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Money and Swedish Inflation Reconsidered

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Summary

Analysing the role of money for Swedish inflation, we apply a single equation "P-Star" model and a structural VECM for the period of the late 1980 to the beginning of 2005. Against the background of theoretical and empirical considerations, we find that money – when measured by the "price gap" or, alternatively, the "money overhang" – has a statistically significant impact on future price movements. The results suggest that money should play a systematic role in monetary policy making in Sweden compared with the status quo.

JEL code: E31, E41
Keywords: Inflation forecast, price gap, P-star model

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1 Introduction

After being forced to withdraw from the European Exchange Rate Mechanism (ERM) in November 1992, the Riksbank's Governing Board decided in January 1993 to adopt an explicit "inflation targeting" (IT) regime as from 1995 (Heikensten and Vredin (2002), p. 8).[1] Since then, the Riksbank's inflation forecasts have been playing an important role in Swedish monetary policy making. In fact, the Riksbank's inflation forecast serves de facto as an "intermediate target" for policy making. Interestingly enough, however, economic literature on the inflation determining factors in Sweden has been relatively scarce.[2] This article attempts to provide a contribution to filling this gap by analysing the role of "excess liquidity" for Swedish inflation.

In the last years, a great deal of monetary policy analyses has been based on New Keynesian model frameworks, in which money does not play a role in the determination of inflation and monetary policy impulses are spread solely via the real demand for goods (see, for instance Woodford (1997)). The "economy-without-money" approach is, however, neither satisfactory from a theoretical point of view, nor does it reflect the empirical evidence of the role of money as a leading indicator for inflation for a number of countries such as, for instance, the euro area. The reluctance to assign a prominent role to money when analysing monetary policy impacts on output and prices is actually quite surprising given that there is hardly any disagreement among economists as far as Milton Friedman's famous dictum is concerned, namely that "inflation is always and everywhere a monetary phenomenon".[3]

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1 For a detailed discussion of how IT was put into practise in Sweden, see *Svensson* (1999, 2001). More generally on IT, see also *Baltensperger* (2000); *Bernanke* et. al. (1999).

2 For the period ranging from 1972 to 1995 *Baumgartner* et al. (2003) showed that narrow money M0 was a powerful leading indicator for Swedish inflation and that broadly defined money M3 as well as inflation expectations had significant predictive information for inflation: "Both monetary aggregates contain information about inflation sufficiently far into the future to allow the policymakers to respond to this information in a meaningful way" (p. 14).

3 *Milton Friedman*'s and his associates' "monetarism" emphasised the importance of assigning an important role to monetary developments for prices and the economy more broadly (*Friedman* (1956, 1960); *Brunner* (1968); *Brunner and Meltzer* (1972)).

The empirical evidence for Sweden for the period Q1 87 to Q1 05 suggests that excess liquidity, as measured by the ”P-star” approach, has as statistically significant impact on inflation. The results indicate that money might have to play a (more) prominent role in the Riksbank's policy making compared to the status quo. Especially so as measures of the price gap appear to support forward looking information, supporting a monetary policy that tries to prevent rather than react to actual inflation. The rest of the paper is organised as follows. In a first step, the theoretical framework of measures of excess liquidity will be outlined (2.). Thereafter, an empirically estimable inflation equation will be set up and the results for the period Q1 87 to Q1 05 will be presented (3.). The article concludes with a summary and conclusions (4.).

2 Measures of "excess liquidity"

In the following, two measures of excess liquidity will be discussed briefly: (i) the P-star model and (ii) the "monetary overhang".

