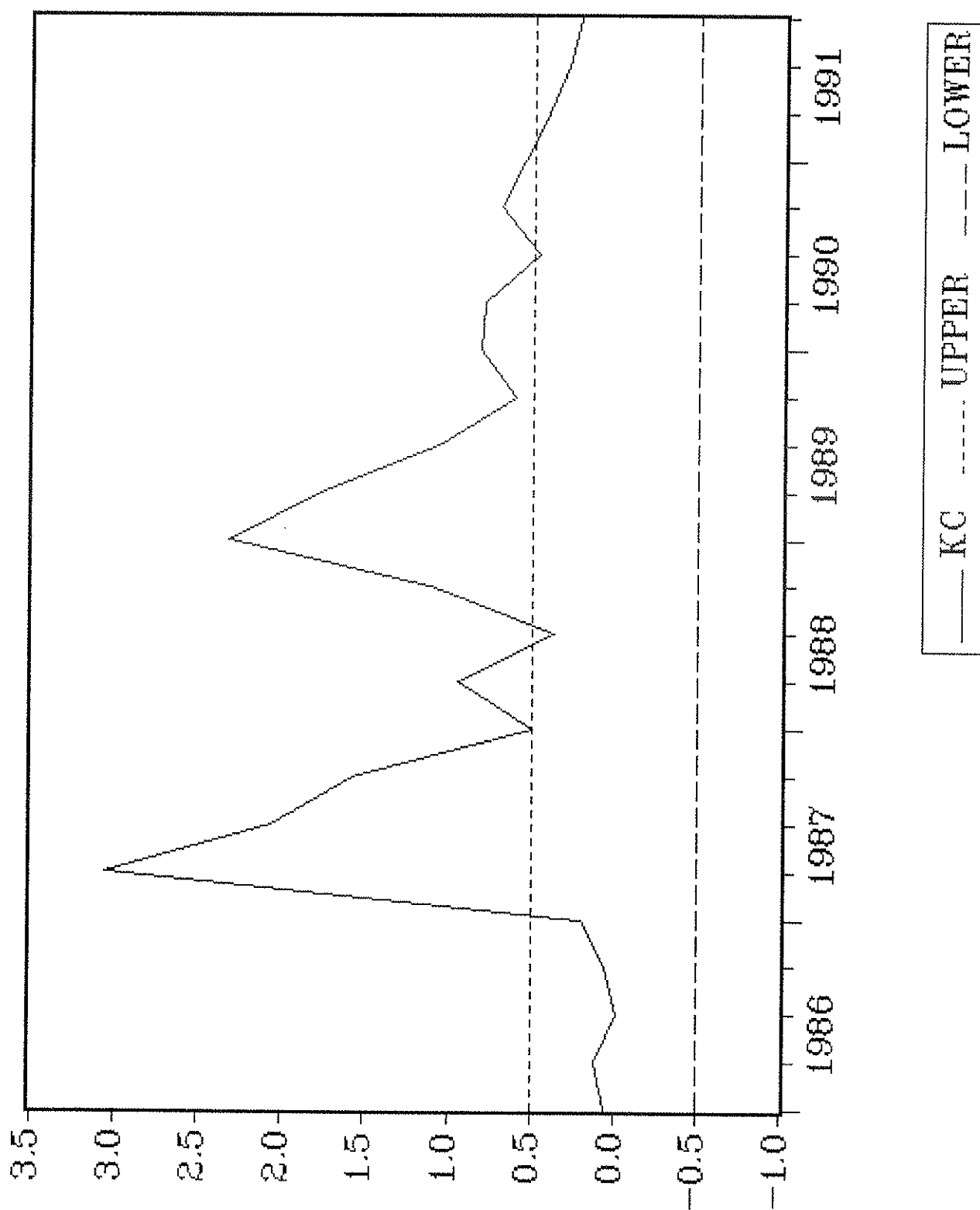
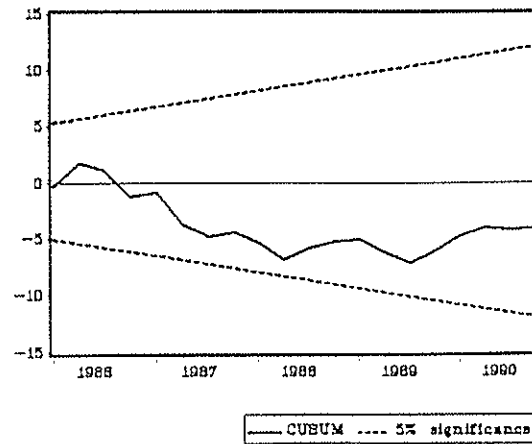
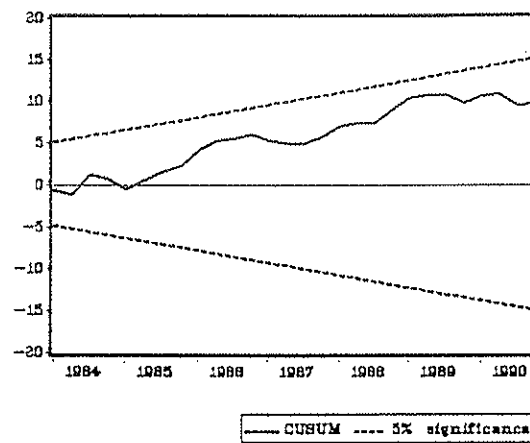


