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RATIONAL EXCHANGE RATE AND PRICE EXPECTATIONS UNDER DIFFERENT EXCHANGE RATE REGIMES IN FINLAND

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ABSTRACT

In this paper a small aggregative model of the Finnish economy with rational exchange rate and price expectations is specified and estimated with quarterly data. Optimal exchange rate regimes are assessed by simulating effects of various unanticipated and permanent shocks. According to the simulation results fixed exchange rates seem to insulate the domestic economy from monetary shocks while floating rates are preferable if shocks are real.

CONTENTS

1 INTRODUCTION

Until quite recently Finnish financial markets have been relatively underdeveloped and isolated from the rest of the world. During the past few years, however, the importance of market elements has increased in Finnish financial markets and interest rates have become instrumental in equilibrating demand and supply of finance. Also with increased price awareness, internationalization of the business and banking sector, rapid innovations in the financial markets and some relaxation of the capital controls, the international integration of Finnish financial markets has grown considerably. This has been demonstrated by the increased sensitivity of foreign capital flows to interest rate differentials and exchange rate expectations.

During the post-war period Finland has continuously pursued a policy of pegging the exchange rate. After the breakdown of the Bretton Woods system in the early 1970s, this has taken place by the use of a currency index.[1] Even so it has been possible for rather protracted periods to implement monetary policies geared to domestic considerations.

However, with increased sensitivity and mobility of foreign capital flows and adherence to the fixed exchange rate target possibilities to conduct monetary policies independently from the rest of the world have clearly diminished. The reduction of autonomy of domestic monetary policy is likely to be irreversible and to continue at least in the near future. In this situation and also if there is a loss of confidence

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[1]For an explanation of Finland's current currency index system and fixed exchange rate policy, see Åkerholm (1987).

in the fixed exchange rate policy domestic monetary policy is severely constrained by safeguarding external liquidity. Changes in domestic or foreign economic developments and expectations thus cause pressures on domestic monetary policy and require adjustment through fluctuations in domestic interest rates and/or changes in foreign exchange reserves.

One policy option is to shift part of the adjustment burden to the exchange rate thus enabling a choice between changes in interest rates and exchange rates and foreign exchange reserves.[2] The choice between alternative exchange rate regimes so as to insulate the economy from domestic and foreign shocks has been treated extensively in the literature and seems to depend on a range of structural factors.[3] Among the most important of these are the openness of the economy, rigidity of price and wage adjustment, degree of capital mobility and interest rate elasticity of domestic demand. Also it is important if some shocks dominate in the short-run while others in the long-run. Moreover the economy might react differently if the schoks are anticipated or unanticipated or if they are temporary or permanent.

These considerations suggest that when examining the choice of an optimal exchange rate regime for a particular economy also empirical analysis are needed. The aim of the paper is to examine this question for the Finnish economy using an econometric macromodel with rational expectations. In Section 2 the model is specified and estimated. The simulation results are presented and discussed in Section 3. The conclusions for exchange rate policy are drawn out in Section 4.

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[2]Exchange rate flexibility would also serve to decrease directly capital mobility which is inversely related to exchange risk, see Aurikko (1985a).

[3]For recent surveys, see Marston (1985) and Argy (1986).

2 THE MODEL

The model used in this study is a small aggregative quarterly model of the Finnish economy. The model contains 9 stochastic equations and is estimated using mainly data from the period 1975.1 - 1986.4 obtained from the data base of the quarterly model BOF4 constructed by the Research Department of the Bank of Finland [Bank of Finland (1987)]. The model is basically a Mundell-Fleming IS-LM model with imperfect capital mobility. In the model interest rate movements and foreign capital flows equilibrate the demand for and supply of money with domestic credit of the central bank exogenous.

As the purpose of the model is to assess exchange rate regimes operationalization of exchange rate expectations is crucial. In the model exchange rate as well as price expectations are assumed to be formed rationally given current period information.[4] Exchange rate expectations determine the expected rate of change of the domestic currency and thus together with domestic and foreign interest rates capital movements. Price expectations have an influence on wages and on the real interest rate.

The behavioral equations of the model are estimated using OLS. However, the equations with expectation variables are estimated by TSLS as suggested by McCallum (1976). The equations of the model are:

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[4]Other possibilities would have been to assume static expectations or expectations formed according to some set of fundamental variables. The former approach while simple is obviously too limited and the latter cannot be used because of the fixed exchange rate policy in Finland.

$$(1)\ \Delta w = \underset{(0.03)}{-0.122} + \underset{(0.20)}{0.430}(pd_{+1} - w_{-1}) + \underset{(0.24)}{0.157}(pd_{-1}-w_{-1})$$

$$+ \underset{(0.10)}{0.172}(y_{-1} - ycap_{-1}) + \underset{(0.0005)}{0.002TR}$$

$\bar{R}^2 = 0.408$ DW = 2.133 SE = 0.016 75.1 - 86.4

$$(2)\ \Delta pd = \underset{(0.01)}{0.091} + \underset{(0.06)}{0.331}(w-pd_{-1}) + \underset{(0.01)}{0.056}(pf+e-pd_{-1})$$

$$\underset{(0.0002)}{-0.001TR}$$

$\bar{R}^2 = 0.428$ DW = 2.747 SE = 0.009 75.1 - 86.4

$$(3)\ y = \underset{(0.28)}{0.530} - \underset{(0.0006)}{0.001}[rd - 400 \cdot (pd_{+1} - pd)]$$

$$+ \underset{(0.04)}{0.908}y_{-1} + \underset{(0.03)}{0.031}(pf + e - pd) + \underset{(0.07)}{0.239}yf$$

$$- \underset{(0.08)}{0.136}yf_{-1}$$

$\bar{R}^2 = 0.989$ DW = 2.126 SE = 0.012 75.1 - 86.4

$$(4)\ px = w + \underset{(0.01)}{0.254} + \underset{(0.04)}{0.501}(pf + e - w) - \underset{(0.0003)}{0.004TR}$$

