European Monetary and Fiscal Policies after the EU Enlargement

DRAFT PAPER – NOT TO BE QUOTED

Reinhard Neck

University of Klagenfurt, Universitaetsstrasse 65–67, A-9020 Klagenfurt, Austria
Ph: +43(463)2700-4121, Fax: +43(463)2700-4191, reinhard.neck@uni-klu.ac.at

Gottfried Haber

University of Klagenfurt, Universitaetsstrasse 65–67, A-9020 Klagenfurt, Austria,
Ph: +43(463)2700-4122, Fax: +43(463)2700-4191, gottfried.haber@uni-klu.ac.at,
and Ludwig Boltzmann Institute for Economic Policy Analyses, Vienna, Austria

Warwick J. McKibbin

Australian National University, Australia and The Brookings Institution, Washington, DC

Abstract

This paper examines possible effects of an EU membership of Central and Eastern European countries (CEECs) on key macroeconomic variables. To do so, we consider both scenarios with CEECs being members of the European Monetary Union (EMU) and without. For the European Central Bank, we consider several different intermediate targets, such as a fixed-rules monetary policy (monetary targeting), inflation and price level targeting, exchange rate targeting and nominal income targeting. For the fiscal policy-variables, we assume that the governments of both incumbent and new members may either refrain from pursuing active stabilization rules or follow either noncooperative or cooperative activist fiscal policies. Different scenarios are simulated with the macroeconomic McKibbin-Sachs Model (MSG2 Model), and the resulting welfare ordering is determined. They show that the advantages and disadvantages depend strongly on the nature of the shock the economies are faced with, on the objective function chosen, and on some key parameters of the MSG2 Model. Additional macroeconomic noise resulting from the CEEC's membership does not seem to be too much of a problem.

Key words: European Economic and Monetary Union, monetary policy, fiscal policy, European integration, dynamic games, cooperation, rules.

JEL codes: E52, E63, C50, C70

Introduction

According to the present time schedule set by the EU Commission, up to ten new member states from Central and Eastern Europe will be accepted by the European Union by the beginning of 2004. Even if some of the present accession countries will probably not join in the first round, the political consequences of the "Eastern Enlargement" of the EU will be considerable, as will be the economic ones. Fears have been expressed that the accession of CEECs (Central and Eastern European countries) may increase the economic divergence within the EU and may result in more asymmetric shocks acting upon the European economies. In particular, some observers regard the membership of former Communist countries as threat to the macroeconomic stability of the EU, because the political system in some of them has no or only a weak tradition of macroeconomic policies for stability and higher growth.

This paper examines possible effects of an E(M)U membership of CEECs on the welfare effects of macroeconomic stabilization policies and alternative objectives followed by the European Central Bank (ECB). To do so, we consider both scenarios with CEECs being members of the European Monetary Union (EMU) and without. For the ECB, we consider several different intermediate targets, such as a fixed-rules monetary policy (monetary targeting), inflation and price level targeting, exchange rate targeting and nominal income targeting. For the fiscal policy-variables, we assume that the governments of both incumbent and new members may either refrain from pursuing active stabilization rules or follow either noncooperative or cooperative activist fiscal policies. Different scenarios are simulated with the macroeconomic McKibbin-Sachs Model (MSG2 Model), and the resulting welfare ordering is determined.

Up to date, there is much literature focusing on several aspects of monetary unions, especially on the European Monetary Union. In the context of macroeconomic stabilization policy, several questions might arise, which are still not answered sufficiently. On the one hand, the specific design (objectives, institutional setup) of macroeconomic policy and in particular of monetary policy in Europe can be discussed. For example, Bryant et al. (1993), Hall and Mankiw (1994), De Grauwe (1997), Allsopp and Vines (1998), Gros and Thygesen (1998), Bean (1998), Clarida et al. (1998), and Bernanke et al. (1999) treat several aspects of this question and arrive at very different conclusions about the "best" strategy for the ECB and/or the fiscal policy makers. On the other hand, questions of international

policy coordination might arise. Rogoff (1985) was a pioneer in showing that cooperation might be counterproductive in certain circumstances. Hughes Hallett and Mooslechner (1999) emphasize the strong effects of policy coordination on the overall outcome of economic policy in Europe.

Neck et al. (1999) and Haber et al. (2001) give some hints concerning the choice of policy objectives and policy coordination in a European and global context: In the presence of supply shocks, rather fixed rules tend to produce better results, while shocks on the demand side might call for more activist (discretionary) economic policy. In most cases, cooperation seems to dominate non-cooperation in terms of social welfare. We follow the approach used in these papers and do not rule out any scenarios a priori.