2.1 The P-star model

The P-star model has become a prominent approach for calculating "excess liquidity". It rests on the well-known "transaction equation" which can be written as follows:

$$M \cdot V = Y \cdot P, \qquad (1)$$

where M is the stock of money, V the velocity of money, Y real output and P price level. Equation (1) simply says that the stock of money, multiplied by the number of times a money unit is used for financing purposes, equals the real output valued with its price level. Taking logarithms, equation (1) can easily be written as:

$$m + v = y + p. \qquad (2)$$

Now let us turn to the "P-star" model (Hallman, Porter and Small (1991)). To start with, the actual price level is simply:

$$p = m + v - y. \qquad (3)$$

The long-term price level can be formalised as:

$$p^* = m + v^* - y^*, \qquad (4)$$

whereas asterisks represent the long-run or equilibrium values. The difference between equations (4) and (3) is the so-called price gap:

$$p^* - p = (v^* - v) + (y - y^*)\,. \qquad (5)$$

The price gap consists of (i) the "liquidity gap" $(v^* - v)$ and (ii) the "output gap" $(y - y^*)$.[4] The left hand side of (5) can be interpreted as the "real money gap" with the sign reversed. Real money is defined as actual money supply less actual price level (Gerdesmeier, Polleit (2005)):

$$m_{real} = m - p\,. \qquad (6a)$$

The real equilibrium real money holding is:

$$m^*_{real} = m - p^*\,. \qquad (6b)$$

The difference between (6b) and (6a) is the "real money gap":

$$m^*_{real} - m_{real} = (m - p^*) - (m - p) = -p^* + p\,. \qquad (6c)$$

In the empirical part, we approximate *v** and *y**. This will be done by applying the Hodrick-Prescott-Filter (HP-Filter), which has become a standard procedure in many applied econometric work (Orr, Edey and Kennedy (1995), Martins and Scarpetta (1999)), to *v* and *y*.

2.2 The "money overhang"

The money overhang, ε_t, is the relative difference between the (log) money stock and money demand (Tödter (2002)):

$$m_t = m_t^d + \varepsilon_t\ , \qquad (7)$$

where m_t is the outstanding stock of money and m_t^d is the demand for money. It is an indicator of disequilibria on the money market, expressing the difference between the existing money holdings and the demand for money holdings resulting from the current economic situation (measured by current *y* and *i*). If the money demand function forms a stable cointegration relationship, the monetary overhang is a stationary variable (error correction term) which contains information on the future development of the money stock and/or price level – and may thereby

[4] For an extension of the model for small and open economies (especially in view of fixed exchange rates) see *Clemens and Tatom* (1994).

qualify as an inflation indicator. This measure of excess liquidity will be used in the cointegration analysis in part 3 of the paper.

3 Estimating Swedish inflation

In the following, (i) the theoretical model of inflation determination is set up and (ii) alternative specifications are tested for two periods, namely Q1 87 to Q4 00 and Q1 87 to Q1 05.

3.1 Inflation determination

Following the approach of Gerlach and Svensson (2003), inflation in period *t*, π_{t+1}, shall be determined by the following function:

$$\pi_{t+1} = \hat{\pi}^{e}_{t+1,t} + \beta_1 (p^{*}_{t} - p_t) + \beta_2 z_{t+1} + \varepsilon_{t+1}, \qquad (8)$$

where $\pi^{e}_{t+1,t}$ denotes inflation expectations in *t* for period *t*+1 (which will be specified below), z_t is any exogenous variable taking into account "cost push" factors (such as, for instance, oil price, exchange rate and unemployment changes), and ε_t is the (i.i.d.) white noise term.

The model assumes that future inflation does not only depend on past inflation, π_t, but also on the central bank's "implicit" inflation objective in period *t*, $\hat{\pi}_t$:

$$\pi^{e}_{t+1,t} = \hat{\pi}_{t+1} + \alpha_{\pi} (\pi_t - \hat{\pi}_t). \qquad (9)$$

Equation would suggest an adaptive expectation model, in which past target deviations influence expected inflation. The underlying idea is to take into account the period of disinflation in the 1980s, in which central banks across Europe aimed at bringing inflation lower in a gradual fashion; and monetary policy's views about the "acceptable" level of inflation should have had an important bearing on inflation expectations. After being forced to withdraw from the ERM, the Riksbank decided in January 1993 to adopt an explicit "inflation targeting" (IT) regime (Heikensten and Vredin (2002), p. 8).[5] Applying a somewhat simpler approach than Gerlach and Svensson (2001), the Riksbank's (implicit) inflation target was approximated by a linear trend for Swedish inflation in the period Q1 81 to Q4 94, and, as from Q1 95

[5] After allowing for a "transition period", the framework became operational only from 1995 onwards.

onwards, set at the Riksbank's inflation target of 2.0 percent.

