Effects of a single European monetary policy: simulations with the multi-country model of the Deutsche Bundesbank

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Introduction

In the spring of 1998 it will be decided whether the European Monetary Union (EMU) will start in 1999 and which countries will participate. In the meantime it is completely open which countries will qualify then. One of the pre-conditions set in the Maastricht Treaty is at least a two-year participation in the exchange rate mechanism (ERM) of the European Monetary System without severe exchange rate tensions. For that reason Italy has returned to the ERM in November 1996 to reserve the possibility of joining the EMU from the beginning. Principally all countries of the European Union now participating in the exchange rate mechanism of the European Monetary System have a chance to fulfil the convergence criteria laid down in the Maastricht Treaty. It may even be possible that the United Kingdom and Denmark which have been granted an opting-out clause in the Maastricht Treaty will participate in the European Monetary Union. But the necessary regime shift from national monetary policies to a common monetary policy of the European Central Bank cannot be realised overnight. On the way to the European Monetary Union it seems necessary to coordinate national monetary policies converging to the likely single European monetary policy because otherwise the changes in monetary policy instruments will become too large and too abrupt.[1] Coordination of monetary policies will be the more necessary when the decisions on the participating countries have been taken in 1998.

The common monetary policy will result in a single short-term interest rate within the European Monetary Union, irrespective of whether the European Central Bank follows a strategy of monetary or of inflation targeting.[2] At present (January 1997), an assessment of macro-economic effects of the transition to a single monetary policy in EMU is not possible without some rather heroic and very strong assumptions. In the following analysis with the macro-econometric multi-country model of the Deutsche Bundesbank it has been assumed, therefore, that:

- EMU starts at the beginning of 1999,
- all six European countries contained in the model, i.e. Belgium, France, Germany, Italy, the Netherlands and the United Kingdom, will fulfil the convergence criteria and participate in EMU from the beginning,[3]
- the conversion rates to the Euro will be identical to the present exchange rates (which are not far from ERM central rates for the participating currencies).[4] There will be no realignments within the ERM in the years 1997 and 1998.

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1 Actually, the strengthening of the coordination of Member States' national monetary policies is a main task of the European Monetary Institute in Stage II of the Maastricht process.

2 The necessary strategy decisions and the operational framework for the single monetary policy have been described in EMI (1997).

3 However, the reluctance of the British Government to rejoin the ERM and to make the Bank of England fully independent may indicate that the UK will not participate in EMU in the first round.

4 On other possible procedures to fix the conversion rates see DeGrauwe (1996).

This means that a fully credible fixed exchange rate system is already in effect in advance of EMU. This credibility may be strengthened further by an early announcement of the conversion rates and a commitment to consistent underlying monetary and economic policies.[5] But the still existing differences in short-term interest rates point to lasting exchange rate risks, especially in the case of the Italian lira and the pound sterling. At the moment, risk premiums are very low between the currencies of the so-called "core"-countries Belgium, France, Germany and the Netherlands. These countries already form a quasi monetary union approximating an optimal currency area. But risk premiums are distinctly higher against the Italian lira and the pound sterling.[6]

The paper is organised as follows. Following a short description of the model the effects of a transition from national monetary policies to a single European monetary policy have been simulated. This common policy has been formulated in two alternatives: first as an adjustment to German short-term interest rates and second as an adjustment to an average European interest rate level. The paper closes with some tentative conclusions.

1. Overview of the model

In analysing the transition from the European Monetary System to the European Monetary Union the macro-econometric multi-country model of the Deutsche Bundesbank is used. This model consists of nine country models for the United States, Japan, Germany, the United Kingdom, France, Italy, Canada, the Netherlands, Belgium and a foreign trade sector. The German country model has nearly 150 equations, whereas the other country models have between 53 and 56 equations. This adds up to a total of nearly 640 equations (see Table 1). The German model, which has been estimated for Germany as a whole, is much more disaggregated than the others and therefore contains more structural details of the economy. All of the country models are built on long-run neo-classical theory with short-run rigidities in the labour and goods markets and an adaptive expectation formation. But only some of the behavioural equations in a country model are decisive. These are especially the equations for real private consumption, real private investment, real imports, labour demand, potential output, effective wages, price deflators, real money demand, long-term interest rates and exchange rates (Table 2 gives a simplified version of a country model). Thus the country models belong more to the small size scale. Most of the other equations are included to facilitate the description and the simulation of the model. In many cases the dynamics of the equations are based on an error correction mechanism.[7]

The exchange rate of ERM currencies against the Deutsche mark is modelled as a quasi-fixed exchange rate. This implies that the short-term interest rate in the respective countries equals the German short-term interest rate plus a foreign exchange risk premium. The exchange rates of the mark and of non-ERM currencies against the US dollar are explained by equations based on interest rate differentials against the United States and purchasing power parity.[8] The short-term interest rates in these countries are either described by an autoregressive equation or can be used as the exogenous monetary policy instrument or can be specified in a monetary policy reaction function.

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5 See Bayoumi (1996).

6 Other European countries like Austria, Denmark, Spain and so forth as well as their currencies are not contained in the model used.

7 Deutsche Bundesbank (1996).

8 Jahnke (1996).

Table 1

Size and structure of the multi-country model: number of equations

Sector		US	JP	DE	UK	FR	IT	CA	NL	BE	FT	Total
I.	**Aggregate demand**											
	Estimated equations	4	4	7	4	4	4	4	4	4		39
	Identities	11	11	20	11	11	11	11	11	11	31	139
	Total	15	15	27	15	15	15	15	15	15	31	178
II.	**Aggregate supply**											
	Estimated equations	10	10	14	9	8	9	10	10	9		89
	Identities	6	6	19	7	8	7	6	6	7		72
	Total	16	16	33	16	16	16	16	16	16		161
III.	**Factor cost and price deflators**											
	Estimated equations	6	6	14	6	6	6	6	6	6		62
	Identities	5	7	7	5	5	7	5	5	5	17	68
	Total	11	13	21	11	11	13	11	11	11	17	130
IV.	**Government sector**											
	Estimated equations	3	3	9	3	3	3	3	3	3		33
	Identities	4	4	10	4	4	4	4	4	4		42
	Total	7	7	19	7	7	7	7	7	7		75
V.	**Money, interest and exchange rates**											
	Estimated equations	4	5	31	4	5	5	5	5	5		69
	Identities	1		18		2		1	2	2		26
	Total	5	5	49	4	7	5	6	7	7		95
Total model												
	Estimated equations	27	28	75	26	26	27	28	28	27		292
	Identities	27	28	74	27	30	29	27	28	29	48	347
	Total	54	56	149	53	56	56	55	56	56	48	639
Exogenous variables		2	2	36	2	4	4	4	5	3	4	66

Note: BE: Belgium, CA: Canada, DE: Germany, FR: France, FT: Foreign trade, IT: Italy, JP: Japan, NL: Netherlands, UK: United Kingdom, US: United States.

