

Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism?

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Abstract

The implications of monetary unification for fiscal policies are discussed. The roles of nominal exchange rate flexibility in the presence of asymmetric national shocks and nominal price rigidities as an automatic stabilizer and source of disturbances to real economic performance are reviewed. Two main themes are considered. The first is whether a system of fiscal insurance across member states qualitatively replicates the effects of autonomous monetary policy instruments when exchange rates are permanently fixed. It is argued that while fiscal insurance schemes increase the instruments available to fiscal authorities to influence resource allocation, they do not augment existing fiscal instruments in a manner that replicates monetary policy under long-run monetary neutrality in an overlapping generations economy. Restrictions imposed on national fiscal instruments as a condition of monetary unification may give rise to a need for fiscal insurance to replace their role as stabilizers. The second theme addresses whether political unification is a necessary logical conclusion of the usefulness of fiscal insurance scheme. The argument that sustainable insurance arrangements can be devised without foregoing national sovereignty over fiscal policymaking is discussed.

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1 Introduction

The prospects for progress towards European monetary integration in the near future have focussed the attention of policy makers and economists to the implications of monetary unification for the role of fiscal policy. The loss of independent monetary policies for member states and proposed creation of a common European Central Bank should increase the importance of autonomous national, or regional, fiscal policies for the purpose of aggregate demand management in the face of national, or regional, macroeconomic shocks. It has also raised the perceived need for fiscal policy coordination in the European Union and for restrictions on the fiscal actions of member countries. This paper addresses the fiscal consequences of monetary unification in Europe and critically discusses much of the literature concerning the implications of a common currency for macroeconomic stabilization in the European Union.

Much of the policy debate over the adoption of a common currency for Europe concentrates on the sufficiency of national fiscal policy instruments to replace autonomous monetary policies and flexible exchange rates. A primary question in this debate is whether a system of fiscal federalism that implements temporary fiscal transfers across members or regions, similar to that practiced by the United States or Canada, is necessary to assure adequate macroeconomic stabilization against idiosyncratic regional aggregate supply and demand shocks.

One of the primary objectives of this paper is to re-examine the argument, originating with Ingram [1959], that a system of fiscal transfers between states serves as partial replacement for nominal exchange rate flexibility in macroeconomic stabilization under monetary union. I argue, on the basis of a macroeconomic model incorporating savings and investment behavior by rational households and firms, that fiscal transfers between the member states of a monetary union do little or nothing to increase the set of fiscal instruments available to separate national authorities for replacing the role of autonomous monetary policies. This statement holds as long as the set of fiscal and financial tools available to national authorities is not restricted

and money is neutral in the long run but not in the short run. In particular, if national fiscal authorities retain the capacity to run budget deficits and issue national public debt, then adding temporary fiscal transfers does not necessarily add to the capacity of the fiscal policies at hand for short-run stabilization. It does not say that a system of international fiscal insurance is not beneficial; it is and does increase the capacity of governments to smooth national purchasing power to stabilize real output, employment and investment in the face of asymmetric national disturbances to real supplies and demands. There are two implications. One is that restrictions on public sector debts and deficits imposed with monetary union may create their own need for fiscal federalism. The other is that there are efficiency-based arguments for international fiscal insurance schemes, so that these may be observed in national monetary unions, such as the United States, because political union allows the nation to take advantage of them.

A second objective is to address the issue of whether political union is necessary to sustain a system of fiscal insurance between member states. I argue that if policy makers act on long horizons, then some degree of international fiscal insurance for stabilizing real incomes across idiosyncratic temporary real supply and demand shocks is sustainable for fiscally sovereign states. There are further gains from a more extensive fiscal transfer scheme that requires external enforcement to be viable. Political unification would allow these additional gains from fiscal insurance to be realized. Together these arguments about the role of fiscal federalism and its sustainability without external state power suggest that monetary integration does not necessitate political unification. The arguments here complement those given by Eichengreen [1996] to make the same point.

This paper discusses the role of fiscal policy in a monetary union. The discussion of the consequences of a common currency and single central bank for fiscal policy is separated between issues that arise when all prices and wages are perfectly flexible and the problem of macroeconomic stabilization in the presence of nominal price or wage rigidities. The next section reviews the effect of monetary union on the budgetary instruments and policies of national fiscal authorities that exist without price or wage stickiness. The review is brief and

provides some definitions used later and discusses a few issues related to the argument that political union need not be necessary for monetary union.

The third section turns to the macroeconomic stabilization problem in the presence of nominal wage or price rigidities. It briefly and critically reviews the empirical findings and theoretical arguments used by others to suggest that a system of fiscal federalism may be needed to realize gains from monetary integration. Section 4 systematically discusses how fiscal insurance schemes augment the set of fiscal instruments available to national authorities for stabilization in the presence of asymmetric national aggregate disturbances. The possibility of international fiscal insurance schemes without political unification and the gains from political union are taken up in Section 5. The last section concludes.

2 Fiscal implications of monetary union without nominal rigidities

This section touches on two topics concerning how monetary unification, independently of the integration of markets, affects the fiscal policy choices of national governments. Monetary union has budgetary implications for member states by eliminating national control over the monetization of public sector budget deficits. The reduction of the set of fiscal instruments available to member states by the adoption of a common currency is reviewed first. Monetary unification can also change the incentives for fiscal discipline by national authorities because the social costs of monetization by a single central bank under a common currency are spread across all other members of the union. Fears that the proposed European Central Bank will not be able to resist pressure for a monetary expansion in the face of a fiscal crisis for an enterprise as large as a member state have given birth to restrictions on public sector debt and deficits in the Treaty of Maastricht and in a subsequent German proposal. A number of critiques of these restrictions on public sector budgetary policies are already available¹, so the discussion is brief and focusses on the underlying issue of whether monetary unification for Europe really changes the problem of fiscal discipline.

2.1 Budgetary consequences of a common currency

The monopoly right to issue an intrinsically valueless money useful as a medium of exchange allows a government to appropriate real resources from the private economy. By maintaining a national currency, a national government can use seigniorage revenues and inflation taxes to help finance national public expenditures. Exchange rate flexibility allows individual national governments to use these instruments independently of each other. Monetary union eliminates the ability of individual member governments to pursue independent monetary policies, restricting the use of these fiscal policy instruments by national governments. Under a permanently-fixed exchange rate regime, the equilibrium rate of inflation of the prices of traded goods is the same across borders and the equilibrium rates of inflation in non-traded goods' prices differ to the extent that national productivity growth rate differentials between traded goods and non-traded goods diverge. With the adoption of a common currency, seigniorage revenues must accrue to the single central bank to be allocated across members, or, equivalently, be divided between the member banks of a system of central banks according to a prescribed or agreed upon scheme.

Seigniorage and the inflation tax are related but distinct and readily confused concepts. Seigniorage is defined as the resources raised by the government through an expansion of the nominal monetary base. Seigniorage as a fraction of nominal GDP, $P_t Y_t$, in period t is given by

$$\pi_t = \frac{\Delta H_{t+1}}{P_t Y_t} \quad (1)$$

where H_t is the nominal quantity of base money at the beginning of period t and $\Delta H_{t+1} = H_{t+1} - H_t$. The inflation tax is generally defined as the reduction in the real value of the monetary base due to increases in the price level. Inflation tax revenues are the proportionate rate of increase in the price level times the real monetary base. As a fraction of GDP, the inflation tax rate is given by

$$\delta_t = \frac{1}{Y_t} \cdot \frac{\Delta P_{t+1}}{P_t} \cdot \frac{\Delta H_{t+1}}{P_{t+1}} = \pi_{t+1} \frac{Y_{t+1}}{Y_t} h_{t+1} \quad (2)$$

where $\frac{\Delta P_{t+1}}{P_t} \approx \frac{Y_{t+1}}{P_t}$, $\frac{\Delta P_{t+1}}{P_t} = \pi_t$ is the inflation rate and $\frac{h_{t+1}}{H_t} = \frac{Y_{t+1}P_t}{Y_tP_{t+1}}$ is the base money to nominal GDP ratio.

A little algebra shows that the inflation tax and seigniorage are related by the identity

$$\pi_t = \zeta_t + g_{t+1}h_{t+1} + (h_{t+1} - h_t); \quad (3)$$

where g_{t+1} is the growth rate of real GDP. This says that seigniorage exceeds the inflation tax by the amount that real demand for money increases due to real economic growth (the term $g_{t+1}h_{t+1}$) and to changes in the demand for base money (the term, $h_{t+1} - h_t$).² In a non-inflationary growing economy, the government collects seigniorage revenues by issuing additional base money to meet the increasing real demand for liquidity.