Future inflation is determined by expected inflation: $\pi_{t+1} = \pi^{e}_{t+1,t}$. Using equations (7) and (8), an estimable equation for the deviation between actual and target inflation is:

$$\pi_{t+1} - \hat{\pi}_{t+1} = a_{\pi}(\pi_t - \hat{\pi}_t) + a_m(p_t^{*} - p_t) + a_y(y_t - y_t^{*}) + a_z z_{t+1} + \varepsilon_{t+1} \qquad (10)$$

where the output gap is added among the explanatory variables in order to compare its information content with that of the excess money.

3.2 Single equation estimation results

Table 1 (a) shows the result of a simple AR inflation estimation (*benchmark model*) for the periods Q1 87 to Q1 05 and Q1 87 to Q4 00. A shorter sample period was chosen to identify changes in the relationship following the "9/11" effect. The difference between actual inflation and the central bank's inflation objective enters the equation with a time lag of one quarter. *DUM* represent dummy variables which take the value of zero except 1 the first quarter of 1990, 1991 and 1992, respectively, allowing for the effects of exchange rate turbulences in the ERM. The equation accounts for 53% and 57%, respectively, of the variance of the variable to be explained.

Table 1 (b) shows the results of a "richer" specified inflation estimate. The price gap on the basis of M3 as well as (lagged) changes in the oil price (Δ*oil*), exchange rate (Δ*exsek*), wages (Δ*w*) and unemployment (Δ*u*) prove to be statistically significant for explaining inflation in both time periods considered.[6] The output gap, however, does not have any explanatory power according to standard statistical tests.

Table 1 (c) shows the results of using the price gap on the basis of the stock of M3-extended. In contrast to the output gap, the price gap, which enters the equation with a time lag of two quarters, has a statistically significant explanatory power for explaining inflation. The estimates appear to be stable for both time periods, that is

[6] In this paper we focus on the more „broadly defined" money aggregates which tend to be less strongly affected by (temporary) non-banks' portfolio shifts. Moreover, the results in Table 1 are based on a version of a backward-looking specification of the Phillips curve relation which is still used by some empirical workers – although we acknowledge a potential lack of micro foundation.

the after "9/11" period does not seem to have altered the long-run relation between the variables under review.

Tab. 1. – Results of estimates for inflation deviations (m – p – y* HP-filtered)

Variable	No. of Lags	(a) AR model		(b) M3 price gap		(c) M3-extended price gap	
		Q1 1987 – Q1 2005	Q1 1987 – Q4 2000	Q1 1987 – Q1 2005	Q1 1987 – Q4 2000	Q1 1987 – Q1 2005	Q1 1987 – Q4 2000
a_π	-1	0.363**	0.342**	0.339**	0.3740**	0.407**	0.449**
		(0.085)	(0.009)	(0.074)	(0.081)	(0.075)	(0.078)
a_m	-2					0.051**	0.061*
						(0.022)	(0.023)
	-3			0.077**	0.072*		
				(0.031)	(0.033)		
Δ*oil*	0			0.011**	0.012**	0.014**	0.013**
				(0.004)	(0.004)	(0.004)	(0.005)
Δ*exsek*	-1			0.034**	0.034**	0.029*	0.024*
				(0.009)	(0.001)	(0.009)	(0.011)
	-2					-0.023*	-0.035*
						(0.009)	(0.011)
Δ*w*	-1					0.184**	0.143*
						(0.073)	(0.084)
Δ*u*	-1			0.008*	0.009*		
				(0.001)	(0.004)		
Δ*u*	-2					-0.008**	-0.010**
						(0.004)	(0.005)
DUM901	0	0.025*	0.025**	0.026**	0.026**	0.025**	0.024*
		(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
DUM911	0	0.018**	0.039*	0.043**	0.004**	0.029**	0.029**
		(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
DUM921	0	-0.020*	-0.020**	-0.018*	-0.017**	-0.014**	-0.015**
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
R2		0.531	0.574	0.675	0.7096	0.738	0.791
SEE		0.005	0.005	0.004	0.005	0.004	0.004
DW		2.210	2.237	2.101	2.010	2.035	1.875
Diagnostic tests (p-values):							
Q-statistic (4 quarters)		7.30	4.25	3.34	2.69	2.99	1.31
		[.12]	[.37]	[.50]	[.61]	[.56]	[.86]
Normality		10.5	6.85	0.44	1.21	0.61	0.41
		[.01]	[.03]	[.80]	[.55]	[.74]	[.81]
ARCH (4 quarters)		0.38	0.29	1.06	0.63	3.67	0.31
		[.82]	[.88]	[.39]	[.77]	[.09]	[.86]
White		0.19	0.22	0.76	0.89	0.60	0.79
		[.96]	[.94]	[.69]	[.56]	[.87]	[.68]

