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Monetary Policy Credibility:

The Experience of the Netherlands

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MONETARY POLICY CREDIBILITY: THE EXPERIENCE OF THE NETHERLANDS

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Abstract

In this paper we applied the credibility-hypothesis to the Netherlands' exchange rate policy. Since September 1979 Dutch exchange rate policy has been intensified. The policy is now to keep the guilder in the upper part of the EMS band and to strive for an unchanged central rate with the Deutsche mark. Such a policy, if maintained, will lead to a lower premium for currency risk on the guilder vis à vis the DM, resulting in a lower level of Dutch interest rates.

By means of two indirect and two direct estimation methods we found support for the credibility-hypothesis. After one year this policy led to a significant and permanent cut in money market rates, amounting to about 1¼%. Further, the public turned out to react to policy results, not merely to policy announcements.

We also found evidence the unanticipated devaluation of the guilder vis à vis the DM in the March 1983 realignment was seen as cheating.

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§ 1 Introduction

Since Fellner (1976) introduced the credibility concept in macroeconomics, there has been a continuing interest in its theoretical underpinnings and its empirical applications (for a survey see Blackburn & Christensen, 1989 and Persson & Tabellini, 1990). This paper tries to give some insight in the credibility of Dutch monetary policy makers. The so-called credibility-hypothesis states that economic policy is more effective if the public believe in it. The costs of a disinflation policy for example are lower if the public has confidence the initial policy will be maintained. A credible policy means that expectations will adjust faster. As a result the Phillipscurve shifts more quickly downward giving a recession a mild and short-term character.

In this paper we introduce the credibility-hypothesis for a related field i.e. exchange rate policy. We will concentrate on the role of the Dutch exchange rate regime in the explanation of the Dutch-German interest rate differential. Specifically we will ask ourselves if the policy of shadowing the Deutsche mark since the start of the EMS contributed to a narrowing of the guilder-mark interest rate differential. After all, this is what the EMS discipline hypothesis implies. It is argued that the (quasi) fixed exchange rate regime of the EMS works as an anchor and introduces inflationary discipline at a lower cost than would be possible otherwise (Giavazzi & Pagano, 1988). So interest rates, being very sensitive to changes in market expectations, will fall in those countries which abide the EMS rules because their authorities perceive a devaluation to be costly.

The paper is organized as follows. Section 2 provides the macroeconomic background for the policy pursued by the Dutch authorities, in section 3 we focus in more detail on the credibility-hypothesis. In section 4 we divert on the theoretical specification which we will estimate in section 5. Our results will be put in a broader framework in section 6 by comparing them with other empirical findings. Finally, section 7 presents our conclusions.

§ 2 Economic background

Recently Secretary of Finance Wim Kok formulated the Dutch exchange rate policy as follows: "...Dutch monetary policy will continue to focus on the fundamental strongest currency within the EMS. If the Federal Republic of Germany continues to pursue price stability after the German unification the fixed peg between the guilder and the Deutsche mark will be maintained (Kok, 1990). From the beginning of the eighties De Nederlandsche Bank (i.e. the Dutch central bank, abbr. DNB) stresses that the aim of exchange rate policy is to stimulate confidence in the Dutch guilder (Timmerman, 1982, p. 185). On the longer term this confidence will make a relatively lower interest rate possible (Szász, 1981, p. 321). Although pegging to the Deutsche mark because of the low inflation reputation of the Bundesbank may now seem a sensible policy, it did not take that central place in most EMS countries for many years. Even the Netherlands were not an exception. For example, since the end of the Bretton Woods system in 1973 the guilder was devalued several times against the Deutsche mark. Moreover, in the seventies Dutch policy makers never said a word about confidence aspects.

In the remaining of this section we will bring to the fore the Dutch considerations basic to realignments of the par value of the guilder in the EMS and its predecessor the Snake Arrangement. Sometimes we will quote the policymakers. This is done on the one hand to signal the policy shift in the Netherlands and on the other hand to show the influence of policy announcements on market expectations.

¹ The author wishes to thank Frank den Butter, Eelke de Jong, Rick VanderPloeg, Hans Visser and Nout Wellink for their helpful comments on an earlier draft of this paper.

§ 2.1 The Snake Arrangement (1972-1979)

The Netherlands fearing not without reason that universal free floating might undermine countries' domestic economic discipline, had joined the Snake from its very start in 1972 (Den Dunnen, 1979, p. 46). Especially the participation of Germany, with its traditional aversion to inflation, should be mentioned in this respect. Moreover, two-third of Dutch national income is exported to Snake member-countries, implying that external trade could benefit from rather stable exchange rates.

The experience of the Dutch economy during the seventies looked like the text book case of an high open economy facing external shocks, while the internal situation was characterized by structural rigidities. Increasing unit labour costs supported by wage indexation, led to a continuing profit erosion of the business sector, culminating in a post-war record low of the capital income ratio of 8% in 1982. As an effect unemployment rose sharply. Partly because of the first oil-crisis a dangerous wage-price spiral came into life, inducing the monetary authorities to admit this being far outside their control. Further, partly as a result of cyclical movements, the government deficit rose to unprecedented heights after 1978, tempting the government to monetary financing. Moreover, this source of money creation thwarted monetary policy which since 1977 imposed credit ceilings upon the banking system to stem their credit expansion. Table 1 summarizes some macroeconomic developments.

Table 1 Comparative macroeconomic performance

	1968-72	1973-78	1979-88	1968-73	1974-79	1980-88
	Real GDP			Unemployment rate		
Netherlands	4.9	2.7	1.3	1.5	4.9	9.9
EEC	4.9	2.5	2.0	2.9	4.8	9.7
	Consumer prices			Current balance as % of GDP		
Netherlands	6.9	7.2	3.0	0.9	1.2	2.4
EEC	6.2	12.3	7.7	0.7	-0.3	-0.1
	General government net lending as % of GDP			Current receipts of government as a % of GDP		
Netherlands	0.5	2.3	5.7	43.5	49.8	53.6
EEC	0.7	3.6	4.7	35.8	38.8	42.7

source: OECD Historical Statistics, 1960-1988

The current account however created a comfortable impression during the first part of the seventies. It moved into sizeable surplus in 1972-1973 when public and private investments showed a sharp lower growth rate. The surplus continued when the contribution of natural gas more than doubled in the wake of the huge oil-price increases. Only in 1977 did the deterioration of the Dutch (non-gas) business sector show up in a sharp reduction of the current account surplus, moving into deficit the next year.