The inflation tax defined in equation 2 is more accurately described as the *anticipated* inflation tax. *Unanticipated* inflation reduces the real value of outstanding nominally-indexed fixed-rate public debt. The longer the maturity of a given nominal quantity of debt, the larger is this effect for a given increase in current and future inflation. The nominal rates of interest on new public debt issues will take account of expected inflation and may include a risk premium reflecting possible unanticipated inflation. Countries with histories of low inflation tend to be most able to use unanticipated inflation tax levies for reducing the real burden of their national debts. A reputation for low inflation allows a government to issue longer maturity fixed interest rate debt on more favorable interest terms to a larger number of creditors. Unanticipated inflation tax levies on the national debt have been the primary means used by the governments of the United States and United Kingdom to appropriate real resources through inflation. An unanticipated increase in the price level, in contrast to an increase in the rate of change of the price level, will reduce the real value of both fixed and variable rate debt denominated in national currency. This can be achieved by an unanticipated discrete devaluation in an open economy.

Monetary unification implies that national governments lose the capacity to impose differential anticipated and unanticipated inflation taxes. The inflation tax is a distortionary tax whenever

money demand responds to the expected rate of inflation. Neoclassical public finance theory implies that an optimal fiscal policy would include seigniorage collection and inflation taxation when no non-distortionary tax instruments are available (a realistic presumption). It seems natural to think that national governments seeking to maximize social welfare would choose different optimal inflation rates as their tax bases and costs of tax collection and administration vary, so that welfare benefits are possible, from the neoclassical perspective of allocative efficiency, from maintaining national currencies and exchange rate flexibility. Mankiw [1987] demonstrates this in an *ad hoc* economic model, and Buiter [1995] shows that identical inflation tax rates should be chosen by different countries in a simple model based on optimizing behavior, so that the theoretical case for divergent optimal inflation taxes is not strong.

On a practical level, seigniorage and the inflation tax have been of little importance for the members of the European Union in recent years, with the exceptions of Spain, Italy, Greece and Portugal. Excluding these countries, the highest average inflation tax rate for the other eleven members over 1990-94 was 0.34% shared by Germany and Sweden. The highest inflation tax and seigniorage rates over the period for all fifteen were 2.90% and 2.93%, respectively, both achieved by Portugal over 1990-92.³ The imposition of a common low rate of inflation is unlikely to increase the excess burden of taxation in any significant way for the European Union. However, the distribution of seigniorage revenue from a common central bank or system of banks undoubtedly will differ from the status quo ante. This will affect the use of seigniorage as a contingent source of revenue.

Monetary unification may increase the importance of seigniorage as a source of public sector revenue for the European Union as a whole. It is likely that a single European currency will compete with the US dollar as an international vehicle and reserve currency, so that total demand for base money issued by the European Union membership will increase. If it does, then the total capacity for earning seigniorage revenues and to transfer real resources from other nations will increase. Because estimates indicate that a majority of the currency of the United States circulates outside the US, this increase could represent a significant amount of resources.

A single currency could generate greater opportunities for using the unanticipated inflation tax depending on the anti-inflationary credibility of the European central bank.

2.2 Budget deficits and fiscal discipline under a common currency

The topic that has dominated the policy debate over monetary unification in Europe since the signing of the Treaty of Maastricht is that a common currency may lead to an erosion of fiscal discipline by national governments. An argument is that with a common monetary policy, individual member states have a greater incentive to accumulate public debt if they expect future monetization. The entire community shares the social costs of monetizing national deficits more with a single currency than with autonomous monetary policies and flexible nominal exchange rates. The Treaty addresses this potential problem of fiscal discipline by forbidding the European Central Bank to financing of public sector budget deficits by issuing money and also forbids bail-outs of member governments by the European Union. It goes further by specifying the Excessive Deficits Procedure, requiring member states to keep deficits and debt below 3 percent and 60 percent of GDP, respectively, and setting forth a process for sanctioning states exceeding the reference value. Many authors have noted that the additional procedure seems excessive or redundant.⁴ The recent proposal from the Ministry of Finance of Germany goes further, setting a standard for deficits at 1 percent of GDP under unexceptional circumstances and requiring deposits equal to 0.25 percent of GDP for countries violating the 3 percent limit.

The fear that national fiscal authorities left to manage deficits by themselves might imperil the stability of a common currency must follow from the presumption that the European Central Bank will be unable to resist bailing out governments in financial distress. If the central bank is expected to monetize large levels of debt eventually, then fiscal authorities have an incentive to respond by incurring excessive deficits. This problem of the time inconsistency of a central bank's pledge to not monetize the treasury's deficits arises as well for single countries with national currencies. The natural and common answer is to establish an independent central

bank, just as envisioned in the Treaty, although a *de jure* independent central bank does not necessarily translate into a *de facto* independent central bank.⁵ At issue is whether these problems are any different for a monetary union than for nations with individual currencies.

Buiter and Kletzer [1991a] and Eichengreen and von Hagen [1995] argue that there is no reason that the public debts of individual member states should not remain the responsibility of those states under monetary union as long as national governments do not give up tax instruments to a supranational authority. In a historical analysis, Eichengreen and von Hagen show that the likelihood of a federal bailout of a lower fiscal jurisdiction in fiscal federations depends on the proportion of total tax revenue collected at the federal level. They also show that the adoption of various restrictions on state and local government indebtedness by the states of the United States⁶ was unrelated to the monetary unification in the United States and find that restrictions on debt issuance by subnational (state, provincial or local) levels of government are unrelated to federal structure in a large cross-section of countries. Eichengreen and von Hagen do find that fiscal restraints on lower jurisdictions are negatively correlated with the share of subcentral government expenditures financed by tax revenues generated at the same level of government. They draw the conclusion that if, as anticipated, the vast majority of tax revenues continue to be collected by national governments, the member states will have the fiscal capacity to service their own public debts so that the commitment by the European Central Bank to the no-bail-out provisions can be credible without enforcement of fiscal restraints by a higher level of government.

Because monetary union eliminates control by national authorities over seigniorage and unanticipated inflation levies on holders of nominally-indexed debt, the set of fiscal instruments available to national governments facing a potential fiscal crisis is reduced. If the fiscal and monetary bailout provisions are credible, then the only recourse for a government that is insolvent given its share of union-wide seigniorage revenues is outright default. As the probability of a sovereign default rises, the risk premium demanded by debt holders (and incorporated into the real interest rate) should increase. At the extreme, the public sector

solvency constraint binds and no more public debt can be issued at any promised rate of interest. If financial markets are complete and not subject to pre-existing distortions, the equilibrium risk premium reflects the full costs of default risk, so that these would be borne entirely by bond issuers and bondholders. The social costs of possible default are internalized fully by willing bondholders and by the households and firms subject to taxation by the concerned state and enjoying the benefits of its public spending. In that case, a bailout by other member states can only serve to redistribute income and wealth between the residents of member states and toward the debtor's creditors. An efficiency-based argument for an *ex post* bailout requires that insolvency by one member creates external effects.

The assumption that financial markets are complete is unrealistic. It rules out the possibility of contagion effects in financial markets that can arise if financial markets are incomplete. One example of contagion is that sovereign default by one member government negatively affects the borrowing opportunities of others. Another, important, possibility is that public sector default leads to a monetary contraction through the workings of the banking system that can propagate, initiating a widespread liquidity and financial crisis. Financial market imperfections allow insolvency for one member government to create financial distress with consequences for real economic activity throughout the community. More generally, the presence of other pre-existing distortions, such as distortionary policy instruments and effective demand failures of a Keynesian variety, imply that the market interest terms and risk premia on national government debt will not reflect in full the social costs of public sector borrowing.⁷

In the case of the European Union, however, the benefits of a bailout may be unaffected to a great extent by monetary unification. With the very high degree of financial capital mobility already achieved for Europe, it is difficult to see any reason why monetary union would increase the costs or likelihood of a spreading financial crisis across member states. If national treasuries are able to generate the same primary surpluses after monetary union as before, then they can make the same real repayments to holders of outstanding public debt. Since inflation tax revenues are relatively unimportant in the budgets of the European Union membership and

the primary responsibility for all other taxes is expected to remain with national authorities, member states should not have any greater incentive to bailout another *ex post* with monetary unification than without.

