Monetary and Non-Monetary Analyses of Inflation in a Small Open Country*

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I. Introduction

The issues of inflation and price stability provide a recurrent topic for articles in the popular and scientific press. Since the disturbing experience with seemingly run-away inflation in the mid and late 1970s the main themes have been the desirability of price stability and early warnings against (perceived) inflationary developments. Three recent articles illustrate the nature of the debate on inflation in the Netherlands. For example, *Berndsen* (1993) called for a restructuring of wage negotiations as an essential part of a strategy to maintain price stability. *Berk* (1994) suggested that in order to maintain price stability, the Dutch government should limit its own contribution to inflation; i.e. compensate increases in government controlled energy prices, housing rents and prices of public sector services with reductions in indirect taxes. *Berk and Winder* (1994) examined the cointegration of Dutch and German consumer prices. They conclude that "a price shock in The Netherlands is eventually adjusted, in so far as it deviates from that in Germany" (p. 72). Their results might suggest that we can somehow blame inflation on foreign influences.

Almost every student in monetary economics is taught the long-held consensus view that inflation – properly defined as the long run upward drift of the general price level – is primarily a monetary phenomenon. We immediately add that this does not mean that even in the short term every change in prices is or needs to be caused by a change in the supply of money. However, macroeconomic theory and the empirical evidence show that a long-run drift of the general price level cannot occur without accommodation by the monetary authorities.

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It is puzzling, therefore, to observe that economists frequently enter the public debate with only minor reference to the basic monetary aspects of inflation. We take this to mean that one of the three following cases must be true: (1) There merely exists a confusion about *the definition of inflation*. Whereas we emphasize the long-run, secular nature of price changes, other authors frequently use the term "inflation" for all changes in the general price index. We agree that in the short-run changes in the level of the general price index can be traced to a wide range of initial disturbances. These do not, however, constitute a theory of inflation. (2) There may exist *a fundamental disagreement* about macroeconomic theory and evidence. Some authors reject the monetary approach to inflation. For example, post-Keynesian economics provides an entirely different approach, because it is assumed that monetary authorities have absolutely no control over the money supply. This remains, however, a minority view among economists. (3) Because the Netherlands represents a *small open economy* that operates within a fixed exchange rate regime, other authors may have concluded that the monetary approach is an inappropriate framework for policy analysis. After all, does the standard IS-LM type model not suggest that with fixed exchange rates the domestic money supply and inflation are effectively under the control of foreign central banks?

This paper (re)evaluates monetary and non-monetary inflation models for the Netherlands. In particular, we examine whether a P-star model – representing a textbook macroeconomic relationship between money and prices – should be rejected in favour of a popular socio-political model based on cost-push factors. In section 2 we develop and discuss both models. We argue that the P-star model can be used for a small economy with fixed exchange rates and conclude that the P-star model need not be rejected on theoretical grounds. Section 3 presents the empirical results. We show that based on in-sample fit and out-of-sample forecasting the monetary model is not outperformed by the socio-political model. Thus, the P-star model need not be rejected on empirical grounds. Section 4 contains our concluding remarks. Basic monetary economics suggests that we should prefer the monetary inflation model. We conclude with some observations on the political-economy aspects of the public debate on inflation and its determinants. It is our hope that a simple illustration of some stylized facts of macroeconomics will endorse their proper use in the public debate about inflation.

II. P-Star and Socio-Political Models of Inflation

1. The P-Star Model

The P-star model that has recently been (re)introduced by *Hallman, Porter* and *Small* (HPS, 1989) relies on two fundamental concepts: (1) a long-run view of the equation of exchange M.V = P.Q, and (2) the lagged adjustment of prices to their long-run equilibrium level. The equation of exchange states that the general price level P equals the product of money per unit of real output M/Q and the velocity of money V. In the long run, output is assumed to equal the economy's potential or trend output Q*. Furthermore, in the long run, the equilibrium value of velocity V* is assumed to be independent of potential output and the money stock (though not necessarily independent of its rate of change). The actual price level will adjust toward a value consistent with the money stock.[1]

HPS (1989, 1991) define the long-run equilibrium of the price level at time t as the price level that is consistent with the current value of the money stock and the current equilibrium values of velocity and output. We derive two equations: one for the actual price level P and one for the equilibrium value P*

$$p_t = m_t + v_t - q_t \tag{1}$$

$$p_t^* = m_t + v_t^* - q_t^* \tag{2}$$

where lower-case variables p, m, v and q denote the logarithms of the price level, money, velocity and real output. Assume that the actual price level adjusts towards its long run level at a constant rate of adjustment. In addition, because theory does not provide full insight into the dynamics of the equilibrium mechanism, also assume that the rate of price change Δp_t depends on past changes Δp_{t-i}. We derive the general dynamic equation ($\alpha > 0$)

$$\Delta p_t = -\alpha(p_{t-1} - p_{t-1}^*) + \sum_{i=1}^{n} \beta_i \Delta p_{t-i} \tag{3}$$

HPS (1989) applied the P-star approach to the U.S. and concluded that 'Over periods of one year or longer, the model tracks inflationary

[1] *Humphrey* (1989) shows that the P-star model is certainly not a new model, but can be traced as far as the early quantity theorists, for example David Hume (1711 - 76).

developments rather well despite these strong assumptions; over shorter periods, factors outside the model play an important role.' (p. 2) Subsequently, the model has also been empirically tested for other countries (for example, *Hoeller* and *Poret,* 1991; *Kole* and *Leahy,* 1991; *Tödter* and *Reimers,* 1994; *Groeneveld, Koedijk* and *Kool,* 1995), generally with positive results.

So far, derivation of the general model seemed straightforward enough and firmly based on monetary theory. However, we must address some possibly critical elements in the standard P-star model.

a) Dynamic Specification

HPS examined the process of price adjustment in some detail and concluded that a specification using second differences of the price level, or first differences of the rate of change, i.e. $\Delta^2 p_t$, is appropriate for the United States. The use of second differences of the price level may circumvent econometric problems associated with possible nonstationarity of inflation. On the other hand, some authors have criticized the second-difference specification because it results in implausibly long periods of price adjustment and implausible overshooting or cyclical behaviour of price changes (*Tatom,* 1990; *Pecchinino* and *Rasche,* 1990).[2] Simulations by *HPS* (1989) showed that in some cases a shock to the system required adjustment periods of more than 100 years. Recent analyses suggest that the problematic specification in second differences is not an unavoidable component of the P-star model. First, our view on (non)stationarity of inflation is not robust to changes in the sample period. For example, it is highly improbable that 100 or 150 years of U.S. inflation data would return a verdict of nonstationarity. On the other hand, inflation would exhibit very strong nonstationarity if the sample period is dominated by observations from the 1970s. A second consideration is that by now unit-root tests for nonstationarity are known to be of very low power in small samples (for example, see *McCallum,* 1993). It has become common practice to if not ignore the formal econometric results from unit-root tests, then at least qualify the results with proper economic insight. (We find that a level specification for inflation is adequate for the Netherlands in the sample period we use.)