Table 2
Simplified version of a country model

I. Aggregate demand

(1) Private consumption: $\frac{C}{WO} = C\left(\frac{YV}{WO * p}, r - \dot{p}^e\right)$

(2) Labour supply: $\frac{E}{WO} = E\left(\frac{WA}{WO}, \frac{w(1-t_d)}{p}\right)$

(3) Real final demand: $Y = C + I + \frac{G}{P} + X$

(4) National income: $VE = Y * p - d * K * p - TI - IM * m$

(5) Disposable income: $YV = VE + TR - TD$

II. Aggregate supply

(6) Optimal real capital stock: $K^* = K^*\left(Y, \frac{p^*(1-t_i)}{c}\right)$

(7) Private investment: $I = I(K, K^*)$

(8) Labour demand: $A = A\left(Y, \frac{p^*(1-t_i)}{w}\right)$

(9) Imports: $IM = IM\left(Y, \frac{p^*(1-t_i)}{m}\right)$

(10) Potential output: $Y^* = Y^*\left(E, \frac{E-A}{E}, K\right)$

(11) Real capital stock: $K = (1-d) * K_{-1} + I$

III. Factor costs and price deflators

(12) Wage rate: $\dot{w} = w\left(\dot{p}^e, \frac{E-A}{E}\right)$

(13) Price deflator of domestic demand: $\dot{p} = p\left(\dot{w}, \dot{m}, \frac{Y - IM}{Y^*}, \frac{p^*}{p}\right)$

(14) Expected inflation rate: $\dot{p}^e = \alpha \dot{p}^e_{-1} + (1-\alpha)\dot{p}_{-1}$

(15) User costs of capital: $c = p^*\left[r^*(1-t_d) - \dot{p}^e + d\right]$

Table 2
Simplified version of a country model (continued)

IV. Government sector

(16)	Direct taxes:	$TD = t_d * VE$
(17)	Indirect taxes:	$TI = t_i * Y * p$

V. Money, interest rates and exchange rates

(18)	Money stock:	$\frac{M}{p} = M(Y - IM, r)$
(19)	Long-term price level:	$p^* = p^*\left(M, Y^*\right)$
(20)	Long-term interest rate:	$r = r\left(\dot{p}^e\right)$
(21)	Exchange rate:	$e = e\left(rsf - rs, \frac{p}{pf}\right)$

Variables

A	Labour demand (employment)
C	Real private consumption
c	User costs of capital
d	Depreciation rate
E	Labour supply (labour force)
e	Exchange rate against US dollar
G	Nominal government expenditure
I	Real private investment
IM	Real imports
K	Real capital stock
K^*	Optimal real capital stock
M	Money stock
m	Price deflator of imports
p	Price deflator of domestic demand
$\dot{p}^e$	Expected inflation rate
p^*	Long-term price level
pf	Foreign price deflator of domestic demand

Table 2
Simplified version of a country model (continued)

r	Long-term interest rate
rs	Short-term interest rate
rsf	Foreign short-term interest rate
TD	Direct taxes
t_d	Direct tax rate
TI	Indirect taxes
t_i	Indirect tax rate
TR	Transfer payments to private households
VE	National income
w	Wage rate
WA	Employable population
WO	Total population
X	Real exports
Y	Real final demand
Y^*	Potential output
YV	Disposable income of private households

If the exchange rate against the mark, the anchor currency, is described by e, the price deflator of domestic demand by p and the price deflator of domestic demand in Germany by pf (all in natural logarithms), the domestic short-term interest rate by rs, the German short-term interest rate by rsf and the exchange rate risk premium by ri, then the following applies:

$$e = \gamma e_{-1} + (1-\gamma) f\left(rsf - rs, \frac{p}{pf}\right) \tag{1}$$

$$rs = \gamma(rsf + \Delta e + ri) + (1-\gamma) f(...) \tag{2}$$

Under a strict fixed exchange rate system with $\gamma = 1$ and $\Delta e = 0$ equations (1) and (2) reduce to:

$$e = e_{-1} \tag{3}$$

$$rs = rsf + ri \tag{4}$$

$$ri = \beta ri_{-1} \quad \text{with} \quad \beta < 1 \tag{5}$$

Short-term interest rates in the ERM-countries have to be used to target the exchange rate against the mark. Therefore, they equal German short-term interest rates plus a risk premium which will be zero in the long run. In a system of fully flexible exchange rates with $\gamma = 0$, the exchange rates follow short-term interest rate differentials (uncovered interest parity) and in the long run purchasing power parity. In this case the short-term interest rate can be used as the monetary policy instrument to

target monetary growth or the inflation rate. If a country abandons the obligation to intervene in the exchange rate mechanism it regains full influence on its short-term interest rate.

In reality the European Monetary System combines elements of a fixed exchange rate system with elements of a flexible exchange rate system. In the ERM, exchange rates can fluctuate in a margin around central rates which, in August 1993, was widened from ± 2¼% to ± 15%. Moreover, the central rates can be changed by realignments. Therefore, the policy parameter γ has to be set between zero (fully flexible exchange rates) and one (strictly fixed exchange rates). The exact value determines the respective changes in short-term interest rates and exchange rates.

Changes in short-term interest rates induced by monetary policy either in Germany or in other ERM-countries lead to changes in long-term interest rates and exchange rates. These in turn influence consumption, investment, exports and imports and therefore real GDP. Labour demand and the output gap depend on variations in real GDP. They again exert their influence on wages, production costs and domestic prices. Wages and employment determine labour income which in turn influences private consumption. Domestic prices as well as price expectations feed back into long-term interest rates, exchange rates and foreign trade.[9]

One of the main advantages of a structural macro-econometric model can be seen in the possibility to identify single channels in the monetary transmission process theoretically. The effects of a change in monetary policy on different sectors of the economy, e.g. on the consumption of private households or on the investment of private firms or on foreign trade, can be quantified empirically. The relative importance of the different transmission channels can be assessed.[10] Moreover the interaction of monetary and fiscal policy as well as changes in the policy-mix can be analysed.

The single country models have been specified in very similar but not fully identical ways. Structural differences between countries, especially in the financial sector of the economies and in the transmission process of monetary policy, are partly reflected in differences between the estimated coefficients but to some extent also in differences in the dynamic specification of the behavioural equations. Therefore, differences in the size and in the dynamics of the effects of a change in monetary policy between countries appear.

2. Convergence of short-term interest rates to a single monetary policy in EMU

With the prospective start of EMU in 1999, the European Central Bank will conduct a single monetary policy in the Euro area and set a common short-term interest rate level in the participating member states. Up to now, different interest rate levels in the selected European countries have prevailed. Short-term interest rates in Germany, the Netherlands and Belgium have already converged towards the lowest interest rate level in Europe for the last two years. The French short-term interest rate differential vis-à-vis these three countries was about two percentage points in 1995, but has narrowed strongly in 1996. The United Kingdom and Italy have higher and more persistent risk premia, with Italy's short-term interest rate being on the very top of these European interest rates. Nevertheless, in Italy, market expectations of participation in EMU from its start have allowed monetary the authorities to cut short-term interest rates substantially during the second half of 1996. With regard to interest rate differentials, it is an open question how interest rates will behave during the transition period to EMU and afterwards. A further interesting feature of the EMU process

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9 Herrmann and Jahnke (1994).

10 Jahnke and Reimers (1995).

consists in the macro-economic effects of the convergence path towards a common EMU interest rate level. Some of these questions should be answered by the following simulation experiments which have been undertaken with the macro-econometric multi-country model of the Deutsche Bundesbank.