$\bar{R}^2 = 0.956$ DW = 1.320 SE = 0.022 75.1 - 86.4

$$(5)\quad x = \underset{(0.43)}{1.395} + \underset{(0.09)}{0.598}x_{-1} + \underset{(0.14)}{0.546}yf + \underset{(0.23)}{0.768}(pf + e - px)$$

$$\bar{R}^2 = 0.950 \quad DW = 2.491 \quad SE = 0.052 \quad 75.1 - 86.4$$

$$(6)\quad pmo = pmof + e$$

$$(7)\quad pmfu = pmfuf + e$$

$$(8)\quad mo = \underset{(0.63)}{-1.794} + \underset{(0.07)}{0.369}mo_{-1} + \underset{(0.11)}{0.714}y - \underset{(0.12)}{0.432}(pmo - pd)$$

$$- \underset{(0.02)}{0.127}DFT69$$

$$\bar{R}^2 = 0.977 \quad DW = 2.038 \quad SE = 0.053 \quad 65.3 - 86.4$$

$$(9)\quad mf = \underset{(0.92)}{-6.964} - 0.350(pmfu_{-1} - pd_{-1}) + \underset{(0.09)}{1.165}y_{-1} + \underset{(.12)}{0.302}mf_{-1}$$

$$\bar{R}^2 = 0.784 \quad DW = 1.802 \quad SE = 0.140 \quad 65.3 - 86.4$$

$$(10)\quad CAB = X \cdot (PX/100) - MO \cdot (PMO/100) - MF \cdot (PMFU/100) + CR$$

$$(11)\quad GFX = CAB + FFG + FFK - FFK_{-1} + GFX_{-1}$$

$$(12)\quad FFK = FPBB + PD \cdot \{\underset{(0.980)}{1.113}[rd - rf - 400 \cdot (e_{+1} - e)]\}$$

$$+ \underset{(0.140)}{1.246}[(FFK_{-1} - FPBB_{-1})/PD_{-1}]$$

$$- \underset{(0.147)}{0.486}[(FFK_{-2} - FPBB_{-2})/PD_{-2}] + \underset{(0.0006)}{0.0008}\ Y$$

$$\bar{R}^2 = 0.831 \quad DW = 1.962 \quad SE = 20.74 \quad 75.1 - 86.4$$

(13) $CUR = B + GFX - BR$

(14) $rd = 8.75 + 0.676rd_{-1} - 46.97\,[CUR/(0.01 \cdot Y \cdot PD)]$
$\qquad\qquad (3.98) \quad (0.092) \qquad\qquad (30.3)$

$\bar{R}^2 = 0.561 \quad DW = 1.980 \quad SE = 2.567 \quad 70.1 - 86.4$

(15) $e = e_{-1} - 0.000005\Delta GFX$

(15') $e = e - 0.001\Delta GFX$

Lower case variables (except interest rates) are expressed in logarithms. Lags are denoted with subscripts -1 and -2 and leads +1. The first backwards differencing operator is denoted with Δ. The standard error estimates of the coefficients are in parentheses, $\bar{R}^2$ is the coefficient of determination adjusted for degrees of freedom, DW is the Durbin - Watson statistic, SE is the standard error estimate of the residual variance and e.g. 75.1 - 86.4 is the estimation period.

Endogenous variables:

W = wage rate, 1980 = 100
PD = price index of GDP, 1980 = 100
Y = GDP in purchasers' prices, millions of 1980 FIM
PX = export prices of goods and services, 1980 = 100
X = exports of goods and services, millions of 1980 FIM
PMO = import prices of goods and services (excl. fuels and lubricants), 1980 = 100
PMFU = import prices of fuels and lubricants, 1980 = 100
MO = imports of goods and services (excl. fuels and lubricants), millions of 1980 FIM
MF = imports of fuels and lubricants, millions of 1980 FIM
CUR = currency in circulation, FIM million
CAB = current account, FIM million
GFX = foreign exchange reserves of the Bank of Finland, FIM million

FFK = cumulant of private capital inflows, FIM million
RD = money market rate, per cent
E = Bank of Finland currency index, 1980 = 100

Exogenous variables:

YCAP = linear trend of Y
TR = linear trend
PF = import prices of Finland's major export countries, FIM/E, 1980 = 100
YF = volume of imports of Finland's major export countries, 1980 = 100
PMOF = import prices of goods (excl. fuels and lubricants), FIM/E, 1980 = 100
PMFUF = import prices of fuels and lubricants, FIM/E, 1980 = 100
DFT69 = dummy variable for the revision of foreign trade statistics in 1969
B = banks' net debt to the Bank of Finland, FIM million
BR = exogenous items in the balance sheet of the Bank of Finland
CR = investment income and income transfers from abroad, net, FIM million
FFG = foreign borrowing by the public sector, net, FIM million
FPBB = banks' forward purchases of foreign exchange from the Bank of Finland, FIM million
RF = average 3 month euromarket interest rate for USD, GBP, DEM and CHF, per cent

