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Seppo Orjasniemi

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SEPPO ORJASNIEMI

STUDIES ON THE MACROECONOMICS OF MONETARY UNION

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Supervised by
Professor Mikko Puhakka

Reviewed by
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Professor Costas Azariadis

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Abstract

The euro area consists of several small open, fairly heterogeneous economies. The establishment of this common currency area greatly changed the macroeconomic interdependency between its member countries. This thesis examines the fundamental macroeconomic linkages and spillover effects between the monetary union member countries with the focus on the phenomena associated with the countries' openness to international trade. This doctoral thesis consists of three essays.

The first essay examines the impact of the implementation of a monetary union on international economic fluctuations. The essay finds that the implementation reverses the expenditure-switching effects between goods produced inside the monetary union, and helps to stabilize economic fluctuations. The second essay examines the effects of openness to international trade on a small monetary union. The essay shows howmovements in the monetary union's exchange rate stabilize output fluctuations inside the monetary union and reduce the need for fiscal stabilization. The third essay argues that, under a non-coordinated optimal fiscal policy, government spending should focus on the stabilization of a local output gap and inflation, while union-wide aggregate fluctuations should be stabilized by a common independent monetary policy. The essay also shows how a suboptimal monetary policy increases the spillover effects of countryspecific shocks.

Keywords: exchange rate, fiscal policy, monetary policy, monetary union, terms of trade

Orjasniemi, Seppo, Tutkimuksia rahaliiton makrotaloudellisista kysymyksistä
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Tiivistelmä

Tässä väitöskirjassa tutkitaan rahaliiton maiden välisiä makrotaloudellisia riippuvuussuhteita. Tutkimuksessa keskitytään erityisesti kansainvälisen kaupan ilmiöihin. Väitöskirja koostuu kolmesta erillisestä esseestä.

Ensimmäisessä esseessä käsitellään rahaliiton perustamisen vaikutuksia kansainvälisen talouden dynamiikkaan. Tulosten mukaan rahaliiton perustaminen muuttaa vaihtosuhteen dynamiikkaa rahaliiton sisällä. Lisäksi rahaliiton muodostaminen vaimentaa jäsenmaiden makrotaloudellisia heilahteluita. Toisessa esseessä tutkitaan kansainvälisen kaupan merkitystä pienen rahaliiton tapauksessa. Havaitaan, että yhteisvaluutan kurssimuutokset tasapainottavat rahaliiton sisäisiä reaalitalouden muutoksia ja vähentävät tarvetta tasapainottaa taloutta finanssipolitiikan avulla. Kolmannessa esseessä osoitetaan, että rahaliiton jäsenvaltioiden harjoittaman itsenäisen finanssipolitiikan tulisi keskittyä kotimaisen inflaation ja tuotannon tasapainottamiseen. Yhteisen rahapolitiikan tulisi puolestaan tasapainottaa rahaliiton keskimääräisiä muutoksia. Tulosten mukaan epäoptimaalinen rahapolitiikka voimistaa maakohtaisten reaalitaloudellisten muutosten välittymistä muihin rahaliiton maihin.

Asiasanat: finanssipolitiikka, rahaliitto, rahapolitiikka, ulkomaankaupan vaihtosuhde, valuuttakurssi

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Espoo, March 2012

Seppo Orjasniemi

Abbreviations

A	*Scientiae Rerum Naturalium*
B	*Humaniora*
C	*Technica*
D	*Medica*
E	*Scientiae Rerum Socialium*
F	*Scripta Academica*
G	*Oeconomica*

List of original articles

The dissertation is based on the introductory chapter and the following three essays:

I Orjasniemi S (2011) How Monetary Union Changes the Dynamics Caused by Country Specific Shocks. Manuscript.
II Orjasniemi S (2011) The Effect of Openness to Trade in a Small Open Monetary Union. Manuscript.
III Orjasniemi S (2011) Optimal Fiscal Policy of a Monetary Union Member. Manuscript.

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1 Introduction

1.1 Background

During the Great Depression of 1930s the international gold standard mechanism was abandoned and countries in Western Hemisphere adopted different exchange rate regimes.[1] The gold standard was blamed for the worldwide spread of depression after 1929, and a system of flexible exchange rates was proposed as an alternative. For example Friedman (1953) argued that a country could be better off by reserving domestic monetary policy for price or employment stability and allowing its currency to float. The foundations of the theory of Optimum Currency Area were proposed by Mundell in the 1960s in a series of influential papers. He raised the question of how the world should be divided into currency areas. He argued that:

> *If the world can be divided into regions within each of which there is factor mobility and between which there is factor immobility, then each of these regions should have a separate currency which fluctuates relative to all other currencies.*
>
> (Mundell 1961, p. 663).

