Global Macroeconomic Policy Implications of an Enlarged EMU

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Abstract

This paper examines the design of macroeconomic policies after the enlargement of the EU by Central and Eastern European countries (CEECs). We consider scenarios with and without CEECs being members of the European Economic and Monetary Union (EMU). For the European Central Bank, the intermediate targets monetary versus inflation targeting are examined. For European fiscal policies, we assume that the governments of incumbent and new EU members either refrain from pursuing active stabilization policies or follow either non-cooperative or cooperative activist fiscal policies. We analyze global effects of different European institutional arrangements under varying assumptions about policy reactions of the USA. Different scenarios are simulated with the macroeconomic McKibbin-Sachs Model (MSG2 Model), and the resulting welfare orderings are determined. They show that the advantages and disadvantages of different policy arrangements depend on the nature and scope of the shocks the economies are faced with and on the assumptions made about policy feedbacks from outside Europe.

Key words: European Economic and Monetary Union, European integration, EU enlargement, monetary policy, fiscal policy, policy rules, world economy, global policy effects.

JEL classification numbers: E52, E63, C50, C70

1 Introduction

May 1, 2004, ten additional countries (mostly from Central and Eastern Europe) will become members of the European Union (EU). The political and economic consequences of this "Eastern EU Enlargement" will be considerable. 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. Some observers even regard the membership of former Communist countries as a threat to the macroeconomic stability of the EU, because the political systems in some of them have no firm tradition of implementing macroeconomic policies for stability and high growth. Moreover, the enlargement of the EU, which will create a political and economic entity of a size comparable to the USA, may have important consequences on the world economy. Policy-making in other parts of the world (including the USA) may be affected and will possibly have to adapt to the changing environment of world trade and finance. These changes will possibly be stronger when the CEECs will not only become members of the EU but also join the European Economic and Monetary Union (EMU), which may be the case at least for some of them within two years.

In this paper, we examine some possible consequences of CEECs' membership in the EMU on the welfare effects of macroeconomic stabilization policies under alternative assumptions about fiscal policies of the European governments, monetary policies of the European Central Bank (ECB), and fiscal and monetary policies of the USA (where we regard government and Federal Reserve Board as one single decision-maker). To do so, we study both scenarios with and without CEECs being members of the EMU. For the ECB, we consider two different intermediate targets, namely a fixed-rule monetary policy (monetary targeting) and a contingent-rule policy of inflation targeting. Regarding fiscal policy variables, we assume that the governments of both incumbent and new members may either refrain from pursuing active stabilization policies or follow either non-cooperative or cooperative activist fiscal policies. Macroeconomic policies of the USA are considered either as passive (no reaction on shocks and on policy changes abroad) or as actively stabilizing according to an objective function. In order to keep the analysis as simple as possible, no other countries are assumed to pursue active policies. Different scenarios are simulated with the macroeconomic McKibbin-Sachs

Model (MSG2 Model), and the resulting welfare orderings of these scenarios under different shocks are determined.

Up to date, there is much literature focusing on several aspects of monetary unions, especially on the EMU. For example, the specific design (objectives, institutional setup) of macroeconomic policy and in particular of monetary policy in Europe has been discussed intensively; see, among others, Buti and Sapir (1998, 2003), Allsopp and Vines (1998), Neck (2002, 2002a), Neck and Holzmann (2002), Allsopp and Artis (2003), De Grauwe (2003). These authors arrive at different conclusions about the "best" strategy for the ECB and/or the fiscal policy-makers. More generally, questions of international policy coordination may arise; for instance, Hughes Hallett and Mooslechner (1999) emphasize the strong effects of policy coordination on the overall outcome of economic policy in Europe.

In Haber et al. (2002), we gave some hints concerning the choice of intermediate targets and the desirability of policy coordination in a European and global context, whereas in Neck et al. (2003), special emphasis was put on the enlargement of the EMU. We found that in the presence of supply shocks, fixed rules tended to produce better results, while demand-side shocks seemed to call for more activist (discretionary) economic policy (contingent rules). In most cases, cooperation seemed to dominate non-cooperation in terms of a measure of social welfare. Here, we follow the approach of these papers and consider a larger variety of scenarios, focusing on effects of different policy arrangements after the EU enlargement on the global economy.