Given these developments it is not surprising that the monetary authorities assigned high priority to the fight against inflation (the Bank Act prescribes the central bank to secure the internal and external value of the guilder). Maintaining international competitiveness of Dutch products was mostly second in rank. Both considerations however were central points in currency realignments. Thus when in September 1973 the guilder was revalued by 5%² the central bank aimed at breaking inflation expectations to avoid play at leapfrog of wages and prices (DNB Quarterly Report 1973/3, p. 66). In the long run the Netherlands Bank expected the revaluation would improve competitiveness. However in 1976 and 1978 the guilder was devalued again vis à vis the Deutsche mark, both times by 2%. Both devaluations were preceded by an effective appreciation of the guilder, making the net effect on the domestic price level small. Although the central bank worried about Dutch competitiveness, she dismissed a lowering of the effective exchange rate as a remedy. Given the country's openness and its institutionalized wage indexation an effective depreciation would not lead to a sustained improvement of international competitiveness. Only a lowering of inflation could strengthen the external performance (DNB Quarterly Report 1978/3, p. 46).

In sum, we can say that the effective exchange rate of the guilder was the central indicator to measure both the consequences for the rate of inflation as for external competitiveness during the Snake: "... the effective results of parity adjustments of the guilder against our major trading partners should be within narrow limits" (DNB, Quarterly Report 1978/3, p. 46). Because those two goals might of course conflict, the fight against inflation could not receive top priority in all circumstances. In fact it did not. It is well known that the guilder devalued against the Deutsche mark every time the mark was explicitly revalued in the Snake against the other currencies (see Table 2).

Table 2 Guilder-Deutsche mark exchange rates in the Snake Arrangement

April 1972	start Snake
March 1973	Deutsche mark revalues against guilder by 3% ³
June 1973	Deutsche mark revalues against guilder by 5½%
Sept. 1973	Guilder revalues against Deutsche mark by 5%
Oct. 1976	Deutsche mark revalues against guilder by 2%
Oct. 1978	Deutsche mark revalues against guilder by 2%
March 1979	start EMS

Note: On its turn the guilder revalued in the above realignments against the French franc and the Scandinavian currencies.

Fase & den Butter (1977) reached the same conclusion. They studied the endogeneity of Dutch monetary policy and found that both the discount rate and credit ceilings strongly reacted on cyclical variations in the unemployment rate. The inflation rate however exerted a weak influence. The authorities thus opted for a compromise. The desire to avoid a short-term

² This was a lagged reaction on the revaluation of the German mark in June of the same year by 5½%.

³ Without specifying its motives the Dutch government came to the conclusion there was no reason to follow the German revaluation by 3% (DNB Quarterly Report 1973/1).

competitive disadvantage may have played an important part in successive devaluations. In sum, sticking to a fixed peg with the Deutsche mark because of, what we now call establishing a reputation, was not an aim of Dutch exchange rate policy in the Snake. However things would change soon in the EMS.

§ 2.2 The European Monetary System (1979 -)

The authorities' stress on the effective guilder exchange rate was initially continued at the start of the EMS. In September 1979 the guilder was again devalued vis à vis the mark by 2% (completing the third devaluation against the mark within three years). Given this minor change in the central rate (within the EMS band) and the slight tendency of effective appreciation of the guilder before the realignment, the Netherlands Bank considered the consequences for the domestic price level as negligible (DNB Quarterly Report 1979/3, p. 60).

After this realignment a policy reversal occurred. Since then the monetary authorities stressed the confidence-aspect of a strong guilder. Because of the deterioration of the public finances much of the rising government deficit was absorbed abroad (i.e. foreigners purchasing government bonds on the Amsterdam capital market). Consequently, the policy makers demonstrated to be very aware of maintaining international confidence in the external value of the guilder (DNB Annual Report 1980, p. 21). After the realignment in October 1981 the authorities were very clear; then the Deutsche mark and the guilder revalued for the first (!) time by the same rate against the other currencies, to foster that "... in the transition to a situation where the government deficit can be financed from domestic savings ... no harm should be done to the confidence in the guilder" (DNB Quarterly Report 1981/3, p. 39). With the same arguments the central bank opposed claims for a greater monetary financing of the government deficit (DNB Annual Report 1981, p. 26), while the Bank's president objected to claims to create some distance from the central rate of the Deutsche mark : "... especially when the confidence in the guilder is not jeopardized, there is the opportunity to lower interest rates" (Duisenberg, 1982, p. 44).

In conclusion, the end of the seventies marked a policy shift from stressing the effective exchange rate to a really fixed peg with the currency of the big neighbour Germany. Although we cannot determine at this stage the precise moment, there is ample evidence the policy turnaround took place after the September 1979 realignment. Also Timmerman (1982, p. 176), a former deputy director of the Dutch central bank points to this: "... In the autumn of 1979 ... maintaining the external value of the guilder ... became all the more pressing ... A realignment of central rates in the EMS forced the Netherlands into an, albeit minor, devaluation of the guilder against the Deutsche mark. In order to prevent this from happening again, the policy was concentrated even more forcefully on securing a strong position for the guilder in the EMS".

Table 3 Guilder-Deutsche mark exchange rates in the EMS *)

March 1979	start EMS
Sept. 1979	Deutsche mark revalues against guilder by 2%
Oct. 1981	revaluation Deutsche mark <u>plus</u> guilder against all currencies
June 1982	revaluation Deutsche mark <u>plus</u> guilder against all currencies
March 1983	Deutsche mark revalues against guilder by 2%
April 1986	revaluation Deutsche mark <u>plus</u> guilder against all currencies
Jan. 1987	revaluation Deutsche mark <u>plus</u> guilder against all currencies

*) We omitted minor realignments involving a single currency where, without exception, the guilder and the mark revalued by the same rate.

In sum, since September 1979 Dutch exchange rate policy rests on two pillars:

- 1 to secure a strong position for the guilder in the upper part of the EMS;
- 2 to maintain confidence in the central rate of the Deutsche mark by keeping it constant in EMS-realignments.