FIGURE 4: CUSUM TESTS

a) NFAP short-run equation



b) Money demand short-run equation



c) Money supply short-run equation

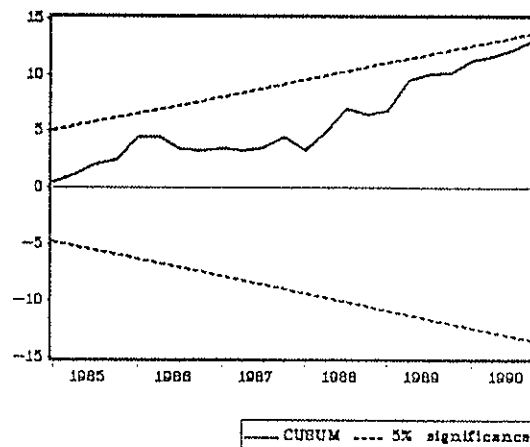
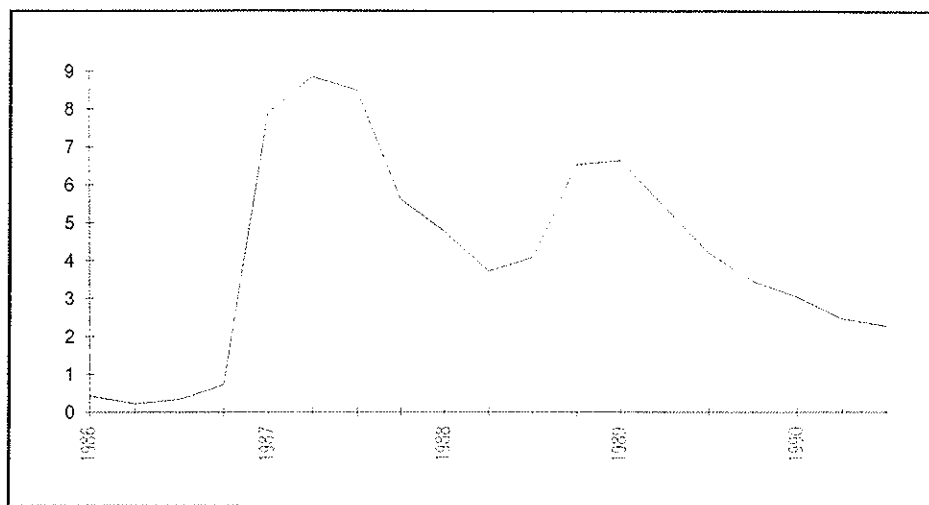
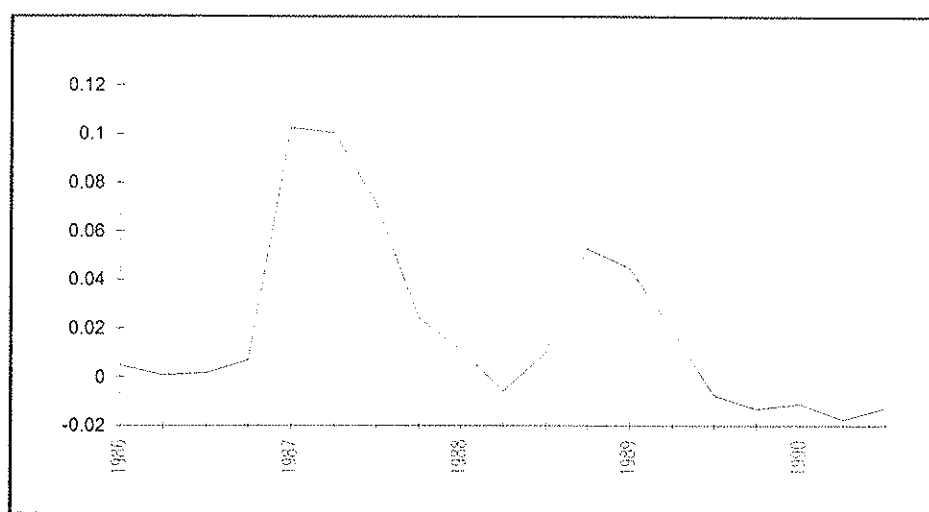


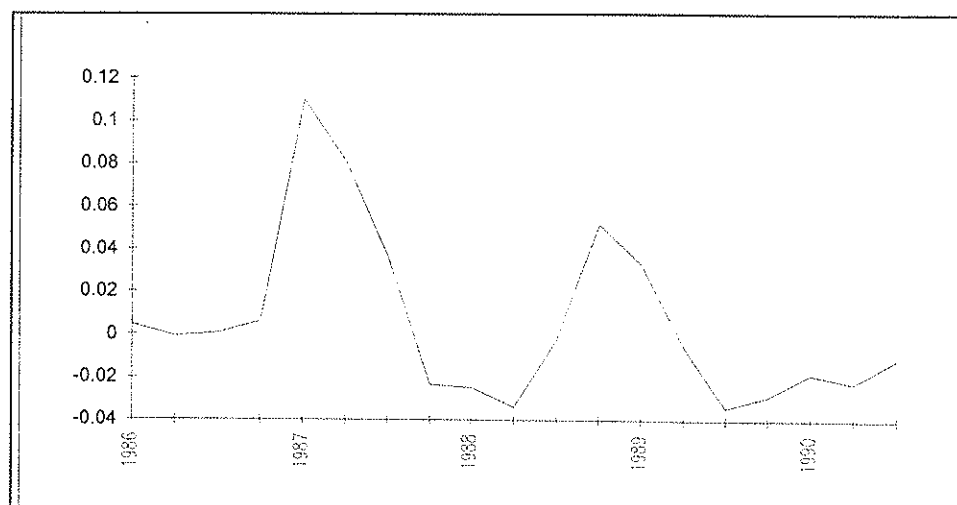
FIGURE 5: EFFECTS OF AN ELIMINATION OF CAPITAL CONTROLS



Percentage deviation of NFAP from baseline



Percentage deviation of M2 from baseline



Deviation of i from baseline



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