2 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 MSGR44A. 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). Nevertheless, the model solves for a full intertemporal equilibrium.

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/); see also Haber et al. (2002), Neck et al. (2003). The long run of the global 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, 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. For the long-run behavior of the model, stock equilibrium rather than flow equilibrium is important. The short run of the model behaves in a way similar to the Mundell-Fleming model under flexible exchange rates and high capital mobility, but the future paths of the global 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 MSGR44A version of the MSG2 Model 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. The basic

theoretical structure for all industrial regions is the same, but institutional differences are taken into account, especially in modeling labor markets.

The MSG2 Model was fitted to empirical data by a mix of calibration techniques for CGE models and econometric time-series estimates. For the simulations and optimizations described in this paper, the original MSG2 Model had to be modified by implementing the European System of Central Banks (ESCB) for the EMU. Money supply in all current EMU member countries (twelve in reality, five in the model) is no longer available as an instrument, but monetary policy is conducted by the ECB, which acts independently of the instruments and goals of national fiscal policies. Therefore we assume a single monetary authority in the EMU (the ECB) and several national fiscal policy makers inside the EMU (and one in the CEECs).

3 Assumptions for the Simulations

3.1. Objective Functions

In order to analyze the welfare effects of different strategies followed by European and US monetary and fiscal policy-makers, it is necessary to define a normative measure of the economic outcomes of different simulation runs. Here, we calculate economic welfare losses caused by various (transitory) shocks by assuming an additively separable quadratic welfare loss function. The welfare losses in each period are equal to the sums of the weighted quadratic differences between the actual values and the optimal values for each of the target variables. Next, the welfare losses in each future period are discounted to their present values (using the rate of time preference of the policy makers, which is assumed to be 10 percent) and summed up over the time horizon (infinity in theory, 97 years in the simulations) to obtain the measure of total welfare loss.

For the countries for which a welfare loss (objective) function is specified (Germany, France, Italy, Austria, REMS, CEEC, USA), the assumed target variables are the rate of inflation, real GDP, the current account and the budget deficit of the public sector. All target weights are set to 0.25, producing an equally weighted standardized objective function. The baseline values (simulated values without any shocks) of the target variables are considered as their optimal values. This makes sense because this reference simulation run represents a stable path towards a long-run equilibrium of the model.

European objective function values are calculated as weighted averages of the respective country-specific values, with weights derived from values of GDP at market prices.

When interpreting the values of these objective functions (welfare loss functions), 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 resulting numbers give a rough feeling for the size of the welfare effects, but must not be overvalued with respect to quantitative comparisons. Moreover, the absolute values of an objective function under different shocks cannot be compared either. What can be done – and this is a main task of this paper – is a systematic comparison of the welfare effects on Europe, the CEECs and the USA under alternative assumptions about the European institutional design, European and US policy reactions, and coordination or lack thereof, for given shock scenarios.

3.2. Scenarios

We have to distinguish between different assumptions with respect to the policy framework. When a country is assumed to pursue an “active” optimizing economic policy, the four economic target variables mentioned above enter the objective function of this country. In these cases, the policy variable is a fiscal instrument (nominal government consumption) for each “active” country. EMU monetary policy is set independently by the ECB according to an assumed intermediate monetary target. The CEECs are assumed not to implement active monetary policy in scenarios in which they do not belong to the EMU. In scenarios called “only European policies”, we assume that no other non-EMU country and region of the model pursues “active” fiscal or monetary policies, i.e., these countries are assumed not to react upon shocks and European policies. In “USA active policies” scenarios, US monetary and fiscal policy-makers are assumed to optimize an objective function of the same type as those for the “active” European countries (with US target variables, of course).