In order to calculate the effects of a single monetary policy in EMU, a baseline scenario has been designed. In this scenario, EMU will not start in 1999. Instead, the current ERM operates without tensions during the whole simulation period (from 1997 until 2003) and exchange rates between the mark and the other participating European currencies are stable. The German short-term interest rate follows an autoregressive path, while interest rates in the other countries are linked to the German short-term interest rate via a risk premium. According to this path, short-term interest rates will increase between 1997 and 2000, decrease thereafter and converge in the long run towards constant values which are 6½% p.a. for Germany, Belgium and the Netherlands, 7% p. a. for France, 9% p. a. for the United Kingdom and 12% p. a. for Italy. For the Netherlands and Belgium the risk premium is held at zero. Risk premia in France, the United Kingdom and Italy are positive, reflecting the interest rate differentials in 1996. To isolate the effects of EMU in the countries considered it is necessary to assume the participation of the United Kingdom in the ERM in this simulation. Therefore, the United Kingdom's entry into ERM hypothetically has been set on 1st January 1997, which seems to be early enough to fulfil the Maastricht exchange rate criterion.

The results of the baseline serve as a basis of comparison for two different policy simulation experiments, both assuming the start of EMU at the beginning of 1999. In the first experiment, short-term interest rates in EMU will converge towards German interest rate baseline levels, i.e. in the EMU area the relatively low German interest rate level will prevail. Since an over-night adjustment of interest rates on New Year's Eve 1998 seems not to be very realistic, a gradual path of convergence has been assumed during the years 1997 and 1998. This means that the positive risk premia of the pound sterling, the French franc and the Italian lira have been reduced exogenously every quarter by the same amount. After 1999 risk premia are zero for all participating currencies.

In the second simulation experiment, interest rates converge towards an average European interest rate level, calculated on the average of short-term interest rates in the baseline weighted by the respective GDP shares of the year 1995. Because of high interest rates in the United Kingdom and, in particular, in Italy the level of the average European interest rate is about 130 basis points above the German level.[11] As in the first case, interest rates converge gradually towards the common EMU level and risk premia are zero after 1999, too, with all these assumptions fully credible in the markets.[12] Regarding short-term interest rates in the United States, Japan and Canada, the assumption is made that they will not be influenced by the transition to EMU. Therefore, in the simulation experiments their interest rates are kept at baseline levels. In addition, fiscal policies in all countries are unchanged in comparison to the baseline solution.[13]

Charts 1 and 2 report the short-term interest rate paths in the respective countries for the different scenarios. The adjustment of short-term interest rates to German interest rate levels implies for France, the United Kingdom and Italy an expansionary monetary policy shock. The short-term interest rate in France falls by 50 basis points up to the start of EMU and in the United Kingdom it falls by 230 basis points. In Italy, the cut in short-term interest rate amounts to more than 500 basis points. In Germany, the Netherlands and Belgium, interest rates remain at baseline levels. The scenario with the adjustment of short-term interest rates to an average European interest rate level

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11 This tightening of monetary conditions can be seen as a strategy of the national central banks and the ECB later on, to build credibility for the new monetary authority in Europe.

12 Similar interest rate scenarios have been described in Scheide and Solveen (1997).

13 Since the aim of this study is to isolate the effects of short term interest rate convergence, the consequences of the fulfillment of the convergence criteria, especially the fiscal criteria, have been excluded. In this respect, see e.g. Hughes Hallett and McAdam (1996) and Gros (1996).

