On the Cost of Moving from a Quasi Monetary Union
to a Full Monetary Union:

The Case of the Netherlands

W. Jos Jansen*

Monetary and Economic Policy Department, De Nederlandsche Bank, Amsterdam, Netherlands

We analyze the effects of a contractionary Dutch monetary policy shock that is consistent with the fixed
guilder/mark exchange rate. Although monetary policy shocks are quite small, they do have plausible effects:
credit, expenditures, output and prices all fall after a monetary tightening. Policy shocks account for non-
negligible parts of the forecast error variance of macroeconomic variables. EMU membership thus entails a non-
trivial sacrifice in terms of macroeconomic stabilization – even for the Netherlands, which many deemed to be in
a quasi monetary union with Germany.

JEL Classification Numbers: E52, O52.

Keywords: monetary union, monetary transmission, VAR models.

W. Jos Jansen
Monetary and Economic Policy Department
De Nederlandsche Bank
P.O. Box 98
1000 AB Amsterdam
The Netherlands

E-mail: w.j.jansen@dnb.nl
Fax: 31-20-5242506
Phone: 31-20-5243275

February 2000

* The views expressed in this paper are the author’s personal views, and not necessarily those of De
Nederlandsche Bank. I would like to thank Hans Brits, Gabriele Galati, Jan Jacobs, Jan Kakes, Job Swank, Peter
van Bergeijk, Carel van den Berg and Laura van Geest for helpful comments on preliminary drafts.
1. Introduction

The establishment of the European Economic and Monetary Union (EMU) on 1 January 1999 is a milestone in post-war European history. Naturally, there has been considerable debate on its costs and benefits. Under EMU, the monetary policy stance will be the same for all participating countries. Many economists have pointed out that the euro area is not an optimum currency area and that the degree of asymmetry of economic shocks may be large, especially at the regional level.¹ EMU membership may imply a substantial cost in terms of a reduced ability to counter asymmetric macroeconomic shocks, because variations in interest and exchange rates will no longer be available as natural shock absorbers at the national level. Proponents of monetary union argue that although the euro area may not be an optimum currency now, it will increasingly become one over time as the economies, trade patterns and institutions adapt to the new regime (Bergman and Hutchison 1999).² Ultimately, the criteria for an optimum currency area are endogenous (Frankel and Rose 1998). Others play down the importance of asymmetric macroeconomic shocks; see, for example, Vijslaar and Albers (1999). Moreover, the experience with the successful Scandinavian Currency Union (1873–1913) suggests that a viable currency union does not seem to require that countries within a single currency area fulfil the criteria of an optimum currency area (Bergman 1999).³

The significance of this debate differs across countries, however. After all, the actual cost of EMU membership in terms of macroeconomic stabilization capabilities also depends on the extent to which countries actually made use of the latitude to pursue monetary policies different from Germany’s. Countries like Italy and Spain have in recent times actually done so, and for them EMU makes a real difference. By contrast, the actual cost of EMU seems low for countries that have maintained a fixed exchange rate against the Deutschmark for over a decade. They just give up a policy instrument that was not used anymore. The same dichotomy can be observed among the three countries that opted out of EMU. The UK and Sweden have chosen to float their currencies against the euro, thus preserving monetary autonomy. However, Denmark maintains a narrow ±2.25% target zone via-à-vis the euro, severely limiting the scope for an independent monetary policy.

² For instance, Calmfors (1998) shows that the incentives for labour market reform are stronger inside a monetary union than outside.
³ The same message can be gleaned from the evidence that regions within existing countries are exposed to large idiosyncratic shocks.
The Dutch experience may shed some light on the issue of the minimum cost of full monetary union. By maintaining the most credible and long-standing peg versus the Deutschmark, the Netherlands was effectively in a quasi monetary union with Germany for over 15 years (1983–98). Consequently, the Netherlands should suffer the smallest loss in terms of lost stabilization opportunities among the euro area countries. Nevertheless, a credible narrow target zone still offers some limited scope for discretionary monetary policy (Svensson 1994). This paper attempts to assess how much room for maneuver the Dutch monetary authorities had in the period 1983–97 by analyzing the effects of a change in the Dutch-German money market interest rate differential that is consistent with the fixed exchange rate commitment.

