

On the Scope for Dutch Monetary Policy *

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1. Introduction

A small open economy that faces a fixed exchange rate and perfect international capital mobility cannot control its money supply (see Dornbusch 1980). The Netherlands is generally believed to be such a country. It faces the narrow EMS band for the exchange rate *vis-à-vis* the Deutsche Mark and parity adjustment has not occurred against the Deutsche Mark since 1983. The Dutch financial system is almost fully liberalised. Official capital controls were abandoned in 1986. Therefore a large degree of substitutability between short- and long-term domestic and foreign assets is possible.

Based on this institutional setting the Dutch central bank announced in its *Annual Report 1991* that money supply is no longer a target of policy and non-market instruments have been abandoned. In this paper we discuss this change in policy. First, we test one of the necessary assumptions for this change in policy: the degree of substitutability between both short- and long-term domestic and foreign assets. Substitutability has two faces. The first is the legal one: is it allowed? The second one is desirability: do investors adjust their portfolios to discrepancies in interest rates? Are German bonds as attractive as Dutch bonds of a similar maturity? If there is a large degree of substitutability, then the choice made by the Dutch central bank was well motivated. If not, it may be questioned.

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To answer this question we construct a small equilibrium portfolio model of the Dutch financial sector in the 1980s. This decade experienced rapid deregulation, liberalisation and internationalisation of financial markets. We discuss this institutional setting in the next section. The model is presented in Section 3. It is a highly streamlined structural monetary model. The estimation and the model properties are presented. Section 4 addresses the possibility for an independent Dutch monetary policy.

2. Institutional setting

One of the facts which has undermined money supply policy is the change in the institutional setting of the financial system. First, financial markets were deregulated. For instance, new share issues no longer need to be announced in advance. Second, financial innovations such as commercial paper and certificates of deposits were introduced in European financial markets in the mid-1980s. Third, internationalisation of finance was stimulated by removal of capital controls. These developments changed the institutional setting for monetary policy, which we describe hereafter. The new financial products made the differences between the traditional money and capital markets more vague and increased international substitutability of assets.

Until the 1980s the Dutch central bank used two sets of instruments to pursue two intermediate targets of monetary policy. The targets were the money market interest rate and the liquidity ratio (defined as M2 over net national income at market prices). Narrow monetary policy was used to control money market interest rates in order to satisfy the goal of a stable exchange rate. The assumption was that a stable exchange rate controls the foreign source of inflation. Narrow monetary policy sought to control the interbank money market. Broad monetary policy was focused on the control of the liquidity ratio. Sources of money growth were monitored: the government, private banks and foreigners. If the foreign component increased, domestic restriction by direct or indirect credit controls was introduced. As monetary financing of government deficits was limited, money supply policies mainly focused on private banks' credit supply. Both short-term and net long-term lending were limited through direct credit controls or interest rate adjustment.

After the start of the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) in March 1979 changes in the financial institutional setting followed each other rapidly. The system required currencies to float within bands, varying from 2.25 per cent to over 6 per cent. The Dutch central bank focused fully on the Deutsche Mark, establishing a *de facto* zone of ± 0.5 per cent after 1983. Throughout the EMS the willingness to buy and sell foreign assets increased as a result of the reduction in exchange rate risk. Since 1986 the Dutch central bank has officially liberalised the capital market and international capital controls were removed. In the first half of the eighties broad monetary policy focused on the control of domestic sources. As monetary financing of government deficits had been abandoned, the control of domestic credit expansion was used. Direct credit controls were used in 1977-1981 and in 1986-1987. Despite that, the central bank could not prevent an increase in the liquidity ratio of 15 percentage points in the eighties. Since 1987 monetary policy was carried out by market-based instruments. Thus, the Dutch central bank tried to use open-market policy to influence the capital market interest rate in the period 1988-1989. Since 1992, however, Dutch monetary policy has been fully focused on the exchange rate target. Money growth is only monitored in order to detect financial developments that can destabilise the exchange rate.

