The Effects of Tax Competition on Monetary Policy Transmission in the Euro Area*

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Abstract

In this paper we investigate the consequences of savings’ income tax competition on monetary policy transmission in a monetary union. Our contribution is to provide a tax competition framework for the competitive equilibrium model of the banking sector of Freixas and Rochet (1997). We show that countries with high tax rates are more responsive to monetary policy than countries with low tax rates. More precisely, following the transmission mechanism of the bank-lending channel, a restrictive monetary policy, implying a contraction in bank reserves, is likely to reduce retail deposits and constrain commercial banks to cut on lending. However, the magnitude of this effect depends negatively on the liquidity of banks. With non-cooperative fiscal policies, countries setting low tax rates attract a part of savings from countries that practice high tax rates, thus leading to a heterogeneous liquidity of banks and an asymmetric monetary policy transmission within a single currency area. In this context, the Council Directive 2003/48/EC on taxation of savings’ income, introducing the generalization of exchange of information within the European Union, may have limited the heterogeneities of monetary policy transmission induced by tax competition across the Euro zone.

Keywords: Monetary policy transmission, Tax competition, Monetary union.

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1 Introduction

As the launch of the Euro as book-entry money on 1 January 1999 marked the end of exchange rate risks within the Euro zone and decreased transaction costs, savings flows between the Euro area countries became more sensitive to the differential of tax rates levied on savings’ income. With a single currency, tax competition is all the more harmful since governments cannot use the exchange-rate devaluation tool any more to restore their competitiveness and have the incentive to use the fiscal instrument instead.

In the European Union (EU), the system of taxation of savings’ income was very different among countries (Huguenenq et al. 1999) until 2005. \(^1\) It was generally based on a residence principle taxation. Thus, residents were supposed to complete a tax return on savings’ income perceived in another EU Member country. In the absence of any coordination of national systems concerning the taxation of savings’ income, the national tax administration could not verify savings’ income earned outside its jurisdiction. As countries were not taxing the income perceived by non-residents, savings held abroad were not taxed at all. This means that taxpayers were incited to put their savings in foreign countries so as to escape from any taxation (Sterdyniak 2005).

This kind of practices can be considered as harmful tax competition as ‘they do not reflect different judgments about the appropriate level of taxes and public outlays or the appropriate mix of taxes in a particular economy, which are aspects of every country’s sovereignty in fiscal matters, but are, in effect, tailored to attract investment or savings originating elsewhere or to facilitate the avoidance of other countries’ taxes’ (OECD 1998, p. 16). Hence tax competition on mobile savings has shifted the tax burden on the labor factor, which appears to be one of the less mobile tax bases. According to Mario Monti, the then European Commissioner in charge of the Single Market, Financial Services and Tax Policy, between 1980 and 1995 the effective tax rate on capital decreased by 10% while taxation on labour raised by 7% (Petites affiches 1998).

Such movements of savings have been observed before the Euro was introduced be-

\(^1\) For more details on tax rates on residents and non-residents see Plichon (1999).
tween Germany and Luxembourg\textsuperscript{2}, as well as between France and Luxembourg,\textsuperscript{3} since the free movement of capital between EU Member countries is effective from 1990. This shows the importance of taxation in the agents' decision making process concerning the location of their deposits (Grilli 1989; Huizinga and Nicodème 2004). However it is likely that savings of well informed and wealthy persons should be more concerned by this phenomenon.

In order to address the problem of tax evasion and improve market efficiency in the EU, the Council Directive 2003/48/EC on taxation of savings' income, in the form of interest payments (hereafter the Directive), was adopted on 3 June 2003, with an application date of 1 July 2005 (EUROPA 2008). The Directive intended to encourage a decision-making investment process based on the quality of available products, instead of fiscal niches (European Commission 2000). The aim of the Directive was not tax rates harmonization, which would imply the application of the same tax rate across all the countries of the Euro area, but tax cooperation.