Table 1: "Institutional Scenarios"

			EU-12 and CEEC	EU-12 and CEEC	EU-12 and CEEC
Fiscal Policy	No Policy	No Policy	Active	Active	Active
Cooperation	-	-	Non-cooperative	Non-cooperative	Cooperative
EMU Type	EMU-12	Enlarged	EMU-12	Enlarged	Enlarged
Scenario	NOP EMU-12	NOP EMU-new	NC-EUnew EMU-12	NC-EUnew EMU-new	C-EUnew / C-ALL EMU-new

Table 1 gives an overview of five European "institutional scenarios", which are considered for each of the shocks, each of the ECB intermediate targets, and for both "only European policies" and "USA active policies" scenarios. The "institutional scenarios" NOP EMU-12 and NOP EMU-new are regarded as baseline scenarios for the different types of shocks. All "institutional scenarios" are calculated for two different ECB policy rules and for policy settings without and with active US policies, thus giving four different outcomes for each "institutional scenario" for each shock.

The NOP EMU-12 institutional scenario assumes no active policy, neither monetary nor fiscal policy, for the present EMU-12, i.e., the values of the fiscal and monetary instrument variables are kept at their baseline values. NOP EMU-new assumes basically the same, but for a "new" EMU ("EMU-new"), where the CEECs are members in addition to the present EMU members (i.e., the CEECs have adopted the euro as legal tender, and their central banks are fully integrated into the ESCB). The non-cooperative "institutional scenarios" assume non-cooperative strategic economic policy-making in the sense that the "active" policy-makers (ECB and fiscal policy-makers in the EMU and the CEECs and – for "USA active policies" scenarios - US policy-makers) do not cooperate. On the other hand, the cooperative "institutional scenario" assumes full cooperation between all policy-makers involved (the ECB and all European fiscal policy-makers for C-EUnew scenarios, the above plus the US policy-makers for C-ALL scenarios). No intermediate constellations (such as coalitions between subsets of policy-makers) are considered. Thus, for the cooperative "institutional scenarios" we assume full monetary and fiscal policy integration of the CEECs into the EMU. For additional scenarios, including

those resembling an EU accession of the CEECs without immediate accession to the EMU (which will prevail during the first months or years after the EU enlargement), see Neck et al. (2003).

For each of the "institutional scenarios", alternative ECB strategies (intermediate targets or policy rules) are studied. Two different policy rules for the ECB are considered here: The "no (active) policy" (NOP) rule leaves the monetary instrument (money supply) of the ECB at its baseline values. Under this policy rule, the ECB targets money supply (therefore it is also called MON). Here the money supply is set so as to keep the European economy on the steady state adjustment path. Due to its particular implementation in the MSG2 Model (not to be discussed in detail), this (intermediate) target can be reached exactly, thus we have strict assignment of the monetary policy instrument to the monetary intermediate target for all MON scenarios. Alternatively, the policy rule of inflation targeting (INF) is implemented by modeling the ECB as a player in a dynamic game; since also in these cases the ECB has a single assigned target, it is always able to reach this target exactly in the non-cooperative cases. Monetary targeting and inflation targeting serve as models for elements of the ECB's "two-pillar" strategy. Alternative monetary policy intermediate targets for the ECB were analyzed in Neck et al. (2003).

In the non-cooperative scenarios, the players (the ECB and the governments of the five EU countries/regions, in the "USA active policies" scenarios also the US policy-makers) 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 policy game. In the cooperative scenarios, a joint welfare loss function, which is a weighted sum of the individual objective functions, is minimized subject to the dynamic model. This results in the collusive solution of game theory, because all players have equal weights in the joint objective function. The cooperative solution can be interpreted as the result of an agreement between the ECB and the fiscal policy-makers (the governments) of the six European countries/regions. In the case of the "USA active policies" scenarios, some arrangement is also assumed between the European and the US policy-makers (for example, a binding agreement concluded at a summit of policy-makers). This may not seem to be a very realistic possibility at the moment, but it may serve as reference for comparisons with non-cooperative scenarios. Note that all cooperative scenarios assume an enlarged EMU (or equivalently full cooperation between the ECB and the central bank(s) of the CEECs). In the "USA active policies"

scenarios, the US policy-makers (government and Fed) are always regarded as one player, i.e., full cooperation is assumed between the US policy-makers also in the (globally) non-cooperative scenarios.

