Journal of Economic Dynamics & Control 35 (2011) 1531–1546

Contents lists available at ScienceDirect

Journal of Economic Dynamics & Control

journal homepage: www.elsevier.com/locate/jedc

Ramsey policies in a small open economy with sticky prices and capital

Stéphane Auray[a,b,c,d,*], Beatriz de Blas[e], Aurélien Eyquem[c,f]

[a] CREST (Ensai), France
[b] EQUIPPE (EA 4018)—Universités Lille Nord de France (ULCO), France
[c] GREDI, Université de Sherbrooke, Canada
[d] CIRPEE, Canada
[e] Universidad Autónoma de Madrid, Departamento de Análisis Económico: T. e H. Económica, Campus de Cantoblanco, 28049 Madrid, Spain
[f] Université de Lyon, Ecole Normale Supérieure de Lyon, CNRS, GATE Lyon St Etienne, France

ARTICLE INFO

Article history:
Received 10 July 2010
Accepted 18 March 2011
Available online 20 May 2011

JEL classification:
E52
E62
E63
F41

Keywords:
Small open economy
Sticky prices
Optimal monetary and fiscal policies

ABSTRACT

This paper analyzes jointly optimal fiscal and monetary policies in a small open economy with capital and sticky prices. We allow for trade in consumption goods under perfect international risk-sharing. We consider balanced-budget fiscal policies where authorities use distortionary taxes on labor and capital together with monetary policy using the nominal interest rate. First, as long as a symmetric equilibrium is considered, the steady state in an open economy is isomorphic to that of a closed economy. Second, sticky prices' allocations are almost indistinguishable from flexible prices allocations both in open and closed economies. Third, the open economy dimension delivers results that are qualitatively similar to those of a closed economy but with significant quantitative changes. Tax rates are both more volatile and more persistent to undo the distortions implied by terms of trade fluctuations.

1. Introduction

It is now well known that it is optimal to use unexpected variations in prices in a flexible prices set-up to smooth taxes. However, when prices are sticky, a trade-off appears between using unexpected inflation to smooth taxes and the fact that adjusting the price level is costly (Schmitt-Grohe and Uribe, 2004). When an open economy framework is considered, new issues come into play, such as whether to stabilize exchange rate fluctuations or not, and their implications on inflation and welfare (Benigno and de Paoli, 2010).

The literature of optimal taxation following Lucas and Stokey (1983) in flexible prices environments has established that distorting taxes should be very smooth over time and states of nature. Chari et al. (1991) and Chari and Kehoe (1999) present a set of seminal results in a flexible prices economy with debt, capital income and labor income taxes: (i) capital taxes should be close to zero in the long run, (ii) the ex-ante tax rate on capital should be zero in the short run, (iii) the ex-post tax rate on capital income is highly volatile and bears most of the adjustment after unexpected shocks, together with debt returns, and (iv) labor taxes should consequently be almost kept constant. Restricting the analysis to balanced-budget policies, Stockman (2001) and Klein and Rios-Rull (2003) show that most of these results are preserved, including

* Corresponding author at: Ensai – Campus de Ker-Lann, Rue Blaise Pascal – BP 37203, 35172 BRUZ cedex, France.
E-mail addresses: stephane.auray@gmail.com (S. Auray), beatriz.deblas@uam.es (B. de Blas), aurelien.eyquem@ens-lyon.fr (A. Eyquem).

0165-1889/$ - see front matter
doi:10.1016/j.jedc.2011.03.013

Chamley's (1986) result that states that the capital income tax rate is zero in the long run. The major difference in a balanced-budget set-up is that the ex-ante capital income tax rate is not zero anymore, since debt may not be used as a buffer mechanism after unexpected shocks. The ex-ante rate thus fluctuates a lot, and its variance is about two third of the one of the ex-post rate.

Schmitt-Grohe and Uribe (2004) find that the major results about optimal fiscal policy are mostly unchanged in a closed economy when sticky prices are introduced, even though a set-up featuring public debt induces an optimal policy leading to a unit root on debt, spreading to the policy instruments, including tax rates. However, considering an open economy induces important changes in the optimal policy. In a flexible prices environment, Benigno and de Paoli (2010) show that the open-economy dimension introduces fluctuations of terms of trade that directly affect labor supply decisions through the terms of trade spillovers identified in the monetary policy literature.[1] In an open economy, due to the impact of terms of trade on the trade-off between the marginal utility of consumption and the disutility of labor, policymakers face an incentive to appreciate terms of trade. This situation increases the conditional expected consumption and reduces the conditional expectation of labor supply at the same time. The monetary policy literature shows that conditional expectations of terms of trade, labor and consumption relate to the conditional second order moments of the model, and that internalization of terms of trade spillovers by policymakers implies that fluctuations in terms of trade should be stabilized.