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[2] Exactly what time period constitutes an implausibly long adjustment period is open for debate. Empirical evidence for purchasing power parity indicates that certain price adjustments can take decades.

b) Inflation Expectations

Another critical issue is the implicit treatment of expectations in the proposed adjustment process. Since the Friedman-Phelps critique on traditional Phillips curves, textbook models of price behaviour assume that price changes consist of expected inflation, plus a term capturing unanticipated shocks or price disequilibrium leading to subsequent updating of future expected inflation. The expectations-augmented Phillips curve would be

$$\Delta p_t = \Delta p_t^e + \lambda z_{t-1} \tag{4}$$

where z usually denotes some measure of excess demand.

Price-adjustment models based only on lagged values of price changes and the lagged price gap ($p_{t-1} - p^*_{t-1}$) can rapidly conflict with the hypothesis of rational expectations (at least in its normal textbook interpretation). The adaptive-expectations mechanism used implicitly by *HPS* is optimal only for specific, stationary ARIMA processes (classical reference is *Muth,* 1960).

The standard P-star specification might arguably be most suitable to the case where the m, v and q time-series processes are pure random walks (random walks without drift). It is doubtful whether this is in fact an accurate description. If it is not, rational expectations imply that prices adjust to notions of *future* values of M, V*, and Q* rather than only the current values of M, V*, and Q*. An alternative formulation of the model would then be (compare also *Tödter* and *Reimers,* 1994)

$$\Delta p_t = \Delta p_t^* - \alpha(p_{t-1} - p^*_{t-1}) \tag{5}$$

$$\Delta p_t^* = f(\Delta m_{t+i}, \Delta v^*_{t+i}, \Delta q^*_{t+i}, \ldots) \tag{6}$$

where the expectations of underlying inflation Δp^* depend on expectations of future money growth, future changes in velocity and future changes in potential output.

Set aside for a moment the textbook interpretation of the rational expectations hypothesis, i.e. "perfect foresight with random expectation error". Lagged adjustment processes can be fully consistent with rational economic behaviour if, for example, agents are confronted with fundamental uncertainty about the past, current, and future state of the economy. It is a basic fact that both professional economists and private

agents have only limited information about the relative importance of nominal versus real and temporary versus permanent shocks. Economists can also strongly disagree on appropriate macroeconomic models. This uncertainty must affect the optimal response to new information (for a more thorough exposition of this line of reasoning see for example, *Meltzer,* 1982; *Brunner* and *Meltzer,* 1993; and also *Mussa,* 1975). Lagged adjustment may simply capture an *unavoidable* process of gradual learning about the actual importance of past events.[3]

c) Small Open Economies with Fixed Exchange Rates

One might argue that the P-star model cannot be applied to small open economies where the monetary authorities choose to maintain a fixed exchange rate. In the P-star model the general price level adjusts towards a level consistent with a particular money stock. However, textbook IS-LM models suggest that with fixed exchange rates the money supply becomes endogenous and is no longer available as an independent instrument of monetary policy. Money follows rather than causes price changes. Domestic prices are predetermined by foreign prices, the fixed exchange rate, and the 'law of one price' incorporated in purchasing power parity (equation 7); the interest rate is fixed by the foreign interest rate through (uncovered) interest rate parity (equation 8); and, because the economy tends to fluctuate randomly around its natural rate, the money supply must automatically follow the demand for money (equation 9: income elasticity is unity and c is the intercept of the equation).

$$p_t = p_t^f + e_t \tag{7}$$

$$i_t = i_t^f + E_t(\Delta e_{t+1}), \quad \text{with } E_t(\Delta e_{t+1}) = 0 \tag{8}$$

$$m_t - p_t = c + q_t - \theta i_t \tag{9}$$

Kool and *Tatom* (1994) developed a P-star model for small open economies with fixed exchange rates. They argue that with fixed exchange rates the equilibrium value P* should be derived from a dominant large

[3] Note that this interpretation of lagged adjustments suggests that the adjustment process is unstable. The optimal speed of adjustment is linked to the degree of uncertainty about the economic environment.

country in the exchange rate system (for example, Germany within the EMS). Their results indicate that a foreign-based price gap can indeed outperform the purely domestic price gap in the P-star model.

We accept that a credible fixed exchange rate must act as a long-run constraint on money and prices. But, we argue that there is no reason to discard the P-star model with a domestic price gap as a possible description of price level dynamics. Basically, we dispute that in this case the textbook IS-LM model with only a single interest rate and perfect integration between all goods and financial markets is a relevant model. There are two main points of criticism. First, it is a well-known empirical result that purchasing power parity is not a good description of short-term price behaviour. Purchasing power parity can only be established as a long-run phenomenon (see *Froot* and *Rogoff,* 1994). Therefore, domestic prices are not continuously fixed by foreign prices but can move within some unspecified band around purchasing power parity. This result requires an alternative explanation for the behaviour of domestic prices in the short to intermediate run. Alternatively, one could argue that purchasing power parity only applies to internationally traded goods. Nontradables are however also part of the domestic general price level. Purchasing power parity has therefore some implications for *relative prices,* but is not a complete theory of the *general price level.*

The second point of criticism is that fixing short-term interest rates in accordance with interest rate parity will not automatically stabilize the economy (compare the familiar *Poole* (1970) analysis when money demand shifts dominate the system).[4] Even in the IS-LM model stabilization depends on the shocks to the IS curve. However, perhaps more importantly, since the 1960s, monetarists such as Brunner and Meltzer have argued that the IS-LM analysis ignores disturbances in other finan-

[4] To limit the size of the paper we do not present a detailed model, but refer to other authors. The arguments that follow represent a more or less straightforward application of the monetarist theory of money, credit, output, and prices associated with Brunner and Meltzer (for example, *Brunner* and *Meltzer,* 1993; also see *Bordo, Choudhri* and *Schwartz,* 1987 for some empirical support). Our analysis is also related to the work of *Goodfriend* (1987, 1991) and others on interest-rate smoothing and price level stationarity. Interest-rate smoothing is what remains of traditional fixed-exchange-rate open-economy models once the assumption of continuous purchasing power parity fails. Compared to the IS-LM model, the Brunner-Meltzer analysis allows a wider range of economic disturbances to cause base drift of monetary aggregates and price-level non-stationarity. Compare *Daniels* and *VanHoose* (1995) on base drift and price level stationarity in open economies. *Sephton* (1989) examines consequences of exchange-rate smoothing objectives of monetary authorities.

cial markets. Recently, *Bernanke* and *Blinder* (1988) have rekindled attention for this line of argument, by illustrating the effects of the simple addition of a market for bank credit to the IS-LM model. In short, the alternative story based on imperfect substitution between financial markets is as follows. Like central banks in most other industrial countries, the Dutch central bank uses its leverage over the short-term interest rate as its main policy instrument. In particular, the short-term interest rate is employed to maintain a fixed DMark/Guilder exchange rate. The required interest rate follows directly from interest rate parity vis-à-vis Germany when we set the expected rate of depreciation at zero (ignoring risk premiums). However, whereas the policy related short-term interest rate applies to the market for monetary base or bank reserves, the demand and supply of money as well as the demand and supply of bank credit to the private sector do not depend on this short-term interest rate alone. They depend on the entire spectrum of interest rates, including interest rates on bank loans, rates of return on investments in physical capital, real estate, commodities, gold, etc. In a simple alternative to the IS-LM model, all we need is a second interest rate. Perhaps we can limit our thoughts to a second, long-term interest rate representative of consumption, saving, investment decisions in the real economy.