Note: Standard errors in parentheses. – */** denotes significance at the 5%/1% level. – Constant not shown. – T = 73 (56). Legend: a_π is the deviation of actual from desired inflation, a_m is the price gap, *oil* is the change in the oil price (US$ per barrel), *exsek* is the exchange rate, *w* is wages *u* is unemployment, and *Δ* is the first difference of log levels. *DUM* is a dummy variable.

Admittedly, the identification of the long-run equilibrium value for income velocity by using the HP-Filter is just one among many other procedures. What is more, using the HP-Filter might not necessarily solve the non-stationarity problem (Nelson and Kang (1981)). As a measures of "cross-checking", Table 2 shows the estimation results based on the price gaps which calculated by first differences rather than filtering.

Tab. 2. – Results of estimates for inflation deviations (m – p – y* in first differences)

Variable	No. of Lags	(a) AR model Q1 1987 – Q1 2005	(a) AR model Q1 1987 – Q4 2000	(b) M3 price gap Q1 1987 – Q1 2005	(b) M3 price gap Q1 1987 – Q4 2000	(c) M3-extended price gap Q1 1987 – Q1 2005	(c) M3-extended price gap Q1 1987 – Q4 2000
a_π	-1	0.363**	0.342**	0.320**	0.361*	0.362**	0.379**
		(0.085)	(0.009)	(0.071)	(0.077)	(0.077)	(0.085)
a_m	-1			0.071**	0.086**	0.035	0.035
				(0.029)	(0.032)	(0.029)	(0.037)
Δoil	0			0.010**	0.009*	0.010*	
				(0.004)	(0.005)	(0.004)	
$\Delta exsek$	-1			0.033**	0.028**	0.034**	
				(0.008)	(0.011)	(0.008)	
	-2					-0.023**	
						(0.009)	
Δw	-1			0.124*			
				(0.071)			
Δu	0				0.011**	0.011**	0.014**
					(0.005)	(0.005)	(0.005)
	-1			0.010**			
				(0.005)			
Δu	-2			-0.014**	-0.016**	-0.013**	-0.016**
				(0.005)	(0.005)	(0.005)	(0.005)
DUM901	0	0.025**	0.025**	0.025**	0.026**	0.026**	0.025**
		(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)
DUM911	0	0.018**	0.039**	0.038**	0.037**	0.040**	0.037**
		(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
DUM921	0	-0.020**	-0.020**	-0.013**	-0.013**	-0.014**	-0.017**
		(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)
R2		0.531	0.574	0.717	0.743	0.701	0.734
SEE		0.005	0.005	0.004	0.004	0.004	0.004
DW		2.210	2.237	2.145	2.051	2.147	2.020
Diagnostic tests (p-values):							
Q-statistic (4 quarters)		7.30	4.25	5.00	3.19	4.29	2.96
		[.12]	[.37]	[.29]	[.53]	[.37]	[.56]
Normality		10.5	6.85	1.24	0.96	0.73	0.21
		[.01]	[.03]	[.54]	[.62]	[.69]	[.89]
ARCH (4 quarters)		0.38	0.29	0.53	0.37	0.69	0.22
		[.82]	[.88]	[.71]	[.83]	[.59]	[.92]
White		0.19	0.22	1.03	1.96	1.68	0.66
		[.96]	[.94]	[.44]	[.05]	[.07]	[.80]

Note: For a list of variable definitions and abbreviations see*Legend*: See Table 1.