As he noted, his argument works best if each nation and currency has internal factor mobility and external factor immobility. In his analysis Mundell assumed that all goods produced in each region were tradeable. McKinnon (1963) divided total production into traded and non-traded goods and concluded that when a country is more open to international trade, flexible exchange rates become less effective as a control device for external balance.

The question of optimum currency areas emerged again when the Economic and Monetary Union (EMU) was formed within the European Union. The optimality of Western Europe as a currency area was already discussed in the 1950s by such authors as Meade (1957). With more advanced macroeconomic models, the discussion rose to a new level and also the potential benefits of a monetary union were discussed. Studies showed that while most of the countries which were about to form the EMU were already moving towards the EMU convergence criteria of economic performance, some

[1] See Reinhart & Rogoff (2004) for an analysis of history of exchange rate arrangements.

countries would converge only over time, see e.g. Bayoumi & Eichengreen (1997). Also De Grauwe & Vanhaverbeke (1993) argued that without sufficient increase in labor mobility between countries, all of the countries in the EMU would not profit from the Monetary Union.

A system of flexible exchange rates stabilizes unemployment and inflation; depreciation of a currency can help lower unemployment rate while appreciation can slow down local inflation. The exchange rate of a monetary union follows union-wide aggregate fluctuations and the stabilization of the regional economy is left to the local fiscal authority. Interaction between monetary and fiscal authorities has been studied extensively, see e.g. Beetsma & Jensen (2005), Gnocchi (2007), Galí & Monacelli (2008) and Ferrero (2009). The purpose of fiscal policy is often considered to be the provision of public goods, as in Sibert (1992), Levine & Brociner (1994), and Beetsma & Bovenberg (1998). The possibility of fiscal expansion associated with the countercyclical role of fiscal policy has been studied e.g. by Dixit & Lambertini (2003). In EMU the Stability and Growth Pact sets the limits on the public debt ratio and on the general government deficit ratio. Chari & Kehoe (2007) and Dornbusch (1997) argue that when the monetary authority can commit to its policies fiscal constraints are not necessary, while e.g. Beetsma & Bovenberg (1999) and Beetsma & Uhlig (1999) argue that fiscal constraints improve welfare.

The early technical analysis of the dynamics under the fixed exchange rate regime was based on the Mundell-Fleming-Dornbusch framework (MFD) of international economy.[2] The MFD model was the workhorse for analyzing international transmission until the emergence of the "new open economy macroeconomics" (NOEM). This framework was introduced by Obstfeld & Rogoff (1995).[3] In their influential article Obstfeld and Rogoff integrated imperfect competition, nominal rigidities and microeconomic foundations into a dynamic general equilibrium model of international economy. They also used money in the utility function[4] to give a microeconomic foundation to the role of money demand.

The NOEM framework gave a robust tool to analyze the welfare consequences of different monetary and fiscal policies. It also provided a new approach to the analysis of current account dynamics and international policy interdependence. The NOEM

[2] See e.g. Marston (1984), Läufer & Sundararajan (1994) and Clausen & Wohltmann (2005).

[3] See Lane (2001) for an excellent survey on the NOEM literature.

[4] Money-in-the-utility-function assumes that money yields direct utility to the agents. This is done by incorporating real money balances into the utility function, see Sidrauski (1967).

framework was also used to analyze monetary and currency unions by several authors including Carre & Collard (2000), Evers (2006) and Rumler (1999).

The solid microeconomic foundations of the new Keynesian framework made it possible to derive a utility-based welfare criterion. Grounded on the welfare of private agents, Woodford (2002) derived linear quadratic loss functions for monetary policy. In these loss functions, the utility of a representative agent is usually assumed to depend on inflation and the output gap. This approach launched a wave of literature where optimal monetary policy is the policy that minimizes the quadratic loss function. The optimal monetary and fiscal policies of monetary union were analyzed based on this approach by authors including Benigno (2004), Kirsanova, Satchi & Vines (2004) and Beetsma & Jensen (2005).[5]

Kydland & Prescott (1977) argued that policy makers should follow policy rules rather than select the best decision, given the current situation. In the spirit of Kydland & Prescott (1977), Taylor (1993) argues:

> *If there is anything about which modern macroeconomics is clear however - and on which there is substantial consensus - it is that policy rules have major advantages over discretion in improving economic performance. Hence, it is important to preserve the concept of a policy rule even in an environment where it is practically impossible to follow mechanically the algebraic formulas economists write down to describe their preferred policy rules.*

(Taylor 1993, p. 197).

Earlier Simons (1936) also advocated a rule based monetary policy:

> *There are, of course, many special responsibilities which may wisely be delegated to administrative authorities with substantial discretionary power... The expedient must be invoked sparingly, however, if democratic institutions are to be preserved; and it is utterly inappropriate in the monetary field.*

(Simons 1936, p. 2-3).