1 The McKibbin-Sachs Global Model

For the calculations in this paper, the McKibbin-Sachs Global Model (MSG2 Model), a dynamic, intertemporal, general-equilibrium model of a multi-region world economy, is applied. We use the European version R44. Based upon microeconomic foundations by assuming that economic agents maximize intertemporal objective functions, the model exhibits a mixture of classical and Keynesian properties: partly rational expectations in combination with various rigidities allow for deviations from fully optimizing behavior. In particular, nominal wages are assumed to adjust slowly in the major industrial economies (except for Japan). In spite of that, the model solves for a full intertemporal equilibrium in which agents have rational expectations of future variables. As a model with theoretically constrained long-run properties, it can display how the short-run adjustment of the world economy to exogenous shocks depends upon the long-run adjustment. This is especially useful when transitory shocks are simulated.

McKibbin and Sachs (1991) describe the original version of the model in full detail. Additional resources are available on the web (http://www.msgpl.com.au/); we constrain ourselves to present only those theoretical features which make it particularly well suited for analyzing economic policy. The long run of the world economy is driven by a neoclassical growth model, with exogenous technical progress and population growth. Keynesian rigidities in the goods and labor markets in the short run and optimal decisions, conditional on expected future paths of the world economy, drive the short run of the model. Thus, the model captures long-run effects of shocks and short-run dynamics towards

these long-run outcomes based on historical experience, with expectations formation providing a link between the long-run outcome and the short-run adjustment. As the MSG2 Model is a fully specified dynamic general-equilibrium model, it incorporates both the demand and the supply sides of the major industrial economies. Stock-flow relations are carefully observed, and intertemporal budget constraints are imposed. The underlying growth of Harrod-neutral productivity plus growth in the labor force is assumed to be 2.5 percent for each region. Asset prices are determined by intertemporal arbitrage conditions and rational expectations. For the long-run behavior of the model, stock equilibrium rather than flow equilibrium is important. Asset prices stabilize in real terms, once the desired ratios of asset stocks to GDP are reached. The short run of the model behaves similarly as the basic Mundell-Fleming model under flexible exchange rates and high capital mobility; however, the future paths of the world economy are important in the short run because of the forward-looking behavior in asset and goods markets. The assumptions of rational expectations in financial markets and of partially forward-looking behavior in real spending decisions allow for the incorporation of the effects of anticipated policy changes. The supply side of the model is specified in an internally consistent manner. Factor input decisions are based in part on intertemporal profit maximization by firms. Labor and intermediate inputs are determined to maximize short-run profits, given a stock of capital that is fixed within each period and adjusted according to a Tobin's q-model of investment, where Tobin's q evolves according to a rational-expectations forecast of future after-tax profitability.

The version of the MSG2 Model used in this paper, called MSGR44A, consists of models of the following countries and regions: the United States, Japan, Germany, the United Kingdom, France, Italy, Austria, the rest of the former European Monetary System (REMS), the rest of the OECD (ROECD), Central and Eastern European economies (CEEC), non-oil developing countries, oil-exporting countries, and the former Soviet Union. For the last three regions, only foreign trade and external financial aspects are modeled, whereas the industrial countries and regions are fully modeled with an internal macroeconomic structure. Although the basic theoretical structure for all industrial regions is the same, institutional differences are taken into account, especially in modeling labor markets.

The MSG2 Model is fitted to empirical data by a mix of calibration techniques for CGE models and econometric time-series estimates. Behavioral parameters taken from econometric studies and data

for macro aggregates were combined with steady-state relations in the model to generate other data. The reference year, for which actual data is replicated, is regarded as representing a point on the stable adjustment path towards the steady state of the model, hence not all steady-state relations are assumed to hold for that year. The model is solved in linearized form, with the linearization taking place at a point in time. The baseline in the version used here is recalibrated to 1997.

For the simulations and optimizations described in this paper, several modifications of the original MSG2 Model were done. Apart from changes in the global exchange rate mechanisms due to the introduction of the EMU, the implementation of the European System of Central Banks (ESCB) is the most important update of the model structure. In this respect, we follow the approach described in Haber *et al.* (2001). Thus, money supply in all EMU member countries is not available as an instrument any more, but monetary policy is conducted by the ECB, which acts independently of the instruments and goals of national fiscal policies. Therefore we have a single monetary authority in Europe (the ECB) and several national fiscal policy makers inside the EMU (and one in the CEECs). This is in line with the current institutional setup in Europe.

2 Simulation Layout

2.1 Design of the Optimizations and Scenario Sets

In this paper, the focus of the analysis is on the comparison of the effects of different strategies followed by the ECB within different global frameworks regarding policy reactions and possible cooperation. To accomplish this, a single measure of the economic outcomes of different optimization runs would be desirable. Therefore, we calculate economic welfare losses caused by various (transitory) shocks. For computational ease, an additively separable quadratic welfare loss function has been chosen. The welfare losses Ω_t in each period t are equal to the sums of the weighted (l_i) quadratic differences between the actual values t_i and the optimal values t_i* for each of the i target variables. Next, the welfare losses in each period are discounted to their present values (using the rate of time preference of the policy makers r, which is assumed to be 10 percent) and summed up over the time horizon T (100 years in the simulations, from 2003 to 2102) to obtain the total welfare loss.