Equations (1) and (2) form the wage-price block of the model. Wages are assumed to depend on price expectations in the next quarter according to the contract wage approach by Taylor (1980). The Phillips curve effect is transitory and proxied by the deviation of real GDP from trend. In equation (2) prices are assumed to be formed as a markup on wages and foreign prices in domestic currency. Equations (1) and (2) incorporate slow partial adjustment and are constrained linearly homogeneous implying that in the long-run domestic inflation rate equals world inflation or exchange rate depreciation. Equation (3) is a conventional IS curve. The real interest rate differs from the nominal interest rate by the amount of rationally expected inflation rate which has been multiplied by 400 to convert it from a quarterly proportional inflation rate to a percentage per annum inflation rate. The long-run interest rate elasticity of aggregate demand is approximately -0.1.

In equation (4) export prices adjust instantaneously and linearly homogenously with respect to domestic costs and competitors' prices. In equation (5) exports depend on foreign imports and a ratio of prices of foreign imports to domestic export prices. Equations (6) and (7) imply that import prices in terms of domestic currency change by the full amount of the change in the exchange rate.[5] Imports of goods and services in equations (8) and (9) depend on real GDP and relative prices. Price elasticity in the latter model has been constrained to correspond that obtained by using a more elaborate specification, see Aurikko (1985b).

Identity (10) defines the current account where investment income and income transfers are exogenous, while (11) defines foreign exchange reserves of the Bank of Finland with foreign borrowing by the public sector exogenous. In equation (12) uncovered private capital inflows are determined according to the portfolio theory by the expected return differential and wealth proxied by GDP. The model is estimated in stock form deflated by 1980 prices. The dependent variable is calculated as a cumulant from the flow data because results of estimation of the model in the flow form were not particularly satisfactory.[6] According to the estimation

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[5]In the case of Finnish imports the assumption of a 100 per cent pass-through rate is a simplification as evidence from past Finnish devaluations suggests a somewhat smaller pass-through rate, see Aurikko (1982).

[6]See also Åkerholm and Tarkka (1986).

results a 1 percentage point increase in the expected return differential causes in the short-run a capital inflow of FIM 200 - 600 million in 1986 prices and in the long-run an inflow of FIM 1 000 million.[7]

Identity (13) being the balance sheet of the Bank of Finland defines supply of money (currency). Equation (14) is the LM curve of the model where interest rate is the dependent variable. This specification is based on the assumption that the income elasticity of money demand is unity and that the semi-elasticity of money demand with respect to the interest rate is proportional to the velocity of money, i.e. $(0.01 \cdot Y \cdot PD)/CUR$.

Equations (1) - (14) form the fixed exchange rate version of the model. In this version exchange rate is exogenously fixed while interest rate fluctuates. Equations (1) - (15) is the flexible exchange rate version of the model. The central bank is assumed to intervene in the foreign exchange market so that a FIM 1 000 million increase in the foreign reserves appreciates the exchange rate by about 0.5 per cent. This leaning against the wind intervention rule permits the exchange rate to adjust somewhat. Finally equations (1) - (14) together with equation (15') form the floating exchange rate version of the model. According to equation (15') the exchange rate is iterated in each period to a level where there is no change in the reserves. The value -0.001 of the adjustment parameter was chosen empirically to ensure fast convergence.

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[7]The estimate for the sensitivity of capital movements is lower than those obtained in other studies, cf. Åkerholm and Tarkka (1986). However, this is mainly due to the inclusion of the change in exchange rate in the return differential. Because the simulation period for the various shocks below start from the first quarter of 1980 and end in 1984 chacterized still by relatively underdeveloped domestic financial markets the estimated equation (12) with moderate capital mobility was used.

The use of rational expectations deals with the Lucas (1976) critique because the reduced form of the model depends on the policy parameters. However, in the three versions of the model behavioral coefficients are assumed to be insensitive to the change in regimes. Actually the coefficients or even the specifications might change with the policy rule requiring explicit microeconomic derivation of the behavioral equations under each regime.[8]

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[8]See for a more thorough discussion Taylor (1986). Especially capital mobility would seem to be sensitive to the exchange rate regime. With capital mobility inversely related to the variance of the one-period exchange rate expectations the coefficient of capital mobility could be a function of this variance.

3 SIMULATION RESULTS

Optimality considerations of fixed or floating exchange rate regimes are often based on insulating properties of either regime in the presence of a particular shock to the economy. In general terms fixed exchange rates are superior when monetary disturbances are predominant while floating rates tend to insulate the economy from real shocks. However, as discussed earlier these straightforward conclusions should perhaps be modified in the light of the structural characteristics of the economy.

In order to evaluate exchange rate regimes with simulations the model must be solved. The solution of the model is carried out using the extended path method developed by Fair and Taylor (1983). The method solves a non-linear rational expectations model through three types of iterations. In the first phase of iterations the model is solved dynamically forward for an arbitrary finite horizon with given initial values for the expectations. In the second phase the solution of the model for the expectations replaces the initial values until convergence is reached. In the third phase the horizon is extended successively by one period forward and the second phase iterations are repeated until the relative difference of the solution of the model for the extended period and the one-period shorter solution from the preceding round is less than the convergence criterion.