In this alternative model with more details of different financial markets, the results from the standard IS-LM model tend to break down. The central bank must accommodate any increase in the demand for reserves in order to stabilize the short-term interest rate around its target predetermined by the commitment to fixed exchange rates. Inflationary booms can start from disturbances in a wide range of real and financial markets. Important is that money and credit can expand to finance inflationary booms, even when the demand for money is stable. The monetary approach to inflation states that money growth in excess of the economy's long-run growth potential ultimately causes the general price level to drift upward. In the long run, a gap between domestic and foreign prices will result in current-account problems and probably a speculative attack in the foreign-exchange market. Purchasing power parity is however a long-run constraint and cannot be employed as a short-term anchor for domestic prices.

We conclude that with fixed exchange rates the central bank loses its instrument(s) to control the growth rate of the money stock. The short-term interest rate that corresponds to a short-run target for the exchange rate need not coincide with the interest rate that corresponds to long-run inflation objectives for the domestic economy. More elaborate models

allow the growth rate of money still to be a primary determinant (and at least necessary requirement) for the drift in the general price level. Therefore, it is legitimate to at least evaluate the empirical relevance of the P-star model.

2. *The Socio-Political Model*

According to the socio-political view inflation results from processes largely exogenous to economic markets. Social groups compete to capture larger shares of national income. Conflicting expectations and conflicting views about the distribution of national wealth cause social unrest and increase militant behaviour of workers and their labour union representatives. The conflict over income distribution and differences in expected future inflation lead to upward pressure on wages. Price inflation results from the wage-push hypothesis: prices are set by a more or less fixed mark-up over unit labour costs and are automatically accommodated by an endogenous money supply beyond the control of monetary authorities.

As more or less representative for the socio-political approach to inflation, we propose a small model that consists of a wage equation (10), a price equation (11) and a price expectations hypothesis (12).[5]

$$\Delta w_t = a_0 + a_1 \Delta p_t^e + a_2 U_t + a_3 MIL_t + a_4 Z_t^w \tag{10}$$

$$\Delta p_t = b_0 + b_1 \Delta x_t + b_2 \Delta im_t + b_3 \Delta w_t + b_4 Z_t^p \tag{11}$$

$$\Delta p_t^e = E[\Delta p_t \mid \Omega_{t-1}] \tag{12}$$

The wage equation contains the expected rate of price changes Δp^e, unemployment rate U, labour-union militancy MIL and a vector of other determinants Z^w. The direct influence of workers and labour unions on wage-price inflation is frequently represented by an index of labour militancy

[5] There exists no single theoretical framework for the socio-political model, and therefore *the* socio-political model as such does not exist. Within the constraints of this paper we cannot offer an extensive review of all possible approaches. A wide range of possibilities exist for different assumptions about workers' behaviour, trade-union policy and objectives, wage-bargaining functions, etc. For more details on socio-political models we refer to, for example, *Laidler* and *Purdy* (1974), *Laidler* (1976), *Gordon* (1981), *Addison* and *Burton* (1984), *Nickell* (1987), and *Schnabel* (1990). *Keizer* (1982) is a traditional reference for the socio-political model in the Netherlands. Further references to research on wage models and their relationship with economic performance can be found in the surveys by *Bean* (1994) and *Nickell* (1990).

(see for example *Schnabel,* 1990). In the literature we find three indices: membership of labour unions (in absolute numbers or relative to labour force), labour disputes or strikes (number of strikes or working days lost), and dummy variables. Other studies have attempted to introduce more details of the process of wage determination by adding explanatory variables such as changes in tax rates, contributions to social security, hysteresis in unemployment, etc. These variables are regarded as typical wage bargaining factors, highly relevant for wage determination when an economy is characterized by centralized wage negotiations between employers' organizations and labour unions. In the socio-political model of inflation these factors also enter the reduced form equation for price changes. Much research has been done on the best way to include effects of unemployment and forward shifting of tax burdens. The evidence is not conclusive. The scope of this paper does not allow us to initiate our own extensive specification search for the best wage equation. We did experiment a little, but other than that we think our specifications conform to "best practice" exemplified in other studies.

The price equation contains the growth rate of labour productivity Δx, the rate of change of import prices Δim, the rate of change of wages Δw, and also a vector of other price determinants. For example, unemployment can also enter the price equation because mark-up behaviour of firms depends on the state of the economy.

Expectations are frequently assumed to accord with the rational expectations hypothesis: the expected rate of change of prices equals the actual rate of change, plus or minus a serially uncorrelated forecasting error with expectation zero. We have argued above that this hypothesis is almost certainly too strong in reality, because the presence of fundamental uncertainty forces economic agents to learn gradually about current and past economic shocks and future developments. A combination of fundamental economic uncertainty and rational behaviour tends to result in extrapolation or partial adjustment. This means that lags of price changes and other variables enter the price equation.

A general reduced form equation for price changes can then be written as

$$\Delta p_t = c_0 + c_1 \Delta p_{t-1} + c_2 \Delta x_t + c_3 \Delta im_t + c_4 U_t + c_5 MIL_t + c_6 Z_t \tag{13}$$

Before we can turn to the empirical results for both the P-star and socio-political models, we must first address some critical issues from the socio-political model.

a) Necessary Monetary Validation in Cost-Push Theories of Inflation

Addison and *Burton* (1984, p. 113) state that 'Sociopolitical analysis may in some ways be seen as a reincarnation of cost-push analysis in suitably modified form.' In an earlier review article on the demise of "demand-pull" and "cost-push" in inflation theory they concluded that, given that monetarists have clearly demonstrated the empirical link between money and prices in the long run, socio-political analysis must provide a rationale for the accommodative monetary policy. One strand of the economic literature (post-Keynesian or radical-Keynesian) strongly denies that monetary authorities have any control over the money supply. The empirical evidence on the link between monetary policy actions, changes in the money supply, and subsequent economic results strongly contradicts this view.

A more fruitful approach then is to conclude that, for a given set of political and institutional parameters, the socio-political model provides a theory on some social determinants of monetary policy. Of course, without monetary accommodation changes in real wages can only affect the distribution of income among labour income and profits. High real wages result in unemployment and unemployment induces market pressures to return real wages to labour market equilibrium values.

b) Measuring the Exogenous Wage-Push Factor

Some previous studies of the socio-political model have tested the influence of labour union militancy variables on prices (most recently, *Schnabel,* 1990). A typical result is that the indices constructed to measure militancy do not yield correct and significant coefficients in wage and price equations. It is likely, therefore, that straightforward hypothesis testing would lead to a quick rejection of the socio-political model. These empirical results would not rule out, however, that trade unions are able to exert a significant wage push that is not accounted for by the militancy variables.[6]

Problems with traditional measures of labour union militancy present us with a serious data problem. We cannot simply enter current wages as a determinant of current prices, because lagged and contemporaneous correlation between wages and prices is perfectly consistent with ver-

[6] See *Ward* and *Zis* (1974), *Laidler* and *Purdy* (1974) and *Schnabel* (1990) for criteria and a review of different indices.

sions of both monetary and socio-political models of inflation. There exists then a problem of observational equivalence.