Whereas the price gap on the basis of M3 maintains its explanatory power for deviations of actual from desired inflation, the price gaps on the basis of M3 extended do no longer show statistically significant coefficients. Quarterly changes ("noise") in M3 extended price gap are well above the level of the M3 price gap. These results might therefore suggest that trend changes rather than "noisy" short-term fluctuations in the stock of money, or the price gap, contain information about forthcoming risks to price stability (Neumann and Greiber (2004)).[7]

3.3 Structural VECM estimation results

To analyse the role of the money overhang for price movements in Sweden, a structural vector error correction model (S-VECM) in the tradition of Johansen (1988, 1991) and Johansen and Juselius (1992) was applied. It is assumed that – as expressed by the first vector – a linear combination exists between real M3 holdings ($m_t - p_t$), real GDP (y_t) and real stock returns (Δst_t). Moreover, the system suggests that – shown by the second vector – that the following relations hold jointly: Fisher parity (that is a linear relation between the long-term interest rate (i_t^{long}) and inflation deviations from target (p_t^a)), the term structure of interest rates (that is a relation between the long- and the short-rate (i_t^{short})) and a long-run relation between stock return and bond yields. The Trace-test does not reject the null of the existence of one cointegration vector between the variables under review (see Appendix A2). Choosing two cointegration vectors, the results for the period Q1 87 to Q1 05 is given by equation:

$$\hat{\beta}' X_t = \begin{bmatrix} 1.0 & \underset{(0.25)}{-0.94} & \underset{(0.01)}{0.02} & 0 & \underset{(0.00)}{-0.006} & 0 \\ 0 & 0 & \underset{(0.19)}{0.09} & 1.0 & \underset{(0.07)}{-0.37} & \underset{(0.12)}{-0.81} \end{bmatrix} \begin{bmatrix} m_t - p_t \\ y_t \\ i_t^{long} \\ i_t^{short} \\ \Delta st_t \\ \Delta p_t^a \end{bmatrix} \quad (11)$$

Chi-square (2) = 2.97 [0.23].

The coefficients of the system appear to have economically plausible magnitudes

[7] In order to make our analysis more robust, it appeared to us useful and necessary to conduct a forecasting analysis, i.e. a within-sample forecasting exercise. Since HP-filtering fits our data best, we based this exercise on the estimated regression equation Table (1), column (b), sample Q1 1987-Q1 2005 – and show the variance decomposition. Our forecasting sample starts in 2001 Q1, since the Swedish stock market peaked in early 2000, followed by a period of considerable price correction. The results underline the good forecast properties of our empirical model and are available on request.

and signs. The empirical results of the ECM-model indicate that money overhangs (as captured by the EC-term of the money demand vector) once built up, tend to be reduced in the following quarters (for further details see Appendix). What is more, the coefficient of the money overhang proves to be statistically significant for explaining deviations of actual from target inflation: "excess liquidity" – as measured by the "money overhang" – shows up in inflation rather than output growth (see Appendix A4).

4. Summary and conclusions

Applying a rather simple version of the P-star model to Swedish data from the late 1980s to the beginning of 2005 suggests that broadly defined money, when measured through the concept of the price gap, plays a significant role for explaining Swedish inflation. Our findings may thus be seen as a stimulus for further work on the question whether money could be assigned a much more important role in the Riksbank's policy making according to the IT concept.

Under the Riksbank's IT concept, inflation forecasts serve de facto as the bank's intermediate variable: comparisons between the bank's desired inflation rate and the inflation forecast shall indicate the need for taking action on the part of monetary policy. Needless to say that calculating the inflation forecasts is crucial for delivering low and stable inflation. Having a significant impact on (future) inflation, a closer focus on monetary development may lead to an improvement in inflation forecasting and, thus, policy making.