Our findings may have some relevance for the EU countries that did not join EMU (yet), and in particular Denmark, which is in a situation akin to that of the Netherlands since 1983. In addition, the empirical analysis is by its nature a contribution to the literature on the monetary transmission mechanism. The remainder of this paper is organized as follows. Section 2 goes into some methodological issues, Section 3 presents the results and Section 4 concludes.

2. Methodological issues

When the Netherlands entered EMU it became impossible to change its money market interest rate relative to that of Germany (or other EMU participants). In contrast, the regime of the guilder/mark peg still permitted a limited degree of interest rate flexibility, thus monetary autonomy. If this limited amount of monetary autonomy offered valuable opportunities for macroeconomic stabilization, one would expect a shock in the Dutch interest rate to have the conventional effects on macroeconomic variables like output and the price level. A contractionary monetary policy shock should be followed by a fall in output and prices. If the degree of monetary autonomy is too small from the viewpoint of macroeconomic stabilization, one would expect interest rate shocks to have no discernible effects. We therefore examine how the Dutch economy tended to respond to a change in the Dutch-

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4 The last change in the guilder/mark parity occurred on 21 March 1983 when the guilder was devalued by 2% against the Deutschmark. The exchange rate of the guilder vis-à-vis the Deutschmark has been kept within a very narrow band around the parity ever since. In fact, the actual band was much narrower than the official one of ±2.25%. The fact that the guilder-mark peg was the only one that did not come under attack during the ERM crises in 1992–93 is testimony to the credibility of the fixed exchange rate commitment.

5 The interest rate differential was 0.27% on average in the sample period, varying between 1.65% and –0.61%. The standard deviation was 0.61%.
German money market interest rate differential during the era of quasi monetary union. The sample period is 1983:III–97:IV, the period in which Dutch monetary policy was first and foremost aimed at maintaining a fixed guilder/mark exchange rate, using the money market interest rate as the main instrument. Of course, the Dutch monetary policy shock we consider has to be consistent with the exchange rate objective.

We also analyze how such an interest rate change works through the economy. The literature on the credit channel emphasizes the role of banks in the transmission of monetary policy. In this view banks will respond to a monetary policy tightening with a reduction in their loan supply. Because adjusting the loan portfolio is costly, banks will also try to hedge against the risk of monetary tightening by holding securities as a buffer stock against a reserve outflow.

Following the empirical literature on the monetary transmission mechanism we use a Vector Autoregression (VAR) model to investigate the impact of monetary policy changes. We estimate the following reduced-form VAR model,

\[
Z_t = A_t Z_{t-1} + \ldots + A_{p} Z_{t-p} + u_t,
\]

where \( Z_t \) is a vector of variables observed at time \( t \), and \( p \) is the maximum lag of the system. The VAR disturbance vector \( u_t \) is assumed to be serially uncorrelated and to have covariance matrix \( V \). This reduced form can be thought of as being derived from the following structural model,

\[
Z_t = B_0 Z_{t} + B_1 Z_{t-1} + \ldots + B_{p} Z_{t-p} + e_t,
\]

where \( e_t \) is the vector of the underlying structural shocks that we want to identify. \( e_t \) has as covariance matrix the identity matrix. The reduced form disturbances \( u_t \) are thus related to the underlying structural disturbances \( e_t \) by

\[
u_t = [I - B_0]^{-1} e_t = A_0 e_t,\]

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6 For an overview of Dutch monetary policy in the post-war period, see De Greef, Hilbers and Hoogduin (1998).
7 See Bernanke and Blinder (1992), Bernanke and Gertler (1995) and Kashyap and Stein (1997) for overviews of this literature.
implying $V = A_0 A'$. The impulse-response functions to the structural shocks $e_t$ can be calculated via

$$Z_t = [I - A(L)]^{-1} A_0 e_t$$

We estimate the VAR model by ordinary least squares to obtain estimates of the matrices $V$ and $A(i)$, $i = 1, \ldots, p$. $A_0$ is calculated from $V$ using the conventional Cholesky decomposition. Hence, $A_0$ is a lower triangular matrix and $u_t$ is assumed to be determined in a recursive fashion by $e_t$.