The Directive applies to interest payments received by individuals in EU Member countries other than their country of residence. The main objective of this Directive is to introduce the generalization of information exchange within the EU. Consequently, all Member States, through paying agents established in their territories, are expected to automatically exchange information on interest payments received by individuals residing

\textsuperscript{2}In 1988, Germany announced the project of introducing a withholding tax at a rate of 10\% applicable to the residents and non-residents interest income, establishing the application date of 1 January 1989. The notification of the German project in March 1988 was followed by a relocation of savings in the banks of Luxembourg, where the interest income of non-residents was tax free. The estimated amount of relocations represented 300 billion francs (for 1988) and 340 billion francs (for the first four months of 1989). Given the importance of relocations, Germany had to renounce to the project (Lefèbvre and Gutman 1999). Such flow of savings from Germany to Luxembourg (Janeba and Peters 1999) have also been observed in 1993, when Germany introduced a withholding tax at a rate of 30\% applicable only to the residents interest income (Hugouenq et al. 1999).

\textsuperscript{3}As a result of increasing social security contributions on savings' income, the part of life-insurance contracts of Luxembourg subscribed by French raised by 330\% between 1993 and 1996. Moreover, the number of breach of savings movement's obligation progressed by 78\% in four years (Lefèbvre and Gutman 1999).
The Directive has certainly brought fiscal equity. Yet, the potential impact of the Directive on the monetary policy transmission mechanism has been, to our knowledge, largely neglected. We argue that with respect to savings' mobility, a heterogeneous taxation on savings' income in Euroland could have altered banks' liquidity and strengthened the asymmetric transmission of monetary policy across the Euro zone. In our model, the transmission of monetary policy operates through the well-known bank-lending channel, which considers that banks with less liquid balance sheets will respond to a restrictive monetary policy by reducing their supply of credit.

We use the model proposed by Freixas and Rochet (1997), explaining a competitive equilibrium of the banking sector. Our contribution is to provide a tax competition framework for this model, explaining the location of savings in a monetary union.

In the tax competition literature, national governments are assumed to finance public expenditures by a tax on mobile capital. The main result is that, at Nash equilibrium, a country ignores the positive externality a marginal increase in tax rates induces through an outflow of capital to neighbouring countries. Hence, each country overestimates the marginal cost of public funds, resulting in inefficiently low tax rates on capital. In the symmetric equilibrium (Zodrow and Mieszkowski 1986; Wildasin 1988) every government sets an identical tax rate and there is no ex-post capital flight among countries.

Applying this result to our case of savings' taxation, it would imply no external effect on banks' liquidity and thus on the monetary policy transmission mechanism. As a result, for the purpose of capturing the diversity of Euro zone countries and allowing savings flows in an equilibrium situation, we introduce asymmetry in population size.

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4During a transitional period, Austria, Belgium and Luxembourg impose a withholding tax at a rate of 15% for the first three years, 20% for the following three years and 35% thereafter, but are allowed to receive information from other Member States. Concerning the share of tax revenues, 75% of the withholding tax revenues levied by these three countries during the transitional period are paid back to the taxpayer's residence country (Articles 10, 11, 12 of the Directive 2003/48/CE published in the Official Journal of the European Union).

5The credit view relies on several assumptions, namely the rigidities in price adjustment and the imperfect substitution between loans and bonds for borrowers, as well as for lenders. The last assumption implies that banks cannot shield their loan portfolios against a monetary contraction, inducing a decrease in their reserves (Bernanke and Blinder 1988; Kashyap and Stein 1994).

6For a comprehensive review of tax competition models see Wilson (1999).
In asymmetric tax competition, structural differences among countries induce different levels of tax rates. In the case of capital taxation and asymmetry in population, Bukovetsky (1991) shows that a small country sets a smaller tax rate than a large country and is thereby a net importer of capital. With savings income taxation, it follows that with asymmetric population size, the stock of savings and the banks' liquidity level differ between countries and allow for heterogeneous effects of a single monetary policy.

The paper is organized as follows. The next section develops the model. Section 3 studies the impact of savings' income tax competition on the monetary policy transmission mechanism within a single currency area. The last section discusses the results and concludes.