From a conceptual point of view, inflation forecasting tends to be an "opaque" exercise from the point of view of "outsiders": it is not always obvious which variables are included in the projection model; nor is it known how much weight is assigned to each variable. So the public's confidence in the accuracy of the inflation projections – and the appropriateness of its policy recommendations – can be assumed to hinge de facto on the bank's credibility, that is the bank's perceived willingness and ability to deliver on its price stability promise.

It therefore seems questionable whether inflation forecasts themselves further monetary policy transparency and build up central bank credibility. It might well be that it works more the other way round: Inflation projections (or forecasts) are only reliable if central bank credibility is already in place. A stronger focus on variables which exert a reliable influence on the central bank's target variable – such as monetary aggregates – may thus improve the understanding and acceptance of inflation forecasts, thereby strengthening the central bank's stability oriented policy.

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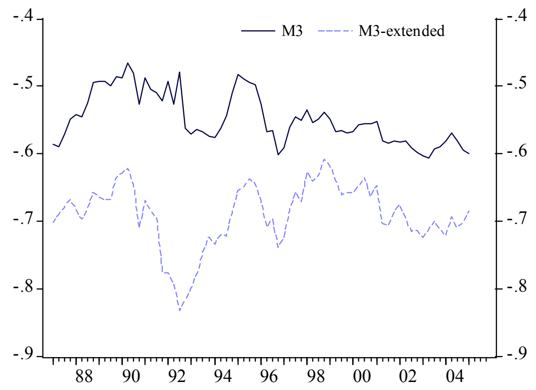
Appendix

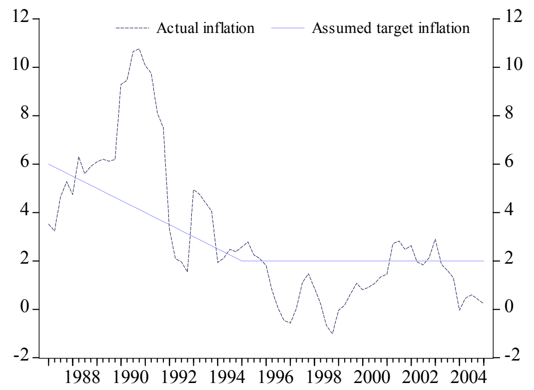
A1) Data

The data used in this paper were taken from the Riksbank, Thomson Financials, the Swedish Statistics Office and the OECD (via Bloomberg). – All variables were seasonally adjusted using Census-X12. – Trend velocity and trend growth were calculated by using the Hodrick-Prescott-Filter.

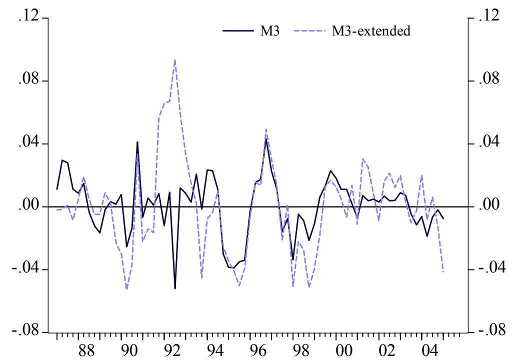
(a) Income velocities of M3 and M3-extended[a]



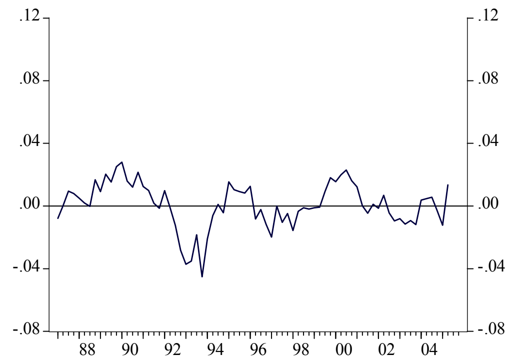
(b) Swedish inflation and target inflation[b]



(c) Price gaps M3 and M3-extended[c]



(d) Output gap[d]



Source: OECD, Thomson Financials, Riksbank, Swedish Statistics Office; own calculations. – [a]Log nominal GDP minus log of the stock of M3 and M3 extended. – [b]Calculated as the fourth differences of log values. The inflation target was approximated by a linear trend for Swedish inflation in the period Q1 81 to Q4 94, and, as from Q1 95 onwards, set at the Riksbank's inflation target of 2.0 percent. – [c]Calculated as defined in equation (5) of part 2 of this article. – [d]Calculated as log real GDP minus log potential GDP (HP-filtered log real GDP). – Period: 1987-Q1 to 2005-Q1.

