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The Impact of Taxation on the International Financial Market Under Inflationary Conditions: A Survey of the Recent Literature

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Contents

1/ The paper was completed during the summer of 1982 when the author was a consultant to the Fiscal Affairs Department. It is a part of a larger study on the subject of "Interest Rates and the Tax Treatment of Interest Income and Expenses" in preparation in the Department, with Ved Gandhi acting as the coordinator. Thanks are due to Ved Gandhi, Sheetal Chand, Jitendra Modi, and Menachem Katz for useful suggestions at various stages of the preparation of the paper. The final draft has improved greatly as a result of significant revisions made by Mario I. Blejer, and the author is extremely grateful to him. The author, however, bears full responsibility for the contents of the paper.

1. Introduction

In addition to short-run capital flows arising from balance of trade disequilibria, international capital movements are also generated by the presence of financial incentives as reflected by interest rate differentials across countries. More specifically, if an individual in a given country could earn a higher return in a foreign country compared with what he can obtain in the domestic market, he will transfer funds to the foreign market in two stages: in the first, he will buy foreign currency; in the second, he will use that currency to buy foreign assets.

Portfolio equilibrium requires the equalization of after-tax returns on alternative financial investments when all the alternatives are measured in the same (local) currency. This equilibrium condition is, in the absence of taxation, the base of the interest-rate-parity hypothesis. This proposition, and some of its recent empirical tests, serve as a starting point for this short survey.

The main body of literature on international financial market equilibrium has disregarded the taxation aspect. Our discussion of the effects of taxation and inflation on international capital movements will deal with the few papers that address themselves to this issue. The effects of taxation and the question of optimal tax policy toward foreign income has been, however, discussed to some extent in the context of multinational corporations, but since this issue is not directly related to the main focus of the present survey it will not be discussed here.

2. Interest Rate Parity

Consider a two-country world, consisting of Country A and Country B, and an "integrated" international financial market, where investors in each country can buy securities and bonds in their own countries as well as in the foreign country. The current one-period interest rates are i_A and i_B, respectively, S is the spot exchange rate, which is defined as the price of one unit of currency of Country B in terms of the currency of Country A, and FS is the future spot rate one period ahead. While i_A, i_B, and S are observed at period t, FS is an unknown in period t.

In a world with integrated capital markets an individual in either country, say, Country A, can invest in period t one unit of local currency and obtain a return equal to $(1+i_A)$ in period $(t+1)$ by investing in a domestic bond, or he can obtain $[(1+i_B) \cdot FS/S]$ by investing in foreign bonds. Under conditions of perfect information and certainty, where FS is known, the following equilibrium conditions should hold:

$$(1+i_A) = (1+i_B)FS/S \qquad (1)$$

This, in a world of certainty, is known as the "interest-rate-parity" equation. But in a world of uncertainty where FS is not known, the expected return, via foreign investment, may depend on the prediction of the future level of the exchange rate (or the rate of its depreciation or appreciation). Different investors may have different preferences (and choices) between bonds denominated in the currency of Country A and bonds denominated in the currency of Country B (henceforth, bonds of Country A and of Country B) according to their view of the future exchange rate, FS, and their attitude toward risk.

With regard to risk, it is commonly assumed in the literature that investors in each country prefer to hold in period (t+1) instruments denominated in domestic currency; therefore, an investment in foreign bonds is more risky because it involves some degree of exchange-rate uncertainty.

One solution to reduce the risk of investment in foreign instruments (see Stein (1965) and references therein) is to hedge against the risk of fluctuations in the value of foreign currency by selling in the forward market the foreign exchange to be obtained at period (t+1). In this case, the covered arbitrage version of the interest rate parity can be written as

$$(1+i_A) = (1+i_B) \cdot F/S \qquad (2)$$

where F is the forward delivered exchange rate or the price at time t of the currency of Country B to be delivered at period (t+1). In the rest of the paper we will refer to equation (2) (rather than equation (1)) as the interest-rate-parity equation. 1/ Equations (1) and (2) can be written in terms of interest differential as