2 The model

We present a two-country and single-currency model in which households locate their savings in the country's bank offering the higher net-of-tax interest rate. As a result of the single currency, we have a single market for deposits. Banks can lend only to local firms. Thereby, each country has a distinct market for loans. Since large firms can issue bonds on capital markets to finance investment, bank-dependent firms are mainly small and medium-sized enterprises (Mishkin 1996). Following the literature on relationship lending, small businesses (which are more informationally opaque) borrow from small and geographically close banks, because of their capacity to collect 'soft' information (Berger et al. 1998; Stein 2002). As we consider a single currency area, there is only one monetary policy. However, each country's government sets the level of the tax rate independently of the other.

2.1 The consumer

Consider a representative immobile agent with an initial endowment which can be used for consumption or saving purposes over two periods. The inter-temporal consumption

\footnote{Peralta and van Ypersele (2005) explore capital tax competition with asymmetry in population and average capital endowment.}
profile \((C_1^i, C_2^i), i = 1, 2\), is chosen by the consumer in such a way as to maximize her utility function \(U_i(C_1^i, C_2^i, G_i) = u_i(C_1^i) + C_2^i + \Gamma_i(G_i)\), under her private budget constraints:

\[
\begin{align*}
\text{max} & \quad u_i(C_1^i) + C_2^i + \Gamma_i(G_i) \\
\text{s.t} & \quad C_1^i + S_i = \omega, \\
& \quad C_2^i = (1 + \rho)S_i,
\end{align*}
\]

where \(S_i\) denotes per capita savings in country \(i\), which is subject to an arbitration between deposits \(D\) and securities \(B\). \(\omega\) is an exogenous initial endowment common to both countries, \(G_i\) represents the level of public goods financed by the government, and \(\rho = r_D(1 - \tau_i)\) is the net-of-tax interest rate. The First-Order Condition is:

\[
u_i' = 1 + \rho.
\]

Substituting equations (2) and (3) in equation (1) gives the indirect utility function:

\[
V_i(\rho, \tau_i, G_i) = u_i(\omega - S_i(\rho)) + (1 + \rho)S_i(\rho) + \Gamma_i(G_i).
\]

Differentiating (5) with respect to \(\rho\) yields:

\[
\frac{\partial V_i}{\partial \rho} = -u_i' S_i' + S_i + (1 + \rho)S_i'.
\]

Using the envelope theorem and the First-Order Condition we have:

\[
\frac{\partial V_i}{\partial \rho} = S_i.
\]

Differentiating (5) with respect to \(\tau_i\) and using (4) yields:
\[
\frac{\partial V_i}{\partial r_i} = -S_i r_D. \tag{7}
\]

Equations (6) and (7) will be used below to solve the government problem.

### 2.2 The Firm

Firms are alike in both countries and rely on bank credit to finance their investment projects. The objective of the firm is to make an investment decision that maximizes its profit \( \pi_i^f \):

\[
\max_{K_i} \pi_i^f = F(K_i) - (1 + r_{L_i})K_i, \tag{8}
\]

where \( F(K_i) \) corresponds to the production function, \( K_i \) is the level of investment and \( r_{L_i} \) represents the interest rates on bank loans. Note that \( F(K_i) \) is strictly quasi-concave, implying \( F''(K_i) < 0 < F'(K_i) \). The First-Order Condition for profit maximization is given by:

\[
F'(K_i) = 1 + r_{L_i}, \tag{9}
\]

which leads to the following investment demand function \( K_i = K_i(r_{L_i}) \). Since the firm does not issue securities, \( K_i(r_{L_i}) \) is equivalent to the loans demand function.

### 2.3 The Banking Sector

In our model, central bank issues base money \( M_0 \). The central bank’s main monetary policy instrument is provided by open market operations.

Each country has a representative commercial bank that has households’ deposits on the liability side and base money in the form of reserves held on accounts with the national central banks (NCB): \( M_0 = \alpha D \), as well as loans made to firms on the asset side. \( \alpha \in [0, 1] \) is the fraction of deposits (in the form of minimum reserves) required
by the central bank to be held by credit institutions on accounts with the NCBs. Each bank sets its loans supply \( L_i \) and its deposits demand \( D_i \) so as to maximize its profit \( \pi_i^b \):

\[
\max_{D_i, L_i} \pi_i^b = r L_i + r M_i - r D_i D_i - C_i(D_i, L_i),
\]

where \( r \) represents the interbank market rate, \( r D_i \) the deposits interest rates, \( C_i(D_i, L_i) \) a convex management cost function, \( M_i \) is the bank’s net position on the interbank market, which equals to \( (1 - \alpha)D_i - L_i \).