Under full cooperation, the ECB gets a weight in the joint objective function, which is equal to the sum of the weights of the European countries/regions, which implies a rather strong central bank. In our view, assigning equal weight ("power") to the ECB and the total of the EMU countries' governments is the most realistic model of cooperative policy design in Europe, given the difficulty of arriving at an agreement between fiscal policy-makers of six (in reality: up to 22) countries. Note that in the NOP/MON case with cooperation in Europe, the ECB can successfully fix money supply to the target values, and cooperation is taking place effectively between the European fiscal policy-makers only.

To avoid time-inconsistency, all non-cooperative simulations are carried out by calculating a closed-loop feedback (Markov-perfect) equilibrium solution of the dynamic policy game under consideration. Time-inconsistency means that at future points in time, re-optimization results in time paths for the instruments that are different from the optimal open-loop policy obtained initially 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. The NOP/MON scenarios are not time-consistent and can therefore be carried out only if strong elements of self-commitment are enforced. The solution algorithm DYNGAME, which is used to solve the MSG2 Model for the non-cooperative equilibria, calculates strongly time-consistent feedback policy rules; hence its solutions are subgame-perfect and 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.

3.3. Shocks

For all scenarios considered, we calculate the effects of a temporary negative supply (total productivity) shock and a temporary negative demand (autonomous consumption) shock. See Table 2 for a systematic overview.

Table 2: Shock Scenarios

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

The negative productivity shock can be interpreted as a temporary inward shift of the production possibility frontiers of the countries affected. Total factor productivity is assumed to fall by 2 percent in the first year, 1.5 percent in the second year, 1 percent in the third year, and 0.5 percent in the fourth year as compared to the baseline of the model. A negative demand shock shifts the aggregate demand curve to the left. Here, we simulate the consequences of a temporary exogenous decrease of real private consumption. In these simulations, autonomous real private consumption is assumed to fall by 6 percent in the first year, 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 can distinguish between a CEEC shock (affecting the CEEC block in the model), an EMU-12 shock (affecting the "old" EMU-12), an EMU-new shock (affecting the EMU-12 and the CEEC block simultaneously, i.e., an "EMU-new" shock), and a world shock (affecting all fully modeled regions in the model). This allows for the assessment of various possibilities for an asymmetric shock as well as a symmetric European or global shock.

4 Results

4.1. General Effects

The negative supply shock causes the well-known stagflation dilemma: GDP decreases while the price level increases. Dealing with this type of shock is non-trivial, as expansionary policy measures would also increase inflation, while restrictive economic policy would further reduce real output. The demand shock does not raise this issue, as 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. The scenarios

considered differ with respect to the interventions by the policy-makers, who try to counteract lower output and higher prices. Here we report only about the results of selected simulation, optimization and dynamic game runs; 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 discussed here.

To evaluate the welfare effects for several kinds of institutional setups, the values of an overall objective function, which for normative purposes is defined as the sum of the objective (welfare loss) functions of the countries/regions (with equal weights, but neglecting the "welfare loss" of the ECB), are calculated for each scenario, given a specific shock and under different assumptions regarding the policy rules of the ECB, cooperation versus non-cooperation and the absence or presence of strategic reactions of the USA. Since the objective function is specified as a welfare loss function, lower values represent "better" results in terms of welfare. In contrast to previous work (e.g., Haber et al. 2002), we refrain from stating any explicit ranking of the scenarios, because the results of the sets of simulations may be seen as dealing with a multi-dimensional question: On the one hand, we are interested in the best ECB rule for a given "institutional scenario"; on the other hand, we want to analyze the effects of different "institutional scenarios", given a specific policy rule or intermediate monetary policy target of the ECB. Moreover, we want to explore the spillovers of different European policies on the USA and the effects of possible feedbacks from US policies to Europe.

4.2. Results of Demand Shocks

First, consider the CEEC demand shock (CA). The welfare (loss) results of this scenario can be seen in Table 3 for the "only European policies" scenario and in Table 4 for the "USA active policies" scenario.

