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Fiscal federalism and monetary unions: A quantitative assessment☆

Michael P. Evers

Goethe University Frankfurt, Department of Money and Macroeconomics, Theodor-W.-Adorno-Platz 3, 60323 Frankfurt am Main, Germany

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ABSTRACT

In this paper, I provide a quantitative analysis of three different forms of fiscal federalism in monetary unions: fully decentralized regional fiscal authorities as the benchmark, fiscal equalization with nominal tax revenue sharing, and a common central fiscal authority. I assess the capability of the different arrangements to stabilize regional consumption, output, and employment over the business cycle. I also study the implications for interregional income, consumption risk sharing and welfare. From this analysis, the following results emerge. First, a central fiscal authority stabilizes consumption fluctuations and increases the scope of interregional income and consumption risk sharing. Second, fiscal equalization destabilizes consumption fluctuations and also reduces the scope of interregional income and consumption risk smoothing. Third, a central fiscal authority leads to welfare gains, whereas fiscal equalization leads to welfare losses.

1. Introduction

In the run-up to the establishment of the European Economic and Monetary Union (EMU), there has been a vivid and continuing debate on the need to complement the monetary union with federal fiscal institutions. The consensus at that time was that the EMU must be embedded into fiscal federalism with either a central fiscal authority or fiscal equalization with tax revenue sharing or other forms of horizontal federal transfers.[1] The current turbulence in the EMU that began with the Hellas crises, however, has again sparked the debate among economists, politicians and commentators alike about the necessity of such federal fiscal arrangements for the EMU.

The purpose of this paper is to provide a quantitative analysis of three different forms of fiscal federalism: fully decentralized fiscal authorities as the benchmark case, a common central fiscal authority with unitary tax system (as e.g. the U.S.A. or the suggested U.S. of Europe), and fiscal equalization with nominal tax revenue sharing within a monetary union (as e.g. in Canada and Germany). The aim of the quantitative analysis is to compare the different federal fiscal arrangements with respect to the capability to stabilize regional consumption, output, and employment fluctuations in response to shocks to productivity and regional government expenditures. It also aims at assessing the implications for interregional risk-sharing and the welfare properties of the different arrangements. The comparison is based on the analysis of first and second moments of the respective business cycle statistics as well as a variance decomposition of regional income to quantify different channels of regional income and consumption risk sharing. To this end, I use a dynamic stochastic general equilibrium model of a monetary union that consists of two regions with a rich description of regional fiscal policies and which builds closely on Chari et al. (2002) and Kollmann (2001). To facilitate the welfare comparison and the computation of first moments, I compute a second-order approximation to the solution of the model as described by Sims (2000) and Kim et al. (2008).

The study of fiscal federalism in monetary unions relates to two distinct branches of the economic literature. According to the traditional theory of fiscal federalism (e.g. Musgrave (1959) and Oates (1972)), macroeconomic interdependencies give reason to delegate stabilization issues and the redistribution of income to a central fiscal authority. The argument is that in open economies, governments cannot contain the impacts of their fiscal stabilization policies to their region. The absence of monetary policy instruments and exchange rate flexibility then confines the scope of regional stabilization policies. A central or federal

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E-mail address: evers@econ.uni-frankfurt.de.

[1] In a study on the feasibility of the EMU, the so-called MacDougall Report (European Commission (1977)) already suggested a central or federal government that redistributes taxes among the states in order to absorb the effects of asymmetric shocks. Jacques Delors, former President of the European Commission, foresaw the potential political distress to which a lack of a federal fiscal arrangement might lead. He argued that the loss of the exchange rate flexibility might cause a tension between member states that could lead to a breakdown of the monetary union if no federal fiscal adjustment mechanism replaced the exchange rates (Delors (1989)). As it is well known, eleven European countries have embarked upon the monetary union in 1999 without any such federal fiscal arrangements.

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government, in turn, could take into account the externalities of regional fiscal policies that arise through macroeconomic interdependencies (compare Oates (1999)). In addition, a central fiscal authority can also play an important role for interregional consumption and income risk sharing. When households of different regions are exposed to idiosyncratic regional shocks and capital markets are incomplete, a federal government can also provide insurance through an appropriately designed transfer scheme (e.g. Bucovetsky (1998), Lockwood (1999), Persson and Tabellini (1996a,b)).

The quantitative results support this view. As compared to the benchmark case with decentralized fiscal policy conduct, a central fiscal authority unambiguously stabilizes production and consumption. It lowers both the standard deviation and persistence of consumption fluctuations over the business cycle. It increases the scope of interregional risk sharing and it leads to welfare gains relative to the decentralized benchmark.

The second branch of the economic literature relates to the classical theory of Optimum Currency Areas (OCA) which was conceived and elaborated by Mundell (1961), McKinnon (1963), and Kenen (1969). OCA points to the potential role of federal fiscal transfer systems to offset idiosyncratic shocks if other adjustment mechanisms fail or are absent. The argument is that the loss of national monetary policy instruments and the exchange rate flexibility becomes severe if the economic adjustment to idiosyncratic regional shocks cannot be fulfilled by prices, wages, or factor mobility. Kenen argued that monetary unions should be furnished with a built-in fiscal transfer system that collects taxes from some member countries and pays transfers to other member countries in order to alleviate the economic consequences of adverse shocks. These arguments also formed the basis for the discussion in the prearrangement to the European monetary unification (e.g. the MacDougall Report (1977) and the Delors Report (1989)).