Thus equation (10) can be rewritten as:

\[
\max_{D_i, L_i} \pi_i^b = (r L_i - r)L_i + (r(1 - \alpha) - r D_i)D_i - C_i(D_i, L_i).
\]

The First-Order Conditions for this problem are:

\[
\frac{\partial \pi_i^b}{\partial D_i} = (r(1 - \alpha) - r D_i) - \frac{\partial C_i}{\partial D_i} = 0, \quad (12)
\]

\[
\frac{\partial \pi_i^b}{\partial L_i} = (r L_i - r) - \frac{\partial C_i}{\partial L_i} = 0. \quad (13)
\]

It yields \( D_i = D_i(r D_i, r L_i, r) \), the deposits demand function and \( L_i = L_i(r D_i, r L_i, r) \), the loans supply function of the representative commercial bank.

Setting \( \frac{\partial C_i}{\partial D_i} = \Phi_D \) and \( \frac{\partial C_i}{\partial L_i} = \Phi_L \), gives:

\[
r_{D_i} = r(1 - \alpha) - \Phi_D, \quad (14)
\]

\[
r_{L_i} = r + \Phi_L. \quad (15)
\]

Equations (14) and (15) show that the bank sets loans and deposits by equalizing intermediation margins to marginal costs of management.
2.4 The effect of taxation on savings’ net return

Let us consider that savings are perfectly mobile and move until their net return is equal across the two countries. The savings market is represented by the following equation:

\[ \sum_{i=1}^{2} \theta_i S_i(\rho(\tau_1, \tau_2)) = \sum_{i=1}^{2} \theta_i D_i(r_{D_i}, r_{L_i}, r) + B, \]  

(16)

where \( \theta_i \) corresponds to the share of the monetary union’s population in country \( i \). Moreover, since we focus on asymmetric tax competition, we consider that population in country 1 is greater than population in country 2, so that \( \theta_1 > \theta_2 \).

Using \( r_{D_i} = \rho/(1 - \tau_i) \), differentiating (16) with respect to \( \tau_1 \) and solving for \( \frac{\partial \rho}{\partial \tau_1} \) yields:

\[ \frac{\partial \rho}{\partial \tau_1} = \frac{\theta_1 \frac{\partial D_i}{\partial r_{D_i}} \rho}{(1 - \tau_1)^2 \left[ \sum_{i=1}^{2} \theta_i S'_i - \sum_{i=1}^{2} \theta_i \frac{\partial D_i}{\partial r_{D_i}} \left( \frac{1}{1-\tau_i} \right) \right]} < 0. \]  

(17)

Given that \( \frac{\partial D_i}{\partial r_{D_i}} < 0 \) and \( S'_i(\rho) > 0 \), \( \frac{\partial \rho}{\partial \tau_1} < 0 \). Therefore, this equation means that an increase in the tax rate of country 1 negatively affects the net-of-tax interest rate which prevails in the monetary union. The greater the population size, the stronger the impact of the tax rate on savings’ net return.

2.5 The government

The government is assumed to be benevolent and sets the level of tax rate in order to maximize the indirect utility function of its representative resident subject to the following balanced budget constraint:

\[ G_i = \tau_i S_i(\rho(\tau)) r_{D_i}. \]  

(18)

Note that we do not introduce deficit in the public budget constraint so as to respond to the Stability and Growth Pact’s requirements that foresee the reduction of government’ deficits. In this way, \( B \) can be construed in equation (16) as government’s previously issued securities. Substituting equation (18) in equation (5), the program of the govern-
ment can be written as:

$$\max_{\tau_i} V_i [\rho(\tau), \tau_i, \tau_i S_i(\rho(\tau)) r_{D_i}] . \quad (19)$$