Table 3: Welfare Results of the CEEC Demand Shock (CA) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	0,23	0,17	0,05	0,00	
	INF	0,21	4,34	0,03	0,00	0,04
CEEC *ECB*	**MON/NOP**	13,31	76,78	11,27	14,49	
	INF	13,29	62,00	11,24	14,43	14,15
USA *ECB*	**MON/NOP**	0,02	0,01	0,00	0,00	
	INF	0,02	0,04	0,00	0,00	0,00

As expected, there are only very small welfare effects for the present EMU when the consumption shock is limited to the CEECs. This is true for both baseline scenarios (the NOP scenarios); if there is no policy reaction, the EMU enlargement is slightly better for the members of the present EMU, but the difference is quantitatively unimportant. Similar results can be seen for the scenarios with active policies: The non-cooperative scenario with an enlarged EMU (NC-EUnew EMU-new) shows nearly no welfare losses, and also the welfare effects in the other scenarios are very small and can be seen as nearly zero. For the members of the present EMU, we find that active fiscal policy is desirable, while the institutional setup (enlargement vs. no enlargement) and the choice of the intermediate target for monetary policy do not matter much. The same is true for the USA: spillovers are very small, and active policies in the EU are better then no-policy scenarios.

As expected, a different picture arises from the point of view of the CEECs for the asymmetric demand shock affecting only the CEECs. A monetary union reduces the ability of the CEECs to counteract their domestic shock by abolishing the possibility of adjusting (flexible) exchange rates between the CEECs and the EMU-12. Therefore all EMU-new scenarios now show higher welfare losses than their EMU-12 counterparts. The difference is most notable for the baseline simulations (NOP), where no other accommodating policy instruments are available that might be substituted for the protective effects of flexible exchange rates. Within an enlarged EMU, cooperation is better than non-cooperation. No-policy scenarios are always inferior to corresponding scenarios with active (fiscal or monetary) policies; in particular, inflation targeting of the ECB is better for the CEECs than monetary targeting, especially when these countries are in the enlarged EMU. As this ranking holds not only for the CEECs but also for the EU-12 countries and the USA, we can conclude that contingent rule policies are superior to fixed rule policies for this shock.

Table 4: Welfare Results of the CEEC Demand Shock (CA) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	0,23	0,17	0,05	0,00	
	INF	0,22	4,35	0,03	0,00	0,02
CEEC *ECB*	**MON/NOP**	13,30	76,76	11,27	14,49	
	INF	13,28	61,92	11,24	14,43	14,26
USA *ECB*	**MON/NOP**	0,02	0,01	0,00	0,00	
	INF	0,02	0,03	0,00	0,00	0,00

The corresponding results under the assumption that the USA react in an active way on the demand shock to the CEECs are shown in Table 4. They are nearly identical to the previous ones. Active policies of the US reduce the (already very low) welfare losses of the USA, and they reduce the welfare losses of the other blocks slightly in most cases. All other welfare orderings remain as before.

Table 5: Welfare Results of the EMU-12 Demand Shock (CO) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	38,07	37,29	32,63	32,65	
	INF	26,07	30,03	25,55	24,19	20,64
CEEC *ECB*	**MON/NOP**	0,85	12,57	1,51	1,41	
	INF	1,07	15,52	2,46	2,61	4,60
USA *ECB*	**MON/NOP**	3,39	3,47	0,76	0,83	
	INF	3,74	3,68	1,56	1,81	2,59

Table 6: Welfare Results of the EMU-12 Demand Shock (CO) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	37,86	36,09	32,53	32,76	
	INF	25,65	29,65	25,30	23,70	26,69
CEEC *ECB*	**MON/NOP**	0,87	13,04	1,55	1,37	
	INF	1,10	15,81	2,55	2,74	1,94
USA *ECB*	**MON/NOP**	2,55	2,62	0,51	0,56	
	INF	2,74	2,71	1,15	1,38	0,69

The results for the case where the negative demand shock is limited to the present EMU-12 (CO) can be found in Tables 5 and 6. The difference between the two baseline runs (NOP) without active policies is still present: an enlarged EMU-new is clearly much worse for the CEECs than the present EMU-12. The spillovers to the CEECs and to the USA are not negligible for the asymmetric EMU-12 shock. This holds in particular for the CEECs when they are members of the EMU: losing the instrument of adjusting exchange rates implies extreme increases of their welfare losses unless they use their fiscal policy instrument to counteract the recession originating from falling demand in the "old" EU. ECB inflation targeting is better than monetary targeting for the EMU-12, but worse for the other regions. Inactive fiscal policies are inferior to optimizing ones for all regions of the model. Cooperation is not necessarily preferable to non-cooperation for all regions involved. The USA can

achieve reductions of welfare losses (to them, but not necessarily to the other regions) by following optimizing active policies.