Regarding monetary policy, the literature underlines that the optimal policy in a competitive environment with flexible prices is to keep the real interest rate constant.[2] However, this rule is suboptimal when sticky prices are introduced in models where taxes are not available (see for instance Woodford, 2003). In this case, the optimal monetary policy rule should aim at stabilizing the inflation rate to minimize the distortions implied by nominal rigidities. In addition, monetary policy recommendations are affected by the assumption of trade openness, through the terms of trade spillovers and domestic price stability is generally outperformed by policies that partially stabilize terms of trade fluctuations (see for instance de Paoli, 2009 or Kollmann, 2002). About the interaction between monetary and fiscal policy, if taxes and debt are reintroduced in a closed economy framework with sticky prices, Correia et al. (2008) show that a combination of taxes can replicate flexible prices allocations, and that monetary policy is not needed in such a case.

To our knowledge, little work has been done on the interaction between monetary and fiscal policies in an open-economy environment with capital.[3] This may look surprising because the effectiveness and proper conduct of national macroeconomic policies should clearly depend on international linkages between national economies. In particular, previous literature omits capital as an input factor, while introducing this variable seems to be crucial for the results of optimal fiscal policy. In this paper, we extend the analysis of Benigno and de Paoli (2010) to a more general environment featuring capital accumulation and sticky prices. We study the dynamic properties of setting taxes and monetary policy optimally in a small open economy with capital and Calvo sticky prices, where households trade consumption goods and engage in complete international asset markets. The set-up is a standard new Keynesian DSGE open economy model in the spirit of Galí and Monacelli (2005), in which the government levies distortionary taxes on inputs (capital and labor) to provide individuals with an exogenously determined amount of public good and keeps the budget balanced at each point in time.[4] An independent regulation authority subsidizes firms to undo the distortions introduced by imperfect competition. We adopt this solution to ease the comparison with the flexible prices competitive economy.

Our approach solves the dual Ramsey problem in the context of a small open economy with capital. We study the optimal taxation system both in the steady state and around this steady state (dynamics). There are several ways in which the open dimension, combined with the presence of nominal rigidities may change some of the traditional results about optimal taxation. First, nominal rigidities may imply departures from the constant interest rate rule. Second, terms of trade spillovers on labor supply, i.e. the impact of changes in terms of trade on households' wealth and labor supply, may change the dynamics of labor taxation. Third, terms of trade fluctuations introduce a distortion in the price of capital goods relative to the price of consumption goods that may affect the dynamics of capital taxation. We contrast the results of our economy with those arising in a closed economy, and with those of an economy with flexible prices. Our results may be summarized as follows.

First, the open economy does not affect the optimal steady state of the economy, as long as a symmetric steady state is considered, i.e. a steady state where per capita foreign and domestic consumptions are identical. This result does not hold when considering an asymmetric steady state. In this case, the determination of steady state allocations takes into account the terms of trade spillovers, leading to a different steady state tax system. However, dynamic results are presented around

[1] See Benigno and Benigno (2003), Corsetti and Pesenti (2001), Corsetti and Pesenti (2005), Devereux and Engel (2007), Obstfled and Rogoff (2003) and Sutherland (2006), among others.

[2] When departing from a cashless economy and introducing money explicitly, the additional recommendation is to set the nominal interest rate equal to zero, a result known as the Friedman rule.

[3] The papers of Ferrero (2009), Galí and Monacelli (2008), and Pappa and Vassilatos (2007), dealing with the optimal fiscal and monetary policy mix in a monetary union affected with idiosyncratic shocks are notable exceptions. However, a multicountry monetary union with one monetary policy and several fiscal instruments is a very specific framework that significantly differs from ours. In addition those papers do not consider capital accumulation.

[4] Public debt is not considered since optimal fiscal policies typically induce a unit root on fiscal instruments in an environment with sticky prices, making approximation methods used to derive the dynamics of variables around the steady state unreliable.