In our empirical analysis below we examine two alternative measures of exogenous wage pressure, denoted by w*. Our first hypothesis is that inflation could result from persistent attempts by labour to raise expected real wages in excess of expected productivity gains.

$$\Delta w_t^{*,1} = \Delta w_t^e - \Delta p_t^e - \Delta x_t^e$$

Our second hypothesis is that inflation could result from the fact that in the previous period nominal wages increased more than prices. As a result, real wages have increased and, if not compensated by gains in labour productivity this year, firms will attempt to raise prices and reclaim their profit share of production.

$$\Delta w_t^{*,2} = \Delta w_{t-1} - \Delta p_{t-1}$$

In the next section we compare the in-sample and out-of-sample performance of our alternative inflation models.

III. Empirical Results

1. The P-Star Model

To estimate the P-star model we need long-run equilibrium values of real activity Q* and velocity V* to construct a measure of the long-run equilibrium level of prices P*. A standard approach to obtain values for Q* is to fit a moving-average trend to actual values of Q: we use the Hodrick-Prescott (HP) filter as a standard way of handling stochastic trends.[7] Using a mechanical approach to estimate long-run equilibrium values for the velocity of money is a much more contestable exercise. Theory and empirical research suggest two fundamental long-run determinants of money velocity: institutional developments (*Bordo* and *Jonung,* 1987), and inflation or nominal interest rates (see for example

[7] We used the HP filter with $\lambda = 100$. Although the HP filter is a popular way of handling nonstationary series, its use is not without controversy. The choice of λ is arbitrary. The HP filter, like every moving-average type filter, results in misleading analyses when applied to time series with permanent shifts in the level or significant changes in trends. More advanced statistical techniques such as the Kalman filter offer solutions (for example, see *Bomhoff,* 1994). Other estimates of potential or trend output can be derived from production functions, capacity utilization, actual and natural rates of unemployment.

Lucas, 1988).[8] It is possible that the influence of institutional developments can be described by mechanical time trends; however, inflation most probably not, because as a monetary phenomenon it is a policy variable. One option then would be to estimate long-run velocity using a time trend, an estimate of future (trend) inflation, and a possible correction for the differential between Dutch and German interest rates. This last factor should then capture short-run disturbances in velocity which are due to currency substitution in a system of fixed exchange rates such as the EMS. The actual approach taken in this paper is to use the HP-filter. Besides being a reasonably flexible filter, the HP-filter has the additional benefit that it yields stationary price, velocity and output gaps for the P-star analysis.

To estimate the P-star model we use annual data for real and nominal GNP. The money stock is the broad money definition from the International Monetary Fund's International Financial Statistics which includes currency, sight deposits, time deposits and savings deposits and is comparable to the M3 definition. (The data and a separate data appendix are available from the authors upon request.)

Table 1 presents the estimates of the P-star model for the period 1953 - 1992. This period is a sizable extension of the annual dataset used in *Hoeller* and *Poret* (1991) and *Kool* and *Tatom* (1994). The first column presents the basic equation.[9] The price-gap variable is significant and appears with the correct negative sign necessary to achieve the error correction mechanism. The other columns in table 1 introduce additional explanatory variables to account for exogenous and temporary disturbances. The second column introduces the lagged change in the relative price of energy (PE). Columns 3 and 4 introduce the difference between short-term (KR) and long-term interest rates (LR) in the Netherlands and Germany.

The results for the two interest-rate differentials deserve some further evaluation. Our initial reason to include interest-rate differentials was to capture the effects of, mostly short-term, money and capital movements

[8] It is nearly impossible to separate institutional trends in velocity from trends in money demand due to (permanent) real income or wealth (compare *Kole* and *Leahy,* 1991; *Tödter* and *Reimers,* 1994). We choose to emphasize the institutional approach.

[9] The *HPS* (1989, p. 11 - 12) test for the specification in first or second differences of the price level rejects the use of second differences.

$$\begin{array}{lllll} \Delta^2 p_t = & 1.172 & - \; 0.277 \; (p_{t-1} - p^*_{t-1}) + & 0.047 \; \Delta^2 p_{t-1} - & 0.262 \; \Delta p_{t-1} \\ & (2.27) & (-3.08) & (0.39) & (-2.58) \end{array}$$

$$R^2 = 0.27 \quad SE = 1.656 \quad DW = 2.11$$

or currency substitution between Germany and the Netherlands. If currency substitution is a serious problem it would distort money velocity and therefore our measure of p^*. We found that it is the long-term interest rate differential with Germany that is important for Dutch price changes. We expected currency substitution effects to be largely associated with short-rate differentials, but we know that estimates of money demand equations tend to favour the long-term interest rate. Because long-term interest rate differentials reflect mainly (expected) inflation differentials we could also attribute the interest-rate effect to the required cointegration of Dutch and German prices. This would make our model a special version of the model in *Kool* and *Tatom* (1994). We do attach, however, some importance to the possibility that interest rates provide a closer view on *expected* inflation, which potentially captures more than the purely mechanical operation of purchasing power parity.

Overall, we select the model in column 4 as our best fit for the Dutch P-star model. Several specification tests were employed. The model does not exhibit significant serial correlation of residuals. White and ARCH tests for heteroscedasticity remained insignificant. A CUSUM squared test did not suggest problems with structural breaks in the equation.

2. *The Socio-Political Model*

Table 2 presents our estimates of the socio-political model. The first two columns of table 2 present simple OLS estimates of what we could call the structural equations of the socio-political model.[10] Column 1 of table 2 contains the price change equation. Most of the results carry straightforward interpretations. Prices adjust with a lag, are negatively related to gains in labour productivity which reduce unit labour costs, and are positively related to import prices and wage costs. Unemployment and changes in taxes and social security contributions do not contribute to the explanation of price changes. We examined whether the change in the unemployment rate or the level of the unemployment rate should be included. The level of the unemployment rate carried a lower

[10] We are not unaware of possible simultaneous equation bias. In this respect the estimates must surely be viewed with caution. According to econometric theory instrumental variables or TSLS provide a solution to simultaneous equation bias. In practice instrumental variables estimators exhibit poor finite-sample performance because we lack a suitable method to judge instrument relevance. We checked our results with TSLS, assuming all variables to be exogenous except current prices and wages. Substituting one lag of prices and wages as instruments did not qualitatively change the results in table 2.