In Section 3 we test the implications of one of the aspects of the institutional setting: the degree of substitutability of financial assets. In an international context our approach is linked with the discussion on international capital mobility. In this discussion both price and quantity approaches can be followed. An example of a price approach is the testing of interest parity conditions (see de Haan *et al.* 1991). Examples of quantity approaches are the testing of the Feldstein-Horioka hypothesis and the estimation of offset or sterilisation coefficients. Here we use a structural approach: demand for and supply of assets are modelled. Perfect substitutability is a limiting case of the model: infinite cross-interest rate elasticities. The structural approach has the advantage that behavioural assumptions are tested.

3. The model

The equilibrium portfolio model is based on a simple but complete financial accounting system. The accompanying tables show the

balance sheets of the monetary and non-monetary private sector at the end of the first quarter of 1989 in billions of guilders.

TABLE 1
BALANCE SHEET STRUCTURE

Balance sheet of the monetary sector			
	Assets		Liabilities
NFA_b^s	1.245	$M2$	202.812
NFA_b^l	17.651	ONL_b	37.032
IR	60.477		
CR^s	105.772		
CR^l	54.699		

Balance sheet of the non-financial sector			
	Assets		Liabilities
NFA_p	74.557	CR^s	105.772
$M2$	202.812	ONL_p	171.597

The monetary sector is formed by private banks and the central bank. The central government has been excluded. The symbols are explained below:

- CR^s short-term supply of bank credit;
- CR^l net long-term supply of bank credit;
- IR international reserves;
- $M2$ liquidity;
- NFA_b^s net short-term foreign assets of private banks;
- NFA_b^l net long-term foreign assets of private banks;
- NFA_p net foreign assets of the private sector;
- ONL_b other net liabilities of private banks;
- ONL_p other net liabilities of the private sector.

The core of the model is formed by the behavioural models of the banking sector and the private non-monetary sector. It has been assumed that this behaviour can be described by a portfolio model of the form:

$$\frac{\Delta A_t}{S_t} = E \left[\frac{r_t}{S_t}, \frac{W_t}{S_t}, \frac{Z_t}{S_t} \right] + C \frac{A_{t-1}}{S_t} + u_t \quad (1)$$

where A_t represents a vector of asset demands, r_t a vector of interest rates, W_t total wealth, Z_t a vector of other explanatory variables, S_t a scaling variable, u_t a residual and E and C matrices of parameters.

In the model of the banking sector IR and ONL_b are assumed to be exogenous. The supply of short-term credit is fully demand determined. In the estimation of the model it has been assumed that the supply of liquidity by banks is determined by the balance sheet total. In the model of the private non-monetary sector ONL_p is determined by the balance sheet condition. The scaling term in the model of the banking sector is equal to the lagged sum of endogenous bank assets. In the model of the private sector lagged real national income at market prices, which is exogenous, has been taken as the scaling variable. All the variables in the model of the private non-monetary sector are in real terms, while in the model of the banking sector nominal variables have been taken.

It has been assumed that foreign interest rates are exogenous for the open Dutch economy. The interest rate on short-term bank credit r_{cr^s} is equal to:

$$r_{cr^s} = r_{odr} + F \quad (2)$$

where r_{odr} represents the official discount rate (the discount rate on promissory notes) and F a fixed mark-up.¹ It has been assumed that the exchange rate is fixed *vis-à-vis* the Deutsche Mark. The short-term interest rate r_s takes care of foreign exchange market equilibrium. Money market policy of the Dutch central bank is endogenous in a way that the short-term interest rate can take care of arranging equilibrium on the foreign exchange market. As a proxy variable for the central bank's money market policy the central bank's interest rate on advances to private banks r_v follows r_s :

$$\Delta r_{v_t} = \sum_{i=0}^{\tau} \alpha_i \Delta r_{s_{t-i}} \quad (3)$$

where τ represents the number of lags.