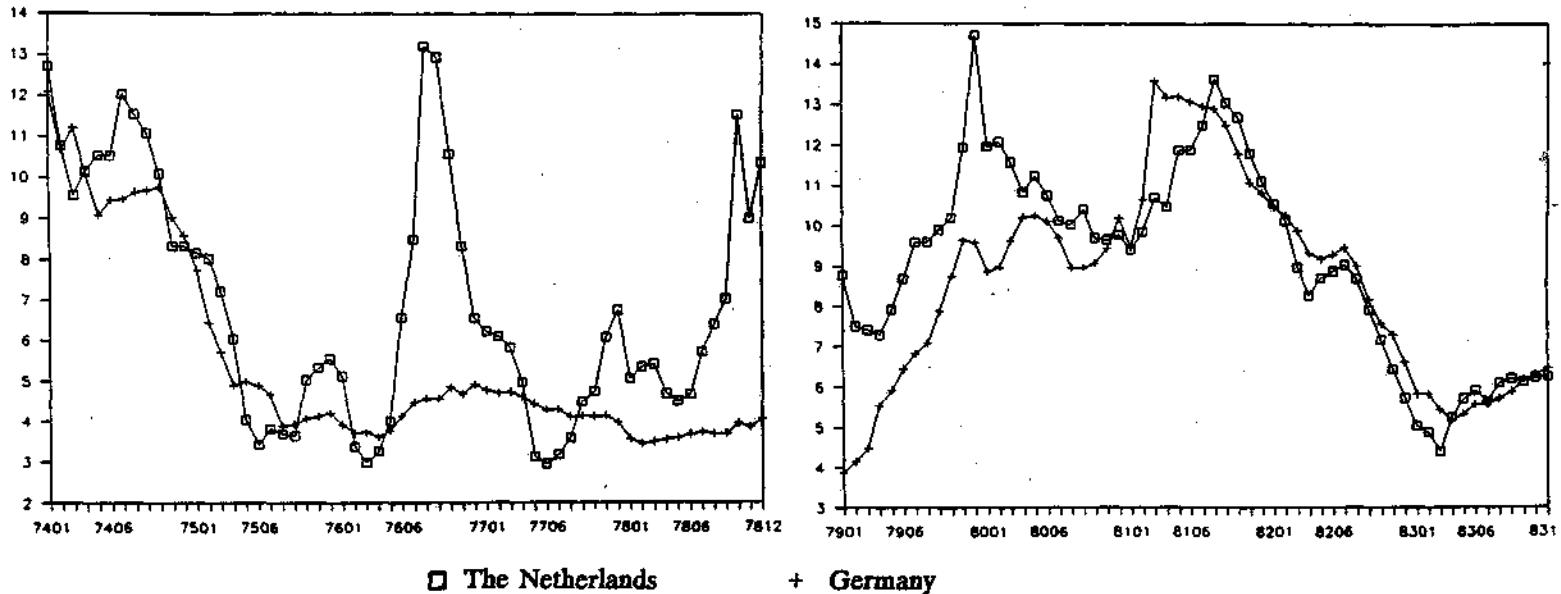
This policy regime change was an important one, because as we showed in the Snake period the guilder stayed behind the mark every realignment when the mark was explicitly revalued. Second, the seventies witnessed long periods in which the guilder crept in the lower part of the EMS-band (DNB Annual Reports). Third, as table 3 shows, the guilder devalued since September 1979 one time only against the Deutsche mark.

§ 3 Theory

In economic literature the concept of credibility is not well defined. However, the essential meaning relates to the question: "Are (beliefs about) policy actions consistent with policy intentions?" (see Blackburn & Christensen, 1989, McCallum, 1984). Rational people will evaluate the current course of policy to know if the government indeed sticks to its plans. To establish credibility the market participants have to be convinced that the monetary policy authorities give priority to, as our subject matter is concerned, its exchange rate objective, even when this would conflict with other aims of economic policy like combatting unemployment (DeGrauwe, 1989).

Up to March 1983 Dutch policy makers did not deviate from their new regime (see table 3). It seems therefore natural to analyze whether this policy has been credible because, if so, the public believes the policy-makers are not going to renege and it consequently revises its expectations. If both aims of the new regime - i.e. a strong position for the guilder in the EMS and a fixed central rate with the mark - are being realized in the eyes of the public, this implies that exchange rate uncertainty and ditto expectations have changed. Uncovered guilder assets are now exposed to a lower exchange rate risk vis à vis the german mark. This leads to a lower premium to account for this risk i.e. a lower nominal interest rate differential with Germany. The credibility-hypothesis will thus imply that the strong-currency option will bring Dutch interest rates to a lower level.

Figure 1 Money market rates in the Netherlands and in Germany



From figure 1 it can clearly be seen that most of the time during the Snake the Dutch money market interest rate lay above its German counterpart. This applies also for the first two years of the EMS. From 1981 however, guilder interest rates are lower than mark interest rates, with the exception of the second half of 1981. We will analyze in the following to which extent the intensified Dutch exchange rate policy since 1979 contributed to this interest rate pattern.

§ 4 Theoretical specification

Because we are interested in a significant contribution of a credible exchange rate policy to the formation of interest rates, we specify a reduced form equation. We chose for the money market rate as the endogenous variable because in the Netherlands the monetary authorities influence primarily short-time interest rates to safeguard the position of the guilder in the EMS (Den Dunnen, 1985). To this end the Netherlands Bank has a number of instruments at its disposal, like the official interest rates, quota's for the average recourse to the central bank⁴, short-term special loans not subject to the quota system and dollar swaps (Timmerman, 1982, p. 179). Because the Dutch money market is characterized by a structural shortage⁵, banks are heavily dependent on central bank borrowing. The Bank is therefore capable to exert a dominant influence on the money market rates if necessary to maintain the external value of the guilder. Should the guilder for instance come under pressure in the foreign exchange market, money market conditions can quickly be tightened. Because the policy makers are in control of the market, we specify the following reaction function for the Netherlands Bank⁶:

⁴ These quota's are fixed every three months for each bank.

⁵ Since the middle of 1988 this shortage is maintained by money market cash reserves for the banks.

⁶ See also the Bank's macroeconomic model called MORKMON (DNB, 1985).

$$i^{NL} = \alpha_0 + \overset{+}{\alpha_1} i^D + \overset{-}{\alpha_2} CA + \overset{+}{\alpha_3} Dev + \overset{+}{\alpha_4} Spec + \mu \quad (1.1)$$

Above the variables are shown the expected signs. The exogenous variables, explained below, are considerations basic to the central bank policy in the money and foreign exchange markets. Given the orientation on the Deutsche mark the short-term German interest rate (i^D) is not surprising. Further, if the Dutch current account balance (CA) shows a surplus, the monetary authorities try to export this via the capital account by lowering interest rates (Kessler, 1981). Moreover, the Netherlands Bank reacts to the actual guilder/Deutsche mark exchange rate (Dev). If the exchange rate of the mark rises (i.e. a depreciation of the guilder) in relation to the central rate, money market conditions are tightened and interest rates will rise. Finally, the interest rate reaction of the central bank on speculative attacks on the guilder in the seventies is modelled by a dummy variable (Spec).