Chart 1

Short-term interest rates

_____ Base line

------- Adjustment to German interest rate level in EMU

..... Adjustment to average European interest rate level in EMU

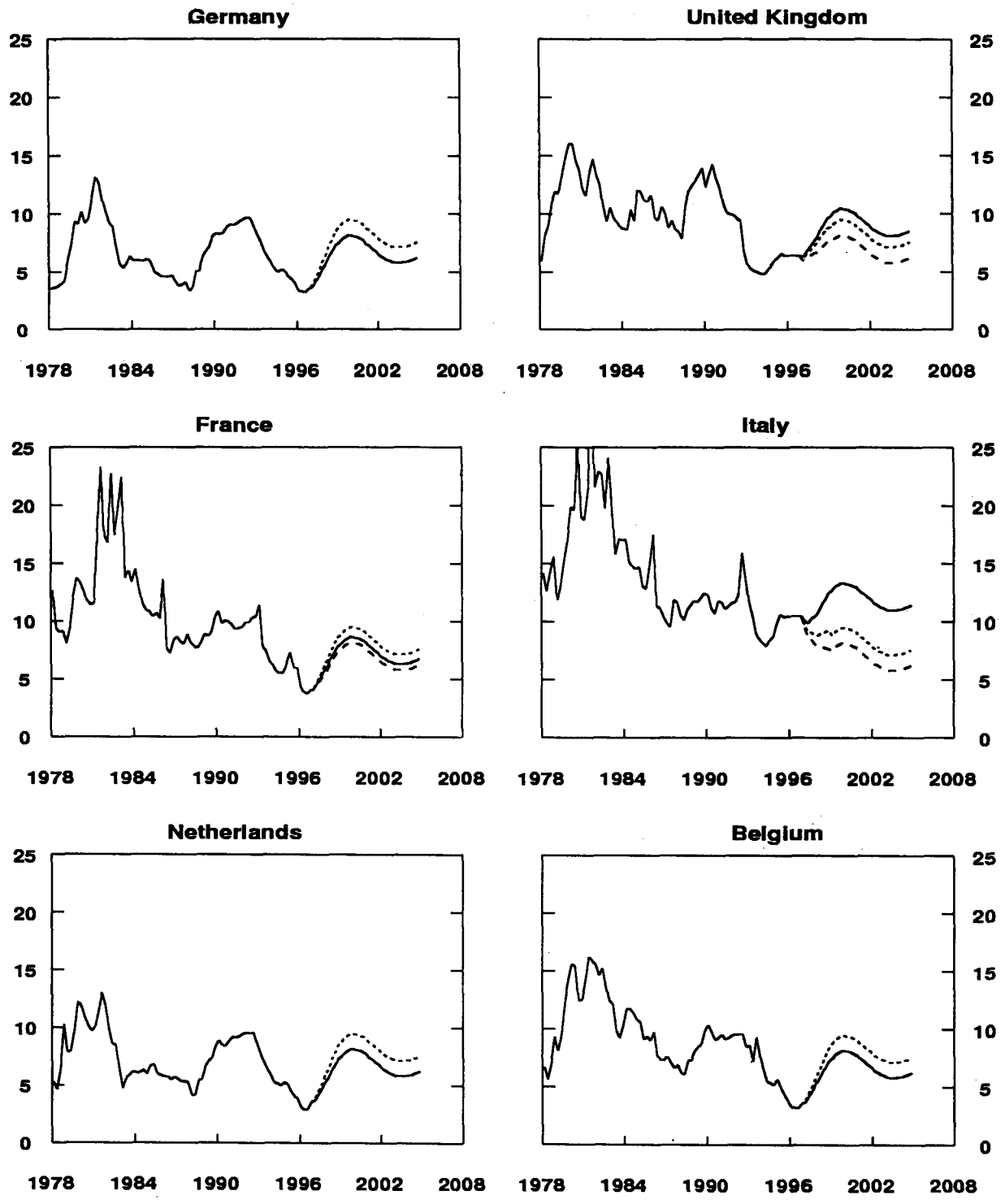
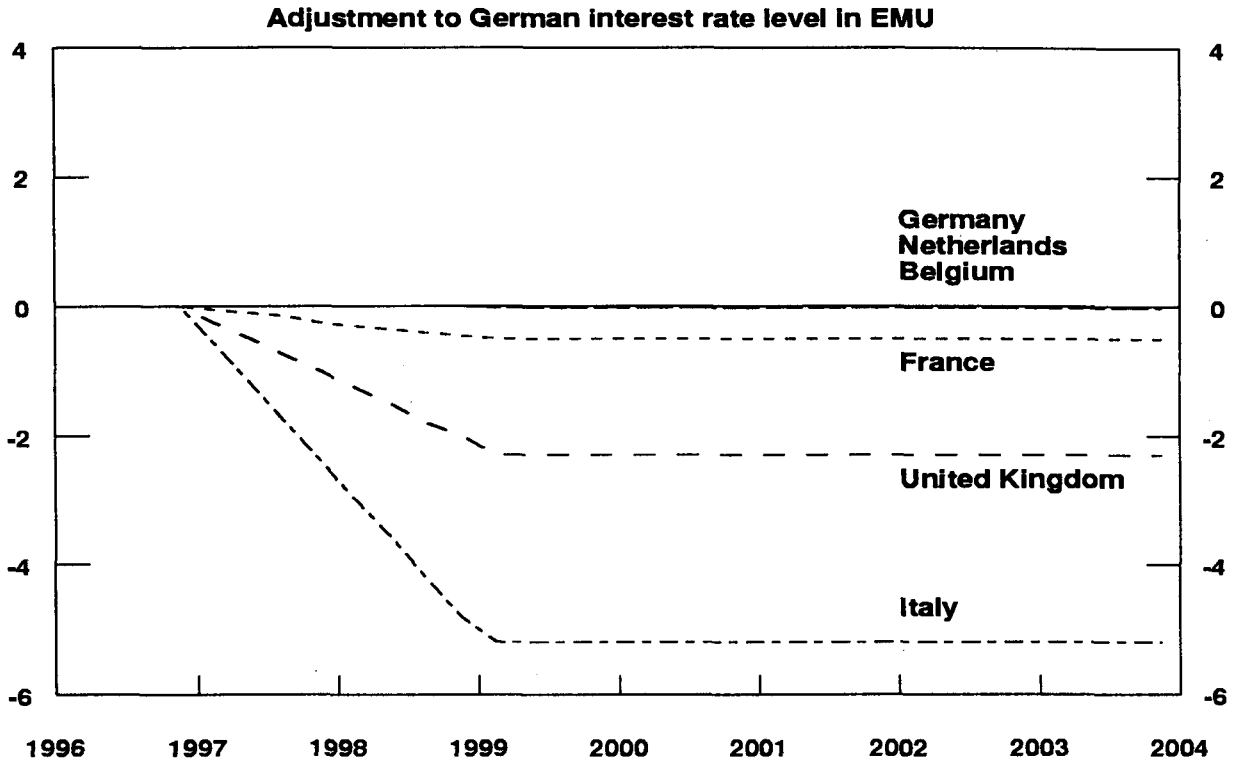
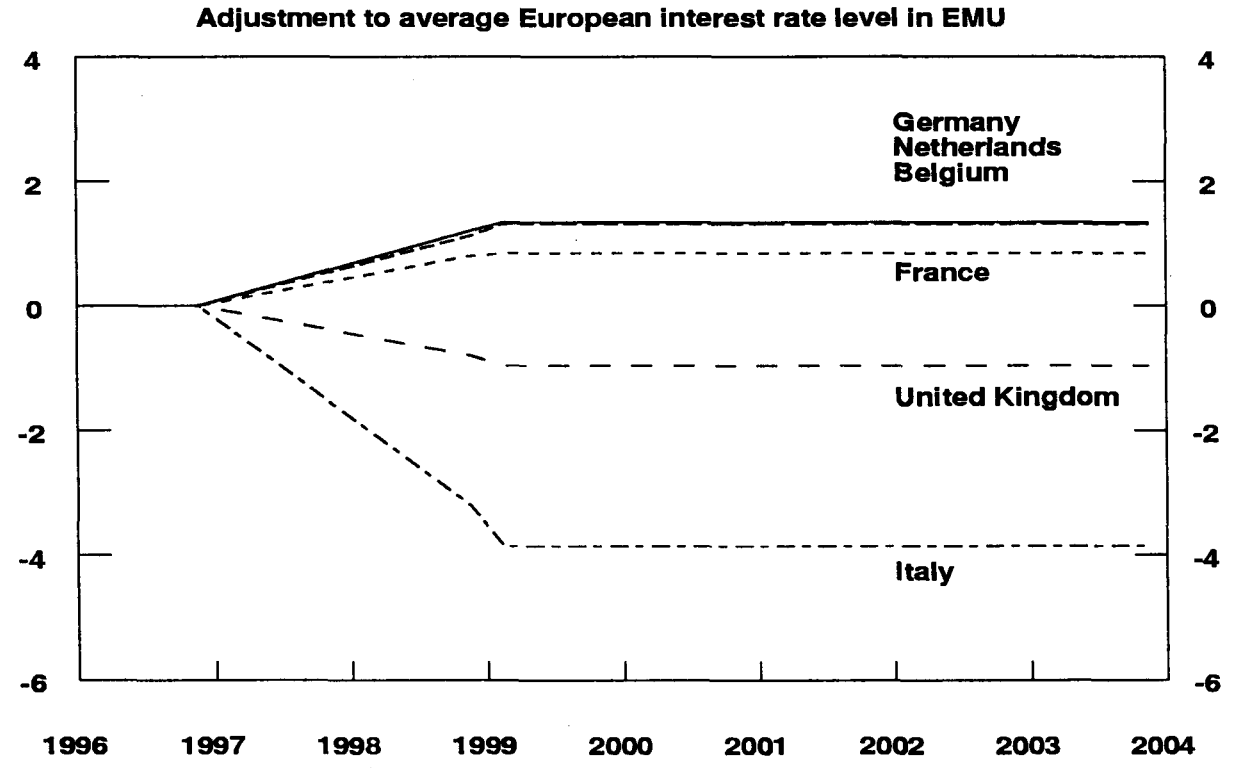


Chart 2

Effects of a single European monetary policy on short-term interest rates





involves for four countries a policy of monetary restraint. In Germany, the Netherlands and Belgium the rise in short-term interest rates is about 130 basis points altogether in 1999. The French interest rate increases by more than 80 basis points. At the same time, the United Kingdom and Italy still experience a loosening of monetary conditions with a reduction of short-term interest rates by roughly 100 basis points and 390 basis points respectively. It should be stressed that both simulation experiments imply a permanent change of interest rates. Fundamentally, this means a regime shift and may be subject to the Lucas critique. However, assuming that agents will not change their behaviour immediately, the application of the model to this kind of questions should still be admissible. But in the longer run, financial structures and transmission processes in the participating countries will adjust, at least to some extent.