Table 7: Welfare Results of the EMU-new Demand Shock (CN) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	37,25	37,61	32,66	32,66	
	INF	24,56	22,32	24,99	24,10	20,71
CEEC *ECB*	**MON/NOP**	13,74	29,53	13,08	8,50	
	INF	13,68	19,02	15,13	7,26	5,82
USA *ECB*	**MON/NOP**	3,91	3,86	0,80	0,83	
	INF	4,29	4,41	1,65	1,83	2,72

Table 8: Welfare Results of the EMU-new Demand Shock (CN) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	37,04	36,38	32,57	32,77	
	INF	24,10	21,88	24,72	23,63	26,05
CEEC *ECB*	**MON/NOP**	13,67	28,74	13,09	8,53	
	INF	13,60	18,63	15,19	7,12	7,62
USA *ECB*	**MON/NOP**	2,96	2,95	0,55	0,56	
	INF	3,17	3,24	1,21	1,40	0,73

Let us consider next the effects of a symmetric demand shock affecting both the EU-12 and the CEECs (Table 7 and 8). For the EMU-12 member countries, the no-policy simulations (NOP EMU-12 and NOP EMU-new) give similar results, the smaller EMU being slightly worse than the enlarged EMU-new in three out of four cases. The opposite is true for the CEECs: for the CEECs, an EMU enlargement again raises welfare losses under no-policy scenarios. On the other hand, with active fiscal policies, entering the EMU is clearly advantageous for the CEECs. ECB inflation targeting is mostly better than monetary targeting for the EMU members (but worse for the USA). Active US policies reduce spillovers to this country without causing visible negative spillovers back to the old continent. No general judgment can be made concerning the advantages or disadvantages of cooperation: without active US policies, the regions of the “new” EMU are better off under cooperation than under non-cooperative stabilization policies; but when the USA react in an active way, cooperation is primarily advantageous for them only.

Table 9: Welfare Results of the World Demand Shock (CX) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	48,63	48,71	67,66	71,64	
	INF	16,59	15,74	20,66	18,34	14,19
CEEC *ECB*	**MON/NOP**	13,81	17,94	20,91	8,02	
	INF	13,47	6,16	37,44	3,03	2,09
USA *ECB*	**MON/NOP**	67,61	67,63	58,93	58,91	
	INF	66,98	66,87	66,07	66,83	63,75

Table 10: Welfare Results of the World Demand Shock (CX) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	45,94	44,26	60,45	64,49	
	INF	13,93	13,23	18,03	15,46	38,19
CEEC *ECB*	**MON/NOP**	13,68	17,17	19,98	7,81	
	INF	13,37	5,81	35,39	3,14	3,22
USA *ECB*	**MON/NOP**	20,39	20,33	21,08	21,03	
	INF	19,31	19,19	19,81	19,58	13,74

The qualitative results for the global consumption shock (CX), as displayed in Table 9 and 10, are similar to the results for the symmetric European shock (CN) but imply higher losses for most regions (especially, of course, for the USA). Here monetary targeting by the ECB gives particularly high values of welfare losses for the EU-12 and is hence inappropriate; it is also inferior to inflation targeting from the perspective of the CEECs (except for the case where these countries remain outside the EMU and fiscal policy is active). Under the global demand shock, the USA are much more affected when they refrain from active monetary and fiscal policies, but can considerably improve their performance when combating the world recession of this case by counter-cyclical policies, especially when they cooperate with European policy-makers.