The empirical analysis is based on quarterly data for the period 1983.III-97.IV (58 quarters). The maximum lag $p$ is set at 3. Given the limited length of the available time series, it is not possible to include all variables of interest in a single unconstrained VAR system. On the other hand, if we include too few variables in the VAR we run the risk of significant omitted variables bias. Given this trade-off we follow an intermediate strategy, which was also employed by Christiano, Eichenbaum and Evans (1996). We estimate a range of VARs for which the vector $Z$ contains five variables. $Z$ always includes the following four core variables: the log of the consumer price index ($P$), the log of real GDP ($Y$), the log of the guilder/mark exchange rate ($E$), and the Dutch-German money market interest rate differential ($R$). These four variables comprise a minimalist model of the Dutch economy. The fifth variable of $Z$ is the one we want to focus on, say $X$. $X$ is thus different for every estimated VAR model. We employ the German money market interest rate (current and three lagged values) as an exogenous conditioning variable to take the German monetary policy stance into account. We thus assume that the German money market rate is set independently from the Dutch interest rate or the state of the Dutch economy, and that the Dutch central bank can react to any German rate changes contemporaneously.

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8 All data series are seasonally adjusted, either at source or by the X-11 method. The sample ends in 1997 because data on some variables are not available for 1998. The data sources are: Quarterly National Accounts published by the Dutch Central Bureau of Statistics (National Accounts data), *International Financial Statistics* published by the IMF (money market rates, CPI, foreign assets and liabilities of banks) and De Nederlandsche Bank (all other data).

9 We set $p$ equal to 3 for degrees-of-freedom considerations. However, fixing $p$ at 4, which is often done in empirical papers using quarterly data, does not change the results materially.

10 As noted by Christiano, Eichenbaum and Evans (1996), a consequence of this approach is that the impulse is not exactly the same across the different VAR models, because the fifth conditioning variable is different. The impulse response functions of the four common variables ($P$, $Y$, $E$ and $R$) are broadly similar across the models, however, suggesting that this is not a serious problem.

11 Treating the German money market rate as an endogenous variable, that is, including it in $Z$, does not change the basic results.
The disturbances are orthogonalized on the basis of the conventional Cholesky decomposition. In that case, the ordering of the variables in the VAR determines the pattern of recursivity, and thus may be of crucial importance for the orthogonalization of the disturbances. The main identifying assumption in this paper is that changes in interest rates and exchange rates do not contemporaneously affect real variables and prices. The price level and output appear at the top of the ordering. Given the overriding importance of the exchange rate objective, the guilder/mark exchange rate has to precede the interest rate differential, which is our policy variable. This assumption permits a contemporaneous response by the central bank to a weakening of the guilder. This is an accurate reflection of actual practice as the Dutch monetary authorities tended to hike short-term interest rates immediately after a weakening of the guilder in an aggressive defense of the peg (De Greef, Hilbers and Hoogduin 1998). If the additional variable $X$ is a balance sheet item or a real variable, it is the third variable in the vector $Z$. In that case we use the ordering $P, Y, X, E, R$. If it is an interest rate set by banks, we place it last in the ordering: $P, Y, E, R, X$. Hence we allow for a contemporaneous response of interest rates set by banks to a change in the money market rate.