3. Effects of a single monetary policy on output and prices

The results of the aforementioned changes in interest rates during the transition period to EMU and afterwards are described in Tables 3 and 4. Chart 3 depicts the response of real GDP to the two monetary policy scenarios during the simulation period. If interest rates in EMU adjust to the German short-term interest rate level all participating member countries will experience a rise in output due to decreasing real interest rates. As the graph in the upper part of Chart 3 shows, the expansionary effect of interest rate adjustment is, not surprisingly, strongest in Italy. After an interest rate cut by more than 500 basis points totally in 1999, output in Italy is 1.5% above the baseline level within five years of the start of interest rate convergence. In the United Kingdom, the peak effect is about 1.2% after five years, while in France it is above 0.2% within the same time period. The weaker effect can be explained by smaller interest rate cuts in these two countries compared to Italy.

On account of the international linkage considered in the multi-country model, output in Germany, the Netherlands and Belgium also increases in comparison to the baseline, though their short-term interest rates remain unchanged. In Germany real GDP is 0.2% above its baseline solution after five years. Remarkably, the effect on real GDP in the Netherlands and Belgium (0.5% and 0.3% respectively) is stronger than on the French real GDP. This is a reflection of the different degree of openness of the countries considered. In addition, different foreign trade elasticities also play a role. Looking on EMU aggregates (see Chart 5), the process towards a single monetary policy will have an expansionary impact of more than 0.6% on areawide activity if interest rates adjust to the low German level.

The lower part of Chart 3 plots the output reaction of short-term interest rate adjustments to an average European interest rate level. Here, the results are mixed. Recalling that this scenario means a tightening of monetary conditions in Germany, France, the Netherlands and Belgium, the reaction of real GDP in the respective countries is as expected. The gradual increase in Germany's short-term interest rates, amounting to 135 basis points altogether in 1999, leads to a reduction of German output by 0.35% in the same year; five years after the start of monetary tightening a negative deviation of Germany's real GDP by 0.1% still persists. In Belgium and especially in the Netherlands activity is much more reduced, though the interest rate shock in these countries is as high as in Germany. Again, the larger effect can be accounted for by the high degree of openness of these countries. In France too, activity is depressed by the higher interest rate.

Regarding the countries with a loosening of monetary conditions, the initial impact on growth is adverse in Italy because of the reduction in activity abroad. But in 1999, when the total interest rate cut of 390 basis points is operative, real GDP in Italy starts to rise as expected. A year later output is 0.4% above the baseline level, then falling again because of negative trade impacts. A remarkable case is the reaction of real GDP in the United Kingdom. Usually, one would expect a surge in activity if interest rates are cut by a total of almost 100 basis points. But in the United Kingdom output remains more or less at baseline levels, because the international interaction plays a role, too. Certainly, domestic activity in the United Kingdom is influenced positively through an

interest rate reduction, but this reaction is not strong enough to overcompensate for the adverse effects on exports originating in the slowdown of activity abroad. For the EMU area as a whole, this scenario leads to a drop in real GDP by 0.15% after five years in comparison to the baseline (see Chart 5 and Table 4).

Table 3

Effects of a single European monetary policy in the multi-country model of the Deutsche Bundesbank: adjustment of short-term interest rates to German interest rate level

Deviation from baseline in percentages or in percentage points

	1997	1998	1999	2000	2001
1. Short-term interest rate					
Germany	0.00	0.00	0.00	0.00	0.00
United Kingdom	-0.64	-1.64	-2.30	-2.30	-2.30
France	-0.14	-0.38	-0.50	-0.50	-0.50
Italy	-1.50	-3.90	-5.20	-5.20	-5.20
Netherlands	0.00	0.00	-0.01	-0.01	-0.01
Belgium	0.00	0.00	-0.02	-0.02	-0.02
EMU	-0.38	-0.99	-1.34	-1.34	-1.34
2. Long-term interest rate					
Germany	0.00	-0.00	-0.00	-0.00	0.00
United Kingdom	-0.16	-0.47	-0.65	-0.50	-0.29
France	-0.01	-0.05	-0.06	-0.02	0.02
Italy	-0.44	-1.46	-2.06	-1.73	-1.18
Netherlands	0.00	-0.00	-0.00	-0.01	-0.00
Belgium	0.00	-0.00	-0.00	-0.01	-0.00
EMU	-0.10	-0.33	-0.46	-0.38	-0.24
3. Money stock					
Germany	0.00	0.03	0.10	0.21	0.33
United Kingdom	0.27	1.17	2.56	3.83	4.69
France	0.03	0.14	0.27	0.36	0.43
Italy	0.52	2.27	4.54	5.64	5.01
Netherlands	0.05	0.28	0.74	1.18	1.41
Belgium	0.03	0.16	0.45	0.80	1.09
EMU	0.14	0.63	1.39	2.04	2.36
4. Real GDP					
Germany	0.01	0.07	0.14	0.20	0.23
United Kingdom	0.11	0.44	0.85	1.09	1.16
France	0.01	0.07	0.16	0.21	0.23
Italy	0.08	0.46	1.06	1.48	1.53
Netherlands	0.02	0.14	0.30	0.41	0.46
Belgium	0.04	0.17	0.30	0.33	0.32
EMU	0.04	0.21	0.44	0.59	0.63
5. Private consumption deflator					
Germany	0.00	0.00	0.01	0.04	0.08
United Kingdom	0.01	0.07	0.29	0.70	1.18
France	0.00	0.00	0.02	0.06	0.13
Italy	0.01	0.13	0.50	1.12	1.80
Netherlands	0.00	0.00	0.02	0.07	0.15
Belgium	0.00	0.00	0.03	0.12	0.25
EMU	0.00	0.04	0.16	0.39	0.65

Table 4

Effects of a single European monetary policy in the multi-country model of the Deutsche Bundesbank: adjustment of short-term interest rates to average European interest rate level

Deviation from baseline in percentages or in percentage points

	1997	1998	1999	2000	2001
1. Short-term interest rate					
Germany	0.38	0.97	1.34	1.34	1.34
United Kingdom	-0.25	-0.65	-0.96	-0.96	-0.96
France	0.25	0.65	0.84	0.84	0.84
Italy	-1.00	-2.60	-3.86	-3.86	-3.86
Netherlands	0.38	0.97	1.33	1.33	1.33
Belgium	0.35	0.91	1.32	1.32	1.32
EMU	0.02	0.05	-0.00	0.00	-0.00
2. Long-term interest rate					
Germany	0.08	0.25	0.35	0.26	0.13
United Kingdom	-0.06	-0.19	-0.31	-0.30	-0.26
France	0.03	0.08	0.08	0.00	-0.08
Italy	-0.30	-0.98	-1.55	-1.43	-1.10
Netherlands	0.13	0.44	0.64	0.56	0.41
Belgium	0.06	0.23	0.37	0.30	0.12
EMU	-0.01	-0.04	-0.10	-0.13	-0.16
3. Money stock					
Germany	-0.24	-0.82	-1.34	-1.39	-1.15
United Kingdom	-0.05	-0.05	0.03	0.07	-0.02
France	-0.17	-0.51	-0.77	-0.88	-1.01
Italy	0.19	0.89	1.93	2.35	1.73
Netherlands	-0.75	-2.54	-4.04	-4.08	-3.43
Belgium	-0.42	-1.62	-3.08	-3.84	-3.68
EMU	-0.16	-0.48	-0.68	-0.69	-0.70
4. Real GDP					
Germany	-0.12	-0.31	-0.35	-0.22	-0.13
United Kingdom	-0.02	-0.01	0.01	-0.01	-0.05
France	-0.08	-0.24	-0.32	-0.32	-0.36
Italy	-0.05	-0.02	0.19	0.39	0.38
Netherlands	-0.19	-0.53	-0.76	-0.83	-0.90
Belgium	-0.35	-0.71	-0.78	-0.69	-0.68
EMU	-0.10	-0.23	-0.24	-0.16	-0.15
5. Private consumption deflator					
Germany	-0.02	-0.14	-0.34	-0.57	-0.77
United Kingdom	-0.04	-0.17	-0.34	-0.45	-0.53
France	-0.02	-0.10	-0.23	-0.38	-0.56
Italy	-0.03	-0.14	-0.24	-0.21	-0.12
Netherlands	-0.01	-0.06	-0.18	-0.35	-0.56
Belgium	-0.01	-0.08	-0.29	-0.63	-1.02
EMU	-0.02	-0.13	-0.29	-0.45	-0.59