For the countries for which a welfare loss (objective) function is specified (Germany, France, Italy, Austria, REMS, CEEC), the target variables in the following calculations are inflation, real GDP, the current account balance and the budget deficit of the public sector. All target weights are set to 0.25, producing an equally weighted standardized objective function. As a reference, the baseline values (simulated values without any shocks) of the target variables are considered as their optimal values. This makes sense because the reference simulation represents a stable path towards a long-run equilibrium of the model. Note that the welfare losses in the baseline scenario have to be zero by definition, which is another reason for using this baseline as a benchmark for all simulations.

When interpreting these values of the objective function (welfare loss function), extraordinary care has to be taken, as the values should mainly be understood as indication for the order of preference of the policy scenarios under consideration within a specific type of shock. The absolute magnitudes of the figures give a rough feeling for the magnitude of the welfare effects, but should not be overvalued with respect to quantitative comparisons. Moreover, for different shocks the absolute values of the objective function may not be compared either, as different types and scopes of shocks produce non-comparable results. What might be done, and this is a main task in this paper, is the systematic comparison of the welfare effects on Europe and the CEECs within alternative assumptions about European institutional design (EU-12 or an enlarged EU), policy reactions and coordination for given shock scenarios.

All European objective function values are calculated as weighted averages of the respective country-specific values. Although it can be shown that the results of the simulations and optimizations do not strongly depend on the selection of the weights, empirical figures derived from GDP (at market prices) have been chosen. The weight for the REMS is calculated as the residual of the other four countries modeled with respect to the EMU aggregate GDP (based upon the sum of the EU-11). The exact figures can be seen in Table 1.

Table 1: Weights for the European Aggregates in the Objective Function

Country / Aggregate	GDP 1998 at Market Prices [millions ECU]	Weight
EMU (EU-11)	5,863,995	
Germany	1,921,764	0.3277
Austria	188,435	0.0322
France	1,297,401	0.2212
Italy	1,058,697	0.1805
REMS	1,397,680	0.2384

Source: Eurostat

In the optimizations there are different assumptions with respect to the policy framework. When a country is enabled to pursue optimizing economic policy, this implies that the four economic target variables mentioned above enter the particular objective function of this country. The policy instrument is a fiscal instrument (nominal government consumption) for each "active" country. European monetary policy is set independently by the ECB according to the implied monetary target. The CEECs do not implement active monetary policy in scenarios in which they do not belong to the E(M)U.

Table 2: Global Policy Scenarios

Fiscal Policy	No Policy	No Policy	EU-12 and CEEC	EU-12 and CEEC	EU-12 and CEEC	EU-12 and CEEC
Cooperation	-	-	Non-cooperative	Cooperative	Non-cooperative	Cooperative
EMU Type	EU-12	enlarged	EU-12	EU-12	enlarged	enlarged
Scenario	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new

Table 2 systematically shows the six European institutional scenarios we consider for each of the shocks and each of the assumptions on ECB policy. Scenarios NOP EU-12 and NOP EU-new are the baseline scenarios for all different types of shocks, while the four other scenarios are applied to all

kinds of ECB objective functions, thus giving five different results for each institutional scenario and for each shock.

The NOP EU-12 scenario implements no active policy, neither monetary nor fiscal policy, for the "traditional" EU-12. NOP EU-new is basically the same, but with the assumption of a "new" E(M)U ("EU-new"), where the CEECs are part of the monetary union with completely fixed exchange rates (resembling a common currency). The scenarios beginning with "NC-Europe" exhibit non-cooperative economic policy in Europe in the sense of full non-cooperation, i.e. all policy makers (ECB and the fiscal policy makers in the EU and the CEECs do not cooperate). On the other hand, the "C-Europe" scenarios include full cooperation between all policy makers mentioned above. Note that the C-Europe EU-12 scenario might therefore interpreted as a scenario resembling an EU accession of the CEECs without immediate accession to the monetary union.

For each of the scenarios, alternative ECB strategies are evaluated in the presence of the exogenous shocks. The different ECB policy objectives can be found in Table 3.

Table 3: Alternative ECB Policy Objectives

ECB Policy	Abbreviation
No active monetary policy (baseline)	NOP
Monetary targeting (baseline)	MON (identical to NOP in this analysis)
Inflation targeting	INF
Nominal income targeting	Y
Exchange rate targeting (USD)	EXR
Price level targeting	P

Five different strategies for the ECB are considered here: The "no (active) policy" (NOP) scenario leaves the monetary instrument of the ECB at its baseline values. When the ECB targets money supply (MON), money supply is set in order to remain on the steady state accommodation path, which is identical to the NOP policy in this case. Due to implementation issues not to be discussed in detail, this target can be reached in any case, thus we have strict assignment of this instrument to the monetary target for all MON scenarios (that is also true for the cooperative set!). Inflation targeting

(INF), income targeting (Y) exchange rate targeting (EXR, a unilateral peg to the USD) and price level targeting (P) on the other hand are implemented by modeling the ECB as a player in the dynamic game, but also with an assigned target, thus the ECB is always able to exactly reach this target in the non-cooperative cases.