¹ Swank (1994) has presented a more sophisticated weighting approach.

The market for foreign exchange is in equilibrium:

$$CA_t = \Delta NFA_{b_t}^s + \Delta NFA_{b_t}^f + \Delta NFA_{p_t} + \Delta IR_t + STAT_t \quad (4)$$

where CA_t represents the surplus on the current account of the balance of payments and $STAT_t$ a statistical residual (exogenous). The long-term interest rate r_t is supposed to take care of the capital market equilibrium. As Walras' Law implies that one market should be modelled implicitly, the long-term interest rate also clears the market for liquidity.

The portfolio models have been estimated with quarterly data by means of Zellner's SURE (see Zellner 1962). The model for the private sector has been estimated with data for the period 1973.I-1989.I, the model for the banking sector with data for 1983.II-1989.I. The latter sample period is taken because short- and long-term net foreign assets of banks can only be measured starting 1983. The estimation results are shown in Tables 2 and 3.

TABLE 2
ESTIMATION RESULTS FOR THE PRIVATE SECTOR

	ΔNFA_{pt}^r	$-\Delta CR_t^r$	$\Delta M2_t^r$
$NFA_{p,t-1}^r$	-0.019*		
$-CR_{t-1}^r$		-0.163	
$M2_{t-1}^r$		0.039	-0.044*
Y_t^r		-0.634	0.131*
r_t^f	795.215		
r_t	-795.215		-1142.551
r_t^s			506.249
d_1	2050.715	30392.158	6306.273*
d_2	2693.893	30498.079	5406.840*
d_3	-306.231*	30897.832	-1325.914*
d_4	-484.269*	30295.972	-35.699*
R^2	0.329	0.373	0.582
DW	2.399	2.125	1.951

In Table 2, columns represent equations. Explanatory variables are shown in rows. All the quantity variables are scaled by lagged real income Y_{t-1}^r , r_t and r_t^f denote the domestic and foreign capital market interest rate. All the quantity variables are in constant prices (1985.IV = 100). A star represents a parameter estimate which is not signifi-

cantly different from zero at the 95 per cent confidence level. d_i represents a seasonal dummy variable. The R^2 has been adjusted for degrees of freedom. DW represents the Durbin-Watson test statistic. In the equation for ΔNFA_{p_t} the variable $(r_t^f - r_t)$ has been included as an explanatory variable. From Table 2 it can be seen that some parameters are not significantly different from zero. The specification has been followed though, as we are interested in the working of the model as a whole. In that respect lagged adjustment is important, so we include the lagged M2 aggregate as explanatory variable in the money demand equation.

TABLE 3
ESTIMATION RESULTS FOR THE BANKING SECTOR

	$\Delta NFA_{b_t}^s$	$\Delta NFA_{b_t}^f$	ΔCR_t^f	$-\Delta M2_t$
$NFA_{b,t-1}^f$	-0.089*			-0.911
$NFA_{b,t-1}^s$		-0.440		-0.560
CR_{t-1}^f			-0.167	-0.833
$-M2_{t-1}$	-0.024		-0.125	-0.851
W_{b_t}			0.042*	0.958
r_t^f	228.582*		-1239.152	1010.570
r_t	-636.879*		222.454*	414.425
r_t^s		2954.297		-2954.297
r_{st}		-2954.297		2954.297
Kr			-2167.100	2167.100
$dum_{87.IV}$			10889.028	-10889.028
R^2	0.180	0.175	0.763	
DW	2.043	2.046	1.819	

In Table 3 again columns represent equations. Explanatory variables are shown in rows. r_t^f and r_t^s represent the long-term and short-term foreign interest rates. Kr represents a dummy variable for direct credit control. This variable equals 1.5 in case net credit operations of banks are not allowed to grow any faster than by 1.5 per cent in three months. This variable can be seen as the exponent of direct broad monetary policy instruments. The variable $dum_{87.IV}$ represents a dummy variable for the fourth quarter of 1987 and represents the impact of the stock market crash. All the quantity variables are scaled by lagged nominal wealth of private banks $W_{b,t-1}$. A star represents a parameter estimate which is not significantly dif-

ferent from zero at the 95 per cent confidence level. In the equation for ΔNFA_b^i the variable $(r_s^i - r_s)$ has been included as an explanatory variable.