3 Nominal rigidities and the consequences of monetary union

A major concern for the analysis of the economic consequences of monetary unification for Europe is that the loss of nominal exchange rate flexibility reduces the capacity of fiscal and monetary authorities to promote macroeconomic adjustment to supply and demand disturbances that are asymmetric across nations or regions. The theory of optimum currency areas is taken as the starting point by most of the literature on the stabilization problem for Europe under prospective monetary unification.⁸ By the definition of Mundell [1961], an optimum currency area exists if permanent nominal exchange rate fixing among a group of countries has no consequences for real economic performance.⁹ This will be the case if all relative prices are fully flexible or if all factors are perfectly mobile across countries even though nominal prices and wages adjust sluggishly. If all relative prices are perfectly flexible, then the choice of exchange rate regime has no effect on real economic performance, so that the only real effects of a common currency are due to the microeconomic efficiency gains from the adoption of a common medium of exchange and means of payment. Under perfect international factor mobility, nominal exchange rate flexibility is superfluous for the allocation of productive resources across borders; labor and capital move freely in response to asymmetric supply and demand shocks to maintain global production efficiency. With nominal rigidities and imperfect labor mobility, monetary authorities can pursue independent monetary policies if nominal exchange rates are flexible so as to reduce the costs of adjustment to idiosyncratic real shocks. With a system of irrevocably fixed exchange rates, the common monetary policy and national fiscal policies need to bear the burden of adjustment that was previously met by the combination of independent national monetary and fiscal policies.

It is conceivable that monetary policies have both short-run and long-run effects on the real economy. The nominal exchange rate regime can only matter in the long run if nominal rigidities are essential for long-run monetary non-neutrality. This is possible if the natural rate of unemployment displays path dependence (hysteresis). For example, if the natural rate depends on past actual unemployment, then temporary shocks to employment can have permanent effects on real output and incomes, so that the short-run non-neutrality of money leads to long-run non-neutrality. Significant empirical evidence of hysteresis in natural rates of unemployment for members of the European Union is lacking, so that long-run monetary neutrality is a reasonable hypothesis to maintain for the analysis of monetary unification.¹⁰

When money is non-neutral in the short run, nominal exchange rate flexibility allows national monetary policies to influence real economic performance temporarily. Transitory adjustment to real or nominal shocks is possible through monetary management, while permanent adjustment only can be achieved through changes in relative prices or in real production and consumption. By joining a monetary union, a country loses its ability to use monetary policy to respond to internal and external shocks that are transitory in nature or to adjust temporarily to permanent shocks. Nominal exchange rate flexibility adds to the temporary capacity of a national government to influence its real exchange rate, output growth, employment and other important measures of real economic performance in response to real supply or demand shocks. Permanent fixing of nominal exchange rates in the presence of sluggish price adjustment with money neutral in the long run, therefore, does not reduce the capacity of the government to adjust to permanent shocks in the long run but can affect the short-run costs of adjustment.

Nominal rigidities also allow nominal or other financial disturbances to affect real economic performance, even when such shocks are unrelated to real economic fundamentals. Indeed, a primary economic motivation for European monetary unification is that nominal exchange rate volatility may reflect financial market noise and speculative capital flows to such an extent that exchange rate flexibility contributes more to the creation than to the mitigation of shocks to real economic activity. Fluctuations of asset prices on financial markets can be caused by

intrinsic noise due to the trading activity of agents who are less informed than others about the fundamental determinants of asset values and use the prices themselves to infer these values. Financial markets can also be subject to extrinsic, or sunspot, noise that arises when traders believe that information unrelated to fundamentals affects asset prices. Since nominal exchange rate volatility translates into real exchange rate volatility with nominal price and wage stickiness, the possibility that intrinsic or extrinsic noise induces exchange rate fluctuations implies that a fixed exchange regime could promote welfare.¹¹

The accumulating empirical evidence that much of exchange rate volatility and speculative trading on exchange markets is unrelated to real fundamentals adds to the usefulness of monetary unification for minimizing the international transmission of shocks to national money demands and supplies with integrated international financial markets. However, the costs of foregoing nominal exchange adjustment as a tool for temporary stabilization in the face of asymmetric national or regional real shocks must be weighed against the potential benefits of reducing financial and other nominal shocks.

3.1 Empirical analysis of adjustment to asymmetric shocks

Building on the theory of optimum currency areas, the recent literature on the monetary unification of Europe emphasizes the relative importance of asymmetric and symmetric national or regional supply and demand shocks as a critical determinant of the net benefits of a common currency. A common tactic used by the literature is to compare the incidence of macroeconomic shocks and the process of adjustment to them between the European Union and the United States. These comparisons are popular since a revealed preference type of argument suggests that the benefits of monetary union outweigh the costs for the United States. There are essentially three components to comparisons of the consequences of monetary unification the United States and those expected for Europe. The first consists of pointing out that labor is less mobile within Europe than in the United States, even within countries. The second part compares the process of adjustment to aggregate supply and demand shocks in the European

Union to that in the United States. The third component is the estimation and comparison of the relative importance of symmetric and asymmetric, temporary and permanent, regional shocks.

The natural presumption is that labor is much less mobile within Europe than within either the United States or Canada for reasons of national identity, culture and language. The relative immobility of labor also holds within national borders. For example, 3.3 percent of the US population moved between states in 1980, while 1.3 percent of the German population moved between *Lander* the same year.¹² The difference between rates of inter-regional migration for the United States and for the European Union may not have any significant relevance for monetary union. To play the role of nominal exchange rate movements in the adjustment process, labor migration would have to respond to temporary shocks and be transitory. That is, monetary policies are important for short-run adjustment so that if migration is a replacement for them, labor must move across regions in response to temporary regional employment shocks. Because independent monetary policies also allow governments to ease the adjustment to permanent asymmetric regional shocks, labor movements that respond to permanent real shocks could partially offset the loss of exchange rate flexibility with monetary union as long as the response lag is similar to the time frame for nominal exchange rate adjustments.¹³

Blanchard and Katz [1992] and Eberts and Stone [1992] study the adjustment of regional labor markets in the United States. The first paper examines labor market adjustment at the state level, while the second studies major metropolitan labor markets. Both studies find that relative unemployment rates adjust more rapidly than relative wage rates across regions of the US. The adjustment process takes up to a decade or more in the data used by Eberts and Stone but between five and ten years in the Blanchard and Katz analysis of state-level data. Both papers argue that unemployment rates eventually converge through migration more than through other means. Eberts and Stone find that migration plays a much smaller role in local labor market adjustment than does labor force participation and provide some evidence that inter-regional migration responds slowly to local labor demand shocks. The empirical literature on regional labor market adjustment in the United States that investigates the role played by

migration does not provide very much support for the hypothesis that labor mobility makes an important contribution the advantages of a common currency for the United States.

The process of short-run adjustment to both temporary and permanent aggregate disturbances displays significant differences between the United States and the European Union. Bayoumi and Thomas [1995], among others, show that relative price movements play a primary role in short-run adjustment to temporary and permanent aggregate shocks in the European Union, while in the United States relative prices and wages are very unresponsive to asymmetric regional shocks. On the other hand, output and employment respond quickly to regional asymmetric shocks and adjust over time in the United States. Bayoumi and Thomas, in particular, demonstrate that estimated aggregate demand shocks affect relative prices and wages far more and relative outputs much less in the European Union than in the United States. For aggregate supply shocks, the adjustment processes are qualitatively similar. As expected, the fluctuations in relative prices are generally correlated with nominal exchange rate movements.

These results suggest that independent monetary policies and flexible nominal exchange rates are important for easing the adjustment to asymmetric aggregate disturbances in the European Union. The estimates and simulations are obtained using a structural vector autoregression model that incorporates *a priori* restrictions to identify supply and demand shocks, but none of the restrictions can identify real and nominal demand shocks. The estimation of the supply and demand disturbances that is used to compare the responses of relative prices and outputs between the European Union and the United States relies on the assumption that relative price movements for Europe are due to real supply or demand shocks. This implies that if nominal shocks are in the original data, then similar shocks are not being compared between the United States and the European Union, so that the responses are not comparable.

There are three reasons to suspect that nominal shocks may be included and important for the estimation results, so that the conclusions are problematic. The first is that the differences reported by Bayoumi and Thomas appear in the responses to aggregate disturbances that are identified as demand shocks and so are likely to include nominal shocks to aggregate demand.¹⁴

The second is that independent monetary policies are a potential source of nominal shocks, so that monetary autonomy itself may be responsible for a portion of demand shocks for Europe. Indeed, a strong argument can be made that inadequate coordination of monetary policies has been responsible for many significant exchange rate movements in Europe in recent years, including the ultimate abandonment of the narrow band ERM following the series of speculative attacks that began in September 1992. The third is that a significant share of relative price fluctuations for the European Union used in the econometric analysis is due to nominal exchange rate movements. If nominal prices are rigid in terms of domestic currency, then nominal exchange rate fluctuations affect employment and output to the extent that export sales are a fraction of national output and firms do not hedge against the relative price risk caused by exchange risk in the forward market. The price fluctuations used to estimate supply and demand shocks may have significant components due to nominal shocks in the case of Europe that cannot be in the data for inter-regional variation for the United States, so that what is estimated is not an adjustment process but, rather, the minor relationship between nominal exchange rate fluctuations and real economic variables.