In the cases with full cooperation, the ECB receives a cooperative weight equal to the sum of the cooperative weights of all European countries (depending on the assumptions on the size of the EU, either EU-12 or EU-new), which implies a rather strong central bank. This is the most realistic cooperative policy design in Europe. Note that, as explained above, in the NOP/MON case (monetary targeting) with cooperation in Europe the ECB can successfully fix money supply to the target values, and cooperation is taking place between the European fiscal policy makers only.

In the non-cooperative scenarios the players minimize their respective welfare loss functions subject to the dynamic model and given the optimizing behavior of the other players. This leads to a Nash-Cournot equilibrium of the dynamic game. In the cooperative set, a joint welfare loss function, which is a weighted sum of the individual objective functions, is minimized subject to the dynamic model. This is equivalent to assuming a European dictator who minimizes overall welfare losses of the players involved, and can be interpreted as the result of an agreement between the policy-makers of the five countries. It corresponds to the collusive solution in game theory, because all players have equal weights in the joint objective function. Variations of these weights were tried, but gave qualitatively similar results.

To avoid time-inconsistency, all optimizations are done calculating a closed-loop policy feedback rule. Time-inconsistency means that at a future point in time, re-optimization results in time paths for the instruments which are different from the optimal open-loop policy obtained by simple optimum control algorithms. The presence of forward-looking private agents can be interpreted as the presence of another (implicit) player in the dynamic game. Note that the NOP/MON scenarios might only be carried out if strong self commitment elements are enforced. The solution algorithm DYNGAME, which is used to solve the MSG2 Model, calculates strongly time-consistent, closed-loop policy rules; hence its solutions do not suffer from the time-inconsistency problem. This has to be kept in mind when interpreting the results of the dynamic simulations involving strategic policy optimization: when

optimization by one or more players is assumed, time-consistent (credible) optimal policies are calculated which may be inferior to unconstrained (but time-inconsistent) optimal policies.

An additional note on the values of the objective functions presented here should be made: Due to the large extent of different scenarios involving different objective functions and several players, we would have no means of comparing the values obtained. Thus, we follow a "two-layer" philosophy: For the optimization runs, the welfare loss functions are applied exactly as stated above. But when calculating the welfare effects for the interpretation of the results (ex post) we use a uniform objective function for all of the players (using the four targets as mentioned before, equal weights, a 10 percent discount rate, GDP weights for the European aggregation). This assumes a "true" objective function which can be used as a benchmark regardless of the behavioral assumptions in the different policy scenarios. Note that this procedure is necessary, as the ECB is considered as a player in the dynamic game but it would not make sense to attach some welfare loss contributions to the ECB activities (e.g. for deviations of the exchange rate from the desired central value). By choosing this implementation, we make sure that only the correct variables sum up to the joint welfare loss figures.

2.2 SHOCKS

In previous work, various shocks have been imposed on the model. Lack of space precludes a detailed discussion of all results. Therefore we confine ourselves to a temporary negative supply (total productivity) shock and a temporary negative demand (autonomous consumption) shock. See Table 4 for a systematic overview.

Table 4: Overview of the Shock Scenarios

	Scope of the Shock	Accession Countries	EU-12 ("old EU")	EU-new	World
Type of the Shock	Supply (Productivity)	YA	YO	YN	YX
	Demand (Consumption)	CA	CO	CN	CX

A productivity shock can be interpreted as a temporary inward shift of the production possibility frontiers of all countries, caused, for example, by a cost shock due to the WTC tragedy on September 11th, 2001, by an environmental catastrophe resulting in a reduction of the supply of intermediate goods required for producing industrial goods, or by any other exogenous reduction in total factor productivity. For the optimizations, total factor productivity is assumed to fall by 2 percent the first year (2003, in our simulation), 1.5 percent in the second year (2004), 1 percent in the third year (2005), and 0.5 percent in the fourth year (2006) as compared to the baseline of the model.

Supply shocks and demand shocks have different effects on output, the price level and other aggregate variables. Therefore, we also consider negative demand shocks shifting the aggregate demand curve to the left. In particular, we simulate the consequences of a temporary exogenous decrease of real private consumption, which might be due to pessimistic expectations or changed preferences, for example. In these simulations, autonomous real private consumption is assumed to fall by 6 percent in the first year (2003), 4.5 percent in the second, 3 percent in the third, and 1.5 percent in the fourth year as compared to the baseline of the model.

For both types of shocks we have a CEEC shock (comprising the CEEC block in the model), an EU-12 shock (affecting the "old" EU-12), an EU-new shock (comprising the EU-12 and the CEEC block), and a world shock (for all fully modeled regions in the model). This allows for the assessment of the two possibilities for an asymmetric shock as well as a symmetric global shock.