The time series we use are usually non-stationary (integrated of order one). This brings up the question whether we should difference the data. Employing differenced data has the drawback of neglecting potentially important long-run relationships among the time series involved. Like a number of recent empirical papers on the monetary transmission mechanism, we have therefore chosen to estimate unrestricted VARs in levels. We thus refrain from imposing cointegration and estimating vector error correction models. Our approach still allows for the existence of cointegrating relationships, however. Faust and Leeper (1997) argue that – in part because the number of cointegrating relationships is unknown and thus has to be estimated – imposing long-run restrictions will not necessarily improve the reliability of structural inferences.

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12 Interchanging $P$ and $Y$ in the ordering does not affect the results materially.
13 See, for example, Bernanke and Blinder (1992), Christiano, Eichenbaum and Evans (1996), and Ramaswami and Sloek (1998).
14 See Hamilton (1994, Chapter 20.4) for a discussion on the issue of ‘to difference or not to difference.’
3. Empirical results

Figures 1-3 present the impulse response functions (IRF) of various variables (usually $X$) after a one-standard error shock to the Dutch-German money market interest rate differential. All IRFs show percentage points in deviation of the baseline path. The broken lines indicate one-standard error bands.

Figure 1 illustrates the working of the guilder/mark peg. A weakening of the guilder versus the mark is countered by a higher interest rate, and the exchange rate quickly reverts to its old value. Moreover, the interest rate falls back to the baseline at a slower pace, pointing to a vigorous and pre-emptive defense of the peg.

Figure 2 shows the macroeconomic effects of a contractionary shock in the Dutch-German money market interest rate differential. The typical shock is only 15 basis points and short-lived (figure 2a), illustrating the limited room for independent interest rate movements in the Netherlands. However, this does not imply that monetary policy is powerless. A rise in the money market rate is followed by a temporary weak appreciation of the guilder (figure 2b). The interest rate shock is thus consistent with a credible guilder/mark peg. Moreover, we find no evidence of the so-called ‘exchange rate puzzle’.

Output gradually declines for 8 quarters to 0.17% below the baseline, before turning around (figure 2c). Prices are sticky, as the price level remains unaffected for 2 quarters, before it gradually falls to 0.19% below the baseline (figure 2d). After bottoming out the price level slowly starts to rise towards the baseline. The so-called ‘price puzzle’ is thus remarkably absent. In the short run the economy’s response is determined by the interplay of net exports and investment in stocks. Net exports sharply contract for two quarters, reflecting lower exports and temporarily higher imports (figure 2h). Inventories rise for two quarters due to falling foreign and domestic demand and decline, as the level of output is adjusted (figure 2g).

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15 Figures 1 and 2a-2d are from the four-variable VAR with $Z = (P, Y, E, R)$. Figures 2e-2h and 3c-3h are IRFs of the variable $X$ from five-variable VARs with $Z = (P, Y, X, E, R)$, while figures 3a and 3b are derived from VARs where $X$ is ordered last: $Z = (P, Y, E, R, X)$.

16 Like Christiano, Eichenbaum and Evans (1996), we show one-standard error bands. We do this for presentational reasons, as displaying two-error bands would double the range of Y-axis and thus ‘flatten’ the IRF. As is well-known, standard errors for dynamic inferences based on VARs are in general relatively large (see Hamilton 1994, chapter 11.7). This is likely to be even more true in our case, where the time-span of the data is relatively short. The purpose of the plots is to concisely present the average response and a standard measure of the uncertainty surrounding it. The bands should not be interpreted as confidence intervals associated with conventional levels of statistical significance.

17 The ‘exchange rate puzzle’ refers to the finding that the exchange rate depreciates after a monetary policy tightening. See Kumah (1996) and Smets (1997) for a discussion.