4.3. Results of Supply Shocks

Next, we consider the effects of transitory supply shocks on the results of EMU, CEEC and US macroeconomic stabilization policies. For the asymmetric CEEC supply shock (YA) shown in Table 11 and 12, the spillovers to the EMU-12 are very small. Differences between EMU enlargement scenarios and corresponding smaller-EMU scenarios are rather small. For the supply shock, the no-policy

scenarios with fixed rules clearly dominate the scenarios with active economic policies. The high welfare losses of the CEECs under an active fiscal policy are especially remarkable. For all regions modeled, the results are clearly in favor of the no-policy scenarios (NOP EMU-12 and NOP EMU-new), where the lowest welfare losses can be observed. Otherwise, all results are within small bounds, so a decision in favor of or against a class of scenarios is not easy. Cooperation tends to be better than non-cooperation for the "old" EMU and worse for the CEECs. There are virtually no spillovers to the US and hence also no differences between scenarios with inactive and active US policies.

Table 11: Welfare Results of the CEEC Supply Shock (YA) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	0,01	0,01	0,15	0,02	
	INF	0,01	0,74	0,09	0,10	0,04
CEEC *ECB*	**MON/NOP**	3,66	4,18	11,61	11,63	
	INF	3,67	3,82	11,49	11,44	11,64
USA *ECB*	**MON/NOP**	0,00	0,00	0,00	0,00	
	INF	0,00	0,00	0,01	0,00	0,00

Table 12: Welfare Results of the CEEC Supply Shock (YA) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	0,01	0,01	0,15	0,02	
	INF	0,01	0,74	0,09	0,10	0,04
CEEC *ECB*	**MON/NOP**	3,66	4,18	11,60	11,63	
	INF	3,67	3,82	11,47	11,45	11,65
USA *ECB*	**MON/NOP**	0,00	0,00	0,00	0,00	
	INF	0,00	0,00	0,00	0,00	0,00

Table 13: Welfare Results of the EMU-12 Supply Shock (YO) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	21,13	21,22	36,46	36,46	
	INF	33,68	29,70	43,12	44,32	31,33
CEEC *ECB*	**MON/NOP**	0,10	0,44	0,15	0,19	
	INF	0,15	3,84	1,79	3,29	0,73
USA *ECB*	**MON/NOP**	0,20	0,20	0,20	0,22	
	INF	0,29	0,27	0,85	1,06	0,14

Table 14: Welfare Results of the EMU-12 Supply Shock (YO) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	21,14	20,57	36,16	35,62	
	INF	33,75	29,74	43,29	43,50	31,26
CEEC *ECB*	**MON/NOP**	0,10	0,39	0,16	0,17	
	INF	0,15	3,89	1,85	3,27	0,47
USA *ECB*	**MON/NOP**	0,12	0,12	0,08	0,08	
	INF	0,19	0,18	0,60	0,70	0,04

For the EMU-12 asymmetric supply shock (YO), the results are shown in Table 13 and 14. As before, the results are mixed with respect to the advantages or disadvantages of the EMU-12 versus the EMU-new monetary union for the present EMU members. Cooperation is better than non-cooperation under a counter-cyclical policy design. Again, from the point of view of the "old" EMU affected by the shock, the no-policy scenarios dominate all scenarios with active policies of the ECB and/or the governments. As expected, spillovers of the asymmetric EMU-12 supply shock are present but not very substantial for the CEECs and still smaller for the USA. Even then, active US policies can improve upon the US results and insulate the USA nearly perfectly from the European supply shock.

Table 15: Welfare Results of the EMU-new Supply Shock (YN) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	21,49	21,46	36,07	36,08	
	INF	34,06	36,05	43,36	46,73	31,75
CEEC *ECB*	**MON/NOP**	4,54	4,98	11,16	12,50	
	INF	4,93	7,37	21,59	10,43	11,85
USA *ECB*	**MON/NOP**	0,22	0,22	0,24	0,23	
	INF	0,31	0,33	0,89	1,13	0,15

Table 16: Welfare Results of the EMU-new Supply Shock (YN) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	21,49	20,81	35,77	35,25	
	INF	34,13	36,10	43,51	45,88	31,50
CEEC *ECB*	**MON/NOP**	4,55	4,87	11,09	12,37	
	INF	4,94	7,43	21,77	10,45	12,19
USA *ECB*	**MON/NOP**	0,14	0,13	0,11	0,09	
	INF	0,21	0,22	0,64	0,75	0,05