3 Results

3.1 General Effects of the Shocks

As expected from the basic economic theories, a negative supply shock causes the well known stagflation dilemma: GDP decreases while the overall price level increases. Dealing with this type of shock is non-trivial, as expansionary policy measures would also raise inflation, while restrictive economic policy would further reduce real output. The demand shock does not raise this issue, the price level decreases in this case. These well-known effects are only true for the reference case, where no policy is conducted at all. As soon as there are strategic interventions by policy makers, they try to counteract those phenomena more or less successfully. In this paper, the results of selected 84

optimization runs are used; as the emphasis of the analysis is on the welfare effects rather than the exact values of the instrument and objective paths, only the welfare effects are treated here. Moreover, the graphs for most of the experiments look rather similar but exhibit different distributions of the baseline deviations over time due to the fact that intertemporal optimization is performed.

3.2 WELFARE EFFECTS IN THE ALTERNATIVE SCENARIOS

To evaluate the welfare effects for several kinds of institutional setups, the values of the objective function are calculated for each scenario given a specific shock and under different assumptions regarding the policy targets of the ECB. The objective function is specified as a welfare loss function (see above), so lower values represent "better" results in terms of welfare. In contrast to previous papers, we refrain from stating any explicit ranking of the scenarios, as the results of the sets of optimizations may be seen as dealing with a two-dimensional question. On the one hand, we might be interested in the "optimal" ECB strategy for a given institutional setup; on the other hand, we might want to analyze the effects of different institutional setups given a specific objective function of the ECB for monetary policy.

First, consider the CEEC demand shock (CA). The results of this scenario can be seen in Table 5 for the EU-12 countries and in Table 6 for the CEEC block.

Table 5: Welfare Results for EU-12: CEEC Demand Shock (CA)

EU-12	*Fiscal Pol. EMU Type*	**NOP EU-12**	**NOP EU-new**	**NC-Europe EU-12**	**C-Europe EU-12**	**NC-Europe EU-new**	**C-Europe EU-new**
ECB	**MON/NOP**	0,23	0,17	0,05	0,06	0,00	0,01
	INF			0,03	0,05	0,00	0,04
	Y			0,05	0,05	0,00	0,02
	EXR			0,06	0,06	0,00	0,00
	P			0,03	0,05	0,00	0,03

As expected, there are only very limited welfare effects for the present EU, if the consumption shock is limited to the CEECs. Both baseline scenarios (the NOP scenarios) exhibit very small welfare losses; if there is no policy reaction, it is slightly better for the members of the present EU when EU enlargement has already been completed, but the difference is quantitatively rather unimportant. Similar results can be extracted from the table with respect to optimization scenarios: The non-cooperative scenario with an enlarged EU (NC-Europe EU-new) shows no intertemporal welfare

losses at all, the welfare effects in the other scenarios are very small and can be seen as nearly zero. For the members of the present EU, we find that active fiscal policy is desirable, while the institutional setup (enlargement vs. no enlargement) and the choice of a specific target for monetary policy do not matter much.

Table 6: Welfare Results for CEEC: CEEC Demand Shock (CA)

CEEC	*Fiscal Pol. EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	13,31	76,78	11,27	11,25	14,49	14,32
	INF			11,24	11,23	14,43	14,15
	Y			11,28	11,24	14,45	14,29
	EXR			11,23	11,27	14,49	14,49
	P			11,26	11,23	14,40	14,15

Naturally, a completely different picture arises from the point of view of the CEECs for the asymmetric shock affecting only the CEECs. As can also be seen from the basic Mundell-Fleming model, the monetary union reduces the ability of the CEECs to counteract the internal shock by removing the flexible exchange rates between the CEECs and the EU-12. Thus, all EU-new scenarios show higher welfare losses than their EU-12 counterparts. The difference is most notable for the baseline simulations (NOP), as there are no other accommodating policy instruments that might adopt the shielding effects of a flexible exchange rate. Cooperation is nearly always better than non-cooperation; the only scenario for which this is not true is the exchange rate targeting of the ECB towards the USD when the monetary union does not include the CEECs. This result might be caused by mechanics similar to those found in Rogoff (1985): The ECB and (indirectly) the CEEC block monetary authority might pursue a stabilization of the exchange rate towards the USD, reducing the power of fiscal policies.

Table 7: Welfare Results for EU-12: EU-12 Demand Shock (CO)

EU-12	*Fiscal Pol. EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	38,07	37,29	32,63	28,87	32,65	28,69
	INF			25,55	23,15	24,19	20,64
	Y			70,03	29,38	65,71	26,45
	EXR			73,13	73,23	73,17	74,27
	P			26,28	22,50	25,48	20,01

If on the other hand the negative demand shock is limited to the present EU-12 (CO), for the EU-12 member states it is no longer irrelevant to choose an appropriate monetary policy goal (the results can be found in Table 7). First, the relative differences between the two baseline runs (NOP) without active policies are still present (a larger EU-new is better than the present EU-12). Still, for all of the institutional setups, cooperation dominates non-cooperation (except for the exchange rate targeting strategy of the ECB). Exchange rate targeting (EXR) and nominal income targeting (Y) sometimes exhibit even higher welfare losses than seen in the baseline simulations without active policy making, which is true for all non-cooperative scenarios. These objective functions for the ECB have already been identified as being problematic in certain situations in previous papers (e.g. Neck et al., 1999; Haber et al. 2001). Inflation targeting (INF) and price level targeting (P) prove to be reasonable strategies throughout most scenarios. The best result is achieved in the cooperative scenario with an enlarged EU with price level targeting by the ECB.