The third step in comparisons between the United States as a successful currency area and the European Union as a prospective one is the estimation of the relative magnitude of idiosyncratic regional shocks. Bayoumi and Eichengreen [1993] decompose shocks to real output growth and inflation rates for individual member states of the European Union and for eight regions of the US into asymmetric and symmetric components. They also break down these shocks into permanent and temporary parts.¹⁵ The average correlation coefficients for permanent output growth shocks are found to be 0.33 for the European Union relative to Germany and 0.46 for the United States relative to the mid-eastern region. The average correlation coefficients of temporary disturbances are found to be 0.18 and 0.37 for the European Union and US, respectively. These results suggest that asymmetric temporary and permanent shocks are both relatively more important for the European Union than for the US.¹⁶ Bayoumi and Eichengreen also find that the standard deviation of permanent shocks (as fractions of output) averages

2.1 percent for the European Union compared to 1.5 percent for the US, while the standard deviation of temporary shocks averages 1.7 percent for the European Union and 2.1 percent for the regions of the US. These authors conjecture that the larger relative magnitude of temporary shocks for the US is due to the greater regional specialization in production brought about by the absence of real exchange rate fluctuations under monetary union. If this is the case, then the magnitude of temporary shocks might be expected to increase after monetary unification in Europe.

The estimates of Bayoumi and Eichengreen [1993] are obtained using a similar structural vector autoregression model that cannot distinguish nominal from real disturbances to outputs and relative price levels.¹⁷ This implies that it is difficult to use these estimates to reach conclusions about the effects of monetary unification. Since nominal shocks cause transitory fluctuations of real variables that are unrelated to changes in real economic fundamentals, the magnitude of asymmetric shocks and the volatility of employment, output and other real measures of economic performance could be reduced by the establishment of a permanently fixed exchange rate regime. It is possible that part of the idiosyncratic shocks measured by these studies are due to exchange rate flexibility itself through the impact of nominal shocks or extrinsic noise on financial markets, so that monetary unification could lead to a reduction in the size of transitory idiosyncratic shocks.

In sum, recent empirical investigations motivated by the prospect of monetary unification in Europe demonstrate the importance of asymmetric aggregate regional shocks for both the European Union and the United States. The implications of similar shocks for the performance of a monetary union could differ if the economies display different capacities to adjust to aggregate real disturbances. Although the empirical evidence indicates that real wages and labor supplies adjust more rapidly in the United States than within member states of the European Union, the response of the labor market in the United States to asymmetric regional shocks may be much too sluggish to serve as a significant replacement for nominal exchange rate adjustment. The argument that monetary unification should be more costly for the European

Union than for the United States because relative prices are much more important for stabilizing regional economies in the face of asymmetric disturbances in Europe is vulnerable to the critique that the shocks identified by the econometric procedure for the European Union are not necessarily comparable to those identified for the United States. If nominal shocks are the predominate source for the estimated impact of temporary demand disturbances on relative prices and outputs, then this evidence would tend to favor monetary unification, while if real shocks dominate the implication already made in the literature that monetary unification will be costly would tend to be supported.

4 Fiscal insurance as an alternative for monetary independence

The empirical importance of asymmetric aggregate shocks to real output growth and limited degree of inter-regional labor mobility in the European Union imply that fiscal policies will need to bear more of the burden of adjustment to asymmetric temporary and permanent shocks with a common European currency than under the current flexible exchange rate regime. Ingram [1959] suggests that fiscal transfers between the federal government and states of the United States serve as a replacement for exchange rate flexibility under monetary union. His argument is that fiscal federalism at least partly replaces independent regional monetary policies in large political and monetary unions. In the US case, automatic stabilizers acting through proportional income taxation and means-tested transfer payments, such as unemployment compensation, endogenize net resource transfers to idiosyncratic regional supply and demand shocks. Further, federal taxation and federal government spending programs redistribute incomes across regions.

Sachs and Sala-i-Martin [1992] argue that fiscal transfers within the United States are important policy tools for stabilizing regional purchasing power under a common currency. They find that net reductions in federal tax liabilities and increases in transfers from the federal government offset about 35 percent of a state's income loss during recession. von Hagen [1990] criticizes their conclusion that the absence of a mechanism for effecting fiscal transfers

within the European Union from the Treaty of Maastricht will have serious consequences for stabilization of regional incomes under monetary unification by noting that Sachs and Sala-i-Martin fail to distinguish between permanent transfers and transitory transfers. He argues that a large share of interstate transfers serve to compensate for divergent long-term income trends across states. The estimation procedure used by Bayoumi and Masson [1994] separates permanent components of interstate transfers in the US from temporary ones. Using their method, they estimate that permanent income differentials are offset by approximately 20 percent through interstate redistribution and that about 28 percent of temporary asymmetric income fluctuations are offset by net interjurisdictional transfers.

The argument that the European Union will need to replace nominal exchange rate flexibility with a system of fiscal insurance has become a popular topic in the debate over monetary unification.¹⁸ Because the entire budget of the European Union equals approximately one percent of total GDP, a move to a system of fiscal insurance would appear to imply significant political changes for Europe. Surprisingly, neither the public debate or the analytical literature has investigated the logic of the original argument of Ingram that fiscal insurance plays a role in macroeconomic stabilization vacated by monetary autonomy with the adoption of a permanently fixed exchange rate regime. The purpose of this section is to discuss the benefits of international or inter-regional fiscal insurance in a systematic fashion to identify the possible roles of fiscal transfer schemes for macroeconomic stabilization. The approach is to focus on how the addition of fiscal transfer schemes to national fiscal policies contributes to the capacity of fiscal authorities to influence resource allocation in a monetary union.

In general, governments can realize mutual social welfare gains through international fiscal insurance when there is no role for monetary policy. That is, in a non-monetary economy in which all prices and wages are perfectly flexible. This will be the case if markets for international insurance are incomplete and there are asymmetric national disturbances to real incomes. Fiscal transfers between national governments can facilitate desirable international risk sharing that markets are unable to provide to households directly. For example, idiosyncratic

productivity shocks mean that young workers face lifetime income risk upon entering the labor market that is typically not insurable in advanced market economies. Taxes, transfers and public sector borrowing can provide for the sharing of risks over time and across households within the country, but cross-border insurance is needed to share asymmetric aggregate national income risks.

Two related reasons why a fiscal insurance scheme might be desirable for the European Union are raised by Eichengreen [1992a] in his discussion of the recent literature on fiscal transfers and monetary unification. These both involve the idea that monetary union may reduce the range of fiscal policies available to national governments. One is that the proposed fiscal convergence criteria may be adopted, restricting the extent to which national governments can use deficit-financing in economic stabilization programs. The second is the standard argument that economic integration tends to reduce the capacity of individual states to pursue divergent fiscal policies because increasing factor mobility causes the elasticity of the tax base with respect to tax rates to rise so that the ability of member governments to service public debt is restricted and deficit-financing is hampered. Eichengreen points out that fiscal insurance may play the role of replacing fiscal instruments that governments lost. However, neither of these arguments is directly related to the permanent fixing of the nominal exchange rate. The first is associated with monetary unification only because the Maastricht Treaty's prescription of fiscal restraints is conditioned on it. The second concerns economic integration, and it is not clear that monetary union itself will increase factor mobility in the already highly integrated post-1992 European economy.

The literature proposing that inter-regional fiscal transfers compensate for giving up nominal exchange rate flexibility is not particularly systematic about how such transfers contribute to the set of fiscal instruments member country governments have available for macroeconomic stabilization. It is useful to distinguish two possible comparisons. The first compares monetary union with and without a system of international fiscal transfers. In this case, the issue is whether the use of fiscal transfers adds to the capacity of national fiscal policies to replace the

role of monetary policy independence in macroeconomic stabilization. The other comparison considers whether the permanent fixing of nominal exchange rates reduces the set of fiscal instruments available to each government and, thereby, creates a need for international fiscal transfers to replace a lost fiscal instrument. It compares the role of fiscal policy with and without monetary unification.

The next two subsections discuss these two possible aspects of international fiscal transfer schemes in economies in which monetary policies only have short-run effects on real economic performance in turn.