The First-Order Conditions are given by:

$$\frac{\partial V_i}{\partial \rho} + \frac{\partial V_i}{\partial \tau_i} + \Gamma_i'(S_i r_{D_i} + \tau_i S_i' \frac{\partial \rho}{\partial \tau_i} r_{D_i}) = 0. \quad (20)$$

Rearranging and using (6) and (7) yields:

$$\Gamma_i' = \frac{S_i r_{D_i} - S_i \frac{\partial \rho}{\partial \tau_i}}{S_i r_{D_i} + \tau_i S_i' \frac{\partial \rho}{\partial \tau_i} r_{D_i}} > 1 . \quad (21)$$

Equation (21) defines the reaction function of the government $i$ $\tau_i(\tau_j)$. The left-hand side is the marginal benefit of the public good and the right-hand side is the marginal cost of public funds, i.e. the cost of providing an additional unit of public good by means of taxation. At Nash equilibrium, countries undermine the marginal cost of public funds since at the first-best optimum it should be equal to 1, leaving the public good under-supplied in each country.

However, the tax rate in each of the two countries differs because of the difference in population size. As $\theta_1 > \theta_2$,

$$\frac{S_1 r_{D_i} - S_1 \frac{\partial \rho}{\partial \tau_i}}{S_1 r_{D_i} + \tau_1 S_1' \frac{\partial \rho}{\partial \tau_i} r_{D_i}} > \frac{S_2 r_{D_i} - S_2 \frac{\partial \rho}{\partial \tau_2}}{S_2 r_{D_i} + \tau_2 S_2' \frac{\partial \rho}{\partial \tau_2} r_{D_i}} . \quad (22)$$

The marginal cost of public funds is perceived to be higher in the large country than in the small country. It follows that the tax rate set in country 1 is greater than the tax rate set in country 2. When the large country increases its tax rate, it depresses the net-of-tax interest rate by a relatively large amount, implying a large outflow of savings to the small country. On the contrary, when the small country increases its tax rate, it depresses the net-of-tax interest rate by a relatively small amount, implying a small outflow of savings to the large country. Thus the cost of raising taxes is lower in the large country, implying a higher tax rate in the large country than in the small country.
2.6 General competitive equilibrium

The competitive equilibrium is characterized by four equations involving three markets: a loans market for each of the two countries of our model, the savings market given by equation (16), and the interbank market, solving for $\rho$, $r_{Li}$ with $i = 1, 2$ and $r$. $\tau_i$ is given by the government program and $r_{Di}$ is obtained with $r_{Di} = \rho / (1 - \tau_i)$.

\[
K_i(r_{Li}) = L_i(r_{Di}, r_{Li}, r), i = 1, 2,
\]

(23)

\[
\sum_{i=1}^{2} \theta_i S_i(\rho(\tau_1, \tau_2)) = \sum_{i=1}^{2} \theta_i D_i(r_{Di}, r_{Li}, r) + B,
\]

(24)

Substituting (24) in (16) and using (23) yields:

\[
\sum_{i=1}^{2} \theta_i S_i(\rho) = \frac{\sum_{i=1}^{2} \theta_i K_i(r_{Li})}{1 - \alpha} = B.
\]

(25)

Using (14) and (15) as well as $\rho = r_{Di}(1 - \tau_i)$, and differentiating (25) with respect to $r$ and to $B$ gives:

\[
\sum_{i=1}^{2} \theta_i S_i'(\rho)(1 - \alpha)(1 - \tau_i)dr - \frac{\sum_{i=1}^{2} \theta_i K_i'(r_{Li})}{1 - \alpha}dr = dB.
\]

(26)

Rearranging:

\[
\frac{dr}{dB} = \frac{\frac{1}{\sum_{i=1}^{2} \theta_i S_i'(\rho)(1 - \alpha)(1 - \tau_i) - \frac{\sum_{i=1}^{2} \theta_i K_i'(r_{Li})}{1 - \alpha}}} > 0.
\]

(27)

Since $S_i'(\rho) > 0$ and $K_i'(r_{Li}) < 0$, $\frac{dr}{dB} > 0$. This means that a sale of securities by the central bank, which amounts to a liquidity shortening, entails an increase in the interbank market rate.
3 Heterogeneous effects of a single monetary policy

In this section, we show that the effect of open market operations on deposits and loans depends on the level of tax rate chosen by each government and thus on the net position on the savings market.