Table 8: Welfare Results for CEEC: EU-12 Demand Shock (CO)

CEEC	*Fiscal Pol. EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	0,85	12,57	1,51	2,41	1,41	1,94
	INF			2,46	2,90	2,61	4,60
	Y			0,94	1,06	1,58	2,22
	EXR			0,01	0,71	0,01	0,01
	P			2,32	2,92	2,38	4,26

The spillovers to the CEECs might not be neglected for the asymmetric EU-12 shock (Table 8). Again, the de-coupling effects of flexible exchange rates can be observed in the baseline simulations (NOP EU-12 produces worse results for the CEECs than NOP EU-new). But now, for the CEECs most preferable results are achieved by the exchange rate targeting strategy (EXR) of the ECB throughout all institutional setups. The non-cooperative scenarios always dominate the cooperative scenarios. This might be attributed to the fact that the CEEC block can use the fiscal instrument to pursue its own objectives without any constraints in the non-cooperative case, while cooperation causes this instrument to be used for optimization of the joint welfare loss function, in which the CEEC objectives enter with a weight of less than 15%. The worst results arise from inflation targeting by the ECB.

Let us now consider the effects of a symmetric demand shock, affecting both the EU-12 and the CEECs (Table 9 and Table 10). For the EU-12 member states, the no policy simulations (NOP EU-12

and NOP EU-new) give similar results, the small EU being marginally better than the enlarged EU-new). Again, exchange rate targeting and nominal income targeting produce high welfare losses in several cases. Inflation targeting and price level targeting are the most desirable strategies and exhibit good overall performance, monetary targeting is always better than the baseline, but inferior to the previous strategies. Again, cooperation dominates non-cooperation, and the enlarged EU-new produces always better results than the original EU-12.

Table 9: Welfare Results for EU-12: EU-new Demand Shock (CN)

	Fiscal Pol.	**NOP**	**NOP**	**NC-Europe**	**C-Europe**	**NC-Europe**	**C-Europe**
EU-12	*EMU Type*	**EU-12**	**EU-new**	**EU-12**	**EU-12**	**EU-new**	**EU-new**
ECB	**MON/NOP**	37,25	37,61	32,66	28,89	32,66	28,31
	INF			24,99	22,40	24,10	20,71
	Y			68,97	28,93	65,97	26,04
	EXR			74,65	74,72	73,20	74,28
	P			25,75	21,80	25,34	20,01

For the CEECs, an EU enlargement is advantageous in nearly all cases, again with the exception of the exchange rate targeting ECB strategy (EXR). But now, no judgment can be made concerning the advantages or disadvantages of cooperation. The best results for the CEECs can be seen in the price level targeting scenario with an enlarged EU and full cooperation (C-Europe EU-new P), which is consistent with the best scenario for the EU-12 countries (see above).

Table 10: Welfare Results for CEEC: EU-new Demand Shock (CN)

	Fiscal Pol.	**NOP**	**NOP**	**NC-Europe**	**C-Europe**	**NC-Europe**	**C-Europe**
CEEC	*EMU Type*	**EU-12**	**EU-new**	**EU-12**	**EU-12**	**EU-new**	**EU-new**
ECB	**MON/NOP**	13,74	29,53	13,08	14,69	8,50	7,60
	INF			15,13	14,87	7,26	5,82
	Y			11,41	13,69	11,72	8,15
	EXR			11,50	13,75	14,72	14,70
	P			15,05	14,91	7,55	5,70

The qualitative results for the world consumption shock (CX), as depicted in Table 11 and Table 12, are very similar to the previous results for the symmetric European shock (CN).

Table 11: Welfare Results for EU-12: World Demand Shock (CX)

EU-12	*Fiscal Pol.* *EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	48,63	48,71	67,66	50,61	71,64	55,59
	INF			20,66	16,63	18,34	14,19
	Y			47,65	31,21	55,35	27,35
	EXR			16,90	17,23	15,56	15,82
	P			21,70	16,33	19,26	13,80

Table 12: Welfare Results for CEEC: World Demand Shock (CX)

CEEC	*Fiscal Pol.* *EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	13,81	17,94	20,91	34,45	8,02	5,60
	INF			37,44	37,11	3,03	2,09
	Y			26,24	48,32	7,34	3,91
	EXR			31,21	36,94	2,18	2,16
	P			38,38	37,32	3,08	2,00

Next, we consider the effects of transitory supply shocks on European and CEEC macroeconomic stabilization policies. For the asymmetric CEEC supply shock (YA) shown in Table 13 and Table 14, the spillovers to the EU-12 are very small. Note that again the income targeting strategy (Y) might introduce some instability into the system leading to significant welfare losses. The results in this paper with respect to this strategy suggest that nominal income targeting might be no suitable alternative for ECB, for both demand and supply shocks. The same is true for exchange rate targeting (EXR) and demand shocks, but in the presence of supply shocks exchange rate targeting might be applicable. For the other ECB strategies, EU enlargement scenarios dominate small EU scenarios in most cases, but the differences are rather small. Note that for the supply shock, no policy scenarios with extremely fixed rules clearly dominate the scenarios with active economic policies.