Table 1

OLS estimates of the P-star model for the Netherlands, 1953 - 1992[a]

	(1) Δp_t	(2) Δp_t	(3) Δp_t	(4) Δp_t	(5) Δp_t
constant	1.104	1.311	1.301	1.045	1.001
	(2.30)	(2.77)	(2.72)	(2.25)	(2.13)
$(p - p^*)_{t-1}$	-0.285	-0.269	-0.272	-0.314	-0.312
	(3.31)	(3.23)	(3.23)	(3.86)	(3.88)
Δp_{t-1}	0.752	0.709	0.711	0.728	0.728
	(7.97)	(7.63)	(7.57)	(8.22)	(8.17)
Δpe_{t-1}		0.023	0.023	0.025	0.025
		(2.04)	(2.01)	(2.27)	(2.30)
$(KR^{nl} - KR^{es})_{t-1}$			0.079		0.119
			(0.56)		(0.75)
$(LR^{nl} - LR^{es})_{t-1}$				-0.400	-0.489
				(2.23)	(2.27)
Regr.stat.					
Adj R^2	0.65	0.68	0.67	0.71	0.71
S.E.	1.637	1.571	1.586	1.490	1.500
D.W.	2.05	1.90	1.92	1.99	2.01
LM4 Prob	0.362	0.079	0.094	0.220	0.241
ARCH4 Prob	0.291	0.790	0.785	0.949	0.721

a Absolute t-values in parentheses. The dependent variable is the log rate of change of the implicit GNP deflator.

level significance. Including the change in the unemployment rate is consistent with the results for our wage equation and corresponds to results in other studies.

Column 2 contains the wage equation. It appears that wages do not adjust with a lag. Nominal wages incorporate full compensation for price increases: we cannot reject the hypothesis that the coefficient of nominal wage changes with respect to price changes is one. Therefore, column 2 is essentially a real wage equation. Real wages incorporate part of the gain in labour productivity and are negatively related to unemployment. A feature that returns in all our estimates is that there appears to be no significant forward shifting of taxes and social security contributions. Our findings therefore contradict results reported in other studies of Dutch wages (for example, *Knoester* and *van der Windt,* 1987; *Graafland,* 1992; current macroeconomic models of the Dutch Central Planning Bureau). On the other hand, insignificant coefficients are not

uncommon in the literature (for example, *Bean, Layard* and *Nickell,* 1986; *Graafland,* 1990). One explanation for our findings might of course be that we simply used different definitions for prices and/or taxes and that these differences show to be significant. A different explanation cen-

Table 2

OLS estimates of the socio-political model for the Netherlands, 1953 - 1992[a]

	(1) Δp_t	(2) Δw_t	(3) Δw_t	(4) Δw_t		(5) [b] Δp_t	(6) [c] Δp_t	(7) Δp_t	(8) [c] Δp_t
constant	0.282	0.012	-0.521	-0.470	constant	0.976	0.958	1.043	0.868
	(0.70)	(0.02)	(0.64)	(0.61)		(1.61)	(1.70)	(1.63)	(1.88)
lag dep.	0.342	0.072	0.013	0.032	lag dep.	0.608	0.536	0.163	0.550
	(3.89)	(0.54)	(0.10)	(0.24)		(4.83)	(4.50)	(0.89)	(5.76)
Δx_t	-0.214	0.482	0.469	0.428	Δx_t	0.227	-0.004	0.006	
	(2.17)	(2.88)	(2.68)	(2.54)		(1.51)	(0.03)	(0.04)	
Δim_t	0.052	-0.007	0.011	-0.009	Δim_t	0.112	0.121	0.112	0.122
	(1.85)	(0.12)	(0.18)	(0.17)		(2.70)	(3.16)	(3.12)	(3.35)
ΔU_t	0.165	-0.635	-0.342	-0.504	ΔU_t	0.048	0.015	0.000	
	(1.03)	(2.41)	(1.05)	(1.85)		(0.19)	(0.06)	(0.00)	
ΔTAX_t	0.057	-0.060	0.051	-0.007	ΔTAX_t	0.135	0.056	0.048	
	(0.59)	(0.33)	(0.27)	(0.04)		(0.90)	(0.39)	(0.32)	
Δw_t	0.451			. . .	$\Delta w_t^{*,1}$	0.317			
	(7.63)					(2.23)			
Δp_t		1.157	1.139	1.188	$\Delta w_t^{*,2}$		0.359		0.364
		(5.35)	(4.86)	(5.58)			(3.26)		(3.68)
Sd_t			-0.003	. . .	Δw_{t-1}			0.370	
			(1.31)					(3.14)	
Sn_t			0.024	0.018	Sn_t			-0.003	
			(1.84)	(1.53)				(0.29)	
ΔD_t			0.219	. . .					
			(0.92)						
ΔT_t			-0.212	. . .					
			(0.35)						
Regr.stat.									
Adj R^2	0.86	0.77	0.77	0.78		0.66	0.70	0.69	0.72
S.E.	1.052	1.918	1.891	1.880		1.629	1.520	1.542	1.459
D.W.	2.07	1.61	1.72	1.69		2.34	2.37	2.33	2.41
LM4 Prob	0.537	0.595	0.885	0.897		0.183	0.516	0.539	0.431
ARCH4 Prob	0.130	0.849	0.489	0.489		0.999	0.585	0.591	0.606

Notes. [a] Absolute t-values in parentheses. [b] Wage pressure on prices $\Delta w^{*,1}$ equals current nominal wage growth in excess of expected price change and expected productivity gains. Expectations accord to rational expectations hypothesis and thus are proxied by actual values. [c] Wage pressure on prices $\Delta w^{*,2}$ equals last year's nominal wage growth in excess of last year's price change.

tres on sample periods and time series characteristics. When we examined our tax-rate variable we found that for the period 1958 - 1975 both inflation and the tax rate exhibited an upward sloping trend. However, whereas inflation measured by the implicit GNP deflator dropped sharply between 1975 and 1987, the tax rate remained approximately stable between 1975 and 1988 - 89. These observations suggest spurious regression problems in shorter sample periods.

According to the socio-political model labour militancy is an important determinant of wages and prices. We examined five indices of labour union militancy: the percentage rate of change of labour union membership (ΔT), membership of labour unions relative to labour force (levels D, changes ΔD), number of strikes (Sn) and working days lost due to strikes (Sd).[11] If these indices of labour union militancy are measures of the same phenomenon, we expect the indices to exhibit a high degree of positive correlation. This is not the case however. Only in one case does the correlation coefficient between indices of militancy exceed 0.5.

We note that labour union membership tends to fall when unemployment is higher. We also note that strike activity measured by Sn is lower when unemployment is higher. These correlations indicate that it may be very difficult to distinguish between the influence of labour union militancy and normal labour market pressure on (real) wages when we consider only their coefficients in the wage equation. Moreover, our results

Table 3

Correlation coefficients for indices of labour-union militancy, 1953 - 1992

	D	ΔD	Sn	Sd	U	ΔU
ΔT	0.225	0.721	0.174	0.047	-0.517	-0.454
D		0.309	0.354	0.035	-0.889	0.146
ΔD			0.041	-0.087	-0.472	-0.390
Sn				0.371	-0.450	-0.323
Sd					-0.077	-0.032
U	...	...	...	...	...	0.137

11 We discarded the absolute level of labour union membership (T) because it is a seriously nonstationary variable. Moreover, the activity of unions related to year to year changes in wage rates is more likely to be reflected in the rate of change of membership than its absolute level.

are consistent with a relationship running from business restructuring with higher unemployment, to fewer protest strikes and lower (real) wage increases. The results do not support the alternative view that more strikes raise real wages and cause higher unemployment, because the actual correlation between strike activity and unemployment is negative.