§ 5 Estimation

From the outset empirical analysis of policy credibility mostly used the prediction error method, in which one considered model predictions of either the inflation rate, or the nominal interest rate or a vector of price inflation, wage inflation and output growth (see e.g. Cagan & Fellner, 1983, Perry, 1983, Christensen, 1987, Giavazzi & Giovannini, 1989). It was argued that a disinflation policy was credible if such predictions for instance overestimated the actual inflation rate during the new regime period, simply because these models were unable to take account of regime changes. Below we will perform this error prediction method for the Dutch money market rate. Also we will sustain our results by adding a dummy variable which should capture the change in expectations resulting from the policy turn. However, as Christensen (1989) pointed out, only in the case the reduced form residuals are due solely to the absent credibility variable, the prediction error method proves useful testing the credibility-hypothesis. Therefore we will in addition include the credibility variable itself in the model, testing its significance. So we shall perform several methods for answering our basic question. In principle all these methods are able providing us with evidence not just about the credibility of the pursued policy, but also about its quantitative impact on interest rates and on any lag length between the policy reversal and the public's change in expectations.

§ 5.1 Prediction error method

Initially we estimated eq. 1.1 for the old regime, roughly coinciding with the Snake arrangement. We applied monthly figures, and to correct for first order serial correlation we estimated at this stage with a GLS procedure specifying the error term as an AR(1) process⁷. In table 4 all coefficients show up to be significant (t-values between brackets); they also have the correct sign.

⁷ Serial correlation could not be measured any more by reestimation of the equation using quarterly figures (see also DNB, 1985). Apparently, short-term processes exist which become irrelevant in longer intervals between the observations (see den Butter 1976, Lütkepohl, 1987).

Table 4 Regression results for the Dutch money market rate

$$i^{NL} = \alpha_0 + \alpha_1 i^D + \alpha_2 CA_{-3} + \alpha_3 Dev_{-3} + \alpha_4 Spec \quad (1.1)$$

Period	α_0	α_1	α_2	α_3	α_4	\bar{R}^2	SE	Q(11) ¹	$\hat{\rho}$
1974:1-1979:9	1.79 (5.55)	1.0	-20.10 (-2.43)	68.68 (4.25)	2.75 (4.76)	0.80	0.99	3.96	0.61 (5.94)
1974:1-1976:12	1.92 (3.84)	1.0	-24.18 (-1.92)	77.04 (3.52)	3.89 (4.66)	0.83	0.98	6.09	0.56 (3.34)
1977:1-1979:9	1.79 (4.38)	1.0	-23.17 (-1.63)	61.48 (2.40)	1.69 (1.96)	0.73	1.02	2.77	0.55 (3.35)

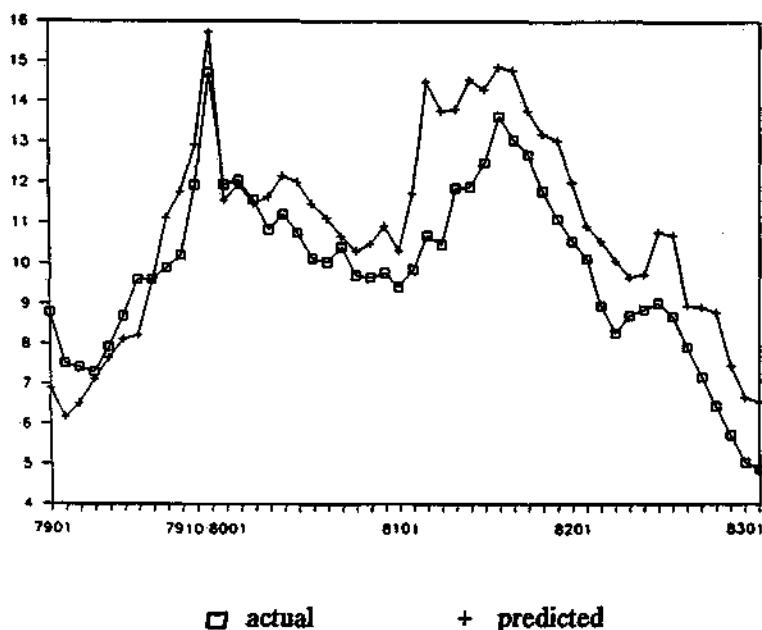
¹ Box-Pierce portmanteau statistic for higher order serial correlation.

i^{NL} , i^D : interest rates on three-month interbank deposits in the Netherlands and in Germany
 CA : scaled current account balance i.e. $(X-M)_{-3}/(X+M)$
 Dev : relative deviation Hfl/DM exchange rate in relation to the central rate, i.e.
 (exchange rate Deutsche mark-central rate Deutsche mark)/central rate
 Spec : dummy to account for extremely high interest rates during speculation against the guilder

The coefficient of the German interest rate has been restricted to one (in the estimation results it was not significantly different from one). Therefore eq. 1.1 can be seen as an explanation of the Dutch-German interest rate differential. To get some insight into the stability of the coefficients, we present also results for two subperiods. The relation appears to be stable. On the basis of the coefficients we predicted the money market rate for the period October 1979-February 1983. We deliberately put an end to the sample period just before the March realignment of 1983, where the guilder devalued quite surprisingly against the Deutsche mark by 2%. Of course this event might be interpreted by financial market participants as a classical example of cheating. So for the new regime to be consistent we should drop this out of the sample. Later on (§ 5.4) we will address this important matter again. If our reduced form model overpredicts systematically the interest rate in the new regime, we will tend to conclude the intensified exchange rate policy has had a downward shifting effect on market expectations regarding the exchange rate risk on the guilder.

In figure 2 the actual interest rates are compared with the predicted ones.

Figure 2 Actual and predicted Dutch money market rate according to eq. 1.1



It is clear that, especially since 1981, there are systematic overpredictions of actual interest rates. Moreover, these overpredictions tend to rise approaching the end of the prediction period (see table 5). This could mean that credibility has to develop. This is in line with learning behaviour and is also found in empirical research (see e.g. Christensen, 1989, Hardouvelis & Barnhart, 1989). Although we now have a first indication of the new regime being credible, we have to confirm it by other methods because prediction errors could relate to a lot of other factors.

Table 5 Actual and predicted Dutch money market rate

period	actual interest rate (1)	eq. 1.1	
		predicted interest rate (2)	forecast error (1)-(2)
1980	10.69	11.33	-0.64
1981	11.59	13.55	-1.96
1982	8.37	9.88	-1.51
1979 Oct- 1983 Feb	10.11	11.48	-1.37
last 12 months	7.48	9.07	-1.59
last 9 months	7.09	8.73	-1.64
last 6 months	6.20	7.89	-1.69

§ 5.2 Dummy variabele method

To test for the significance of the forementioned overestimates eq. 1.2 presents our equation fit through 1983.02, with a dummy variabele Cred added for 1981.01 and afterwards (we also added a dummy Mon^D to account for the unanticipated German monetary tightening in the beginning of 1981).

$$\begin{aligned}
 i^{\#L} = & 1.57 + 1.0 i^D - 15.75 CA_{-3} + 64.76 Dev_{-3} + \\
 & (6.16) \quad (-2.86) \quad (5.11) \\
 & + 2.58 Spec - 1.75 Mon^D - 1.20 Cred \quad (1.2) \\
 & (6.31) \quad (-2.53) \quad (-2.58)
 \end{aligned}$$

$$\bar{R}^2 = 0.83 \quad SE = 0.85 \quad Q(23) = 12.45 \quad \hat{\rho} = 0.63 \\
 \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad (8.04)$$

Cred = 1: since 1981.01

Cred = 0: elsewhere

SMPL: 1974.01 - 1983.02 .