Equation (3.3) has been implemented as follows:

$$\Delta r_{v_t} = 0.327\Delta r_{s_t} + 0.221\Delta r_{s_{t-1}} + 0.064\Delta r_{s_{t-2}} \quad (5)$$

The adjusted R^2 equals 0.783, while the Durbin-Watson test-statistic (DW) equals 1.731.

The estimation results can be summarised as follows:

- the estimated parameters have signs that are theoretically expected;
- the majority of the estimated parameters is significantly different from zero; this property does hold for the parameters which are of special interest for our study;
- the estimated parameters of the lagged endogenous variables are less than unity in absolute terms, implying a reduction of the chance of instability of the model as a whole;
- autocorrelation is absent;
- the fit of the individual equations is poor. Our model is intended to be used as a whole for experiments *ex post*, so no weight is imposed on the importance of individual equation fits. Models of the Dutch financial sector that are used for forecasting purposes can be found in van Erp *et al.* (1989), Fase *et al.* (1991) and Kuipers *et al.* (1990).

As we are interested in the working of the model as a whole we have carried out a dynamic simulation experiment *ex post* over the period 1983.II-1989.I. In a dynamic simulation the model itself computes the lagged endogenous variables. Our model computes two implicit variables, the domestic short- and long-term interest rate. The short-term interest rate maintains equilibrium on the balance of payments, while the long-term interest rate takes care of equilibrium on the capital market and by Walras' Law on the market for liquidity. Table 4 contains Theil's Unequality coefficient (U) and the mean relative absolute error ($MRAE$) for the most important model variables over the period 1983.II-1989.I. Theil's Unequality coefficient is defined as:

$$U = \sqrt{\frac{\sum_{j=1}^n [\Delta Y_{t+j}^f - \Delta Y_{t+j}^r]^2}{\sum_{j=1}^n [\Delta Y_{t+j}^f]^2 + \sum_{j=1}^n [\Delta Y_{t+j}^r]^2}} \quad (6)$$

while the Mean Relative Absolute Error reads:

$$MRAE = \frac{\sum_{j=1}^n \left| \frac{Y_{t+j}^f - Y_{t+j}^r}{Y_{t+j}^r} \right|}{n} \quad (7)$$

where Y_{t+j}^f represents the forecasted value and Y_{t+j}^r the actual value of variable Y , while n is the length of the simulation interval.

TABLE 4
SIMULATION STATISTICS

	U	$MRAE$
NFA_b	0.314	3.567
NFA_b^i	0.192	216.950
NFA_b^l	0.611	47.952
CR^e	0.548	2.629
CR^l	0.151	5.111
$M2$	0.187	1.652
r_o	0.831	27.722
r_s	0.919	22.395
r_l	0.682	14.578

Table 4 shows that our simple model is able to track the quantity variables quite reasonably. The interest rates show stronger *ex post* dynamic forecast errors. The latter is a consequence of the equilibrium approach. For our purpose a good fit is not a necessary condition, as we run policy scenarios that are computed as differences from the base run.