The extended wage equation in column 3 does not yield significant coefficients for the labour union militancy indices. Only the number of strikes Sn yields a marginally significant coefficient that carries the correct sign. We also observe however that because of multicollinearity the militancy variables reduce the significance of the unemployment rate.

The estimates indicate that wage changes are the most important explanatory variable for prices (column 1). We have indicated before that the results cannot tell us whether these results should be interpreted in terms of a monetary model where nominal wages are only part of a general transmission mechanism, or whether wages represent an independent cost-push element associated with socio-political models of inflation. Columns 5 to 8 of table 2 contain quasi-reduced-form equations for prices. In each column we slightly redefine our measure of wage pressures on prices and attempt to obtain additional information on wage-price behaviour. In column 5 the hypothesis is that inflation could result from persistent attempts by labour to raise expected real wages in excess of expected productivity gains: $\Delta w_t^* = (\Delta w_t^e - \Delta p_t^e - \Delta x_t^e)$. The estimates provide some support for this view. If we assume that expectations accord with the rational expectations hypothesis we find that prices do indeed react positively to excess wage claims. In column 6 the hypothesis is that firms raise prices because in the previous period nominal wages increased more than prices: $\Delta w_t^* = (\Delta w_{t-1} - \Delta p_{t-1})$. Therefore, real wages have increased and if not compensated by gains in labour productivity this year, firms will attempt to raise prices and reclaim their profit share of production. This interpretation of wage-price behaviour is supported by the significant coefficient of the lagged real-wage change. We would have liked to see a significant coefficient for labour productivity in this case. Although labour productivity enters the price equation with the correct negative sign its coefficient is not significantly different from zero. One interpretation could be that, in fact, lagged changes in real wages do correctly anticipate or otherwise induce future gains in labour productivity.

In column 7 we examine whether we can identify independent effects of militancy variables on prices. If, according to the socio-political

model, labour militancy is an important determinant of wages militancy variables should also be an important explanatory variable for prices. Clearly, there is no such effect on prices.

Overall, we select the model in column 6 as the best model and representative of the socio-political approach to inflation. However, in column 8 we eliminate the insignificant variables for labour productivity and the tax burden. Furthermore, despite its strong theoretical appeal, we also choose to eliminate unemployment from the final model. For the shorter period 1953 - 1982, the estimated effects of unemployment are implausible in the context of the normal wage model (yielding a marginally significant, positive coefficient) and the out-of-sample results for an equation that included unemployment were worse than an equation without unemployment effects. In the socio-political model the unemployment rate functions as a measure of the bargaining strength of labour. Higher unemployment lowers union power, moderates wage claims and should therefore imply lower rates of price changes. The estimated positive correlation between unemployment and inflation is of course typical for "stagflation" in the 1970s and can be interpreted as showing the influence of aggregate supply side shocks to the macroeconomy. The positive correlation can also be a manifestation of insider-outsider problems in the labour market. According to the insider-outsider theory of unemployment, insiders (workers being employed and therefore inside the firm) can claim large wage increases, but at the expense of more unemployment and without outsiders (workers unemployed and therefore outside the firm) having any mitigating influence on wages which would allow them to return to employment at competitive (lower) real wage levels. In this case, outsiders become part of what is alternatively labelled the structural, natural or the non-accelerating-inflation rate of unemployment.

3. An Evaluation of the P-Star and Socio-Political Models

a) In-Sample Evaluation

Figures 1a and b show the actual and fitted price changes from the two rival inflation models. Their explanatory value as measured by the adjusted R-squared is basically the same: 0.71 for the P-star model (table 1, column 4) and 0.72 for the socio-political model (table 2, column 8).

So-called J-tests can be employed to test whether one rival model contains information over and above the information contained in another

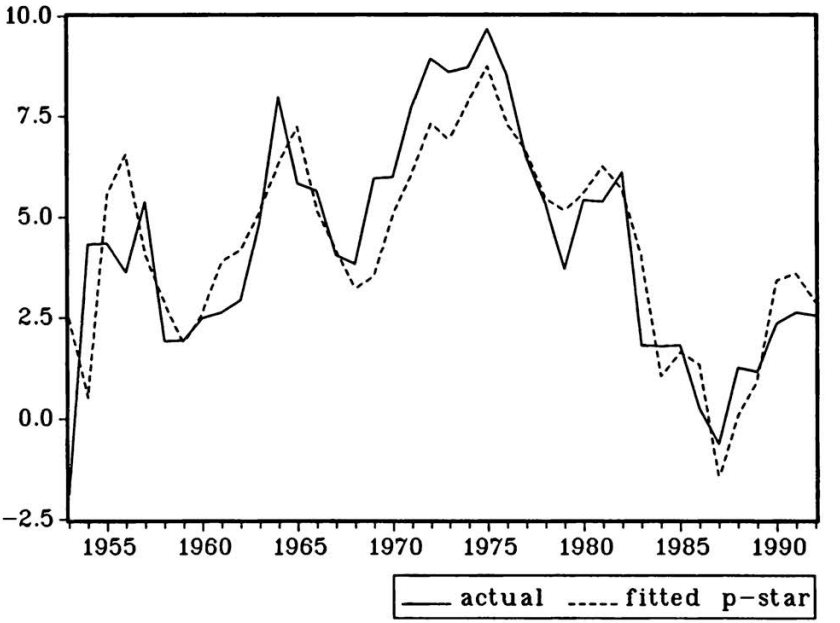

Figure 1a: Actual and fitted inflation from the P-star model (table 1, column 4), 1953 - 1992.

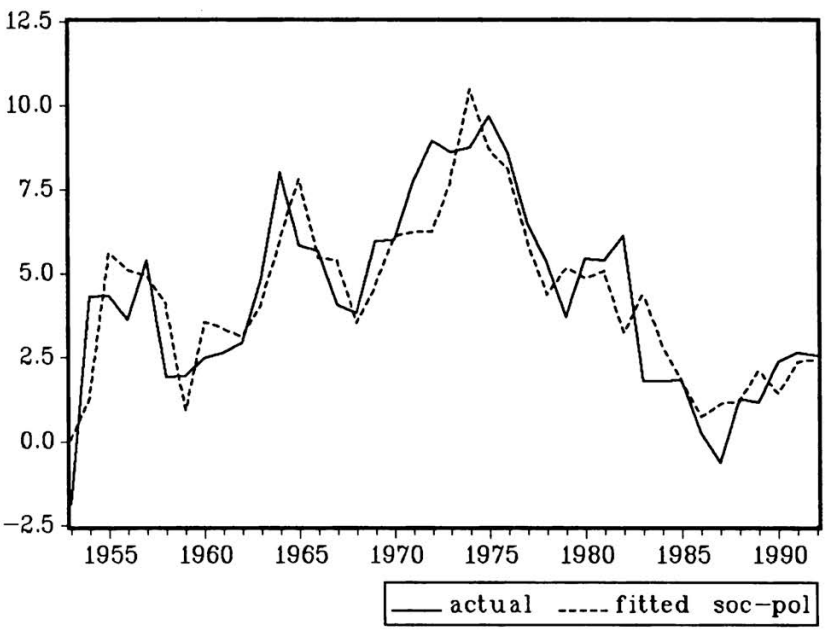

Figure 1b: Actual and fitted inflation from the socio-political model (table 2, column 8), 1953 - 1992.

model. The test consists of adding fitted values from one rival model as an explanatory variable to the other model. The null hypothesis of not rejecting model i in favor of model j is tested by examining the t-values for the coefficient of fitted values of model i in model j. If the coefficient of fitted values from model i is significantly different from zero, we conclude that model i is not rejected by model j.