A2) Johansen Cointegration Tests

Unrestricted cointegration rank test (Trace)					Unrestricted cointegration rank test (max. eigenvalue)				
Hypothesized No. of CE(s)	Eigen-value	Trace Statistic	0.05 critical value	Prob.**	Hypothesized No. of CE(s)	Eigen-value	Max-Eigen Statistic	0.05 critical value	Prob.**
None *	0.452	140.667	117.708	0.0008	None	0.452	43.954	44.497	0.0572
At most 1*	0.3846	96.713	88.8038	0.0119	At most 1	0.384	35.445	38.331	0.1034
At most 2	0.2820	61.268	63.876	0.0813	At most 2	0.282	24.193	32.118	0.3360
At most 3	0.2246	37.074	42.915	0.1698	At most 3	0.224	18.573	25.823	0.3348
At most 4	0.1355	18.501	25.872	0.3112	At most 4	0.1355	10.635	19.387	0.5513

Note: Trend assumption is a linear deterministic trend (restricted). – Lag = 3 quarters. – *Variables*: Nominal stock money M3 extended, deflated by GDP deflator (in logs); real GDP (in logs); 10-year bond yield and 3-month money market rate; first quarter change of log stock prices minus first quarter change of log consumer price index (annualised); deviation of first quarter change of actual consumer prices from first quarter change of price target level (annualised). – Trace test indicates 2 cointegrating eqn(s) at the 0.05 level; max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level. – *Denotes rejection of the hypothesis at the 0.05 level. – **MacKinnon-Haug-Michelis (1999) p-values. – Period: 1987-Q1 to 2005-Q1.

A3) VEC Residual Serial Correlation LM-Tests

H0: no serial correlation at lag order h

Sample: 1987Q1 2005Q1

Included observations: 73

Lags	LM-Stat	Prob
1	49.99708	0.0605
2	39.36865	0.3216
3	46.66328	0.1098
4	42.53038	0.2104

Probs from chi-square with 36 df.

A4) Coefficients of the error-correction term of the VECM and test statistics

Error Correction:	$m_t - p_t$	y_t	i_t^{long}	i_t^{short}	Δst_t	p_t^a
CointEq1	-0.303551	-0.059462	-1.767638	4.711596	22.83854	-25.77990
	(0.08610)	(0.03436)	(2.77829)	(3.05866)	(19.8616)	(10.4909)
	[-3.52557]	[-1.73060]	[-0.63623]	[1.54041]	[1.14988]	[-2.45736]
CointEq2	0.007987	-0.003786	-0.015504	-0.265485	0.233811	0.763649
	(0.00360)	(0.00144)	(0.11629)	(0.12803)	(0.83134)	(0.43911)
	[2.21616]	[-2.63217]	[-0.13332]	[-2.07368]	[0.28124]	[1.73907]
R-squared	0.449687	0.494321	0.311753	0.487486	0.592800	0.504566
Adj. R-squared	0.238028	0.299829	0.047042	0.290365	0.436184	0.314014
Sum sq. resids	0.024213	0.003856	25.21109	30.55615	1288.441	359.4667
S.E. equation	0.021578	0.008611	0.696296	0.766563	4.977722	2.629224
F-statistic	2.124584	2.541598	1.177711	2.473030	3.785063	2.647919
Log likelihood	188.8315	255.8918	-64.77660	-71.79489	-208.3641	-161.7694
S.D. dependent	0.024720	0.010291	0.713275	0.909976	6.629213	3.174461

Determinant resid covariance (dof adj.)	5.10E-07
Determinant resid covariance	6.66E-08
Log likelihood	-18.33336
Akaike information criterion	4.337900
Schwarz criterion	8.730562

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