Eq. 1.2 gives satisfactory over-all results. Further, the dummy Cred differs significantly from zero and has the correct sign. At this stage we can conclude that our policy credibility dummy contributes significantly to the explanation of the interest rate differential since 1981. Subsequently we let the dummy start in several months to obtain an indication of the time-lag preceding the shift in expectations (see table 6). Given the insignificance of the dummy variabele since 1982.01 we conclude that the credibility of the Dutch monetary authorities might be established before 1982. However we cannot reject the hypothesis the new exchange rate policy gained credibility from its very start (i.e. October 1979).

Finally, we also have some insight in the quantitative impact of the new regime: short-term interest rates are 1.2% point lower than otherwise would have occurred. This harmonizes more or less with the outcomes in table 5. In the next section we will try to sustain this evidence by using an alternative method that takes explicitly account of the policy credibility variabele.

Table 6 Regression results for Cred alternatives

starting period	coefficient	t-value	\bar{R}^2	SE	Q(23)
1979.10	-1.17	(-2.77)	0.83	0.84	11.38
1980.07	-1.23	(-2.76)	0.83	0.85	12.52
1981.01	-1.20	(-2.58)	0.83	0.85	12.45
1982.01	-0.73	(-1.11)	0.83	0.86	10.73

§ 5.3 Direct estimation of policy credibility

Methods we employed up till now are indirect tests of the credibility-hypothesis. Empirical research taking account of a direct estimation method can be found for instance in Baxter (1985), Christensen (1989), Hardouvelis & Barnhart (1989). With respect to a reduced form

equation direct estimation boils down to include a variable representing policy credibility in the model and testing its significance. When examining the existence of credibility and reputation effects Blackburn & Christensen (1989, p. 36) point out one should be aware of the following issues. First, in addition to the usual problems created by expectations variables, we have now non tangible concepts that may raise difficulties. One has to obtain a proxy for these concepts, in which case any results are subject to the appropriateness of this proxy. Second, the theoretical literature indicates that credibility is likely to be time dependent. Buiters & Miller (1983) make the distinction between announcement effects - the immediate effects of an announced regime change - and result effects - the effects after proposed plans have been realized. Finally, the theoretical models put forward by Barro & Gordon (1983a, 1983b) and Backus & Driffill (1985) are far too stylized and simple to be of use in empirical work. Or, as Giavazzi & Giovannini (1989, p. 111) put it, discussing the two country-model of Canzoneri & Henderson: "... (this) model is silent on the question of credibility of the exchange rate targets".

Bearing all those questions in mind we proceed by incorporating in our model a variable which captures the new policy since the autumn of 1979. We therefore have to model one of the two pillars of that new policy (see § 2.2). At first we focus on the relative duration of the position of the guilder in the upper part of the EMS band. The longer the guilder "floats" in this upper 1.125% area of the EMS band, the more financial market participants will consider the Dutch currency as strong. As a consequence market expectations will change in favour of the guilder. This policy will therefore gain reputation, as the exchange rate risk on the guilder vis à vis the Deutsche mark is perceived to be lower. As a result the money market interest rate differential between the Netherlands and Germany will narrow. So to sustain high credibility a strong position of the guilder on the foreign exchange market becomes negatively correlated with the interest rate differential. Our policy variable for a given month thus amounts to the relation between the number of months past since the start of the new regime (October 1979) in which the guilder took a top position in the EMS band, and the total number of months past.

First we tested the hypothesis that the intensified exchange rate policy gained credibility from the outset. Although the coefficient had the correct negative sign, it was not significant at a 95% confidence interval. Other specifications did not change that picture⁸. We assumed therefore that the new regime did not lead immediately to a shift in market expectations. So we did not find any support for the announcement effects. Probably the monetary policy makers should stick to their new regime for some time, before they can establish credibility. So we used the same policy credibility variable again but now assigning to it the value zero from October 1979 until January 1981 (the last period has been suggested by the evidence presented in §§ 2.2 and 5.1). Equation 1.3 gives the results:

$$\begin{aligned}
 i^{NL} = & 1.07 + 1.0 i^D - 16.77 CA_{-4} + 68.80 Dev_{-3} + \\
 & (6.10) \quad \quad \quad (-3.20) \quad \quad \quad (6.68) \\
 & + 2.81 Spec - 2.19 Mon^D - 1.05 Top_{8101} \\
 & (4.92) \quad \quad (-4.83) \quad \quad (-3.41) \quad \quad \quad (1.3)
 \end{aligned}$$

$$\bar{R}^2 = 0.87 \quad SE = 0.53 \quad DW = 1.62 \quad Q(12) = 7.80$$

SMPL: 1979.10 - 1983.02 .

The credibility variable Top_{8101} has as we expected a negative sign and is significant. The other statistics are also satisfying. Because serial correlation is not an issue here we tend to conclude the variable Top was indeed an omitted explanatory variable. To get an impression about the lag-length between the policy turnaround and the shift in expectations we let the variable Top start from several months. From table 7 it can be seen that since October 1980 the credibility variable contributes significantly to the formation of interest rates. Besides, it appears Dutch

⁸ Neither the inflation rates in the Netherlands and in Germany, nor the interest rate differential between the US and Germany appeared to be significant.

monetary policy makers established a reputation before 1982. The impact of the reputation gained on the Dutch money market interest rates can be calculated as about 1% point. Further, several Granger-causality tests have been performed which do not indicate that simultaneity is an issue here⁹. In this respect DNB (1985) and Eijffinger & In 't Veld (1987) reported similar outcomes.