Table 13: Welfare Results for EU-12: CEEC Supply Shock (YA)

EU-12	*Fiscal Pol.* *EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	0,01	0,01	0,15	0,14	0,02	0,02
	INF			0,09	0,18	0,10	0,04
	Y			0,11	0,17	6,11	4,89
	EXR			0,16	0,16	0,02	0,02
	P			0,09	0,17	0,13	0,04

For the CEECs, the results are also clearly in favor of the no-policy scenarios (NOP EU-12 and NOP EU-new), where the lowest welfare losses can be observed (only small spillovers). For the EU-12 institutional setups with a small EU, cooperation always dominates non-cooperation, while the results are ambiguous for the EU-new scenarios. All results are within small bounds, so the decision in favor of or against a class of scenarios is not easy. Now the best ECB strategy in terms of overall performance (in the presence of active fiscal policy) is income targeting (Y). But given the severe problems with this strategy in other scenarios and for the EU-12 countries, this might not be a good alternative. Cooperation tends to be better than non-cooperation; at least it is not significantly worse in all of the scenarios.

Table 14: Welfare Results for EU-CEEC: CEEC Supply Shock (YA)

CEEC	*Fiscal Pol. EMU Type*	**NOP EU-12**	**NOP EU-new**	**NC-Europe EU-12**	**C-Europe EU-12**	**NC-Europe EU-new**	**C-Europe EU-new**
ECB	**MON/NOP**	3,66	4,18	11,61	10,32	11,63	11,60
	INF			11,49	10,34	11,44	11,64
	Y			11,41	10,48	10,90	8,82
	EXR			11,50	10,65	11,62	11,61
	P			11,48	10,34	11,38	11,66

For the EU-12 asymmetric supply shock (YO), the baseline simulations are very close to each other. The results for the EU-12 countries are shown in Table 15 and for the CEECs in Table 16. As before, there are no consistent results with respect to the advantages or disadvantages of cooperation vs. non-cooperation and the EU-12 vs. the EU-new monetary union for the present EU memebers. Cooperation seems to be slightly better than non-cooperation, and the enlarged EU-new might be marginally worse than the small EU-12. The optimal scenario (with active policies) is non-cooperative price level targeting in the small EU (NC-Europe EU-12 P), followed by inflation targeting, regardless of the size of the monetary union. For the enlarged EU-new, price level targeting on the other hand, gives rather bad results.

Table 15: Welfare Results for EU-12: EU-12 Supply Shock (YO)

EU-12	*Fiscal Pol. EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	21,13	21,22	36,46	33,11	36,46	34,31
	INF			43,12	31,33	44,32	31,33
	Y			93,98	86,40	87,63	74,25
	EXR			32,42	32,61	32,48	32,92
	P			26,28	32,10	49,27	32,07

As expected from the previous considerations, spillovers of the asymmetric EU-12 supply shock are present but not very substantial for the CEECs. Cooperation is preferable over non-cooperation in some cases (clearly e.g. for ECB price level targeting and inflation targeting). The overall preferable strategy from the point of view of the CEECs is ECB exchange rate targeting (EXR) with the limitations stated above. A good and stable alternative might be monetary targeting (MON). In more than 50% of the cases, an enlarged EU-new produces slighty worse results for the CEECs, but this also depends on the assumptions about policy coordination and the specific ECB strategy.

Table 16: Welfare Results for CEEC: EU-12 Supply Shock (YO)

CEEC	*Fiscal Pol. EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	0,10	0,44	0,15	0,56	0,19	0,13
	INF			1,79	0,62	3,29	0,73
	Y			4,97	7,00	4,94	9,13
	EXR			0,02	0,14	0,02	0,02
	P			2,32	0,64	4,04	0,72

The symmetric European supply shocks (YN) are summarized in Table 17 and Table 18. Income targeting (Y) again proves to be unstable and unsustainable for the EU-12 countries. The cooperative inflation targeting scenarios give the best results, regardless of the size of the monetary union, where a small EU is marginally preferable. Generally speaking, there are no significant differences between the EU-12 and the EU-new scenarios, in some cases the EU-new scenarios are clearly worse (e.g. for non-cooperative price level targeting).