The exchange rate policy evaluation can be carried out either by stochastic or deterministic simulations. In the former shocks are drawn for each period generated from the estimated covariance matrix of the shocks or alternatively actual disturbances are used. Using the same set of shocks the performance of the model under different policy rules could then be examined. Stochastic simulations would require in either case solving the model numerous times. As the extended path solution method is fairly computer intensive only deterministic simulations requiring only one solution of the model for each simulation are performed in this paper.[9]

To illustrate properties of the model and to highlight the distinction of unanticipated and anticipated disturbances which is crucial in models with rational expectations first the fixed exchange rate version of the model is simulated assuming a 1 per cent permanent unanticipated and anticipated devaluation of the exchange rate from 1975.1 onwards. In the anticipated devaluation simulation devaluation is assumed to be known already at the beginning of the first quarter of 1974. The results of the simulation experiment are expressed as a relative or absolute difference (interest rate and foreign exchange reserves) between the disturbed solution and control solution.

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[9] See Taylor (1986). Even for the overall solution of the floating rate version of the model approximately a total of nearly 100 000 iterations were needed requiring about 14 minutes of CPU time with a Burroughs A12 computer.

UNANTICIPATED AND ANTICIPATED DEVALUATION

FIGURE 1. PRICES

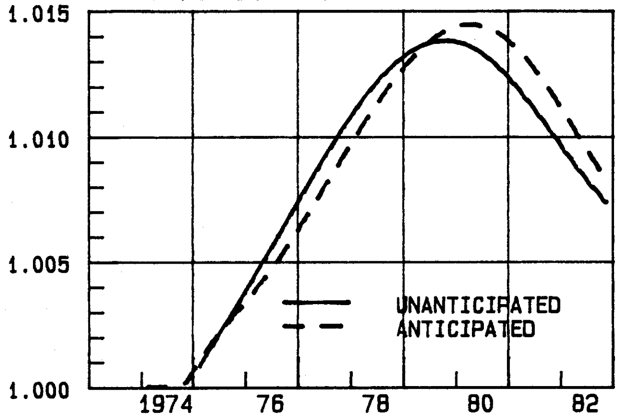


FIGURE 2. OUTPUT

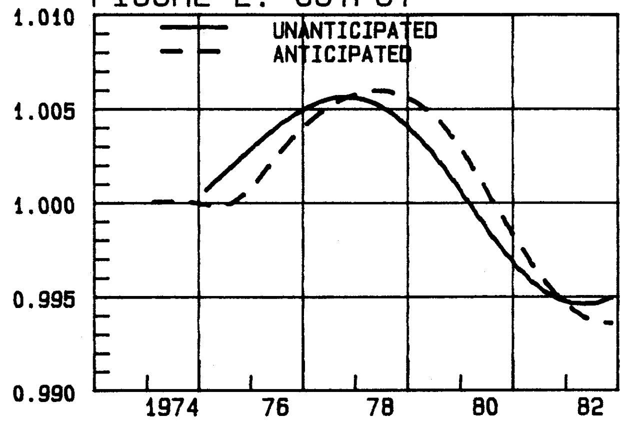


FIGURE 3. INTEREST RATE

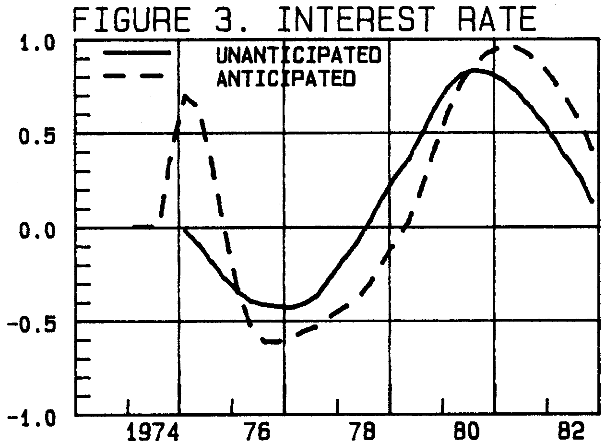
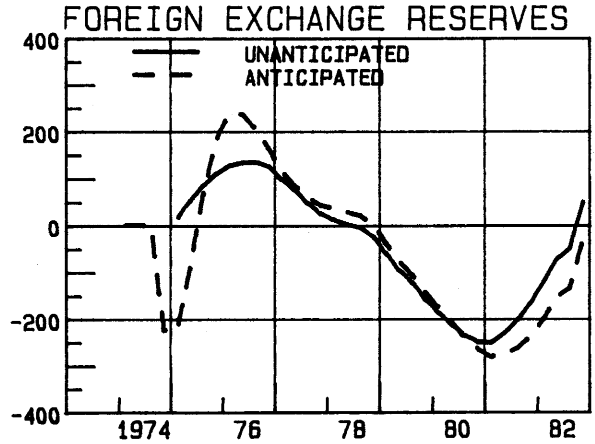


FIGURE 4.
FOREIGN EXCHANGE RESERVES



According to Figure 1 in the cases of unanticipated and anticipated devaluations domestic price level increases quite rapidly and similarly in both simulations. The price level in fact overshoots the devaluation percentage temporarily for a period of about four years after three years of the devaluation because of the Phillips curve effect. In the long-run domestic prices seem to rise by the full amount of the devaluation. There are some differences in GDP developments according to Figure 2 in the two simulations. In the unanticipated devaluation the effect on GDP is initially more expansionary than in the anticipated devaluation mainly because of interest rates responses in the two cases (Figure 3). Interest rates raise markedly initially when the policy measure is anticipated. This reflects rational expectations as there occur capital outflows one quarter before and two quarters after the devaluation to exploit the narrower return differential.[10] With foreign exchange reserves of the Bank of Finland (Figure 4) and also the supply of money decreasing interest rates have to increase to equilibrate the money market. Thus according to the fixed exchange rate version of the model there is a marked difference between unanticipated and anticipated devaluations. This difference originates mainly from the money market.