Chart 3

Effects of a single European monetary policy on real gross domestic product

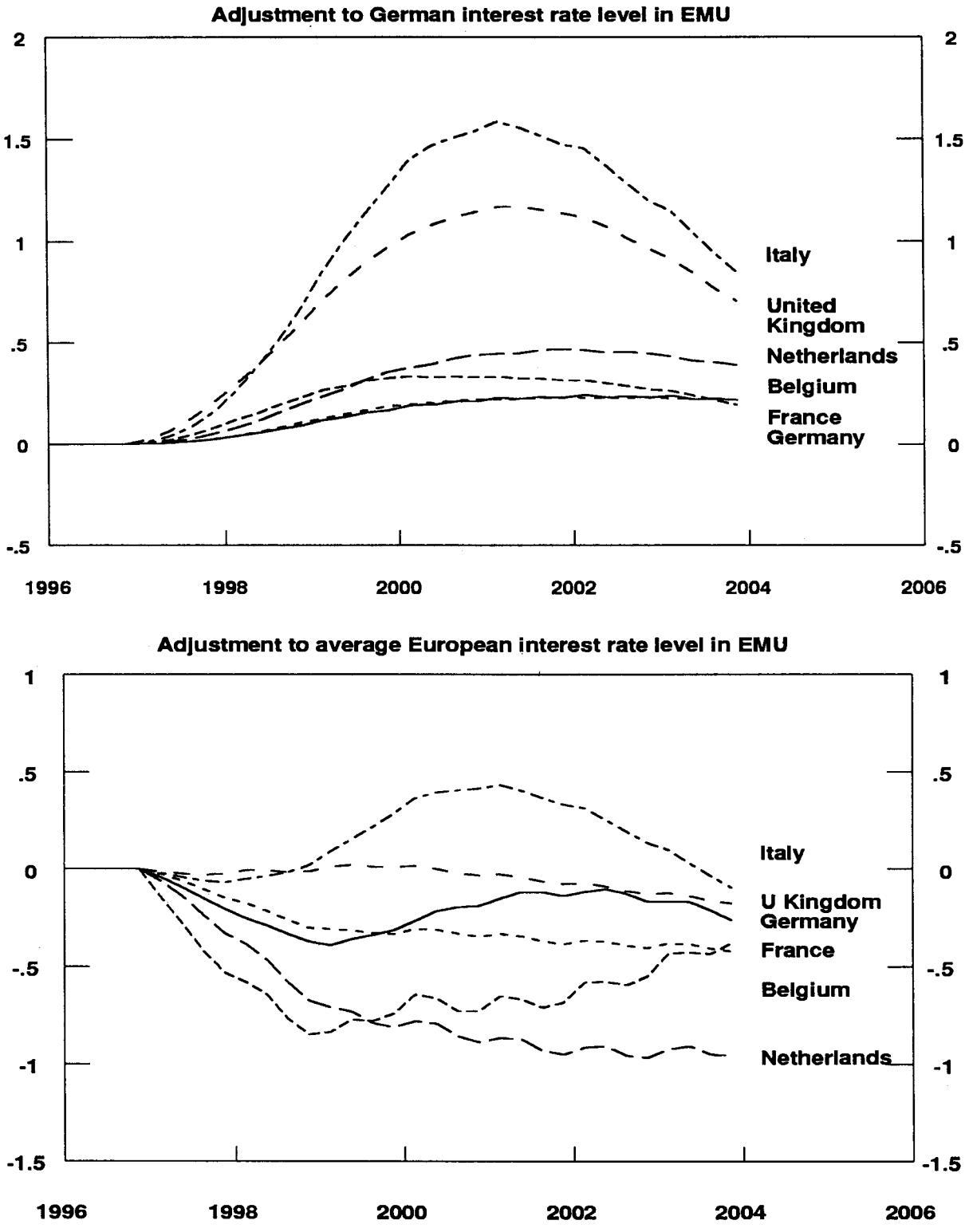


Chart 4

Effects of a single European monetary policy on private consumption deflators

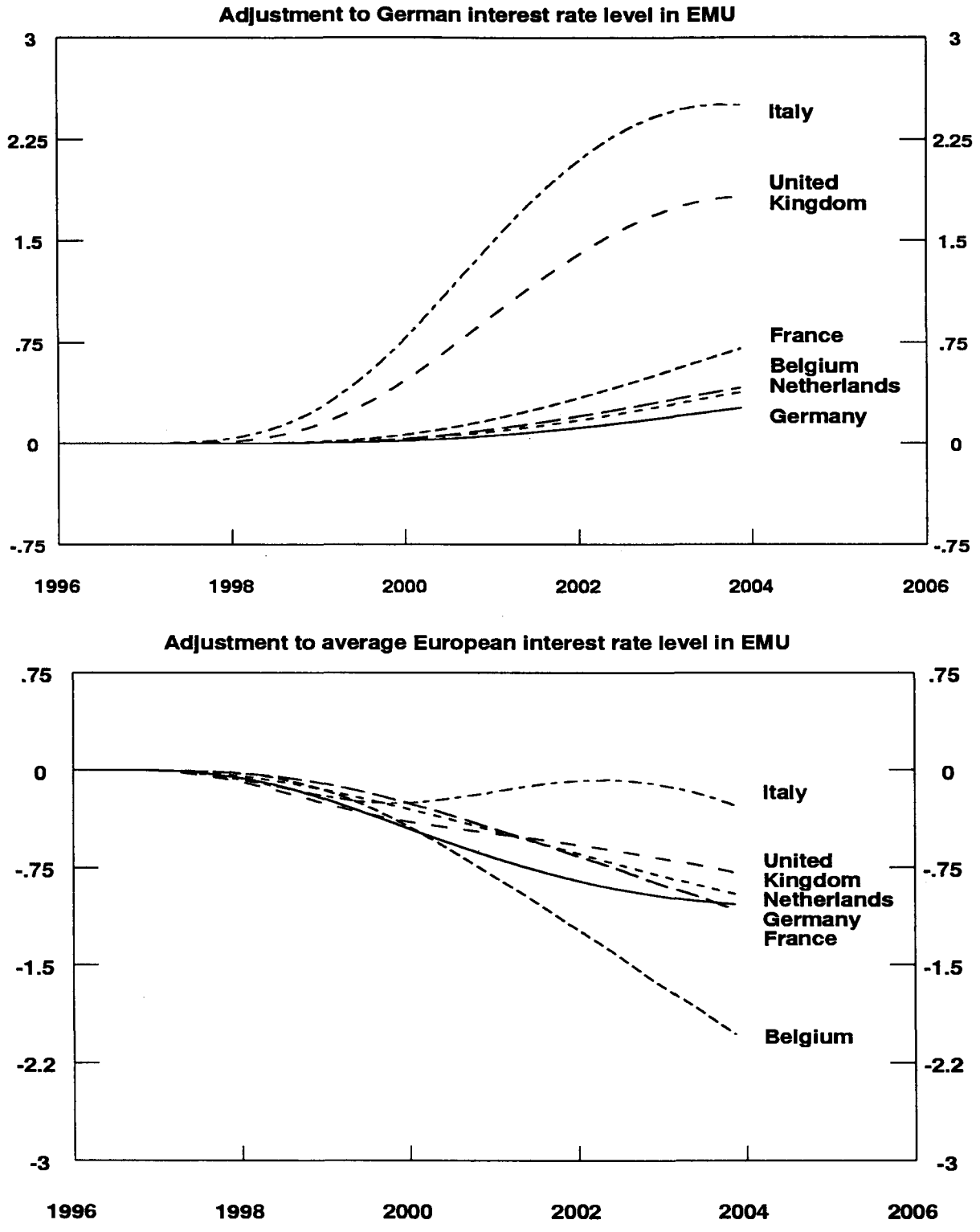
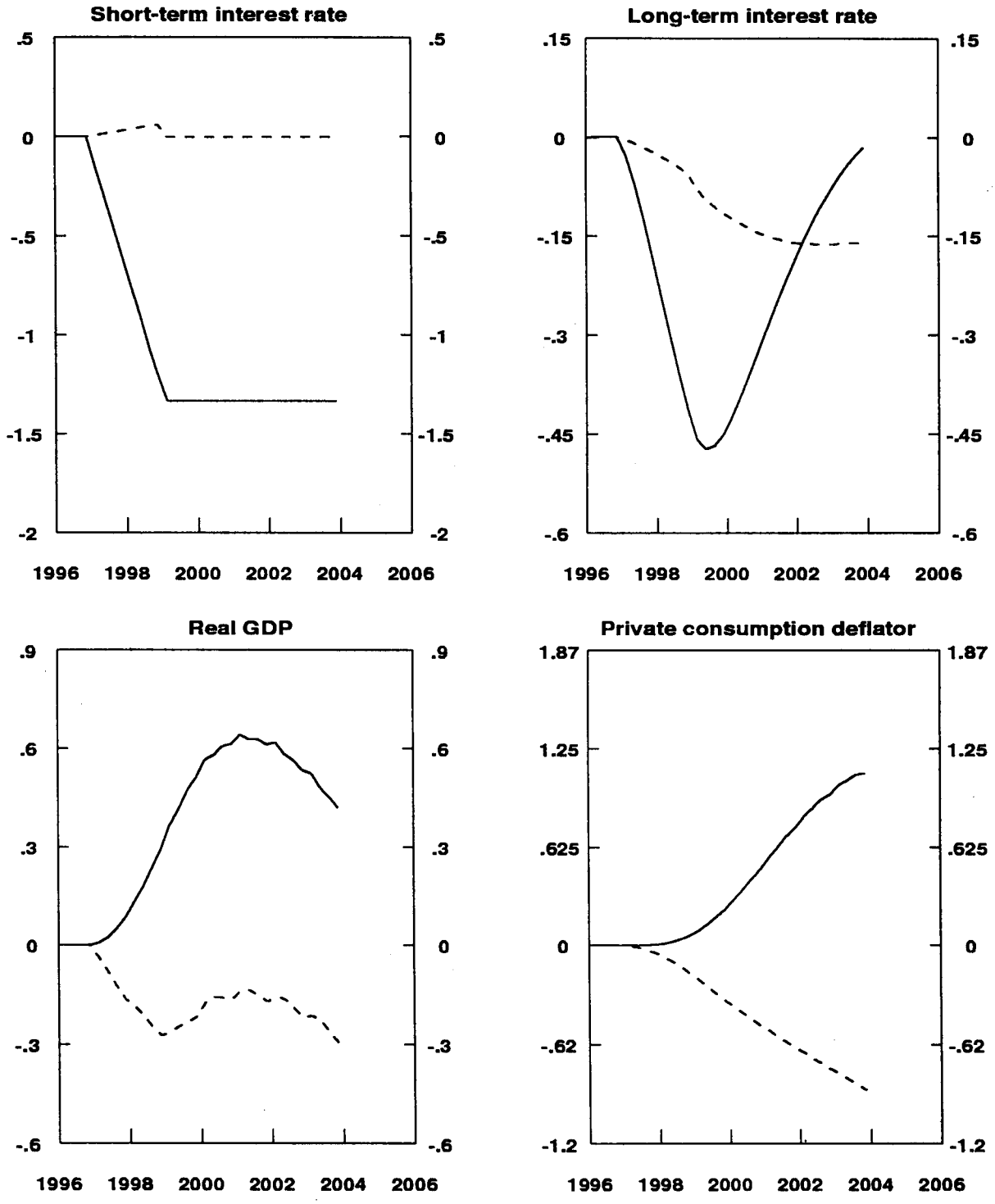


Chart 5

Effects of a single European monetary policy on EMU aggregates

_____ Adjustment to German interest rate level in EMU

-------- Adjustment to average European interest rate level in EMU



The difference between the two simulation experiments is also evident in the simulated price responses. In the upper part of Chart 4 the effects of an interest rate adjustment to German interest rate levels on the private consumption deflators are depicted. As expected, prices rise in every EMU country, since the first scenario is expansionary. Corresponding to the size of the output effect the increase in consumer prices is the strongest in Italy. After five years the private consumption deflator in Italy is 1.8% above the baseline level, while still rising until 2003. The private consumption deflator in the United Kingdom shows a similar behaviour but on a lower scale. In Belgium, France, the Netherlands and, in particular in Germany, price effects are quite small initially. Five years after the start of interest rate convergence, Germany's private consumption deflator is less than 0.1% above its value in the baseline solution. In the later stages of the simulation period the increase in the price level is higher but still moderate. Aggregated over the whole EMU area the deflator of private consumption exceeds its baseline value by about 0.7%.

The price responses of interest rate adjustments to an average European interest rate level are reported in the lower part of Chart 4. Higher interest rates and a slowdown in activity in some countries lead to a fall in price levels in the whole EMU area. Surprisingly, even in Italy prices fall, though growth accelerates in this country. The reason for this unexpected development is decreasing import prices caused by falling export prices in the other EMU countries. Three years after the start of interest rate convergence the private consumption deflator in Italy is about 0.25% below baseline. Then the decreasing effect weakens and the price level deviation from the baseline fluctuates around zero. Since import price elasticities of domestic prices are very high in Belgium, the price drop is very strong in that country. Five years after the beginning of interest rate convergence the consumer price level in Belgium is about 1% below baseline. In the other countries, Germany, France, the Netherlands and the United Kingdom, price reactions are more moderate. In these countries the negative deviation of private consumption deflators range between 0.5% and 0.8% after five years. The aggregated EMU deflator of consumption is about 0.6% below its baseline level.