Table 17: Welfare Results for EU-12: EU-new Supply Shock (YN)

EU-12	*Fiscal Pol.* *EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	21,49	21,46	36,07	33,72	36,08	33,89
	INF			43,36	31,59	46,73	31,75
	Y			95,31	82,89	129,01	108,07
	EXR			32,92	33,30	32,18	32,62
	P			25,75	32,30	52,38	32,53

For the CEECs, again no clear decisions can be made. It is worth noting that the fully cooperative setups within a large EU (C-Europe EU-new) generally produce desirable results and exhibit especially low variation of the results. If one is interested in choosing a stable institutional setup from the point of view of the CEECs which shows only small variation of the results and for which the worst results are still acceptable, this setup should be picked. It is interesting that this setup might be also a good one from the point of view of the EU-12 countries.

Table 18: Welfare Results for CEEC: EU-new Supply Shock (YN)

CEEC	*Fiscal Pol.* *EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	4,54	4,98	11,16	14,28	12,50	11,95
	INF			21,59	15,60	10,43	11,85
	Y			26,97	32,15	15,39	11,81
	EXR			11,57	12,73	11,66	11,71
	P			15,05	15,68	10,71	12,33

Again, the world wide symmetric supply shock presented in Table 19 and Table 20 introduces no significant further insights compared to the symmetric European shock and will not be treated in detail.

Table 19: Welfare Results for EU-12: World Supply Shock (YX)

EU-12	*Fiscal Pol.* *EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	27,01	27,02	48,44	43,93	48,46	44,49
	INF			55,03	39,46	59,27	39,92
	Y			143,16	119,80	184,31	148,95
	EXR			36,78	37,04	36,89	37,20
	P			60,72	40,40	67,48	40,92

Table 20: Welfare Results for CEEC: World Supply Shock (YX)

CEEC	*Fiscal Pol. EMU Type*	NOP EU-12	NOP EU-new	NC-Europe EU-12	C-Europe EU-12	NC-Europe EU-new	C-Europe EU-new
ECB	**MON/NOP**	5,39	6,24	12,74	17,44	14,46	13,58
	INF			27,00	19,46	11,99	13,14
	Y			34,89	43,36	20,00	15,83
	EXR			16,32	17,23	12,11	12,12
	P			28,94	19,55	12,49	13,72

4 Concluding Remarks

The analyses show that the advantages and disadvantages of different institutional setups strongly depend on the nature of the shock the economies are faced with and on the ECB objective function chosen. Previous results on the advantages of rather fixed rules as an answer to supply shocks and more active policy against demand shocks have been further supported. Even in the presence of an EU enlargement, exchange rate targeting and income targeting might lead to instability in certain cases.

In most of the scenarios, the EU enlargement did not lead to significant welfare effects for the EU-12 countries. Thus, additional macroeconomic noise resulting from the CEEC's membership does not seem to be too much of a problem for the present members of the EU-12. On the other hand, no significant advantages for the EU-12 countries could be identified either.

Acknowledgement

Financial Support from the Austrian National Bank (OeNB) is gratefully acknowledged.

References

Allsopp, C., Vines, D. (Eds.), 1998. Macroeconomic Policy after EMU. Oxford Review of Economic Policy, 14 (3).

Bean, C., 1998. Monetary Policy under EMU. Oxford Review of Economic Policy, 14 (3), 41–53.

Bernanke, B.S., Laubach, T., Mishkin, F.S., Posen, A.S., 1999. Inflation Targeting. Lessons from the International Experience. Princeton University Press, Princeton, NJ.

Bryant, R.C., Hooper, P., Mann, C.L., 1993. Evaluating Policy Regimes. Brookings Institution. Washington, DC.

Clarida, R., Gali, J., Gertler, M., 1998. Monetary Policy Rules in Practice: Some International Evidence. European Economic Review, 42 (6), 1033–1068.

De Grauwe, P., 1997. The Economics of Monetary Integration, 3rd ed. Oxford University Press, Oxford.

Gros, D., Thygesen, N., 1998. European Monetary Integration, 2nd ed. Longman, Harlow.

Haber, G., Neck, R., McKibbin, W. J., 2001. Monetary and Fiscal Policy Rules in the European Economic and Monetary Union: A Simulation Analysis. In: Choi, J. J., Wrase, J. (Eds), European Monetary Union and Capital Markets, Elsevier, 195–217, to be published.

Hall, R.E., Mankiw, N.G., 1994. Nominal Income Targeting, in: Mankiw, N.G. (Ed.), 71–94.

Hughes Hallett, A., Mooslechner, P., 1999. Challenges for Economic Policy Coordination within European Monetary Union. Empirica, 26 (3).

McKibbin, W.J., Sachs, J.D., 1991. Global Linkages. Brookings Institution, Washington, DC.

Neck, R., Haber, G., McKibbin, W.J., 1999. Macroeconomic Policy Design in the European Monetary Union: A Numerical Game Approach. Empirica, 26, 319–335.

Rogoff, K., 1985. Can International Monetary Policy Cooperation be Counterproductive? Journal of International Economics, 18, 199–217.