18 The ‘price puzzle’ refers to the finding that the price level rises following a monetary policy tightening. See Sims (1992) and Christiano, Eichenbaum and Evans (1996) for a discussion.
In the medium term, lower output and spending mainly translates into lower consumption (figure 2e). Investment by the private sector remains essentially unchanged for two years, after which it starts to fall. However, the estimates are rather inaccurate as the confidence interval around this IRF is unusually wide (figure 2f). All in all, the results indicate that the positive shock to the Dutch-German interest rate differential can plausibly be interpreted as a contractionary Dutch monetary policy shock.\(^{19}\)

Table 1 reports the contribution of the interest rate shocks to the variability of the different macroeconomic variables for various horizons. Such shocks account for 5-8% and 10-20% of the forecast error variance of real GDP and the price level, respectively. These numbers suggest a small but non-negligible scope for macroeconomic stabilization by monetary policy. Of course, this scope is much smaller for the Dutch central bank than for, say, the Federal Reserve. For instance, Christiano, Eichenbaum and Evans (1996) report for the US that the typical shock to the federal funds rate is 80 basis points and that about 30% of the forecast error variance of real GDP can be attributed to monetary policy shocks at the 6-year horizon.

To gain some further insights, figure 3 focuses on the banking sector’s response to contractionary monetary policy. Banks increase their lending rates in the same quarter by approximately half of the money market rate increase (figures 3a–3b). The central bank succeeds in shrinking the balance sheet of the banking system (figure 3c). Total banking assets quickly fall by 0.5% after one quarter, and start to increase after the third quarter. Despite alternative sources of funding, Dutch banks appear to be unable to fully shield their operations from monetary policy actions. The decline of total banking assets is accompanied by an adjustment of the composition of the portfolio. The share of loans to the domestic private sector increases by 0.2% in two quarters (figure 3f), while the opposite can be observed for foreign assets (figure 3j). Initially, the share of the holdings of securities displays a modest rise (figure 3d). Banks protect their loan portfolio, as initially total loans even increase a bit despite the higher lending rate (figure 3e). This may reflect the temporary increase in short-term financing needs by firms due to higher inventory investment (see figure 2g).\(^{20}\) Banks treat households and firms differently, however. Mortgage loans start to decline quickly, although in percentage terms less than total assets (figure 3g). The share of

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\(^{19}\) The finding (not reported) that various measures of the money supply (M0, M1, M2 and M3) fall after the shock provides additional evidence that this shock represents a (negative) money supply shock rather than a (positive) money demand shock.

\(^{20}\) A similar finding is reported for the US economy by Christiano, Eichenbaum and Evans (1996), and for the German economy by Tsatsaronis (1993).
mortgages rises 0.07% for two quarters before coming down quickly, and it even falls below the baseline in the medium term (figure 3h). Banks also raise the interest rate on mortgages somewhat more aggressively than the short-term lending rate. Firms appear to get preferential treatment, as their loans are less sensitive to interest rates changes in the short run. This finding, in combination with the evidence that small and medium-sized firms are much likelier to experience difficulties with credit availability (De Haan 1997), suggests that large firms in particular are able to maintain and use their credit lines. Ultimately, these loans decline too as the demand for credit falls with economic activity.

The banks’ behavior is consistent with the prediction by the literature on the credit channel and the financial accelerator that following a contractionary monetary policy shock, banks will initially seek to protect their loans by drawing down a buffer stock of assets, and will primarily cut loans to those agents that are more bank-dependent, such as mortgages to households. Interestingly, foreign assets serve as the hedge against monetary tightening. The literature, which is mainly focused on the situation in the US, assigns this role to holdings of securities. Our result also contrasts with Garretsen and Swank (1998) who for Dutch banks also found that securities act as a buffer. Our results suggest that winding down positions in the international interbank market seems to be the cheapest way to adjust the balance sheet quickly, and to shield the loan portfolio in this way from adverse interest rate movements in the short run. It would be interesting to investigate whether the same adjustment pattern can be detected for other countries that have large and internationally oriented banks, such as Switzerland and the UK.