The predictions of the model do *not* confirm this view for fiscal equalization. In contrast to the widely held belief, fiscal equalization acts destabilizing as it increases the standard deviations and persistence of fluctuations in consumption and production. Fiscal equalization reduces the scope of interregional risk sharing and it leads to welfare losses relative to the decentralized benchmark.

The macroeconomic literature on fiscal federalism within monetary unions is surprisingly dormant.[2] In the debate over the EMU, the focus has been on the empirical assessment of the extent to which fiscal federalism offsets asymmetric disturbances in existing federations. Most prominently, Sala-i-Martin and Sachs (1991) found for the U.S. that roughly 40 cents of a one dollar reduction in state income are compensated by the federal government. On this basis, they argued that "*the creation of a European Central Bank that issues unified European currency without the simultaneous introduction (or expansion) of a fiscal federalist system could put the project on risk*". Later studies reduced this figure to roughly 10% of regional income insurance that can be attributed to the U.S. fiscal federalism.[3] Within the quantitative framework, I find that the central fiscal authority accounts for roughly 28% of regional income insurance. In line with the traditional view of macroeconomic stabilization, net payments to the central fiscal authority are procyclical. In contrast, in case of fiscal equalization, the transfer payments are countercyclical and amplify the change in state income by roughly 15%. This leads to a larger fraction of income and hence consumption that remains unsmoothed. As a result, the quantitative analysis corroborates the findings of the empirical literature as it confirms the property of a central fiscal authority to smooth income and consumption across regions. The few exceptions that consider federal fiscal arrangements in monetary unions within a theoretical framework are Kletzer and Buiter (1997), Kletzer (1999), Kletzer and von Hagen (2001), and Evers (2006, 2012). They, however, focus on the implications of simple horizontal transfers among regional fiscal authorities or households of different regions. This paper contributes to the literature along several dimensions. First, this paper provides a quantitative comparison of federal fiscal arrangements as they can be observed in existing federations and as they were discussed in the context of the EMU: fiscal equalization with nominal tax revenue sharing and a central fiscal authority. Second, in terms of modeling, the dynamic structure of the framework is much richer as it allows for capital formation and nominal rigidities which stem from staggered wage and price setting à la Calvo. Third, this paper provides a rigorous analysis of the business cycle properties and the dynamics of the federal fiscal transfers. I also study the different channels of interregional risk sharing on the basis of a variance decomposition of regional income as proposed in Asdrubali et al. (1996). Fourth, employing recent advances in computational economics allows analyzing the implications of the different federal fiscal arrangements on the first moments and welfare as well, which yields important insights.

The paper is organized in 7 Sections. The next section presents the two-country model of the monetary union. Section 3 explains the different federal fiscal arrangements. Section 4 presents the calibration and the solution method. It also explains the shock decomposition into common aggregate components of shocks and perfectly asymmetric components of the shocks and the welfare measure. Section 5 compares and discusses the different federal fiscal arrangements with respect to first and second moments of the business cycle statistics, the impulse responses to productivity and government expenditure shocks, and their welfare implications. Section 6 presents the variance decomposition of regional income and elucidates the implications for channels of interregional risk sharing. The paper concludes with Section 7.

2. A two-country monetary union

The monetary union consists of two regions referred to as "home" (h) and "foreign" (f). The two regions are inhabited by infinitely lived representative households. Each region produces a non-tradable final good for either consumption or investment and a continuum of tradable intermediate goods. Final goods are produced using an aggregation technology that combines domestic and foreign intermediate goods as input factors. Domestic final goods firms are home-biased in the sense that they use domestic rather than foreign intermediates. It is assumed that there is perfect competition in regional final goods markets. The intermediate goods are imperfect substitutes and each intermediate goods producers is a monopolistic supplier of a specific variety. Intermediate goods producers charge the same price in the home and the foreign market. The intermediate goods technology is based on a Cobb–Douglas production function using capital and labor as input factors. The markets for rental capital are perfectly competitive, and input factors are fully immobile between regions. In this economy, nominal rigidities enter as setting of both intermediate goods prices and nominal wages are staggered. Once prices and wages are set, intermediate goods firms and households must deliver the quantities demanded at the posted prices and wages. In addition to the trade in intermediate goods, the two regions are connected by the international financial market, where a single risk-free nominal bond is traded. Money is not

[2] In the aftermath of the Maastricht Treaty with the Stability and Growth Pact (1997), the attention of the profession was drawn to the analysis of deficit rules and appropriate institutional arrangements of fiscal policy coordination within monetary unions (e.g. Beetsma and Uhlig (1999), Dixit and Lambertini (2001, 2003), Uhlig (2002), and Chari and Kehoe (2007)). Pappa and Vassilatos (2007) study the implications of different regional fiscal constraints on public deficits and debt on the dynamics of the economies and welfare. More recently, the focus has been on optimal fiscal policy of member states within a monetary union, as for example in Beetsma and Jensen (2005), Kirsanova et al. (2007), Galí and Monacelli (2008), and Ferrero (2009). Duarte and Wolman (2008) consider the role of regional fiscal policy for inflation differentials among the member states of the union.

[3] See e.g. von Hagen (1992), Atkeson and Bayoumi (1993), Goodhart and Smith (1993), Asdrubali et al. (1996), Sørensen and Yosha (1998), Obstfeld and Peri (1998), Athanasoulis and van Wincoop (2001), and Fatás (1998). Detailed overviews of this literature can be found in Mélitz and Zumer (2002), Kletzer and von Hagen (2001), and von Hagen (2007).