$$(1+i_A)/(1+i_B) = F/S$$

or

$$(i_A-i_B)/(1+i_B) = (FS-S)/S \qquad (1')$$

and

$$(i_A-i_B)/(1+i_B) = (F-S)/S \qquad (2')$$

1/ Many empirical tests have been conducted in forward markets on the question whether the forward rates are good predictors of the future rate and whether the financial markets are efficient. Although there are some findings that forward rates can serve as predictors for future rates (see, e.g., Cornell (1977) and Callier (1981), there are also indications that forward rates are affected by speculations (e.g., Kesselman (1971)). A survey of that literature is given by Levich (1979). More recent findings, using more elaborate statistical techniques, are presented by Hansen and Hodrick (1980); they tend to question the hypothesis that the forward rates are unbiased predictors of the future spot rates and suggest the existence of risk premium in the forward market.

The intuitive explanation of this relationship is that if the interest rate in Country B is lower than the interest rate in Country A then an investor will hold bonds of both countries only if he expects to be compensated by an appreciation of the currency of Country B. If the interest rate in Country B, i_B, is rather small (or the length of the maturity of bond is quite short) we can approximate equations (1') and (2') as

$$i_A - i_B = (FS-S)/S \tag{1''}$$

$$i_A - i_B = (F-S)/S \tag{2''}$$

Equation (1'') states that the percentage increase in the exchange rate is equal to the interest rate differential, while equation (2'') states that the forward exchange premium is equal to the interest rate differential. It should be noted again that under certainty, when both equations hold, the forward rate is equal to the future exchange rate.

Under uncertainty, assuming risk aversion and given the risk of unexpected exchange-rate fluctuations, a trader in Country A will buy bonds in Country B (without covered arbitrage) only if the expected return there is above the return in Country A, or

$$(1+i_B)E_A(FS) > (1+i_A) \tag{3}$$

where $E_A(FS)$ is the expected future exchange rate for investors in Country A. Similarly, for investors in Country B to invest in bonds in Country A, assuming again the riskiness of foreign investment, we will get

$$(1+i_B) < (1+i_A) \cdot S/[E_B(FS)] \tag{4}$$

where $E_B(FS)$ is the expected exchange rate as considered by investors in Country B.

A comparison of equations (3) and (4) suggests that investors in Country A and Country B will hold open positions buying bonds in both Countries A and B, only if (a) they have different expectations with regard to the future exchange rate; (b) they require risk premium in holding foreign bonds; or (c) there are other factors affecting portfolio decisions, e.g., transaction costs, risks of political intervention (Aliber (1973)), default risk (Stoll (1968)), and differential taxes on domestic and foreign interest income and capital gains.

The literature contains a relative large amount of empirical tests on the validity of the hypothesis of covered interest rate parity. One of the earlier tests was performed by Stein (1965), considering the United States, the United Kingdom, and Canada. Frenkel and Levich (1977, 1981) have formulated the interest-rate-parity equilibrium conditions

in a world with transaction cost and have obtained that the forward premium could deviate from the interest rate differential in a range that depends on the transaction costs. A relevant empirical question in testing the interest rate parity is whether the observed deviation from the prediction of the theory can be explained by governments' intervention, which disturbs the response of the capital markets. A study by Dooley and Isard (1980) explains the deviation from interest rate parity by the United States and the Federal Republic of Germany as a result of capital control in the German market, while Otani and Tiwari (1981) calculate the deviation from interest rate parity in the Tokyo and the London markets and explain it in terms of the control measures and moral "pressure" used by the Japanese Government.

3. Taxation and Interest Rate Parity Under Inflation

Most of the literature on interest rate parity, both empirical and theoretical, does not take into consideration the effect of taxes on international equilibrium. By ignoring taxes, the literature implicitly assumes that taxes have no effect on capital flows, or that the taxes affect two sides of the interest rate parity in the same proportional way. Considering tax rules in Western countries, neither of these implicit assumptions seems to be correct. A number of recent articles, which are discussed below, incorporate the issues of taxation in the context of the interest-rate-parity formulation.

Levi (1977) has considered the tax rules of Canada and the United States with regard to foreign generated income, as well as the differential tax treatment of income and capital gains.