The results for the symmetric European supply shocks (YN) are summarized in Table 15 and 16. Even for the all-European supply shock, the spillovers to the USA are fairly weak, especially when compared to the spillovers of demand shocks of comparable size. The fixed-rules no-policy scenarios are again the overall winners from the perspective of the regions directly affected by the shock (EU-12 and CEECs), but for the USA (not affected directly by the shock), an active (discretionary) policy design can help. Within the class of activist policies, the EU-12 and the USA gain from cooperation; the CEECs don't. Generally speaking, there are no dominance relations between the EMU-12 and the EMU-new scenarios; only under activist non-cooperative policies, the CEECs clearly gain from being within the EMU.

Table 17: Welfare Results of the World Supply Shock (YX) – Only European Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-EUnew**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	27,01	27,02	48,44	48,46	
	INF	43,04	44,52	55,03	59,27	39,92
CEEC *ECB*	**MON/NOP**	5,39	6,24	12,74	14,46	
	INF	5,91	9,86	27,00	11,99	13,14
USA *ECB*	**MON/NOP**	30,82	30,82	26,49	26,32	
	INF	32,17	32,22	35,99	37,29	30,93

Table 18: Welfare Results of the World Supply Shock (YX) – USA Active Policies

	FISC-EU	**NOP**	**NOP**	**NC-EUnew**	**NC-EUnew**	**C-ALL**
	EMU Type	**EMU-12**	**EMU-new**	**EMU-12**	**EMU-new**	**EMU-new**
EU-12 *ECB*	**MON/NOP**	26,04	25,22	45,33	44,74	
	INF	41,53	43,05	53,34	56,10	87,80
CEEC *ECB*	**MON/NOP**	5,21	5,80	12,21	13,77	
	INF	5,73	9,48	26,07	11,73	20,76
USA *ECB*	**MON/NOP**	24,04	23,96	21,55	21,41	
	INF	24,85	24,88	28,20	28,84	16,15

The world-wide symmetric supply shock presented in Tables 17 and 18 delivers the following insights: For the European regions, no-policy strategies (fixed rules) are best. For the USA, on the other hand, the reverse holds: active fiscal and monetary policies unambiguously improve upon performance when compared to a strategy of benign neglect. Moreover, activist EU fiscal policy helps the USA; activist monetary EU policies (ECB inflation targeting) hurt the USA in terms of the welfare measure chosen.

Cooperation is good for the “larger” player (the EU-12 in the case of inactive US policies, the USA in the case of active US policies). Differences between an EMU with the CEECs and one without them are small, except for the case where the EU governments and the ECB follow an activist policy – there it is definitely advantageous for the CEECs to be within the EMU.

5 Concluding Remarks

The analysis shows that the advantages and disadvantages of different institutional setups strongly depend on the nature and scope of the shocks the economies are faced with. There are also important differences with respect to the international spillovers and feedbacks of shocks and policies. Previous results on the advantages of fixed rules as an answer to supply shocks and more activist policies against demand shocks are supported by the present results for the European countries, but not for the USA. Cooperation is not necessarily better than non-cooperative activist policy-making, and in most cases, cooperation comes at the expense of the “smaller” player and favors the “larger” one (on a global level, the USA).

In most of the scenarios, the EMU enlargement does not lead to significant welfare effects for the present members of the EMU. Thus, additional macroeconomic noise resulting from the CEECs’ membership does not seem to be too much of a problem for the present members of the EMU-12. On the other hand, no significant advantages for the EMU-12 countries can be identified either. For the accession countries, EMU membership only in a few cases provides significant reductions of macroeconomic welfare losses. The results for the USA are not substantially affected by including the CEECs in the EMU, which may lead to conjecturing that global effects of the EMU enlargement will be minor. It remains to be shown how robust these results are with respect to variations in the model used and to the assumptions about the objective functions. At present, it seems as if the decision about the EMU membership of the accession countries need not too much be influenced by macroeconomic policy considerations.

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