Table 7 Regression results for Top alternatives

starting period	coefficient	t-value	average impact on interest rates (% point)	\bar{R}^2	SE	DW	Q(12)
1979.10	-0.52	(-0.75)		0.83	0.61	1.47	6.31
1980.10	-1.02	(-3.05)	0.87%	0.87	0.55	1.40	21.65
1980.11	-1.07	(-3.27)	0.91%	0.87	0.54	1.50	18.65
1980.12	-1.12	(-3.69)	0.95%	0.88	0.52	1.42	17.50
1981.01	-1.05	(-3.41)	0.90%	0.87	0.53	1.62	7.80
1981.02	-1.18	(-4.20)	1.00%	0.89	0.50	1.45	6.90
1982.01	-0.25	(-0.78)		0.83	0.61	1.50	6.75

Next, we were interested to find out if focussing on the second cornerstone of the new exchange rate policy - keeping the guilder/Deutsche mark central rate constant - would provide us with corresponding results. The longer this central rate is kept constant, the more credible it becomes in the eyes of the markets. Therefore we calculated, for every month, the relation between the number of months since the new regime in which the central rate of the mark did not change, and the total number of months past since the EMS took off in March 1979. We included this alternative policy credibility variable Par into our model. The best results were obtained with eq. (1.4):

$$i^{NL} = 1.13 + 1.0 i^D - 12.59 CA_{-3} + 72.30 Dev_{-3} + 2.29 Spec - 1.33 Par_{0101} \quad (1.4)$$

(3.81) (-1.91) (4.24) (3.84) (-2.81)

$$\bar{R}^2 = 0.83 \quad SE = 0.62 \quad Q(11) = 9.61 \quad \hat{\rho} = 0.42$$

(2.70)

SMPL: 1979.10 - 1983.02 .

⁹ Several tests have been done of the following equations (see Harvey, 1981, p. 303):

$$Top8101_t = f\left(\sum_{i=1}^j Diff_{t-i}, \sum_{i=1}^j Top8101_{t-i}\right) \quad j = 1, \dots, 6$$

The variable $Diff$ is the short-term interest rate differential between the Netherlands and Germany. No single F-test showed a significant effect of the $Diff$ variables together, although several lag structures have been tried.

It is clear that these results support those of table 7. Also the credibility variable Par_{8101} is significant and has the right sign. Next, we calculated its impact on Dutch money market rates, being about 1.2% point; experiments with starting months other than January 1981 led to similar results. So in the last months of 1980 (one year after the policy reversal) the variable shows up to be significant.

We can conclude from this section that the tightened exchange rate policy provided the Dutch monetary policy makers with credibility on financial markets. By sticking to their intended policy financial markets put their trust in them. After all, since September 1979 the guilder was without exception revalued together with the Deutsche mark during sometimes turbulent foreign exchange developments. Moreover, the position of the guilder in the EMS continued to be strong. As a consequence Dutch money market rates became more attractive as the perceived foreign exchange risk diminished while the interest rate differential with Germany initially remained the same. The resulting upward pressure on the guilder induced the Netherlands Bank to lower its dealing rates with the market, paving the way for declining money market rates. A new equilibrium was thus regained between a lower perceived exchange rate risk and a lower interest rate differential.

Table 8 summarizes the quantitative impact of the four methods applied in this paper on the money market rates. We can conclude from this table that all four methods used to analyze the policy credibility of the Dutch monetary authorities show a convergence of results, which adds to the latter's robustness.

Table 8 Summary quantitative impact of policy credibility on interest rates

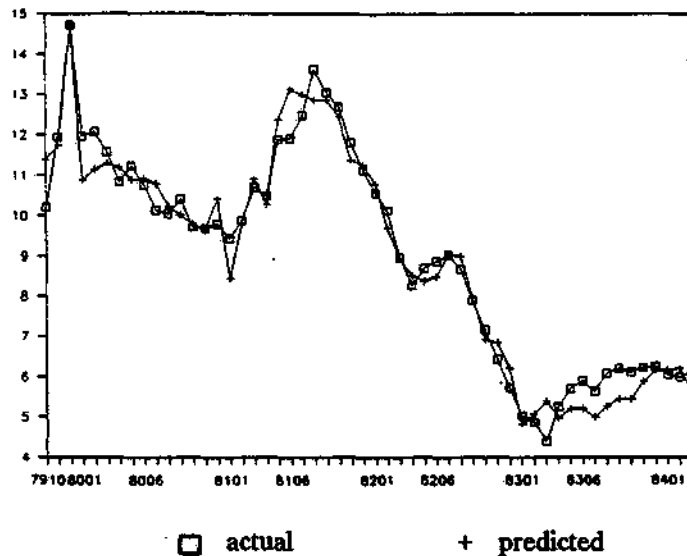
	prediction error method	dummy variabele method	direct estimation policy credibility	
			Top	Par
average impact on interest rates	1.7%	1.3%	1.0%	1.2%

§ 5.4 Was the March 1983 realignment seen as cheating?

As a complete surprise the guilder was devalued by 2% against the mark in March 1983. The initiative came from the former Secretary of Finance Onno Ruding. The Netherlands Bank advised the par value of the Deutsche mark should be unchanged. However, the Law of the Exchange Rate gives the government the last word. During the realignment negotiations it became clear Germany wanted for political reasons to revalue at a higher rate than might have been expected on economic fundamentals. Therefore the Dutch government decided maintaining the par value of the mark was not possible (DNB Quarterly Report 1983/1). The Netherlands Bank finally agreed with the government decision, but only to keep together the European exchange rate system. With some threat the Bank added the devaluation should be considered as once-only (ibid. p. 14).

In the following we will try to analyze if this unanticipated devaluation raised the Dutch interest rate level. Also we will try to find out if the monetary policy makers lost their credibility. On the basis of eq. (13) we produced figure 3, making use of the prediction error method.

Figure 3 Actual and predicted interest rate according to eq. (1.3)



It can be clearly seen that after the March 1983 realignment the predicted interest rate systematically overestimates its actual course. This deviation amounts to over 0.4% in the period April 1983-March 1984, and it amounts to even 0.6% in the period April 1983-November 1983. More or less the same results were obtained applying the prediction error method to eq. (1.4). Next, we tried to support this evidence of a mark-up on the interest rate by adding a dummy to the model, representing the loss in credibility. This appeared to be the case. In eq. (1.5) the variable "Incred" represents this loss in credibility in terms of percentage point increase in the interest rate.

$$\begin{aligned}
 i^{RL} = & 1.11 + 1.0 i^D - 14.59 CA_{-4} + 67.56 Dev_{-3} + \\
 & (7.11) \quad \quad \quad (-3.41) \quad \quad \quad (7.15) \\
 & + 2.85 Spec - 2.10 Mon^D - 1.17 Top_{8101} + 0.58 Incred \quad (1.5) \\
 & (5.38) \quad \quad (-5.19) \quad \quad (-4.54) \quad \quad (2.85)
 \end{aligned}$$

$$\bar{R}^2 = 0.86 \quad SE = 0.49 \quad DW = 1.55 \quad Q(12) = 9.94$$

Incred = 1: 1983.04 - 1983.11

Incred = 0: elsewhere

SMPL: 1979.10 - 1984.03 .