Starting from equation (2'), the interest rate parity without taxes ($i_A = i_B + (1+i_B)[(F-S)/S]$), Levi considers the case where the tax rate on capital gains (from foreign exchange transaction) is lower than the tax rate on regular income. If $i_A > i_B$, the returns to residents of Country A from investing in foreign bonds will consist of regular income (i_B) and a capital gain (F-S), while the return on investment in the home country (i_A) will be fully taxed at the higher income tax rate. Therefore, if the equality before the tax holds (equation (2')), after taxes there will be an incentive for residents of Country A to move their funds to Country B. In order to obtain equilibrium, equality of after-tax returns between the local market A and foreign market B should be established; this would require that equation (2') be changed to

$$i_A = i_B + (1+i_B)[(F-S)/S] + \theta \qquad (5)$$

where θ can be viewed as the excess pretax premium on local bonds, which reflects their less favorable tax treatment. (This premium is similar to the premium paid on taxable bonds, compared with nontaxable bonds.)

In the opposite case, when $i_A < i_B$, equality before taxes implies that the term (F-S)/S in equation (2') is negative, which suggests that residents of Country A will not be able to take advantage of the lower capital gain tax by investing in the bonds of Country B. However, they may be able to generate a capital gain by taking a loan in Country B and investing it in local bonds. In this case, although the investors pay higher interest in Country B on their loans (than in Country A), they will have a capital gain from the depreciation of the loan in local currency terms. At the same time, it will be beneficial for tax considerations to an investor of Country B to borrow in Country A and invest domestically. Therefore capital flows are again generated, even though equation (2') holds. Levi also applies his analysis to the specific tax law in the United States that allows special treatment to long-term (over six months) capital gain.

The main contribution of Levi's analysis is its emphasis on the role of taxation and of its importance as an explanation of observed deviations from the pretax interest rate parity. Levi's study provides a rational explanation of international capital movements, like two-way capital flows, which would seem "abnormal" in the absence of the consideration of tax factors.

In a related paper, Hartman (1979) has considered the effect of taxation on capital flows between two countries in an inflationary environment. He considers in particular the effect of different tax arrangements with respect to income generated domestically and abroad. In a world with no taxes, theory suggests the simultaneous existence of the Fisher effect, the interest rate parity, and the purchasing power parity (see also Roll and Solnik (1979) and Ben-Zion and Weinblatt (1982)).

The introduction of taxes leads to the modified Fisher effect, which indicates that the interest rate in a country will increase by more than the rate of anticipated inflation, i.e., $i_A = r_A + \pi_A/(1-t_A)$ where r_A is the real interest rate, π_A is the rate of anticipated inflation in Country A, and t_A is the income tax rate. 1/ Consider now an investor from Country B who is subject to a rate of income tax, t_B, in his country, with nominal and real interest rates i_B and r_B, respectively.

Let us assume for simplicity that the inflation in Country B is zero and that the real rates of interest are r_A and r_B. Here, the inflation in Country A will affect the equality between the real after-tax return; this will tend to create capital flows, which are induced only by anticipated inflation and taxation, and will lead, according to Hartman, to real changes in the capital intensities in the two countries.

1/ Cf., Darby (1975), Feldstein (1976), and Tanzi (1976).

Recently Tanzi and Blejer (1982) have developed a similar model where local investors in a (developing) country hold foreign assets (bonds) as part of their portfolio and where the interest rate adjusts to inflation according to the modified Fisher effect. Tanzi and Blejer assume furthermore that investors in Country B (the developing country) can avoid paying taxes (at least de facto) on interest income earned in Country A (the United States).

If originally, with no inflation, after-tax interest rates are equal,

$$(1-t_B)r_B = r_A \qquad (6)$$

then, as a result of inflation in Country A, the return on investment in that country will increase, according to the modified Fisher effect, to $[r_A + \pi/1-t_A]$, which will lead to capital flows from Country B to Country A. 1/

An important implication of the Tanzi-Blejer model is that inflation in the United States attracts capital flows from other countries, owing to the preferential tax treatment (de facto) of interest income of nonresidents in the United States, and explains the recent appreciation of the U.S. dollar in terms of other currencies.