4. Scope for monetary policy

The model presented in the previous section makes it rather easy to compute a reduced-form model that is suited for our goal. We try to measure the possibilities for an independent money supply policy in The Netherlands in the recent past, where the Dutch capital market was characterised by both internationalisation and liberalisation. The reduced-form model contains two equations. Both equations relate

the short-term and long-term interest rates. One equation represents the equilibrium condition for the foreign exchange market, the other the equilibrium condition for the capital market, i.e. the market for liquidity under Walras' Law. The former can be found by substituting the empirical equations for ΔNFA_p , ΔNFA_b and ΔNFA_s in the balance of payments equation. The following equation can be found:

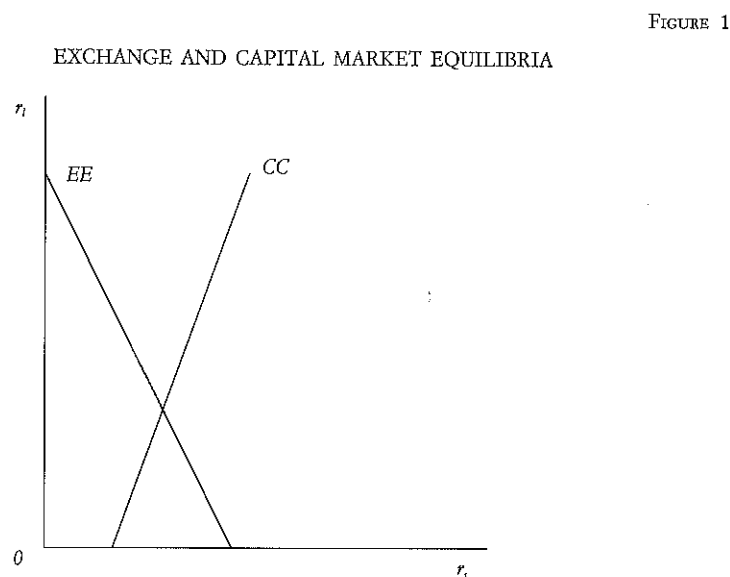
$$r_l = -1.83r_s + 0.75r_l^f + 1.83r_s^f + a_e \quad (8)$$

where a_e represents an autonomous component, which is predetermined.

The capital market equilibrium follows from the supply of and the demand for $M2$:

$$r_l = 3.61r_s + 1.02r_l^f - 2.98r_s^f + 2.19Kr + a_c \quad (9)$$

where a_c represents an autonomous predetermined variable. Figure 1 contains both equation (8) and (9) for given values of foreign interest



rates, credit policy and autonomous components. In Figure 1 CC denotes the capital market equilibrium and EE the exchange market equilibrium. If the short-term domestic interest rate increases the demand for short-term net foreign assets decreases. The only way in which balance of payments equilibrium can be restored is by a

decrease in the demand for long-term net foreign assets through a decrease in the domestic long-term interest rate. This explains the negative slope of the EE -equilibrium locus. A similar argument can be used to explain the positive slope of the CC -locus. If the short-term interest rate increases, demand for liquidity increases and supply of liquidity decreases. If other variables remain unchanged the long-term interest rate has to increase to reduce liquidity demand and increase liquidity supply.²

In case the monetary authorities tighten monetary policy by credit restrictions the capital market equilibrium CC moves to the left. As a result the long-term interest rate increases. So a money supply policy which is independent of exchange rate policies is possible. A steep yield curve can thus be effected by credit restrictions.

From equations (8) and (9) we can compute the following reduced form:

$$r_l = 0.84r_l^f + 0.22r_s^f + 0.73Kr + b_l$$

$$r_s = -0.05r_l^f + 0.88r_s^f - 0.40Kr + b_s$$

where b_l and b_s are linear combinations of a_e and a_c .

From these equations the following can be concluded.

- Credit control increases the slope of the yield curve by 1.7 percentage points $[(0.73+0.40)*1.5]$. This type of policy was pursued in The Netherlands in 1986 and 1987.

- An increase in the foreign long-term interest rate leads to an increase in the domestic capital market interest rate by 0.8 percentage point. The domestic money market interest rate is hardly affected.

- An increase in the foreign short-term interest rate by one percentage point leads to increase in the domestic money market interest rate by 0.9 percentage points (other variables being unchanged). The domestic capital market interest rate increases by 0.2 percentage points in that case.