Set $\sum_{i=1}^{2} \theta_i D_i = D$ in equation (16). Differentiating with respect to B yields:

$$\frac{\partial D}{\partial B} = \sum_{i=1}^{2} \theta_i S'_i(\rho)(1-\alpha)(1-\tau_i) \frac{dr}{dB} - 1.$$  \hspace{1cm} (28)

Using (27) and rearranging gives:

$$\frac{\partial D}{\partial B} = \frac{1}{\sum_{i=1}^{2} \theta_i S'_i(\rho)(1-\alpha)^2(1-\tau_i)}.$$  \hspace{1cm} (29)

Since $S'_i(\rho) > 0$ and $K'_i(r_{L_i}) < 0$, $\frac{\partial D}{\partial B} < 0$. This suggests that a liquidity absorbing open market operation reduces settlement balances for banks, thereby rising the rate of interest on the interbank market. This may thereby lead to an increase in rates of interest on households’ deposits and thus to a decline in banks’ demand for households deposits. Differentiating (29) with respect to $\tau_k$ gives:

$$\frac{\partial^2 D}{\partial B \partial \tau_k} = -\sum_{i=1}^{2} \theta_i K'_i(r_{L_i})(\sum_{i=1}^{2} \theta_i S''_i(\rho) \frac{dr}{\partial \tau_k}(1-\alpha)^2(1-\tau_i) - \theta_k S'_k(\rho)(1-\alpha)^2) \Big/ \left[ \sum_{i=1}^{2} \theta_i S'_i(\rho)(1-\alpha)^2(1-\tau_i) - \sum_{i=1}^{2} \theta_i K'_i(r_{L_i}) \right]^2.$$  \hspace{1cm} (30)

Since $S''_i(\rho) > 0$ and $K'_i(r_{L_i}) < 0$ and $\frac{\partial r}{\partial \tau_k} < 0$, $\frac{\partial^2 D}{\partial B \partial \tau_k} < 0$. This suggests that a rise in $\tau_k$ strengthens the reduction in the amount of deposits $D$ following an open market operation carried out through a sale of securities $B$ by the central bank. In order to consider the effect of an increase in the amount of securities $B$ on the commercial banks’ loan supply in each country, equation (24) can be rewritten as:

$$\theta_1 L_1 = (1-\alpha)D - \theta_2 L_2.$$  \hspace{1cm} (31)

Differentiating with respect to $B$ and using (23) gives:
\[
\frac{\partial \theta_1 L_1}{\partial B} = \frac{(1 - \alpha)\partial D}{\partial B} - \frac{\theta_2 K'_2 (r_{L_2}) dr}{dB}.
\]

(32)

According to the bank-lending channel, a monetary tightening implying a sale of securities by the central bank on the open market leads to a contraction in banks’ reserves. Therefore banks are forced (to the extent that there is a system of compulsory reserves and given an unchanged coefficient of compulsory reserves) to reduce their supply of credit and push bank-dependent firms to cut on investment. However, as \( K'_i (r_{L_i}) < 0 \), \( \frac{dr}{dB} > 0 \) and \( \frac{\partial D}{\partial B} < 0 \), the effect of an increase in securities \( B \) on the level of loan supply in country 1 is ambiguous. A possible explanation is that the impact of a monetary contraction on bank lending also depends on the firms’ credit demand. The greater the fall in the firms’ credit demand in country 2, the less the bank in country 1 will cut back on lending. Indeed, the bank in country 1 can use the deposits offered by the bank in country 2 on the interbank market to make up for the decline in retail deposits induced by the central bank’s policy. Consider that \( \frac{\theta_2 K'_2 (r_{L_2}) dr}{dB} \) is not too high and \( \frac{\partial \theta_1 L_1}{\partial B} < 0 \).