If the null hypothesis is that the P-star model (j) does not reject the socio-political model (i), the t-value for g_i for the full sample 1953 - 92 is 3.60 and we accept the null-hypothesis. Equally, the null hypothesis that the P-star model (i) cannot be rejected by the socio-political model (j) is also accepted with a t-value for g_i of 2.77.

An alternative test statistics is based on the Davidson-MacKinnon encompassing test. Fitted values $yfit_1$ and $yfit_2$ from 2 rival models are used as regressors to explain actual values of inflation:

$$y = \delta yfit_1 + (1 - \delta) yfit_2.$$

If model 1 is true (false), then the true value of δ is one (zero). The coefficient for the fitted values of the P-star model is 0.419 with a t-statistic of 2.39. The coefficient for the fitted values of the socio-political model is 0.596 with a t-statistic of 3.42.

These results attribute about equal weight to both models. It appears that for the period 1953 - 92 neither model is able to reject the other as an adequate description of price behaviour.

Table 4

In-sample tests of rival inflation models, 1953 - 92

	J-tests inflation model		Encompassing test
	PSTAR	SOCPOL	
FITPSTAR		0.574	0.419
(t-value)		(2.77)	(2.39)
FITSOCPOL	0.760		0.596
(t-value)	(3.60)		(3.42)

b) Out-of-sample evaluation

Another way to compare alternative models is to examine their relative out-of-sample performance. We re-estimated both models for the shorter period 1953 - 1982 and obtained the equations

$$\begin{array}{lllll} \Delta p_t = & 0.910 - & 0.339\ (p - p^*)_{t-1} + & 0.764\ \Delta p_{t-1} + & 0.027\ \Delta pe_{t-1} - \\ & (1.06) & (3.11) & (5.71) & (1.62) \end{array} \quad \begin{array}{l} 0.412\ (LR^{nl} - LR^{du})_{t-1} \\ (1.57) \end{array}$$

$$Adj\ R^2 = 0.59 \quad S.E. = 1.630 \quad D.W. = 2.04$$

(14)

$$\begin{array}{lllll} \Delta p_t = & 1.387 + & 0.511\ \Delta p_{t-1} + & 0.118\ \Delta im_t + & 0.318\ \Delta(w - p)_{t-1} \\ & (1.99) & (4.17) & (2.63) & (2.85) \end{array}$$

$$Adj\ R^2 = 0.63 \quad S.E. = 1.540 \quad D.W. = 2.15$$

(15)

If we include the change in the unemployment rate in the socio-political model its coefficient for the 1953 - 1982 period is +0.448 (t-statistic 1.43). We suggested above that this "stagflation"-type of result appears to contradict the theoretical interpretation of the unemployment rate in the socio-political model. For this reason we ignore the strong theoretical appeal to include unemployment effects on wages and prices. (We provide some results but only for comparison.)

Figure 2 presents the actual and fitted price changes in the out-of-sample period 1983 - 1992 (using actual values for the explanatory variables). Both models explain the general time pattern of price changes. On average, however, the out-of-sample prediction errors of the P-star model are better than those of the socio-political model. Mean absolute error and root mean squared error of the P-star prediction errors are lower. We find that the mean prediction error of the socio-political model is significantly different from zero and therefore biased.

We can formally test whether the prediction errors of one model can be explained by predictions from another model. The prediction errors of model i are regressed on $(f_t^j - f_t^i)$, the difference between the predictions from model j and i

$$\epsilon_t^i = \beta_{ij}\,(f_t^j - f_t^i) + u_t.$$

We conclude that model i provides better predictions than model j if β_{ij} is not significantly different from zero, while at the same time β_{ji} does differ significantly from zero. With P-star as model (i) and socio-

Table 5

Summary of out-of-sample prediction errors

Mean error (MEAN), mean absolute error (MAE) and root mean squared error (RMSE), 1983 - 1992

	MEAN	MAE	RMSE
P-star model	1.580	0.988	1.185
Socio-political model (incl. ΔU_t)	2.676 (2.398)	1.211 (1.242)	1.520 (1.792)

Table 6

Out-of-sample J-tests

	P-star errors β_{ij}	Socpol errors β_{ji}
coefficient	-0.357	-0.643
(t-statistic)	(1.90)	(3.43)

political model being model (j), the t-value for β_{ij} is 1.90 and for β_{ji} the t-value is 3.43. We conclude that the out-of-sample performance of the P-star model is significantly better than the out-of-sample performance of the socio-political model.

IV. Concluding Remarks

Contrary to the monetary approach to inflation emphasized in economic textbooks, most of the public debate about (the prevention of higher) inflation usually refers to wage costs, public sector price increases, etc. This is puzzling because monetary economics refers to this line of thinking as the cost-push myth (see for example *Batten*, 1981). The essence of the well-known statement "inflation is a monetary phenomenon" is that inflation, defined as the long run upward drift of the general price level, cannot occur without a corresponding increase in money. The basis for this statement rests in the strong relationship between money and prices which has long been established. Because central banks are able to control the rate of growth of money, if and when they really want to, they must bear the primary responsibility for inflation.

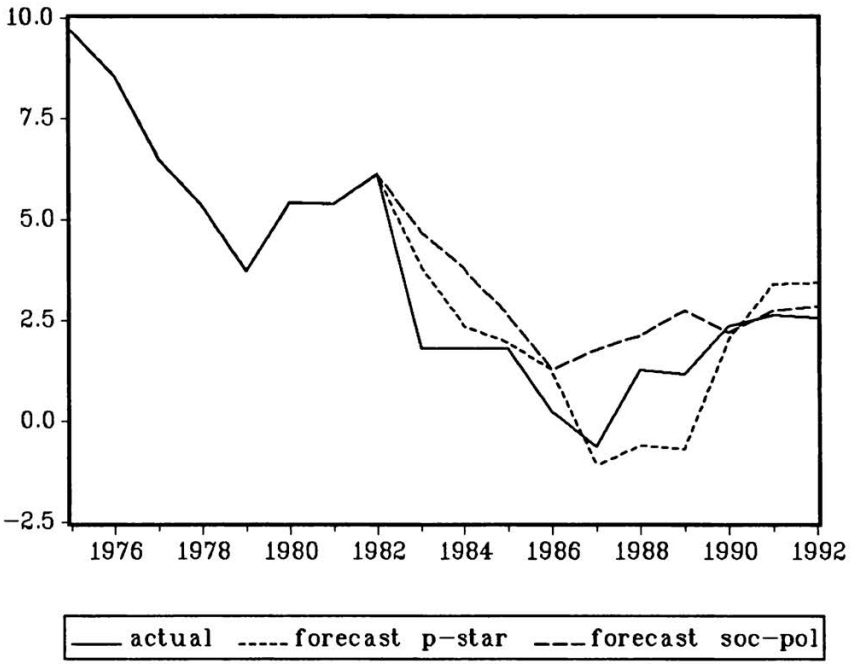

Figure 2: Actual price changes and out-of-sample forecasts from the P-star and socio-political models, 1983 - 1992.