Conclusions

Even though many important issues on the way to EMU are still left open and will only be decided in the course of 1998, it seems necessary to assess the prospective effects of a transition towards a single European monetary policy. At the present time in January 1997, this is only possible under some very heroic assumptions regarding the participation of countries, the starting date and the conditions of entry into EMU. From different monetary policy scenarios which have been simulated with the macro-econometric multi-country model of the Deutsche Bundesbank only tentative conclusions can, therefore, be drawn.

If short-term interest rates in EMU converge towards the relatively low German rates, the effect on output in all participating countries will be expansionary, at least for some years. In this case inflation in EMU will accelerate and the price level will increase. The whole area gains in real output, but looses in price stability. This could endanger the credibility of the ECB and may lead to rising inflation expectations. If the European Central Bank adjusts its short-term interest rate to an average European level this will have an expansionary influence activity in some countries, mainly in Italy. But in other countries, including Belgium and the Netherlands, this policy will have contractionary output effects. This exerts a further dampening effect on prices even in those countries where the inflation rate is already very low. Output in the whole EMU area as well as the level of the private consumption deflator are below baseline levels in this case. In the transition period to a single monetary policy the whole area looses some real GDP, but gains in long-run price stability. The simulated reactions in output and prices depend, to some extent, on the expectation formation process used in the model and may be smaller and faster in the case of model-consistent expectations.

A single European monetary policy influences economic activity in the participating countries of EMU differently, at least in the transition period and in the first years of EMU, when

structural differences between countries still exist. Real growth rates as well as inflation rates will, therefore, differ from country to country. According to the latest convergence report of the European Monetary Institute[14] the difference between the lowest inflation rate in Finland (0.9%) and the reference value (2.6%) in the period from October 1995 to September 1996 amounts to 1.7 percentage points. If such an inflation differential lasts for four years the price levels between different countries have already diverged by 7%. A single areawide monetary policy alone which targets aggregate goals does not seem to be suited to accelerate or even to maintain the convergence process between countries. On the contrary, the common policy may have divergent effects on the inflation rates in the participating countries. Instead, convergence has to be obtained by national economic policies, possibly in the field of fiscal policy and structural reforms to enhance flexibility and mobility in the labour, capital, goods and financial markets.

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[14] European Monetary Institute (1996).

Comments on : "Effects of a single European monetary policy: simulations with the multi-country model of the Deutsche Bundesbank" by Wilfried Jahnke and Bettina Landau

by C. E. V. Borio

The paper by Jahnke and Landau simulates the effects of the move to a common monetary policy associated with the establishment of EMU. The exercise is based on the Deutsche Bundesbank multi-country model and covers the period 1997-2003. It assumes a smooth transition: short-term interest rates converge in 1999 against the background of unchanged exchange rates among participating countries (Germany, France, the United Kingdom, Italy, the Netherlands and Belgium) and flexible rates vis-à-vis the rest of the world (specifically, the United States, Japan and Canada). Two scenarios are put forward. In the first, short-term interest rates converge to the level of those ruling in Germany. In the second, they converge to the average level prevailing in participating countries. The main results vary according to the scenario. In scenario 1 there is an overall expansion; given the differing starting points, this occurs at a different pace across countries. In scenario 2, there is an overall contraction and the behaviour of inflation and output diverges across countries. In other words, in this second case nominal convergence is associated with divergence in nominal and real variables.

This is a very neat and clear paper. It addresses an important question and provides some interesting answers. My comments will address essentially three questions. First, are the scenarios "reasonable" and properly handled by the model? By "reasonable" I do not mean "realistic": the paper is not attempting to provide a forecast; rather, the key criterion is internal consistency. Second, is the transmission mechanism implied by the model rich enough? Finally, what broader policy issues does the paper raise?

The scenarios and their handling

Much of what I will have to say on this relates to what is assumed to be exogenous in the simulations. The main point is that the assumptions about exogeneity may not be fully justified and can unnecessarily limit the validity of the results.

The paper posits an exogenous reduction in the "risk premia" on short-term interest rates. In fact, whether this can actually take place depends on other policies whose evolution is not consistently modelled. This is the case, most critically, for fiscal policy, both with regard to the Maastricht criteria for EMU eligibility and to the constraints imposed by the "Stability Pact" that would apply after 1999. Put differently, the "rules of the game" imply a specific relationship between the path of fiscal and monetary variables that would otherwise not exist. Some attempt to model this seems appropriate.

The paper does not really say much about the conditions under which each of the two scenarios would actually materialise and hence about what they would mean. In the model, convergence to the *average* level of interest rates (scenario 2) is an unambiguous tightening. In reality, this would presumably in part reflect less credibility on the part of the ECB compared with scenario 1 and thus higher long-term inflation expectations.[1] This would imply less of a tightening than assumed in the model. Simulations based on some form of model-consistent expectations would help here. They would seem more appropriate given the nature of the exercise.

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[1] Of course, this would be different if higher short-term rates resulted from a pre-emptive strike by the ECB in an attempt to establish credibility.

The final point follows from the previous one. As posited in the present simulation, presumably in the scenario in which short-term rates converge to the average level there is a concomitant appreciation of European currencies vis-à-vis the other world currencies. This would strengthen the overall contraction. However, if the rise reflected an attempt to cope with a loss in credibility, this would not be the case. The observation reiterates the point that a careful use of model-consistent expectations – or at least ad hoc ways of capturing their effect – would have bigger implications than probably assumed by the authors.

The transmission mechanism

The paper does not explain much of the link between short and long-term interest rates. Given the major role that long-term rates play in the model, a richer discussion would be useful. This should cover not just changes but also the *levels* of the spreads, so as allow a better assessment of their plausibility. In fact, the model, as it stands, cannot account for one significant part of the story: for highly indebted governments default risk premia could rise as access to the printing press is centralised, tending to offset the reduction in the exchange rate (inflation) premium associated with a single monetary policy.

Similarly, it is not clear how much room the model allows for differences in countries' transmission mechanisms. A worthy example is the relative importance of short-term versus long-term rates. Previous studies, for instance, have clearly shown that in the United Kingdom and, to a lesser extent, in Italy, short-term rates play a more significant role than in the other continental European countries included in the model, where long-term rates are more influential.[2] This could well have an impact on the simulation results. One may wonder, for instance, if the surprisingly small increase in output in the United Kingdom to the 100 basis point cut in interest rates may not in part reflect the model restriction that monetary policy impulses are transmitted only via long-term rates.

Policy issues

It would have been useful had the authors expanded on the implications of their analysis for certain key policy questions touched upon in the conclusions. At least three sets of issues appear to be particularly relevant.

(i) What do the divergences they find for inflation and output imply for the credibility of the convergence process? And for the sustainability of EMU arrangements?

(ii) How strong will be the forces working towards a weakening of differences in the transmission mechanisms once EMU is put in place? How fast will those forces operate? Are the implications of such differences of first order significance?

(iii) What could the model tell us about the net effects of a weak and a strong Euro?

Clearly, these questions go well beyond the strict confines of the model. Yet the function of the simulation is precisely that of providing a benchmark for organising our thoughts and place us in a better position to find the corresponding answers.

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[2] See BIS (1995), *Financial structure and the monetary policy transmission mechanism*, CB 394, Basle, March.