From eq. (1.5) it can be inferred that the confidence of the financial markets in the Dutch exchange rate policy diminished immediately after the devaluation, for the variable Incred is significant and has the correct sign. However, confidence did not vanish. After all, the policy credibility variable Top continues to be significant. So we can say that the unexpected March devaluation of the guilder vis à vis the mark produced a mark-up on the Dutch interest rate amounting to about 0.6% for more than half a year. The same experiment using eq. (1.4) led to a similar result (i.e. a mark-up of 0.7%). Although the combined effect of Top₈₁₀₁ and Incred on the interest rate remains negative (thus the policy being still credible), its impact was diminished temporarily to about 0.4%. We can conclude from this that credibility needs not to be lost completely if the policy makers renege on their plans, i.e. if they are cheating the public. This has also been put forward by Blackburn & Christensen (1989) and found empirically for the United States by Hardouvelis & Barnhart (1989). Moreover, after roughly half a year

exchange rate policy credibility was reestablished. With respect to the latter the following "Dutch-specific" factors played an important part.

At first, the devalued guilder did not imply a policy reversal of the joined monetary authorities. The Netherlands Bank, which can be compared with the Bundesbank as independence is concerned, was against the decision to devalue and made no secret of this see (DNB Quarterly Report 1983/1). But also the Secretary of Finance declared before Parliament the Dutch exchange rate continued unabated to stability in the EMS (*ibid.* p. 18).

Second, the central bank brought into action its full money market and foreign exchange market instruments to underline its determination to defend the guilder which, not surprisingly, came at that time under pressure. For instance the discount rate was raised, tightening dollarswaps were announced and almost one-third of the foreign exchange reserves were sold (DNB Annual Report 1983, p. 91-95).

Finally, the fact that the government too stressed the one-shot character of the devaluation before Parliament was of overriding importance (*Handelingen Tweede Kamer 1982-1983*).

§ 6 Discussion

The last years much empirical research has been carried out presenting evidence of a shift in expectations prompted by the assumed disciplining feature of the EMS. For instance Christensen (1987, 1989) reported results for Denmark indicating the Danish exchange rate policy gained credibility since the beginning of 1983. Giavazzi & Giovannini (1989) too observed for Denmark a change in expectations finding that the actual rates of wage and of price inflation were overpredicted.

For France the evidence is mixed. Giavazzi & Giovannini found a significant change in parameter stability after the beginning of the EMS. By contrast they were unable to detect such a change in correspondence with the French policy turnaround of the spring of 1983. These authors note however this result might be related to a low power for the parameter stability tests. Weber (1988) could not find an apparent influence of the EMS on the French counterinflation reputation.

For Italy the evidence seems to point in the same direction. Weber (1988) found an increase in Italy's counterinflation reputation after the June 1985 realignment, whereas Giavazzi & Giovannini (1989) reported Italian evidence of an adjustment in inflation expectations in the second quarter of the same year.

With respect to the Irish economy, Dornbusch (1989) observed a change in expectations in the fall of 1982, as a result of the policy turnaround in the preceding summer. Although bond market evidence suggested immediate credibility, the Irish programme failed in terms of public finance and employment.

As far as we know, only Weber (1988) analyzed the Netherlands too. Our results hold up his assertion the gains in Dutch reputation have been the outcome of a strong commitment to lower inflation rates and therefore to lower interest rates. Evidence presented in this paper does not support Weber's result the Netherlands had the same counterinflation reputation as Germany at the beginning of the EMS. If that would be the case, it would be difficult to explain significant differences in interest rate levels. In fact, German short-term and long-term interest rates were in 1979 on average lower than those in the Netherlands: 2.8% and 1.5% respectively. However, we should be very careful by making such a comparison. Besides other differences, Weber used a different reputation measure (i.e. a built-up of anti-inflation reputation by updating inflation expectations affected by the actual inflation rates) while we focused on the credibility of the exchange rate policy as reflected in interest rates.

Although we presented additional evidence in favour of the EMS credibility-hypothesis we did not analyze whether the Dutch disinflation policy has been more efficient in terms of output lost compared with a floating exchange rate regime. In fact, the European evidence is not

in favour of the hypothesis that the costs of disinflation were lower in EMS countries than outside the system (see Dornbusch, 1989, DeGrauwe, 1990). While there are serious difficulties to construct models for one regime and simulate them for another, we argue the costs of disinflation in the Netherlands may have been lower. First, one should not play down the importance of significant lower interest rates for government finance and for the business sector. For instance a 1% point sustained fall in short-term and in long-term interest rates leads to a reduction of the interest rate burden for both sectors of about 1.3% GDP (DNB Annual Report 1982). This would mean that fiscal restraint could be less severe and that the business sector might move earlier out of the depression. We can hardly imagine the Dutch achieving these disinflation advantages outside the EMS.

Second, DeGrauwe (1990) pointed out that countries with a high inflation and a low reputation at the start of the EMS were more constrained than for instance the Netherlands in their disinflation strategies. Because those countries could not produce a steep overvaluation of their currencies using a shock therapy as applied by the US and the UK, they were forced to follow more gradual and mild deflation policies, stretched out over many years in order to break inflation expectations. As a result inflation was slower in coming down.

By contrast, Weber (1988) and the evidence presented in this paper confirm the view the Dutch monetary policy makers enjoyed a good reputation at the start of the EMS, implying that a disinflation policy might have prompted a quick shift in expectations. This is to indicate that further research along these lines is pressing.

§ 7 Summary and conclusions

In this paper we applied the credibility-hypothesis to the Netherlands' exchange rate policy. Since the EMS-realignment in September 1979 Dutch exchange rate policy has been intensified. The policy is now to keep the guilder in the upper part of the EMS parity-grid. Moreover, Dutch monetary authorities now aim for an unchanged central rate with the Deutsche mark. According to the credibility-hypothesis such a policy, if maintained, will be fruitful and leading to a lower premium for currency risk on the guilder vis à vis the D-mark. This will translate into a lower level of Dutch interest rates.

By means of two indirect and two direct estimation methods we tried to analyze the credibility of the new exchange rate policy. The credibility-hypothesis was supported by the data. Moreover, we found a convergence of results; after one year this policy led to a significant and permanent cut in money market rates, amounting to about 1¼%. Further, the public turned out to react to policy results, not merely to policy announcements.

We also analyzed if the unanticipated devaluation of the guilder vis à vis the DM in the March 1983 realignment was seen as cheating. We found evidence it was. This devaluation damaged immediately, albeit not completely and only temporarily, the Dutch authorities' reputation. We found evidence of a mark-up on the interest rate during half a year of over 0.6%.