4.1 The contribution of fiscal insurance to fiscal policies as stabilizers under monetary union

Under monetary union, independent national fiscal policies can be used to stimulate output and employment in a member state suffering an adverse real supply or demand disturbance by shifting purchasing power across households to raise demand for the output of that country. Fiscal transfers can perform this function by shifting permanent income from some member states to others. An understanding of how fiscal transfer schemes add to the capacity of national fiscal policies to influence private resource allocation requires study of how fiscal policies affect the lifetime budget constraints of households and returns to the activities of producers. Each country is assumed to be able to issue public debt denominated in the common currency.

Consider first the case such that each country has a single representative household that is infinitely lived. The home country government receives a fiscal transfer at some date t from another government, relaxing the home country's intertemporal public sector budget constraint. The single-period budget identity for the home and foreign governments are

$$B_{t+1} = (1 + i_t)B_t + G_t - T_t + X_t \quad (4)$$

and

$$B_{t+1}^* = (1 + i_t^*)B_t^* + G_t^* - T_t^* + X_t; \quad (5)$$

respectively, where X_t is the fiscal transfer made at date t . Because there is a single currency,

$i_t = i_t^*$; for nominally-indexed debt unless there is differential public sector default risk. This international fiscal transfer is equivalent to the assumption of a portion of the home country's public debt by the foreign country. It allows the home country fiscal authority to increase the net lifetime transfer to (equivalently, reduce net lifetime taxes paid by) the home country household in present value terms and requires a reduction in transfers or public goods spending or an increase in taxes in present value terms in the foreign country. If public spending on goods and services is held constant in each country, then current consumption spending will rise in the home country and decrease in the foreign country in the standard case. It does not matter when each government actually changes its fiscal policies as long as the transfer is not simply a loan to be repaid on the same terms as other public debt. In the representative agent model, the opportunity to make international fiscal transfers increases the ability of national authorities to influence nominal and relative prices and the regional pattern of employment and investment at time t .

A richer description of the private sector is provided by an overlapping generations economy. In an overlapping generations model economy, each consumer has a finite lifetime and new generations are born each year and that at least some members of each generation do not wish to make bequests to future generations. In this case, I argue that fiscal transfers between members of a monetary union do not increase the capacity of the national fiscal authorities to influence the current distribution of purchasing power across countries in general. Transfers do add to the ability of fiscal authorities to influence the entire growth path of the economy, but they do not augment the set of fiscal tools for managing aggregate demands in the short run, outside exceptional circumstances. This is shown in stages. The first part of the argument is that a given fiscal transfer can be postponed and made later in equal present value terms without changing the equilibrium of the private economy. The second part explains when the fiscal transfer can be eliminated without changing the short-run equilibrium path for real and nominal variables. This implies that as long as money is neutral in the long run, fiscal transfers do not add to the usefulness of fiscal policies for replacing independent monetary policies. The

caveats to this claim are spelled out at the close of this subsection.

For expositional purposes, I divide the lifetime of each consumer into two periods, young and old, as in the Diamond-Samuelson overlapping generations model. In the first period, the household makes its first-period consumption, saving and labor supply decisions and chooses its financial portfolio. There can be uncertainty about aggregate demands and supplies or policies in the second period, so that financial assets are risky. In the second period, the household receives the gross returns to its savings when young. For a household without a bequest motive, second-period savings is always zero. The first-period budget constraint for the typical household of the generation born at date t is given by

$$w_t \dot{c}_t + P_t c_t + \zeta_t + s_t + M_t; \quad (6)$$

where w_t is the (nominal) wage rate, \dot{c}_t is labor supply, c_t is household consumption, ζ_t represents taxes paid net of transfers received, s_t is non-monetary savings and M_t equals money holdings, all at date t . For each possible outcome in the second period, the budget constraint is given by

$$R_{t+1}s_t + w_{t+1}\dot{c}_{t+1} + M_t \geq P_{t+1}c_{t+1} + \zeta_{t+1}; \quad (7)$$

where $R_{t+1}s_t$ represents the second-period equilibrium gross (nominal) return to the portfolio held by the household. For example, savings may be held in the form of public debt issued by either government or equity claims on the earnings of capital located in either country. In this case, the gross return to household savings unearned income in the second period is the sum of the gross interest on holdings of public debt and gross earnings on equities held by the household as given by,

$$R_{t+1}s_t = \frac{h}{(1 + i_{t+1})b_t + (1 + i_{t+1}^*)b_t^*} + \frac{i}{P_{t+1}(1 + \gamma_{t+1})k_t + P_{t+1}^*(1 + \gamma_{t+1}^*)k_t^*}; \quad (8)$$

The household's demands for home (foreign) country public debt and equities are denoted b_t and k_t (b_t^* and k_t^*), respectively. $P_{t+1}(1 + \gamma_{t+1})$ is the gross value marginal product of home country capital (γ_{t+1} is the net real rate of return to investment and is subject to real shocks),

and similarly for foreign capital. Equilibrium in world capital markets requires that total savings by the young in both countries equals the total outstanding stock of public debt plus the gross capital stock carried into the next period:

$$N_t S_t + N_t^x S_t^x = [B_t + B_t^x] + [P_t K_t + P_t^x K_t^x]: \quad (9)$$

The total number of households of the young generation at time t for the home and foreign country are denoted by N_t and N_t^x , respectively. K_t and K_t^x denote total (gross) physical investment at time t in the home and foreign country, respectively.

Household behavior depends on the prices and wages prevailing at time t , those expected for time $t+1$ and on the net taxes owed in each period. Consumption and labor supply at any age depend on the lifetime budget constraint for the household which depends on the present value of lifetime resources, but an individual's savings decision also depends on how income net of taxes and transfers is distributed over the life cycle. The distributions of returns to various assets influence savings and the financial portfolio chosen by each household. Fiscal policies affect output, employment and capital accumulation by changing the budget constraints for households, the returns to production and investment decisions by firms and the outstanding stock of public debt.

Suppose that the fiscal transfer, X_t , is made from the foreign country to the home country at date t as part of a given pair of fiscal policies for the two countries. These policies imply a particular path for the tax obligations and transfer entitlements of every household currently alive or yet to be born and determine the stock of outstanding public debt issued by each government that, in asset market equilibrium, must be held by all households. Now, consider a different pair of fiscal policies. Under these alternative policies, the taxes imposed on and transfers made to any generation alive at date t or later is the same as under the original policy pair. Public spending on goods and services by each government and any taxes or subsidies imposed on firms are also held constant. The only difference is that the fiscal transfer is not made at date t , but an equal present value transfer is made T periods later, at date $t+T$.

Using the budget identities for each government, this implies that the value of the outstanding public debt for the home country at date is larger by the amount X_t at date $t+1$, and the debt of the foreign government is smaller by the same amount under the substitute policies than under the original policies. By not changing any other aspects of either country's fiscal policy path, the home government is essentially borrowing X_t and paying off the additional accumulated debt at date $t+T$. The foreign country makes a loan of matching value. The home country repays this addition to its outstanding public debt with certainty. Therefore, the transfer made at date $t+T$ by the foreign country to the home country under the substitute policies equals X_t plus an amount equal to the accumulated interest at the implicit risk-free rate.

If the substitute policies are to support the exact same equilibrium for all real economic variables, the outstanding stock of public debt that must be held by households in asset market equilibrium must be the same as under the initial fiscal policies. If it is, then the governments' fiscal policies will have the exact same effect on private sector behavior in the two cases. Because the transfer is made with certainty, the value of the additional debt for the home country exactly equals the value of the debt reduction for the foreign country at every date between t and $t+T$ under the substitute policy. This holds even if there is a risk of default by either government or the maturity, indexation or other contractual characteristics of the public debt issued by each are different. The change of timing of the transfer has no effect on the intertemporal budget constraints of either government at any date, so that the distribution of returns to the total portfolio of outstanding public liabilities issued by both countries is identical at every date under the two policies. This implies that given the original equilibrium path of prices, wages and interest rates, households demand the same portfolios of privately-issued financial claims and firms undertake the same investments under the two policies. No assumptions were made about the nature of the tax or transfer instruments used by the governments; taxes can be distortionary, and tax collection and transfer administration can be costly.

The next step is to consider a final pair of fiscal policies that support identical paths for all

transfers, taxes, subsidies and public expenditures between time t and $t+T$ but do not include the inter-governmental transfer at date $t+T$. After date $t+T$, the public debt for each country is different under this third policy pair than it was under the two alternative policy paths with a fiscal transfer.