To examine the choice of an optimal exchange rate regime the transmission to the economy of different disturbances is simulated with the three versions of the model. In the simulations of all the possible combinations between anticipated or unanticipated and temporary or permanent disturbances only permanent and unanticipated changes are considered. These are applied in foreign prices, foreign demand, foreign interest rates and domestic supply of money from the first quarter of 1980 onwards. In each simulation the disturbed solution of the model is compared in the form of relative or absolute difference (interest rate) to the undistrubed control solution.

In the case of a foreign price shock all the exogenous foreign prices in the model (competitors' prices in exports and import prices) are increased permanently by 1 per cent beginning from the first quarter of 1980. The effects of the disturbance on the most important variables of the model are presented in Figures

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[10] Because of one-period expectations in the model and fixed exchange rate the effects of the anticipated devaluation are seen clearly only one quarter before the implementation of the measure even though it enters in the economic agents' information set four quarters earlier. Experiments with anticipated shocks using the floating rate version indicate strong and immediate effects. Also using leads of two quarters by Lahti and Virén (1988) in a rational expectations macromodel produced similar results.

5 - 8. The simulations were run only for the years 1980 - 84 because with longer solution period the number of iterations for the solution of the model increased considerably.

FOREIGN PRICE SHOCK

FIGURE 5. EXCHANGE RATE

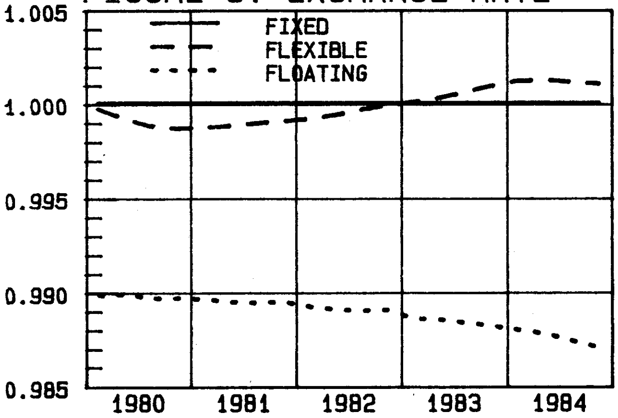


FIGURE 6. INTEREST RATE

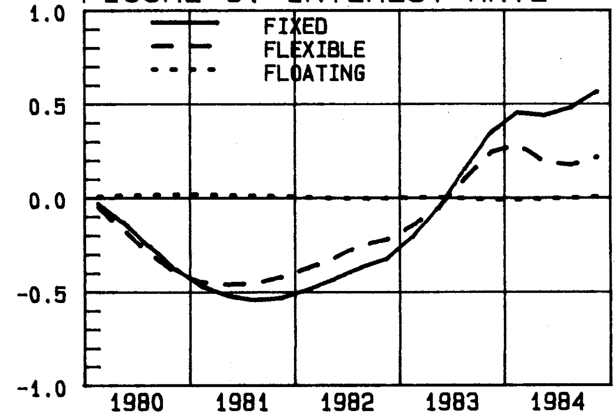


FIGURE 7. PRICES

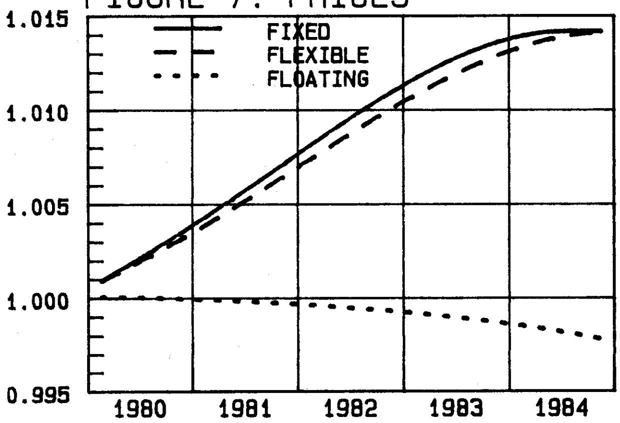
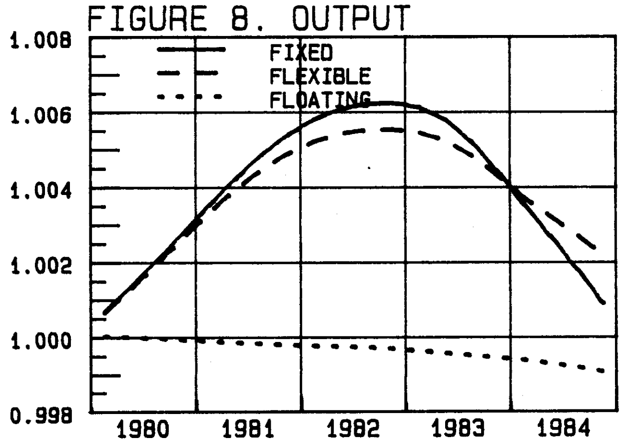


FIGURE 8. OUTPUT



According to Figure 5 the exchange rate appreciates in the floating exchange rate version of the model and fully offsets the increase in foreign prices. In the flexible rate model the exchange rate response is fairly modest and because of the improvement in price competitiveness foreign exchange reserves and money supply increase temporarily. Thus with flexible as well as fixed exchange rate domestic interest rate decreases while with floating exchange rate there is no change in the interest rate as demand for money and money supply are unchanged.

