



Why macroeconomic coordination may not be possible in a monetary union: A game theoretic approach [☆]



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ABSTRACT

In order to explore the possibility of macroeconomic policy coordination in monetary unions, we model the monetary union as an n -person cooperative game. A key equilibrium concept of this game is the *core*, which is defined as the set of outcomes that can be blocked by no coalition. It follows that in a monetary union, coordination is possible if the monetary game possesses a core, i.e., when the joint outcome, obtained if all member countries coordinate their activities, cannot be challenged by anyone. Thus, coordination is possible in all cases, in which the existing economic conditions eliminate all outcomes that any subset of countries could improve upon. And since these economic conditions are summarized by the characteristic function of the game, coordination (or the failure of coordination) of economic policies in a monetary union is determined by its properties.

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1. Introduction

Modern theory of OCA provides a framework for the workings of an optimum currency area.¹ The theory asks under what conditions a country would prefer macroeconomic independence that comes along with an independent currency (and perhaps with flexible exchange rates) or it prefers the benefits of a fixed exchange rate system and perhaps of a common currency. A country enjoys the benefits of a common currency if it satisfies a number of criteria (factor mobility, price flexibility, etc.) that reduce the cost of sacrificing its exchange rate as a policy instrument. What the OCA theory *essentially states*, is that when a region is subjected to an asymmetric shock, the *adjustment process* requires either the factors of production to move or the real exchange rate to adjust or a combination to the two. Otherwise, regional concentrations of unemployment will be inevitable (De Grauwe & Vanhaverbeke, 1993). Thus, if factor mobility fails to restore equilibrium following an asymmetric shock, real exchange rates have to adjust. And since in a monetary union nominal exchange rates are fixed, this means that nominal prices have to change.

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¹ The modern theory of optimal currency area is usually credited to Mundel (1961), Kenen (1969) and McKinnon (1963), although the criteria for an optimal currency area (free trade in final goods and factors of production) were emphasized by Lerner back in 1944 (Lerner, 1944, p.375).

But beyond stating that changes in nominal prices are needed to restore equilibrium, the modern OCA theory does not explain (i) how this adjustment mechanism works, and (ii) the necessary conditions for its effectiveness. The adjustment mechanism is not different from the mechanism of adjustment in a fixed exchange rate regime (a monetary union is an extreme case of a fixed exchange rate regime) and requires that relative prices have to decline in the countries experiencing a trade deficit after an asymmetric shock and increase in the opposite case. It will be effective in restoring equilibrium, after an asymmetric shock, if all the members of the monetary union are willing to adjust, which implies that all members of the monetary union have to coordinate their macroeconomic policies in order to achieve the desired outcome (Alessandrini, Fratianni, Hallett & Presbitero, 2014). If the adjustment mechanism proves to be ineffective (i.e., if some member countries refuse to adjust), the process of adjustment becomes asymmetric and the cost of adjustment is transferred to the subset of countries that are willing (or forced) to adjust. But the asymmetric cost of adjustment may destabilize the monetary union, because the cost of remaining in it may be too high in terms of some alternative choice. Thus, the criteria proposed by the received OCA theory for a successful monetary union may not constitute a safe policy guide, unless the adjustment mechanism works and is effective in the above sense.

The facts of experience show that macroeconomic policy coordination fails because the surplus countries are reluctant to adjust. They prefer to keep the creditor position, after an asymmetric shock, throwing the cost of adjustment to the deficit countries that have no other choice but to deflate and allow unemployment to rise (Eichengreen, 2012; Feldstein, 2013; Keynes, 1980). This asymmetric behavior sets the problem to be discussed in this paper: why macroeconomic policy coordination fails in a monetary union? There are two approaches to this problem. In the first, we treat the monetary union as a non-cooperative game strategic game (Yannacopoulos, 2014), and then examine whether a Stackelberg type leadership may improve coordination (Hallett & Weymark, 2007). On this, we have to compare the outcome of two different models: the outcome of a strategic simultaneous game with that of a two player extensive game, with perfect information. In the second approach (the one we adopted in this paper), we model the monetary union game as a cooperative game in characteristic function form. A key equilibrium concept of this game is the core, which is defined as the set of outcomes that leave no subcoalition of countries in a position to improve the payoff of its members. It follows that a monetary union coordination is possible, in this approach, if the monetary game possesses a core, i.e., when the joint outcome obtained, if all member countries coordinate their activities, cannot be challenged by anyone. Or, to put it differently, coordination is possible in all cases, in which the existing economic conditions eliminate all outcomes that any subset of countries could improve upon. And since these economic conditions are summarized by the characteristic function of the game, coordination (or the failure of coordination) of economic policies is determined by its properties.

The paper is organized as follows. In the next section, we review the mechanisms of adjustment to equilibrium in a monetary union; in the third section, we model the monetary union as a cooperative game, and in the last section, we conclude.

2. Monetary unions: mechanisms of adjustment

A monetary union is defined as a group of countries sharing a common currency but without fiscal integration. It is assumed that these countries operate in a decentralized framework, which means that they try to improve their own welfare by their own individual actions and do not seek to agree on some coordinated choice of actions. Since the monetary union is an extreme form of a fixed exchange rate regime, the process of adjustment is no different from the process of adjustment in that regime. In both cases, equilibrium is restored either via the price mechanism, if prices are flexible enough or via changes in the level of income, if prices are fixed (the so called “Keynesian” case). In this section, we are focusing our attention on the price mechanism.

Let us assume, that a monetary union, consisting of two countries, is subjected to an asymmetric shock. Due to this shock, the first country develops a trade balance surplus, while the second a trade deficit. Equilibrium is restored via changes in relative prices: they have to increase in the country exhibiting a trade surplus and decline in the country with the trade deficit. This price adjustment may take place automatically via the redistribution of the common currency (provided that the quantity theory of money holds). In fact, the distribution of the common currency in a monetary union, as in any fixed exchange rate regime, is endogenous through the balance of payments. Therefore, it will flow from the deficit country to the surplus one reducing the relative prices in the first, and increasing them in the second. The fall in the domestic relative prices in the deficit country improves its balance of payments by stimulating its exports. The opposite is true for the surplus country. Eventually, equilibrium in the balance of payments is restored.

If the relative prices are constant, as it is assumed by the monetary theory of the balance of payments, then equilibrium is restored via changes in the rate of hoarding and dishoarding (Dornbusch, 1980, pp.120–125). According to this view, at a given price level, countries with a positive trade balance exhibit a positive rate of hoarding, i.e., their nominal spending is less than their nominal income, while the opposite is true for the countries exhibiting a balance of payments deficit. Given the endogenous character of the distribution of the common currency, the flow of money from the deficit country to the surplus one reduces the rate of dishoarding in the first, and the rate of hoarding in the second, restoring thus equilibrium in the balance of payments.

In all these cases, the behavior of the member countries is symmetric. The decline in the relative prices in the deficit countries is compensated by an increase in relative prices in the surplus ones, or (in the case of constant relative prices), the

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