Begin with the case that the two countries' public debts are perfect substitutes. Only the total quantity of outstanding public debt issued by the two governments, and not its national composition, matters for asset market equilibria. This should be the case if there is no risk of default, the legal rights and obligations of debt holders do not vary with nationality and each government minimizes its expected present value cost of borrowing.¹⁹ It may seem surprising that it is feasible for neither government to change its fiscal policy at any time from date t onwards in this case (including after date $t+T$). This is because only the sum of the national public debts of the two members of the monetary union affects the allocation of resources if financial markets are fully integrated. When the public debts are perfect substitutes, the aggregate public sector budget identity for the two countries,

$$B_{t+1} + B_{t+1}^{\pi} = (1 + i_t)(B_t + B_t^{\pi}) + (G_t + G_t^{\pi} - T_t - T_t^{\pi}); \quad (10)$$

is unchanged. With the same fiscal policies for all dates and contingencies, household savings and the decisions of firms are the same functions of prices, wages and rates of return under all three financing policies. If the fiscal policies are feasible for each country under either plan incorporating an international fiscal transfer, then they must also be feasible without the transfer in this case. Note that allowing the two governments' debts to be imperfect substitutes does not matter; the quantities B_t and B_t^{π} would need to be interpreted as market equilibrium values.

This implies, however, that if each government remained solvent under the original plan with an international transfer, then the home government is now running a Ponzi debt scheme exactly matched by the foreign government's Ponzi credit scheme. Equivalently, in place of an explicit fiscal transfer at date $t+T$, the foreign government makes a loan of equal value, intermediated by the world financial market, to the home country that is never repaid. To eliminate the

international fiscal transfer, public sector solvency constraints will have to be imposed on the fiscal-financial plans for each government separately, ruling out the extension of credit by one government to the other that is never repaid.

Consider a last change in the policies pursued by the two governments. At date $t+T$, the fiscal policies for each government adjust to maintain solvency without an international fiscal transfer (between t and $t+T$, the fiscal policies are identical to the original, transfer-inclusive, policies). Using the simple overlapping generations economy, let T exceed the lifetime of those alive at date t . The budget constraints for households alive at date t , equations 6 and 7, imply that household consumption and savings at date t will be unchanged as long as the real wage rate and real interest rate are the same. The value of the outstanding stock of public debt for the integrated economy (as in equation 10) is also unchanged under the proposed policy pair. The real interest rate for period $t+1$ is a function of investment at time t . This is just the excess of savings over public debt. The budget constraints imply that it depends only on the actions of households alive at date t . Therefore, equilibrium employment, investment, consumption and the real interest rate are the same at date t with and without a fiscal transfer. The effects of eliminating the transfer is passed to households entering the economy after date t through larger taxes net of transfers in the home country and lower taxes net of transfers in the foreign country. At date $t+T$ and beyond, the equilibrium path for the economy is different under the two policy pairs.

This implies that it is feasible to replicate the short-run effects of feasible fiscal policies with a fiscal transfer using feasible fiscal policies, subject to each government's intertemporal budget constraint, that do not involve the transfer. The capacity to make fiscal transfers between members of a monetary union does affect the growth path of each country, but it does not add to the ability of the individual national fiscal authorities to influence short-run employment and output. That is, a system of fiscal insurance does not contribute an additional instrument to make up for the loss of nominal exchange rate flexibility when money is neutral in the long run.

There is one caveat to this argument. The model expressed by equations 6 and 7 has a single

relative price, the real interest rate. Adding a second commodity, the budget constraints become

$$w_t c_t + P_t^1 c_t^1 + P_t^2 c_t^2 + \zeta_t + s_t + M_t \quad (11)$$

and

$$R_{t+1} s_t + w_{t+1} c_{t+1} + M_t + P_{t+1}^1 c_{t+1}^1 + P_{t+1}^2 c_{t+1}^2 + \zeta_{t+1}; \quad (12)$$

where, for example, c^1 and P^1 denote consumption and nominal price of the first good, respectively. In this more general economy, relative spot prices at a future date will be affected by the taxes and transfers imposed on future generations of consumers. When households alive at date t expect to consume in future years simultaneously with future generations, then short-term consumption and savings can differ between the two policies to the extent that future spot commodity relative prices affect them. Such effects are almost certain to be of minimal empirical importance for realistically-sized temporary fiscal transfers.

In the comparison of monetary union with and without a system of fiscal insurance, international fiscal transfers increase the set of fiscal tools for short-run stabilization only to the extent that future reductions in outstanding national public debt matched by increases in foreign public debt affect current relative prices. This does not imply that transitory fiscal transfers between states or provinces are not useful for short-run stabilization in the presence of asymmetric real supply and demand shocks for countries with systems of fiscal federalism such as the United States and Canada. Such transfers may add little, if anything, to the capacity of fiscal tools to replace independent regional monetary policies as short-run stabilizers when regional fiscal authorities do not give up their ability to issue public debt as well as money. In a nation, inter-regional transfers may substitute for deficit-financing of public expenditures at the state or provincial level for historical and political reasons. In the case of the United States, a wide variety of restrictions, some much stronger than others, have been placed on the issue of public debt by all but one of the states. Such restrictions reduce the set of fiscal instruments available to state authorities for achieving stabilization in comparison to the set of instruments available to the sovereign member states of the European Union. The argument made above

indicates that the role of fiscal federalism for doing some of the work of monetary autonomy arises as a replacement for the active use of public debt. In their historical study of restrictions on deficit-financing at the sub-national level, Eichengreen and von Hagen [1995] find an association between the federal government assuming a significant share of the responsibility for taxation and restraints on sub-national public debt.

4.2 The loss of fiscal instruments with monetary unification

With separate national currencies and flexible nominal exchange rates, each member government can potentially issue public debt indexed to the domestic currency. To the extent that foreign residents hold home country nominally-indexed debt, the home country government can arrange an incoming international real resource transfer through the *unanticipated* inflation tax. This instrument of fiscal policy is largely lost with the adoption of a common currency. To the extent that the common central bank chooses monetary policy to debase public debt, it cannot select the differential national rates of unanticipated inflation taxes that autonomous national monetary policies allow.

Nominal indexation with national currencies implies that international fiscal transfers occur in response to both nominal and real shocks. In particular, they may occur in response to financial market noise that is unrelated to the asymmetric disturbances to real economic variables motivating arguments for system of fiscal federalism under monetary unification and may even exacerbate the impact of such noise on real economic activity. This implies that while an instrument of fiscal policy is lost with monetary unification, part of its effects may be undesirable due to financial market incompleteness. Because some degree of fiscal insurance is possible for member states of the European Union, an argument for fiscal transfers based on monetary unification, rather than economic integration, exists. Unfortunately, international systems of accounting do not allow us to estimate the size of these transfers or estimate the share that is noise-generated.²⁰

5 Fiscal insurance with and without political union

The preceding argument concludes that the primary role of systems of fiscal federalism in monetary unions is not to increase the set of a priori fiscal instruments in a manner that compensates for the loss of independent monetary policies. Fiscal insurance schemes in political-monetary unions may replace deficit-financing by individual regions of a union in its role for stabilization against asymmetric shocks to real economic activity. The deficit and debt limits proposed by the Treaty of Maastricht will be critical for deciding the importance of fiscal transfers as a replacement for monetary stabilization. As already noted, fiscal insurance schemes can be used to promote economic welfare without reference to monetary unification, as long as existing insurance markets are incomplete. That is, the presence of asymmetric real supply and demand shocks for the members of the European Union implies that there are gains to be had by adopting an international fiscal insurance scheme even if fiscal restrictions are not imposed.

The primary reason for systems of fiscal transfers in countries with economically diverse regions more likely could be due to the ability of a political union to enforce social welfare-improving insurance schemes and to impose and administer taxes more efficiently under economic union than to the adoption of a single currency. The relevance of arguments for a system of fiscal federalism for the European Union are frequently questioned on the grounds that the entire budget of the union is approximately one percent of total GDP at present and political unification would need to precede any significant expansion of its fiscal role. This section considers how a scheme of fiscal insurance might be possible without requiring more than coordination by the union. First, the possibility that international fiscal transfers may be feasible for smoothing national real purchasing power with each member state retaining sovereignty over its fiscal policies is discussed using a simple game theoretic model. Second, the additional gains from fiscal insurance that are possible if some of the fiscal sovereignty of member states is subordinate to the union as a whole are discussed.