Domestic prices rise according to Figure 7 nearly identically in the fixed and flexible rate versions. After three years of the shock prices have risen by the full amount of the shock and overshoot somewhat afterwards. With floating exchange rate there is no change in domestic prices. In this case also output is unchanged while with fixed or flexible rates the output effect of the shock is expansionary diminishing gradually because of the increase in domestic prices (Figure 8).

FOREIGN DEMAND SHOCK

FIGURE 9. EXCHANGE RATE

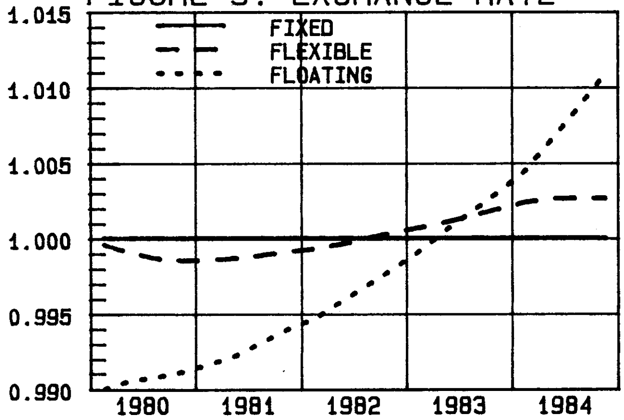


FIGURE 10. INTEREST RATE

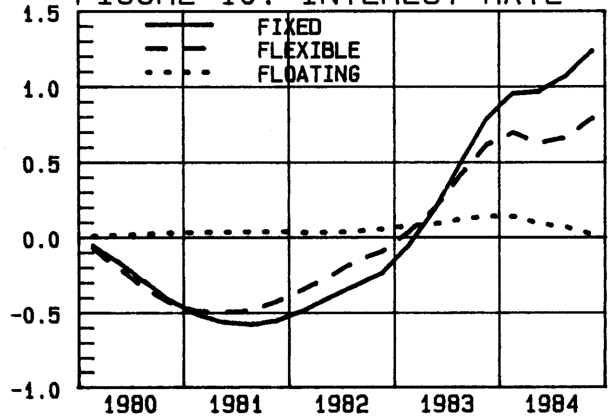


FIGURE 11. PRICES

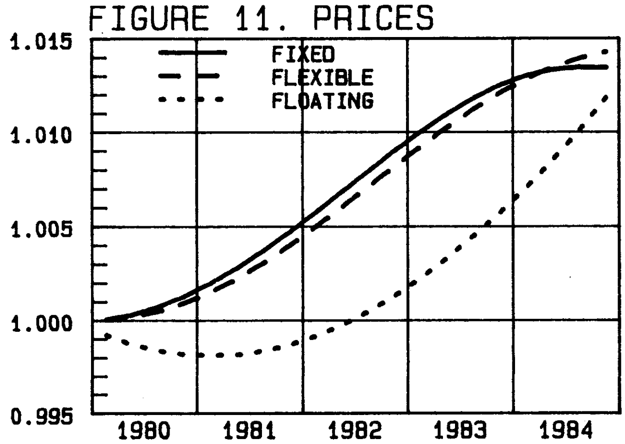
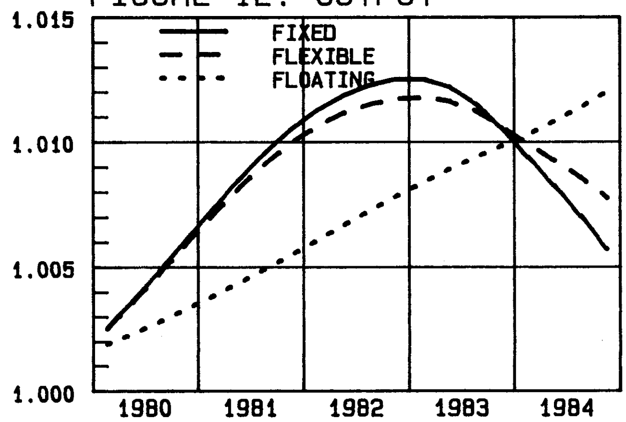
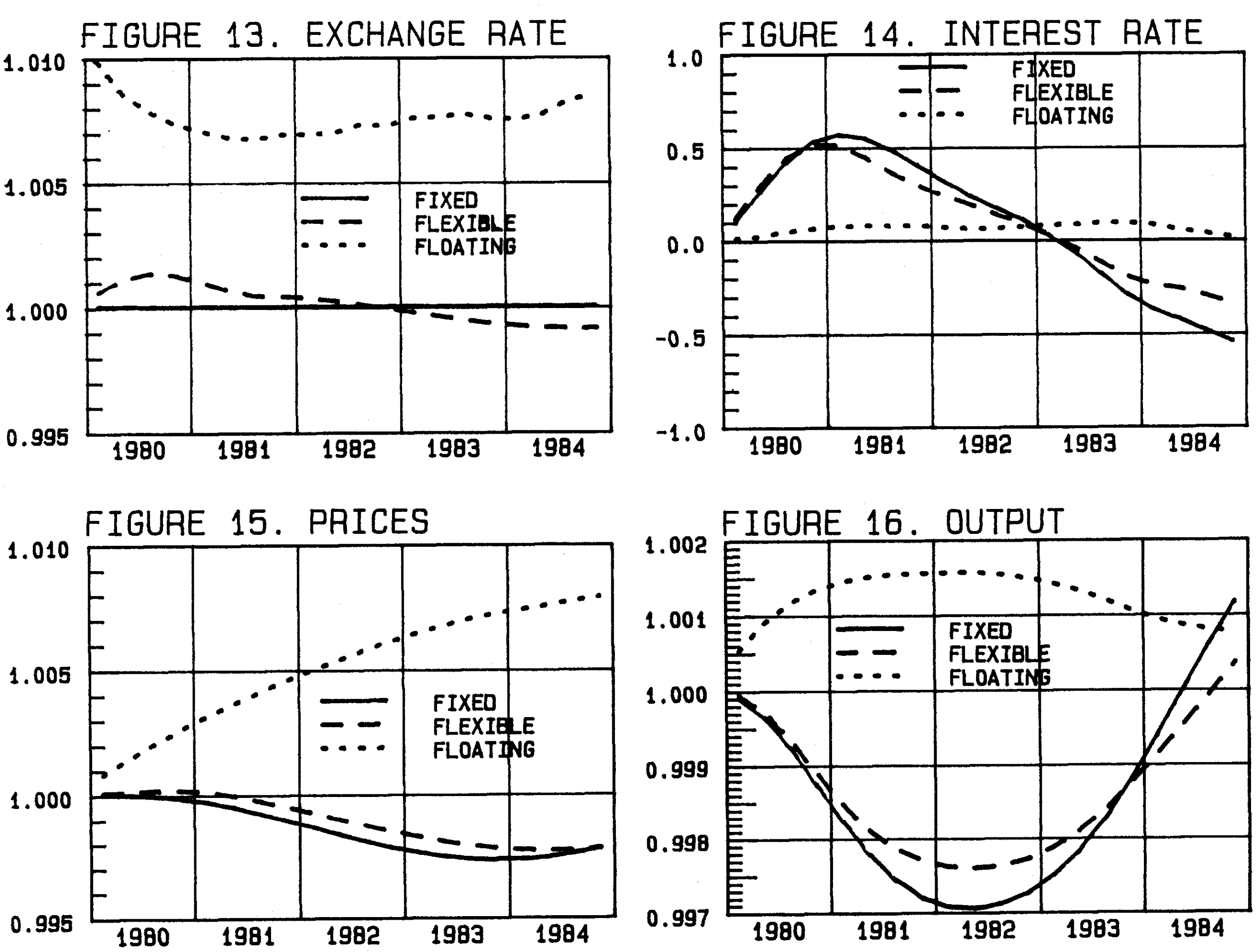


FIGURE 12. OUTPUT



In the foreign demand shock the exogenous foreign demand variable (foreign imports) is increased permanently by 1 per cent from the first quarter of 1980. The exchange rate appreciates clearly but depreciates later on in the floating rate version (Figure 9). This is due to the output expansion (Figure 12) and growth of imports causing the current account to deteriorate compared with the control solution already starting from the fifth quarter of the simulation period despite increased exports. With rational forward looking expectations the exchange rate depreciates starting from the second quarter. The same kind of developments although less pronounced occur with flexible exchange rate. The interest rate decreases immediately with fixed or flexible exchange rates as demand for money increases and money supply stays fixed or even contracts. With floating rates there is no change in the interest rate (Figure 10). Because of the Phillips curve effect and eventual exchange rate depreciation domestic prices increase in all regimes (Figure 11).

FOREIGN INTEREST RATE SHOCK



In the third simulation experiment the foreign interest rate is raised by 1 percentage point. In this case the main channel of causation is through capital movements. When the foreign interest rate raises there occurs an outflow of capital and thus the exchange rate depreciates (Figure 13). Again the interest rate raises to equilibrate the money market (Figure 14). According to Figures 15 - 16 effects on prices are with the exception of the floating rate modest while in all versions output effects are fairly small.[11]

The above simulations with the different versions of the model considered disturbances originating from abroad. In the next simulation effects of a domestic money market disturbance are examined assuming a FIM 50 million permanent increase in the money supply.

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[11]In the current circumstances with increased capital mobility obviously the interest rate raise in the fixed exchange rate regime would be wider. With perfect capital mobility the domestic interest rate would follow the foreign interest rate.