The power of policy rules comes from taking into account the expectations of economic agents. When the decisions of the policy makers follow simple and easily

[5]See Kocherlakota (2005) for a survey of research on optimal monetary policy.

understandable rules economic agents can make their decisions on future actions more efficiently. Taylor (1993) presented a monetary policy rule where the interest rate responds to fluctuations in inflation and output gap. Galí & Monacelli (2005) used a new Keynesian model to investigate the fluctuations of the exchange rate of a small open economy under different monetary policy rules. They showed that if the interest rate equals the natural interest rate, that is, the interest rate associated with the efficient state of the economy, there is no need for fiscal stabilization of supply shocks. However, their result does not apply to monetary unions. The small open economy model was extended to a monetary union model by Galí & Monacelli (2008). They show that under the optimal monetary-fiscal policy mix the union-wide economic fluctuations are stabilized, while country-specific fiscal policy is needed to smooth fluctuations in the local economy.

1.2 The purpose of this thesis

This thesis deals with the fundamental macroeconomic linkages and spillover effects between monetary union member countries. The focus is on phenomena associated with the Monetary Union member countries' openness to international trade. I also examine trade with countries outside the Monetary Union. In all of my essays I will use the standard new Keynesian framework. The results show that openness to international trade decreases the spillover effects of country-specific shocks and the fluctuations of the exchange rate of the common currency play an important role in the adjustment of the relative prices inside the Monetary Union.

This study consists of three essays. In each essay I discuss the macroeconomics of monetary unions and different fiscal policies in that context. In the first essay I examine the impact of the implementation of a monetary union on international economic fluctuations. The second essay examines the effects of openness to international trade on the optimal monetary and fiscal policy of a small monetary union. In the third essay I study the optimal non-coordinated fiscal policy of monetary union member countries. The research of all these essays is carried out using dynamic general equilibrium models with a staggered price setting. A nondistorting source of government revenue is also assumed. I argue that understanding the dynamics in a simple setting provides an important starting point for the analysis of more complex problems.

2 Summary of essays

2.1 Essay 1: How Monetary Union Changes the Dynamics Caused by Country Specific Shocks

The purpose of this essay is to examine the changes in international economic fluctuations caused by the implementation of an open monetary union. The launch of the euro in 1999 has stimulated discussion on the costs and benefits of creating a monetary union. Gonçalves, Rodrigues & Soares (2009) have shown that the implementation of a common currency area has increased the bilateral business cycle correlation in the euro area. In this essay I develop a three-country new Keynesian model which I use to explore this empirical finding.

In this essay I show that the the exchange rate fluctuations of the common currency are the main channel of spillover effects of a country specific shocks. When a monetary union is implemented, the dynamics of the monetary union's internal trade are reversed. The results also show that the spillover effects of government spending are smaller when the country has a fixed exchange rate regime.

2.2 Essay 2: The Effect of Openness in a Small Monetary Union

During the past few years an extensive amount of work has been done on the interaction of fiscal and monetary policies in a monetary union. The main finding in this literature is that fiscal policy is needed to reduce the inflation differentials inside the monetary union, i.e. to replicate the missing exchange rate fluctuations. Most of these studies are, however, conducted in the context of closed monetary unions.

The purpose of this essay is to explore the effect of openness to international trade on the optimal monetary and fiscal policies of the Monetary Union. With the model of an open small monetary union I am able to study the exchange rate fluctuations of the common currency and the associated fluctuations of the terms of trade. The results show that the openness to international trade decreases fluctuations inside the monetary union, and also reduces the need for fiscal stabilization.

2.3 Essay 3: Optimal Fiscal Policy of a Monetary Union Member

This essay examines the fiscal policy of a Monetary Union member. I examine whether the outcomes of such a policy vary under different monetary policies, and how the relative size of a monetary union member affects the effectiveness of fiscal policy. I extend the standard monetary union model to solve the optimal discretionary non-coordinated fiscal policy of a single monetary union member country. In this essay, the dynamics of the economy are derived assuming that monetary policy is practiced by a common central bank and the national fiscal authorities maximize the utility of local households using public spending as their tool.

The results of the model show that government spending should exceed its efficient level when the economy faces deflation or a negative output gap. The sensitivity analysis shows that the fiscal policy of a relatively large monetary union member country is more efficient than the fiscal policy of a small member. Also the spillover effects of country specific shocks increase when monetary policy is suboptimal.

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I Orjasniemi S (2011) How Monetary Union Changes the Dynamics Caused by Country Specific Shocks. Manuscript.
II Orjasniemi S (2011) The Effect of Openness to Trade in a Small Open Monetary Union. Manuscript.
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