Ben-Zion and Weinblatt (1982) have further extended the ideas of differential tax treatment in a period of inflation, presented in Hartman, and Tanzi and Blejer. They assume a tax treaty between countries, under which residents pay taxes only in their own country on the interest income earned abroad in their own currency. 2/ Under the assumption of the two-country model presented above and of purchasing power parity (PPP), inflation in Country A will raise the real pretax return of investing in Country A for a nonresident from r_A to $r_A + (1 + \pi_A)\ [t_A/1-t_A]$, thereby inducing capital movements from Country B to Country A. This differential in return arises because tax agreements and adjustments in the exchange rate, according to the PPP, make nonresidents, unlike residents, pay taxes only on the "real" interest rate in Country B from investment in Country A. At the same time they benefit from the modified Fisher effect in Country A, which is based on the taxation on nominal interest income in that country.

1/ Under the purchasing power parity hypothesis this result holds regardless of the rate of inflation in Country B.

2/ Although the Ben-Zion and Weinblatt model is similar in spirit to the one developed by Hartman, it emphasizes that international capital flows, mainly short-term financial flows, will not normally affect the capital intensities in the two countries (which is a result of long-term investment capital flows).

The interaction between the modified Fisher effect and the PPP and the interest rate parity was discussed in a recent paper by Howard and Johnson (1982). Assuming the existence of PPP they show, that the interest rate parity will cause a change in the real rate of interest, so that the modified Fisher effect will not hold. Alternatively, the modified Fisher effect may hold but the real exchange rate will have to change. Furthermore, they show that the nonneutrality of inflation arises from the taxation of nominal inflation and that it would disappear if taxes were levied on real interest income.

An important result that follows from the abovementioned literature is that the flow of capital and the relative exchange rate appreciation in the country with higher inflation (Country A) leads to an increase in the volume of imports and reduction in employment in that country and may aggravate the situation of inflation and unemployment further.

4. Concluding Comments and Agenda For Research

Although a large body of literature has in recent years dealt with the effect of inflation on interest rates, across countries, and the impact of these variables on exchange rates and capital flows, most of the literature on the latter has ignored the existence of taxation.

The works of Levi (1977), Hartman (1979), and Tanzi and Blejer (1982) have shown the crucial role of taxation in the determination of capital mobility and the relevance of alternative assumptions regarding the tax treatment of foreign interest income. Using these approaches, it was shown by Ben-Zion and Weinblatt (1982) that tax consideration results in a significant incentive for short-term capital flows and that these flows may change the real rate of interest or the path of the real exchange rate (Howard and Johnson (1982)), as well as affect other important variables.

The theoretical implications, the process of market equilibrium and, particularly, the empirical assessment of the effect of taxation on the international capital market are yet far from being resolved. A clear picture that emerges from the existing literature is that the standard relationships upon which open-economy macromodeling is based, namely, the interest-rate-parity hypothesis, purchasing power parity, and the "open" Fisher effect, do not hold in their simple formulation in the presence of taxes, and that they should be modified to provide a more realistic framework for analyzing developments in the real world.

In terms of research needs it is apparent that priority should be given to the development of a comprehensive framework that incorporates into the determinants of capital flows and of equilibrium in the international capital market the effects of differential taxation, tax agreements, tax evasion, and other fiscal considerations. Of equal importance is the evaluation of the empirical importance of these factors. The assessment of the magnitude of these effects is essential

in order to obtain a correct perspective of their importance and of their policy implications. A prerequisite, however, to the empirical evaluation is the collection of institutional and legal information on the tax treatment of international flows in different countries.

Two additional related topics that need review are (1) the evaluation of the potential importance of international tax policy in developing countries for the growth of their capital markets, and (2) the theoretical and empirical implication of tax consideration for optimal portfolio composition in an open economy.

It seems that research in this important area may have high expected returns in real terms, with regard to its impact on understanding the effect of the tax policy of one country on the international markets and on real variables in other countries.

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