MONEY SUPPLY SHOCK

FIGURE 17. EXCHANGE RATE

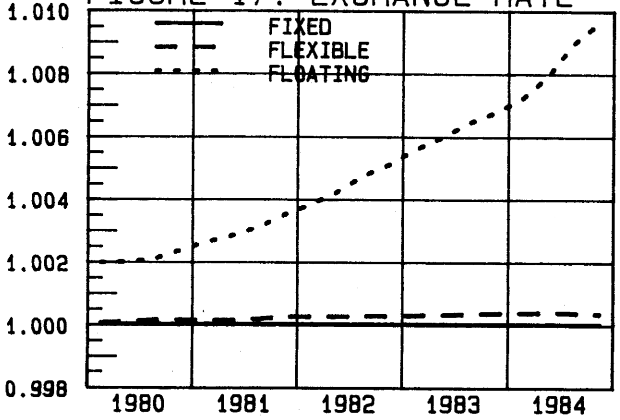


FIGURE 18. INTEREST RATE

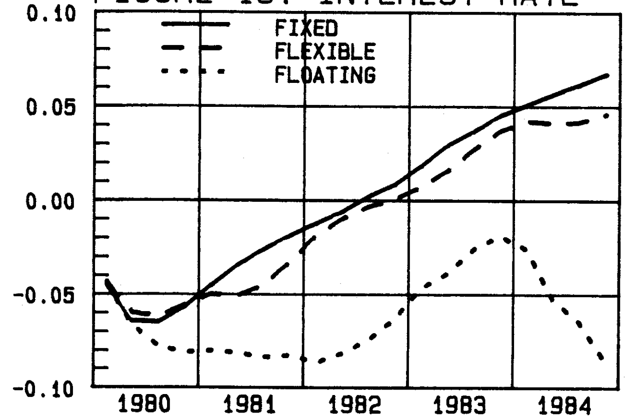


FIGURE 19. PRICES

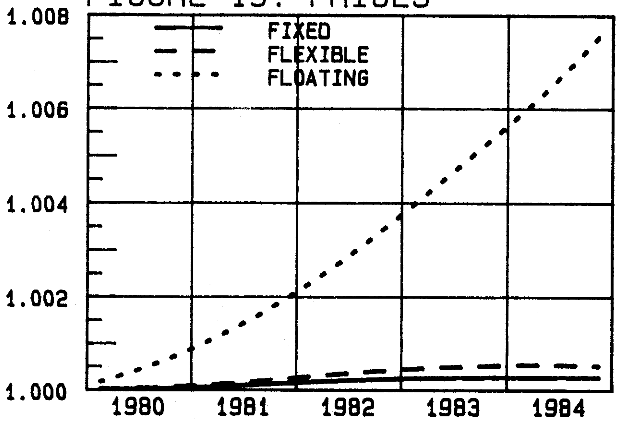
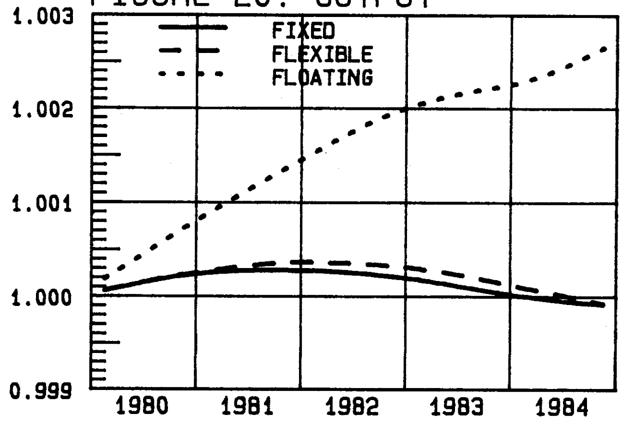


FIGURE 20. OUTPUT



With floating exchange rate and increase in the money supply the interest rate declines and because of the consequent outflow of capital the exchange rate depreciates (Figures 17 and 18). However, the exchange rate adjustment clearly undershoots the money supply change. With fixed or flexible rates the interest rate decline brings about an offsetting decrease in the foreign exchange reserves and thus effects on prices and output are rather modest. With floating rate the effects are markedly more expansionary (Figures 19 and 20).

Considering the insulating properties of the exchange rate regimes it can be concluded that none of the alternative regimes insulates the economy from all the unanticipated and permanent disturbances considered in any time span. According to the simulations the optimal exchange rate policy in the case of a foreign price shock is floating. With the exchange rate adjusting there is no effect on domestic prices and output. When there is a foreign demand shock prices and output fluctuate marginally less with floating exchange rate. In the case of a foreign interest rate shock prices are relatively stable when the exchange rate is fixed or flexible. There is thus no significant difference in the output fluctuation which occur in opposite direction as compared with the floating rate version. In the domestic money supply shock it is optimal to fix the exchange rate.

The simulation results between the fixed and flexible exchange rate versions of the model do not differ markedly. This is due to the rather weak intervention rule in the flexible rate version. The rule was chosen for illustrative purposes and in view of the 4.5 per cent fluctuation range of the currency index.

The simulation results are qualitatively similar to results with the corresponding versions of the BOF4 model [Aurikko (1988)], although in the BOF4 model the floating exchange is operationalized assuming market specific rational expectations and unanticipated changes in exogenous or predetermined variables of the model [Willman (1988)].

4 CONCLUDING REMARKS

In this paper effects of various shocks are studied in the framework of an econometric macromodel with rational expectations for the Finnish economy. Optimal exchange rate regimes are analyzed by using fixed, flexible and floating exchange rate versions of the model. As with all rational expectations models the results illustrate the crucial distinction between anticipated and unanticipated disturbances. However, in the simulations only unanticipated and permanent shocks were applied. According to the simulation results none of the exchange rate regimes insulates the economy from all the shocks studied. By and large fixed rates seem to be preferable if shocks are monetary while floating rates are optimal if shocks are real. Thus if real shocks dominate in the short-run and monetary shocks in the longer run some support for the Finnish exchange rate policy with fixed rates in the long-run and some fluctuations in the short-run.

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