Substituting (29) in (32) and differentiating with respect to \( \tau_k \) (k=1,2) gives:

\[
\frac{\partial^2 \theta_k L_k}{\partial B \partial \tau_k} = - \frac{(1 - \alpha) \sum_{i=1}^2 \theta_i K'_i (r_{L_i}) \sum_{i=1}^2 \theta_i S''_i (\rho) \frac{\partial \rho}{\partial \tau_k} (1 - \alpha)^2 (1 - \tau_i) - \theta_k S'_k (\rho) (1 - \alpha)^2}{\sum_{i=1}^2 \theta_i S'_i (\rho) (1 - \alpha)^2 (1 - \tau_i) - \sum_{i=1}^2 \theta_i K'_i (r_{L_i})}.
\]

(33)

Since \( S''_i (\rho) > 0 \), \( K'_i (r_{L_i}) < 0 \) and \( \frac{\partial \rho}{\partial \tau_k} < 0 \), \( \frac{\partial^2 \theta_k L_k}{\partial B \partial \tau_k} < 0 \). This suggests that a rise in \( \tau_k \) strengthens the reduction in loan supply \( L_k \) following an increase in securities \( B \). This amounts to saying that the greater the level of the tax rate set by the government, the greater the effect of a restrictive monetary policy on the decrease in loan supply. When a country practices a tax rate level higher than abroad, this involves a lower net-of-tax interest rate, which leads to a savings’ outflow to the country with a higher net return on savings. The savings’ flight entails a shift in the liquidity of the balance sheets of country’s banks; constraining them to cut on lending. Conversely, the lower the tax rate’s level, the less pronounced the impact of a monetary contraction on the reduction in loan supply, as commercial banks with more liquid balance sheets can insulate their
loans portfolio against the monetary tightening.

From this model, it is possible to draw the following conclusions. The Council Directive 2003/48/EC on taxation of savings' income, implementing a compulsory and systematic exchange of information between EU Member States, may have limited the heterogeneous effects of the single monetary policy in the Euro area.

Further, as argued by Rossi (2007), the flight of bank deposits from one Member country to another within the Euro area may lead to a divergence of inflation rates between them. In this way, countries receiving bank deposits will probably observe higher inflation rates than those countries suffering from an outflow of deposits, which may be problematic for the correct implementation of the single monetary policy by the European Central Bank. We can suppose that the Directive may also have limited inflation rate differentials between E(M)U Member countries, which may have resulted from the effect of tax competition on the monetary policy transmission mechanism across the Euro area.

In addition, several Eastern Europe countries which participate to the Economic and Monetary Union will adopt the Euro. These countries are particularly aggressive in the tax competition game and, in the absence of the Directive, would have attracted savings from countries with high tax rates. Thus the Directive also avoided the consequences that the entry of these countries (which practice low tax rates) could have had on monetary policy transmission.

4 Conclusion

This paper shows that in a monetary union where savings are mobile because of the absence of exchange rate risk, tax competition between Member States may be harmful not only for the provision of public goods but also for the monetary policy transmission mechanism. When countries differ in population size, they have different incentives to compete for savings and set different levels of tax rates. More precisely, small countries set low tax rate and are net importers of savings, and large countries set high tax rate and are net exporters of savings. Therefore, the banks of the small country which attracts
savings have more liquid balance sheets and are thus less responsive to the action of monetary authorities. For example, in the case of a restrictive monetary policy, the small country’s banks have additional funds to counteract a liquidity absorbing open market operation and to limit thereby the reduction in lending. According to this mechanism, it is difficult for the central bank to attain the inflation objective in the monetary union uniformly, as small countries which attract savings may experience greater inflation rates than large countries.

On the ground of these results it appears that the Council Directive 2003/48/EC on taxation of savings’ income has not only brought fiscal equity. This Directive, introducing the generalization of exchange of information on taxation matters in the European Union, may also have limited the heterogeneities of monetary policy transmission induced by tax competition, notably in terms of bank lending and inflation rates.

Possible extensions of this model for further research would be to consider tax competition between two currency areas. In this case, it would be interesting to take into account not only tax competition but also the competition of monetary policies between the two currency areas and the potential reaction of the monetary policy to a capital flight faced by a given monetary space.
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