² Liquidity supply will increase through a rise in domestic long-term bank lending, but decrease through a fall in long-term foreign assets of banks. From Table 3 it appears that the latter exceeds the former. The net effect of a change in r_l on liquidity supply is, however, much less than that on liquidity demand.

Before we turn to a policy experiment, we discuss the two basic findings of our model.

- Our model comes to the conclusion that Dutch and non-Dutch assets are not perfect substitutes. If domestic and foreign assets would have been perfect substitutes, the foreign exchange market equilibrium locus in Figure 1 would have been vertical.

- Short- and long-term assets are imperfect substitutes. The slope of the equilibrium locus CC is unequal to one, while the locus will shift in case of changes in foreign interest rates and credit restriction policies.

With the full model we have carried out an experiment by implementing a direct credit control (that is our variable Kr takes the value of 1.5). We report the consequences of this experiment for the major endogenous variables as deviations from the base projection. This base projection is the dynamic *ex post* tracking path. The experiment has the character of a temporary shock. As the base year of the shock we have chosen three different points in time: 1989.I (the last observation), 1988.I and 1985.I. This enables us to investigate the impact of the shock after 1, 5 and 16 quarters. The experiment over 1 quarter assumes the lagged endogenous variables to be known, while the other two are dynamic tracking experiments. The former gives us some of the results mentioned above. These two approaches enable us to study the portfolio adjustment processes. Table 5 presents the results. The second column (denoted by 1) gives the results after 1 quarter, while the third and fourth column (denoted by 5 and 16, respectively) give the results after 5 and 16 quarters. The quantity variables in the tables are in millions of guilders, the interest rates are denoted in percentage points.

A credit restriction leads to an important decrease in $M2$ in the first quarter (about one percentage point in the growth rate of $M2$). The long-term domestic interest rate increases. The resulting capital imports by the private sector are small compared to the reduction in the long-term credit supply. The yield curve steepens quite strongly in the first period, as has been predicted by our reduced-form analysis. The long-term consequences of a temporary shock for domestic interest rates are relatively minor. Portfolio adjustment dampens the quantity effects of the shocks. The long-term experiment has one serious disadvantage: the lack of a real sector in the model. The major lesson of this experiment is that the model does not prove to be unstable.

TABLE 5

AN INCREASE IN Kr

	1	5	16
NFA_p	-1079	-594	-68
NFA_b	1783	987	195
NFA_b^i	-704	-392	-127
CR^r	0	204	202
CR^l	-3105	-2189	-888
$M2$	-1926	-1392	-618
r_o	-0.2	-0.1	0.0
r_s	-0.6	-0.1	0.0
r_l	-1.1	-0.0	0.0

Above we have shown that the Dutch monetary authorities are able to pursue their two goals: a stable exchange rate and a control of monetary expansion. As Table 5 shows, the Dutch central bank can use direct credit control to set a target rate for broad money growth, while the exchange rate is fixed. The direct impact is quite strong. After a number of quarters the impact dampens out.

We have assumed that the Dutch central bank focuses on the two goals of the fixed exchange rate and a target money growth rate. It is not immediately clear that a central bank sticks to these two goals *a priori*. In the *Annual Reports* the Bank's President has argued that the Dutch monetary authorities dislike a deficit on the combined current account and private capital balance. If, as has been argued by the President of The Netherlands Bank in his *Annual Report 1991*, the central bank would also reject a deficit on the combined current account and private capital balance, it would face three goals, which cannot be reached by means of two instruments only. If the central bank focuses on the exchange rate and wants to maintain equilibrium on the balance of payments of the non-monetary sectors, the central bank cannot control the supply of money any longer.

A similar argument can be made with respect to the yield curve. The goal of reaching a target yield curve can be in conflict with money supply policies. If the central bank considers the exchange rate as the primary target and a flat yield curve as undesirable to reach that target, money supply policies can again not be carried out.