4. Conclusion

This paper provides a tentative assessment of the cost of moving from a quasi monetary union – a credible target zone regime – to a full monetary union, such as EMU. By entering EMU countries give up an important tool for macroeconomic stabilization at the national level, namely monetary policy. This cost will differ across countries. In particular, for countries that

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21 See, for example, Bernanke and Blinder (1992) for the US, and Tsatsaronis (1993) for Germany.
22 There are a number of non-trivial differences between our analysis and theirs, however. Garretsen and Swank employ monthly data running from 1979 to 1993 in a seven-variable VAR involving Dutch and German variables. In this period the guilder was twice devalued, and the peg was probably not credible in the first years. In contrast, our sample consists of quarterly data from 1983 to 1997 in which there was clearly one exchange rate regime. Furthermore, they measure output by industrial production, which in the Netherlands accounts for only 20% to 25% of GDP, whereas we use GDP figures. Finally, they use changes in the German money market interest rate as the monetary policy shock, thus assuming that the scope for Dutch monetary policy was negligible.
have long maintained a fixed exchange rate against the German mark, EMU membership presumably involves little cost in this regard. These countries lose a policy instrument that is not used anyway. However, even a narrow target zone – at least in principle – permits some degree of interest rate flexibility. Hence, the demise of the target zone still represents a loss of policy autonomy.

Looking into the experience of the Netherlands, this paper examines how much leeway for macroeconomic stabilization a narrow target zone actually offers. To this end we analyze the effects of a contractionary monetary policy shock on the Dutch economy in the period 1983–97. The shock is defined as an increase in the Dutch-German money market interest rate differential that is consistent with the fixed guilder/mark exchange rate commitment. We find that although monetary policy shocks are quite small, they do have plausible effects: credit, expenditures, output and prices all fall after a monetary policy tightening. Moreover, the banking sector’s behavior is in accordance with predictions by the literature on the credit channel and the financial accelerator. Policy shocks account for 5–8% and 10–20% of the forecast error variance of real GDP and the price level, respectively.

Consequently, the Netherlands enjoyed a modest degree of monetary autonomy in the past 15 years. Its move from a quasi monetary union – a credible, narrow target zone – to a full monetary union, EMU, thus entails a non-trivial sacrifice in terms of macroeconomic stabilization capabilities. For other EMU countries this sacrifice has probably been greater. The Dutch experience may have some relevance for countries that opted out of EMU, in particular Denmark. By maintaining a narrow target zone against the euro, Denmark has chosen to retain the limited degree of policy discretion the Netherlands has given up – at least for the time being.\(^23\)

\(^{23}\) In early 2000 political support was building for holding a referendum on joining EMU in both Denmark and Sweden.
Table 1. Decomposition of forecast error variance

<table>
<thead>
<tr>
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<th>Horizon</th>
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<tbody>
<tr>
<td></td>
<td>1 year</td>
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<tr>
<td>CPI</td>
<td>11.0</td>
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<tr>
<td>GDP</td>
<td>4.8</td>
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<tr>
<td>Private consumption</td>
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<tr>
<td>Private investment</td>
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</tr>
<tr>
<td>Inventory investment</td>
<td>4.7</td>
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<tr>
<td>Net exports</td>
<td>17.4</td>
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Note: Percentage of forecast error variance attributable to policy shock.

Figure 1. Response to a weakening of the guilder
Figure 2. Macroeconomic effects of a contractionary Dutch monetary policy shock

(a) Interest rate differential
(b) Guilder/DM rate
(c) Real GDP
(d) CPI
(e) Private consumption
(f) Private investment
(g) Investment in inventories (% GDP)
(h) Net exports (% GDP)
Figure 3. Dutch banking sector’s response to a contractionary Dutch monetary policy shock

(a) Lending rate
(b) Mortgage lending rate
(c) Total assets banks (TA)
(d) Securities holdings (% TA)
(e) Loans to private sector
(f) Loans to private sector (% TA)
(g) Mortgage lending
(h) Mortgage loans (% TA)
Figure 3. Dutch banking sector's response to a contractionary Dutch monetary policy shock (cont.)
References