A two-country case is used for illustrating the possibilities of cooperative fiscal insurance that does not rely on the power of a supra-national government for enforcement. For simplicity, assume that each government seeks to smooth deviations of real national income from the full-employment equilibrium level of real national output over time. This objective is written in an intertemporally additively separable, and each government discounts future deviations at the same constant social discount rate. Also, let the natural level of real output be constant and ignore nominal shocks. Focussing only on temporary shocks, the objective functions to be maximized by each government are

$$\begin{aligned} W_t &= u(\bar{y}_t + x_t) + E_t \sum_{i=t+1}^{\infty} \beta^{-i} u(\bar{y}_i + x_i) \\ W_t^* &= u^*(\bar{y}_t^* + x_t) + E_t \sum_{i=t+1}^{\infty} \beta^{-i} u^*(\bar{y}_i^* + x_i) \end{aligned} \quad (13)$$

where $\bar{y}_t = y_t - \bar{y}$ is the transitory shock to real output in the home country at date t , x_t is the net real resource transfer received from the foreign country at date t and β , such that $0 < \beta < 1$, is the discount factor. The shocks are assumed to be imperfectly correlated and drawn from stationary stochastic processes. The net resource transfer, x_t , from the foreign country can be either positive or negative. A negative transfer would be a positive fiscal transfer from the home country to the foreign.

The optimum can be achieved by an insurance contract under which the two governments pool asymmetric risks. Borrowing and lending using standard debt contracts and imposing solvency cannot lead to the same allocation of resources across the two countries. This is because an insurance contract allows for a payment by one party at date t in exchange for a promise of a state-contingent indemnity payment in the future. Future payments (in net present value) vary with the realized shocks. In a standard debtor-creditor relationship without default, a creditor country receives the same net present value repayment in the future for every realization of shocks. A role for international transfers arises because deficit-financing and public debt cannot yield the optimal degree of pooling of asymmetric real output shocks for the two countries. Any additional insurance that can be achieved using international fiscal transfers

necessarily involves temporary transfers that result in permanent (that is, net in *ex post* present value) transfers of wealth. Recall, that in a competitive insurance market, the insured pays the expected present value of future indemnity payments *ex ante*, but in an adverse event, receives a net present value increase in her wealth *ex post*.

If commitment is possible, then the two governments should negotiate a contract that would maximize a weighted sum of W_t and W_t^* . However, in general, such a contract would commit either country to make payments to other that would leave it worse off than if it permanently refused to participate further, suffering the consequences of shocks as best as it can using domestic resources and policy instruments. This would seem to be the case if sovereignty is respected.

Define the minimum level of reduced-form social welfare that each government can be forced to accept as

$$\begin{aligned}\overline{W}_t &= u("t) + E_t \sum_{i=t+1}^{\infty} -i_i t u("i) \\ \overline{W}_t^* &= u^*(t) + E_t \sum_{i=t+1}^{\infty} -i_i t u^*(i)\end{aligned}\quad (14)$$

where it is implicit that other opportunities for minimizing real output fluctuations are incorporated in the (residual) shocks, " t " and " t^* ". The restrictions that either country can renege on any long-term agreement to make wealth transfers to the other are given by:

$$\begin{aligned}W_t &\leq \overline{W}_t \\ W_t^* &\leq \overline{W}_t^*\end{aligned}\quad (15)$$

for every date t .

This model is analogous to the repeated game model of sovereign borrowing and lending of Kletzer and Wright [1995].²¹ With infinite repetition, cooperative outcomes are possible, where cooperation means any path of policies such that at least one of the governments realizes social welfare higher than the noncooperative (barred) level. The results of Kletzer and Wright imply that at least partial pooling of asymmetric shocks is feasible without any exogenous or external

enforcement of agreements in this model as long as the common rate of discount, γ , is not too small. This is an application of the folk theorem for perfect equilibria of repeated games.

The idea is that the foreign country makes a positive fiscal transfer to the home country when $u_t^x > u_t^y$ because the future transfers that the foreign country will receive from the home country in a cooperative equilibrium make up in social welfare terms for the reduction in current foreign absorption. That is, the foreign government makes a net fiscal transfer because this increases its social welfare looking forward from that date on in the equilibrium. To be successful, such paths require punishments for support. Adequate punishments give a government that fails to make a transfer expected in a cooperative equilibrium the same social welfare it would achieve if the two countries simple abandoned the mutual output-smoothing scheme. This means that a transfer, ζ_t , from the foreign country is possible as part of long-term fiscal cooperation if the following inequality is satisfied by the infinite-horizon path of contingent fiscal transfers:

$$W_t^x = u_t^x(u_t^x | \zeta_t) + E_t \sum_{i=t+1}^{\infty} \gamma^{i-t} u_i^x(u_i^x | \zeta_i) \geq W_t^y \quad (16)$$

For $\zeta_t > 0$, this implies that future ζ_i be negative, that is, the foreign country will receive positive inflows from the home country.

For this type of game, Kletzer and Wright [1995] study the credibility of punishment threats and prove that reversion to noncooperative behavior is not necessary to sustain cooperative behavior without commitment in this type of economy. They also show that cooperation can be supported when there are any number of participating sovereigns.²² The full game theoretic analysis is beyond the scope or purposes of this paper, and interested or concerned readers are referred to that paper.

A formal analysis shows that international insurance schemes for stabilizing national outputs in the presence of asymmetric transitory shocks can be supported without a central fiscal or political authority. As long as the participating governments act in the long-term interest of their nations, mutually beneficial cooperation using intertemporal fiscal transfers is possible that allows the countries to realize some gains from international social insurance beyond what they

could achieve using cooperative fiscal policies restricted by national solvency constraints.²³ The constraints on cooperation in a international mutual insurance scheme assume that either country can refuse to make a net real resource transfer to the other at any date without requiring any disruption of other economic or political relationships between the countries. If threats of market disruption or political reprisal are credible, then more cooperation in a fiscal insurance scheme could be supported as punishments become costlier. In the context of the European Union, it seems reasonable to ignore such possibilities. One role for a union-wide political body may be to facilitate such cooperation as a coordinator even though it possesses no authority to raise taxes or enforce a system of international fiscal transfers for temporary stabilization of national or regional economies.

Cooperative outcomes are also possible in alternate game theoretic models with policy makers possessing uncertain horizons or overlapping ones with feasible short-run commitments. However, if national governments only care about deviations from natural real output over finite horizons in this bare-bones model, then cooperation in a system of mutual social insurance is not possible without third-party enforcement.

The simple model also implies a role for fiscal federalism under political union. The two constraints

$$\begin{aligned} W_t &\leq \bar{W}_t \\ W_t^{\pi} &\leq \bar{W}_t^{\pi} \end{aligned}$$

can be relaxed, then more mutual-smoothing of national real output is possible, allowing higher levels of social welfare *ex ante* for both countries. Relaxation of these constraints requires that the union be able to force net transfers of resources between states; that is, it must be able to impose taxes on member countries or activities within their domains. The additional income insurance that is possible for a nation with economically diverse regions gives one incentive for the states to yield fiscal authority to the federal government by adopting a system of fiscal federalism. Note that this discussion netted out any external benefits that paying regions might

realize by making transfers to other regions.

The European policy discussion has also motivated a theory of the political economy of fiscal federalism presented in papers by Persson and Tabellini [1992, 1993] and by Alesina and Perotti [1995]. Both models demonstrate the possibility that centralized fiscal distribution can create adverse incentives for subfederal levels of governments. In the Persson and Tabellini model, the federal government makes transfers to member states either as block grants or as transfer payments to households for the purpose of pooling consumption risk in the presence of asymmetric real output fluctuations. Subfederal authorities can take actions that increase the riskiness of national production, so that block grants may not raise social welfare as a consequence of moral hazard. They also show that direct transfers to individuals may or may not dominate block grants. In the model of Alesina and Perotti, the taxes imposed by subfederal levels of government are endogenous to the fiscal transfers made by the federal authority. They show that centralized fiscal redistribution to households may reduce the social welfare objective of the federation.²⁴

6 Conclusion

This paper analyzed the implications of the monetary unification of the European Union for the ability of fiscal authorities to stabilize regional real economic performance in the presence of asymmetric regional disturbances to aggregate supplies and demands. Among the issues discussed was the role of nominal exchange rate flexibility in the process of adjustment to asymmetric real aggregate shocks and the consequences of its loss for macroeconomic stabilization. A number of points were argued against the existing literature. One concerned the largely ignored importance of financial market and other nominal shocks for explaining the estimated magnitude of certain asymmetric disturbances to real activity and the significance of exchange rate flexibility in the adjustment process in the European Union. The observed volatility of foreign exchange markets, episodes of speculative attack and theoretical possibilities

that noise unrelated to real fundamentals can generate nominal exchange rate movements that effect real economic variables all suggest that the potential presence of nominal shocks should not be neglected in estimating the relative importance of symmetric and asymmetric aggregate supply and demand shocks.