In both arguments it is unimportant whether domestic and foreign or short- and long-term assets are perfect substitutes or not. The simple fact that the number of (intermediate) goals of monetary policy exceeds the number of independent instruments suffices to make the policy problem insolvable.

5. Conclusions

In this paper we have used a small structural model to test the effectiveness of Dutch money supply policy. We come to three important conclusions:

- perfect substitutability between both domestic and foreign and short- and long-term assets has not been established;
- the Dutch central bank should therefore be able to reach both goals of monetary policy: a stable exchange rate and a target money supply;
- the Dutch central bank has to take the resulting steepness of the yield curve and resulting capital flows as *faits accomplis*. In case one of these phenomena also belongs to the goals of monetary policy, one of the other goals has to be dropped. Given the institutional international context the Dutch central bank would drop the money supply target.

APPENDIX

We have used the following sources for the variables:

- CR^e QR TB 2.1 COL 8 (MCI);
- CR^i QR TB 2.1 COL 24-15-17-45 (MCI);
- IR QR TB 2.1 COL 1 (DNB);
- Kr De Nederlandsche Bank, *Annual Report*, various issues.
- $M2$ QR TB 2.1 COL 33+34+35+36+37+38+39 (MCI);
- NFA_b^s QR TB 2.1 COL 2-28 (MCI);
- NFA_b^i QR TB 2.1 COL 15+17 (MCI);
- NFA_p QR TB 6.1 ROW 4.2+4.3 (cumulated from 1946);
- ONL_b residual item;

- ONL_p residual item;
- P GNP deflator De Nederlandsche Bank (1986);
- r_t QR TB 9.2 ROW 4.1.2;
- r_t^i supplied by De Nederlandsche Bank;
- r_s QR TB 9.2 ROW 3.4;
- r_s^i supplied by De Nederlandsche Bank;
- r_v QR TB 9.2 ROW 8.2 sub;
- $W_b = NFA_b^s + NFA_b^i + CR^i - ONL_b$;
- Y De Nederlandsche Bank (1986);

where QR means *Quarterly Report* by De Nederlandsche Bank, TB Table, COL column, MCI money creating institutions and DNB De Nederlandsche Bank.

REFERENCES

- DE HAAN, J., D.J. PILAT and D. ZELHORST, 1991, "On the relationship between German and Dutch interest rates", *De Economist*, 139, 550-565.
- DE NEDERLANDSCHE BANK, *Annual Report*, Amsterdam/Deventer, various issues.
- DE NEDERLANDSCHE BANK, *Quarterly Report*, Amsterdam/Deventer, various issues.
- DE NEDERLANDSCHE BANK, 1986, "Kwartaalconfrontatie van middelen en bestedingen, 1957-1984", *Statistische Cahiers*, 1, Deventer.
- DORNBUSCH, R., 1980, *Open Economy Macroeconomics*, New York.
- FASE, M.M.G., P. KRAMER and W.C. BOESCHOTEN, 1991, "MORKMON II; Het DNB kwartaalmodel voor Nederland", *Monetary Monographs*, 2, Amsterdam.
- KUIPERS, S.K., B.W.A. JONGBLOED, G.H. KUPER and E. STERKEN, 1990, "CESAM, the CCSO annual model of the Dutch economy", *Economic Modelling*, 7, 202-250.
- SWANK, J., 1994, "An interview survey of bank behaviour in The Netherlands", *Banca Nazionale del Lavoro Quarterly Review*, 48, 199-235.
- VAN ERP, F.A.M. B.H. HASSELMAN, A.G.H. NIBBELINK and H.R. TIMMER, 1989, "A monetary model of the Dutch economy: a quarterly submodel of FREIA-KOMPAS", *Economic Modelling*, 6, 56-93.
- ZELLNER, A., 1962, "An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias", *Journal of the American Statistical Association*, 57, 348-368.