References

- Backus, D. & J. Driffill (1985) "Inflation and reputation", *American Economic Review*, vol. 75, p. 530-538
- Barro, R.J. & D.B. Gordon (1983a) "A positive theory of monetary policy in a natural rate model", *Journal of Political Economy*, vol. 91, p. 589-610
- (1983b) "Rules, discretion and reputation in a model of monetary policy", *Journal of Monetary Economics*, vol. 12, p. 101-122
- Barro, R.J. (1986) "Reputation in a model of monetary policy with incomplete information", *Journal of Monetary Economics*, vol. 17, p. 3-20
- Baxter, M. (1985) "The role of expectations in stabilization policy", *Journal of Monetary Economics*, vol. 15, p. 343-362
- Blackburn, K. & M. Christensen (1989) "Monetary policy and policy credibility: theories and evidence", *Journal of Economic Literature*, vol. 27, p. 1-45
- Buiter, W. & M. Miller (1983) "Changing the rules: economic consequences of the Thatcher regime", *Brookings Papers on Economic Activity*, p. 305-379
- Butter, F.A.G. den (1976) "The use of monthly and quarterly data in an ARMA-model", *Journal of Econometrics*, vol. 4, p. 312-324
- Cagan, P. & W. Fellner (1983) "Tentative lessons from the recent disinflationary effort", *Brookings Papers on Economic Activity*, p. 603-610
- Christensen, M. (1986) "Policy credibility and the Lucas critique - some new Danish evidence", University of Aarhus, mimeo.
- Christensen, M. (1987) "On interest determination, testing for policy credibility and the relevance of the Lucas critique", *European Journal of Political Economy*, vol. 3, p. 369-388
- Christensen, M. (1989) "Policy credibility and the Lucas critique - some new tests" in *Monetary and financial models*. Eds. P. Artus, Y. Barroux, G. McKenzie, London, Macmillan
- DeGrauwe, P. (1989) "Het Europees muntstelsel en de autonomie van het economisch beleid" in *De Europese monetaire integratie: vier visies, WRR voorstudies en achtergronden*, SDU uitgeverij, Den Haag
- DeGrauwe, P. (1990) "The costs of disinflation and the European monetary system", *Open Economies Review*, vol. 1, p. 147-175
- De Nederlandsche Bank, diverse kwartaalberichten (Quarterly Reports), Amsterdam
- De Nederlandsche Bank, diverse jaarverslagen (Annual Reports), Amsterdam
- De Nederlandsche Bank, (1985) "MORKMON, a quarterly model of the Netherlands economy for macroeconomic policy analysis", *Monetary Monographs no. 2*, Martinus Nijhoff, Dordrecht
- Dornbusch, R. (1989) "Credibility, debt and unemployment: Ireland's failed stabilization", *Economic Policy* vol. 4, p. 174-209
- Duisenberg, W.F. (1982) "De rente in Nederland", *DNB Kwartaalbericht 1982/3*, Amsterdam, p. 41-46
- Dunnen, E. den (1979) "Postwar monetary policy", *De Economist*, vol. 127, p. 21-57
- Dunnen, E. den (1985) "Instrumenten van het geld- en valutamarktbeleid in Nederland", *Serie Bank- en Effectenbedrijf no. 21*, Kluwer, Deventer
- Eijffinger, S.C.W. & J.W. In 't Veld (1987) "De relatieve posities van de EMS-valuta's", *Rotterdamse Monetaire Studies no. 27*, Rotterdam
- Fase, M.M.G. & F.A.G. den Butter (1977) "The endogeneity of monetary policy in the Netherlands", *Cahiers économiques et monétaires*, no. 6, Banque de France, Paris, p. 177-204, Paris
- Fellner, W. (1976) "Towards a reconstruction of macroeconomics - problems of theory and policy", *American Enterprise Institute*
- Fellner, W. (1979) "The credibility effect and rational expectations: implications of the Gramlich study", *Brookings Papers on Economic Activity*, p. 167-189
- Giavazzi, F. & M. Pagano (1988) "The advantage of tying one's hands - EMS discipline and central bank credibility", *European Economic Review* vol. 32, p. 1055-1075
- Giavazzi, F. & A. Giovannini (1989) "Limiting exchange rate flexibility - the European monetary system", *The MIT Press*, Cambridge

- Handelingen Tweede Kamer, zitting 1982-1983, 18-5-1983
- Handelingen Tweede Kamer, ucv 26, 21-3-1983
- Hardouvelis, G.A. & S.W. Barnhart (1989) "The evolution of Federal Reserve credibility: 1978-1984", *The Review of Economics and Statistics*, vol. 71, p. 385-393
- Harvey, A.C. (1981) "The econometric analysis of time series, Philip Allen, Oxford
- Heertje, A. & F. VanderPloeg (1990) "De Bundesbank op het monetaire oorlogspad, *Economisch Statistische Berichten*, vol. 75, p. 148-150
- Kessler, G.A. (1981) "De invloed van het monetaire beleid en het wisselkoersbeleid op de ontwikkeling van de werkgelegenheid", *Maandschrift Economie*, vol. 45, p.53-80
- Kok, W. (1990), *Staatscourant* no. 34, 16-12-1990
- Kydland, F. & E.C. Prescott (1977) "Rules rather than discretion: the inconsistency of optimal plans", *Journal of Political Economy*, vol. 85, p. 473-491
- Loo, P.D. van (1984) "De hoogte van de kapitaalmarktrente", *Maandschrift Economie* vol. 48, p. 123-139
- Lütkepohl, H. (1987) "Forecasting aggregated vector ARMA processes", *Lecture notes in economics and mathematical systems* vol. 284, Springer-Verlag, Berlin
- McCallum, B. (1984) "Credibility and monetary policy", in *Price stability and public policy*, Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming
- Perry, G.L. (1983) "What have we learned about disinflation?", *Brookings Papers on Economic Activity*, p. 587-602
- Persson, T. & G. Tabellini (1990) "Macroeconomic policy, credibility and politics", Harwood, London
- OECD (1990) *Historical Statistics 1960-1988*, Paris
- Rompuy, P. van (1990) "Frank schaduw D-mark", *Economisch Statistische Berichten* vol. 75, p. 739
- Sijben, J.J. (1990) "Geloofwaardigheid en monetaire politiek", *Rotterdamse Monetaire Studies*, no. 38, Rotterdam
- Szász, A. (1981) "Het wisselkoersdebat" in *Zoeklicht op beleid*. Eds. E. den Dunnen, M.M.G. Fase, A. Szász, Stenfert Kroese, Leiden
- Taylor, J.B. (1982) "Establishing credibility: a rational expectations viewpoint, *American Economic Review*, vol. 72, p. 81-85
- Timmerman, P.C. (1982) "The Netherlands Bank narrow monetary policy", *De Economist*, vol. 130, p. 176-186
- Weber, A.A. (1988) "The credibility of monetary policies, policy makers' reputation and the EMS-hypothesis: empirical evidence from 13 countries", *CentER Discussion paper* no. 8803, Tilburg
- Wijnbergen, S. van (1990) "De gulden op eigen benen", *NRC Handelsblad* 11-4-1990