Within the European Monetary System of fixed exchange rates, the Dutch central bank has effectively relinquished control over its monetary instruments to the German Bundesbank. Standard macroeconomic theory informs us that if the objective of a fixed exchange rate is to remain credible, inflation in the Netherlands must ultimately equal inflation in Germany.[12] The mechanism through which this occurs is the adjustment of Dutch interest rates and money growth consistent with the existing demand for money. We have argued that fixed exchange rates and purchasing power parity act only as a long-run constraint on prices. Imperfect integration between real and financial markets means that we still need a domestic explanation for price behaviour in the short to intermediate period. Our critical evaluation of the textbook IS-LM

[12] The implicit assumption being that the Dutch and German economies are similar with respect to import/export or tradable/nontradable goods baskets and similar with respect to productivity growth in these sectors.

model allows us to employ the P-star model with the domestic price gap, even for a small open country.

We do not suggest that the P-star model is the best model for inflation that can be derived from the long history of monetary economics. Nor have we attempted extensive search operations to find the best general model for inflation. Nevertheless, having examined the empirical content of the P-star model for the Netherlands, we find no reason to discard this monetary model in favour of a socio-political model based on notions of cost-push inflation. A major advantage is that the P-star model does emphasize, on the basis of other research we think correctly, the basic monetary content of the inflationary process (among others, we refer to *Laidler* and *Parkin,* 1975; *Gordon,* 1981; and more recently, *Parkin,* 1993; *Bomhoff* 1993). For a helpful insight into the role of wages and other cost factors we like to give the following quote from *Bomhoff* (1993):

> 'the rate of growth of the money supply is correlated with the rate of inflation, but usually with a long and variable lag. Hence, in a forecasting context, it is likely that regressions of inflation on current or immediate past rates of change in prices, wages and other cost factors together with measures of demand in the goods or labor markets will produce more explanatory power. This explains why professional forecasters tend to emphasize cost factors and the state of "excess demand" rather than monetary developments.'

Finally, we can fully agree with other authors about the concern for autonomous increases in wage costs, autonomous increases in public sector prices, and the interaction between domestic and foreign prices in a system of fixed exchange rates. The political-economy aspects of this debate must however be clearly spelled out. With a fixed target for exchange rates, the monetary authorities must achieve certain key (long-run) equilibrium conditions: i.e. interest rate parity and purchasing power parity. When excessive wage demands and large public sector price rises threaten to create upward pressures on the general price level, the monetary authorities face a difficult challenge. One option is to raise their short-term interest rate in an early stage to prevent an automatic monetary accommodation of inflation, which would conflict with purchasing power parity in the long run. The likely consequences are two-fold. A restrictive monetary policy to reverse upward price pressures is likely to carry short-run economic costs in terms of a small (growth) recession. At the same time, by increasing interest-rate differentials the monetary authorities risk losing out on their short-term exchange rate objective (unless the interest-rate differential matches perfectly an increase in risk premiums associated with the possibility of future de-

valuation). The second option is not to change interest rates and concentrate on the short-term exchange rate objective, hoping therefore that the shocks to the economy will reverse themselves in the future. In this alternative, the central bank accepts the risk of future speculative attacks on the currency, once it becomes clear that economic shocks have not reversed themselves and the prospect of a devaluation or a recession is near. In a political context it is clear that any central bank should want to shift or at least share responsibility with other parties by highlighting their role in price changes.

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Summary

Monetary and Non-Monetary Analyses of Inflation in a Small Open Country

This paper (re)evaluates monetary and non-monetary inflation models for the Netherlands. In particular, we examine whether a P-star model – representing a textbook macroeconomic relationship between money and prices – should be rejected in favour of a popular socio-political model based on cost-push factors. We argue that the P-star model can be used for a small economy with fixed exchange rates and conclude that the P-star model need not be rejected on theoretical grounds. We also show that based on in-sample fit and out-of-sample forecasting the monetary model is not outperformed by the socio-political model. Thus, the P-star model need not be rejected on empirical grounds. Basic monetary economics suggests that we should prefer the monetary inflation model. We conclude with some observations on the political-economy aspects of the public debate on inflation and its determinants.

Zusammenfassung

Monetäre und nichtmonetäre Inflationsanalysen in einem kleinen offenen Land

Dieser Beitrag hat eine (erneute) Bewertung von monetären und nichtmonetären Inflationsmodellen für die Niederlande zum Gegenstand. Insbesondere untersuchen wir, ob ein P-sternförmiges Modell – das für eine lehrbuchmäßige makroökonomische Beziehung zwischen Geld und Preisen steht – zugunsten eines populären sozio-politischen, auf Kostendruckfaktoren beruhenden Modells abgelehnt werden sollte. Wir sind der Ansicht, daß das P-sternförmige Modell auf eine kleine Volkswirtschaft mit festen Wechselkursen angewendet werden kann, und wir sind zu der Schlußfolgerung gelangt, daß das P-sternförmige Modell aus theoretischen Gründen nicht abgelehnt zu werden braucht. Wir beweisen ebenfalls, daß nach auf der Grundlage geeigneter Stichproben sowie außerhalb der Stichprobe erstellten Prognosen das sozio-politische Modell dem monetären Modell qualitativ nicht überlegen ist. Aus empirischen Gründen ist das P-sternförmige Modell also nicht abzulehnen. Grundlegende monetäre Wirtschaftserkenntnisse legen aus unserer Sicht nahe, dem monetären Inflationsmodell den Vorzug zu geben. Abschließend stellen wir eine Reihe von Beobachtungen dar zu politisch-wirtschaftlichen Aspekten der öffentlichen Debatte über die Inflation und ihre Bestimmungsgründe.

Résumé

Analyses monétaire et non-monétaire de l'inflation dans un petit pays ouvert

L'article (ré)évalue les modèles d'inflation monétaire et non-monétaire pour les Pays-Bas. En particulier, les auteurs examinent si un modèle P-star, qui représente une relation macro-économique de manuel entre la monnaie et les prix, devrait être rejeté en faveur d'un modèle socio-politique populaire basé sur l'inflation par les coûts. Les auteurs argumentent que le modèle P-star peut être utilisé pour une petite économie à taux de change fixe et concluent que celui-ci ne doit pas être rejeté pour des raisons théoriques. Ils montrent aussi que, basé sur des prévisions avec ou sans échantillonnage, les résultats du modèle monétaire ne sont pas annulés par ceux du modèle socio-politique. Donc, le modèle P-star n'a pas besoin d'être rejeté pour des motifs empiriques. Une économie monétaire de base suggère qu'il faut donner la préférence au modèle d'inflation monétaire. Les auteurs concluent avec quelques observations sur les aspects politico-économiques du débat public sur l'inflation et ses déterminants.