A primary focus of the paper was to discuss the logic behind the widely-held presumption that systems of fiscal federalism in national monetary unions serve to replace regional monetary autonomy. This notion has led to any number of suggestions that the monetary unification of the European Union will only succeed if Europe also adopts an international fiscal insurance scheme within the community. It was argued that while fiscal transfers increase the capacity of autonomous fiscal policies to influence resource allocation, they do not do so in a way that augments the ability of fiscal authorities to replace the role of monetary policy independence under flexible nominal exchange rates. Restrictions on the ability of member states to use public sector budget deficits and public debt as temporary policy instruments for stabilization eliminates fiscal tools that were available to national authorities before monetary integration creating a need for fiscal transfers to replace them in their expanded role in macroeconomic management. Such restrictions, mandated by the Treaty of Maastricht and proposed recently in stricter form, may be unnecessary for economic reasons when member states retain the overwhelming control over taxation and undesirable for political reasons since they imply a need for supranational enforcement. To the extent that political unification is necessary to sustain a system of fiscal insurance, the arguments of this paper conclude that monetary union does not necessitate political union.

The idea that a system of fiscal insurance can only be sustained under political union was reviewed next. A game theoretic model was sketched to explain how cooperation over time in a sequence of reciprocal temporary international transfers was possible without violating the sovereignty of individual member states. This implies that political union is not necessarily the only way to achieve fiscal insurance in a union of similar countries experiencing idiosyncratic temporary disturbances to real supplies and demands. Political unification does, however,

allow more extensive fiscal insurance schemes that provide larger social welfare benefits in the general case.

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Endnotes

¹In particular, Buiter and Kletzer [1991a], Buiter, Corsetti and Roubini [1993], Eichengreen and von Hagen [1995], Kletzer and Hutchison [1995] and Eichengreen [1996] cover a broad range of the arguments against imposing fiscal restrictions as a requirement of monetary unification. Canzoneri and Diba [1991] argue from the perspective of optimal taxation that fiscal restrictions can be efficiency enhancing. Buiter and Kletzer [1991b] systematically analyze the welfare economics of fiscal policies in interdependent economies.

² h_t will remain constant over time if the velocity of base money is constant and expected inflation equals actual inflation.

³The data are taken from the International Monetary Fund, International Financial Statistics, June 1995. Seignorage is calculated as the average annual rate of change in reserve money divided by nominal GDP. Inflation is measured by the annual change in the GDP deflator.

⁴Buiter and Kletzer [1991a], Buiter, Corsetti and Roubini [1993], Eichengreen [1992a] and Froot and Rogoff [1991], among others, question the desirability of uniform restrictions on deficits and debt to GDP ratios. Hutchison and Kletzer [1995] discuss the possible redundancy of deficit and debt limits and problems of credibility for the no-money-financing and no-bail-out clauses.

⁵One solution to the problem that the optimal policy for an independent central bank is not time consistent is to appoint a central banker committed to low inflation come what may, as suggested by Rogoff [1985] following the general idea of appointing agents with different preferences that principals explained by Schelling [1960]. Cukierman [1992] discusses central bank independence and the proposed constitution and governance of the European Central Bank.

⁶Forty-nine of the fifty states impose restrictions, which vary widely in legal terms and impact. Vermont is the exception.

⁷Buiter and Kletzer [1991a] stress the distinction between externalities (that is, technological externalities) and spillovers that redistribute income or wealth across agents. If markets are incomplete or subject to pre-existing distortions, then redistributive spillovers affect allocative efficiency and admit an efficiency-based argument for intervention.

⁸See, for example, Ingram [1973], Bayoumi and Eichengreen [1993], Bayoumi and Masson [1994], Bayoumi

and Thomas [1995], De Grauwe and Vanhaverbeke [1991], Dehesa and Krugman [1993], Eichengreen and Wyplosz [1993], Kenen [1992], Krugman [1993], Melitz [1991] and van Hagen and Hammond [1995] among others.

⁹The theory of optimum currency areas is further elaborated by McKinnon [1963], Kenen [1969], Ingram [1969] and Ishiyama [1975].

¹⁰Krugman [1993], for example, suggests that regional monetary autonomy and nominal exchange rate flexibility could affect long-run real output growth differentials between regions of the United States and that the permanent fixing of nominal exchange rates for the European Union might have real long-term consequences because of hysteresis in the natural rate. Long-run neutrality of money may also fail if the long-run Phillips curve is not vertical, implying that an increase in core inflation does not lead to an equal increase in actual inflation. This is neither a theoretically sound nor accepted assumption.

The long-run growth rate of the monetary base can affect real output even in the absence of nominal rigidities. The primary example is the Mundell-Tobin effect under which a higher money growth rate leading to higher anticipated inflation causes savers to substitute claims on capital for money in their portfolios resulting in a higher steady state capital stock. As noted in the text, the choice of exchange rate regime does not matter in this case.

¹¹Indeed, a number of theories demonstrate that the elimination of one trading opportunity in an economy with incomplete financial markets can be welfare-improving. This implies that the permanent fixing of nominal exchange rates could improve resource allocation in the presence of nominal rigidities by eliminating trade in financial assets denominated in different currencies.

¹²These figures are reported in Eichengreen [1992a].

¹³One natural hypothesis is that temporary shocks have permanent effects at the level of the household, so that migration may respond to temporary aggregate shocks and be reversible, with different households making permanent moves. For example, cyclical downturns lead to permanent firm exit and permanently displaced workers and such workers should be prime candidates for migratory job searches. As summarized by Eberts and Stone [1992], only about two percent of these workers report moving between metropolitan areas to find work and are relatively underrepresented among those that do move in the United States, who tend to be young and college-educated.

¹⁴If the estimated demand shocks for the European Union are combinations of real demand disturbances and nominal ones, then the supply shocks are not estimated in a comparable fashion between the United States and the European Union, either. The similar relative magnitudes of the responses of relative prices and outputs to supply

shocks for the United States and European Union is interesting and may be meaningful because of the identification procedure, even though a comparison of the magnitudes of the output and price responses may not be informative.

¹⁵Bayoumi and Eichengreen [1993] use vector autoregressions with identifying restrictions (structural VARs) to decompose shocks into permanent and temporary components using the technique of Blanchard and Quah [1989]. Temporary shocks apply to both real output and inflation and are interpreted in this literature as demand shocks, while permanent shocks to output are identified as supply shocks.

¹⁶Bayoumi and Eichengreen also find that the average correlation coefficient for permanent disturbances is lower for the EU core than for the periphery.

¹⁷Several authors, including Bayoumi and Eichengreen [1993], Cohen and Wyplosz [1989] and Weber [1991], estimate the impact of shocks on nominal variables (inflation rates). This is not the same as estimating the impact of financial market or other nominal shocks.

¹⁸Examples in the economics literature include van Rompuy, Abraham and Heremans [1991], Eichengreen [1992a], Courchene [1993] and Bayoumi and Masson [1994].

¹⁹More precisely, it is differential default risk that must be ruled out. That is, the debts can be perfect substitutes even if both governments potentially default, but they must default in the same events (which is unrealistic with asymmetric shocks to national aggregate supplies and demands). Equal legal treatment implies, for example, that German citizens cannot avoid taxes on interest earned by holding French public debt, so that the composition of the total debt stock matters. The third condition implies that the marginal bond will carry the same terms (for example, maturity and manner of indexation) without regard to which government issues it.

²⁰Neumeyer [1995] presents an interesting formal analysis of the welfare economics of eliminating nominally-indexed public debt instruments in general equilibrium with incomplete markets.

²¹Here both sides of the relationship are risk averse, while in the specific example model used by Kletzer and Wright [1995] to study intertemporal barter one side is risk averse and the other risk neutral. What matters is that there are gains from intertemporal exchange and cooperation.

²²Kletzer and Wright [1995] demonstrate that renegotiation-proof punishments exist that support the efficient perfect equilibrium path in the two-country case and find coalition-proof strategies when there are more than two countries.

²³Properly, policy makers need to have infinite horizons and be sufficiently patient in the model with perfect information adapted from Kletzer and Wright [1995].

²⁴Endogenous member government policy responses and moral hazard could be added to voluntary mutual international insurance scheme outlined here by applying the theory of repeated games under imperfect monitoring. That literature implies that gains from cooperation are still possible. The introduction of centralized redistribution for the purpose of extending risk sharing (by relaxing the sovereignty constraints) leads to the problems raised by Persson and Tabellini.