IMF WORKING PAPER

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WP/94/18

INTERNATIONAL MONETARY FUND

Fiscal Affairs Department

Withholding Taxes and the Cost of Public Debt

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February 1994

Abstract

Several industrialized countries impose withholding taxes on public interest accruing to nonresidents. This paper examines the international incidence of such withholding taxes by estimating to what extent these taxes raise the cost of government borrowing. It is found that the pretax interest rate is most sensitive to the tax withheld on Japanese investors. In particular, the gross-up is about half of this tax, which suggests that about half is returned to the investor in the form of foreign tax credits. The extent of the gross-up rises over the 1989-93 period, which indicates that in recent years foreign tax credits have been available to a lesser extent.

JEL Classification Numbers:

F21, F23, H25, H87

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Summary

Several industrialized countries, including Australia, Italy, Japan, Spain, and Switzerland, levy withholding taxes on interest paid on the public debt to nonresidents. This paper examines to what extent nonresident withholding taxes on public interest affect the cost of government borrowing. Arbitrage is assumed to ensure that investors receive equal after-tax risk-adjusted returns whether they invest in public debt or Eurocurrency deposits in the same currency. An unknown parameter in the arbitrage condition is the extent to which investors receive a foreign tax credit for the nonresident withholding taxes paid abroad. Commercial banks are the primary investors in the Eurocurrency deposit market. Generally, banks are subject to corporate income tax and thus can obtain foreign tax credits. Other international investors such as pension funds and insurance companies, however, are tax exempt in some countries.

The empirical analysis shows that pretax public interest rates are increased by about half of the tax withheld. A fractional grossing-up of withholding taxes into higher pretax interest rates suggests that offsetting foreign tax credits from their home country tax authorities partly compensate international investors for nonresident withholding taxes. Investors that evade their home country income taxes on foreign source interest income clearly cannot obtain credits. The partial gross-up, therefore, suggests that the marginal arbitrageur between public debt and Eurocurrency assets does not evade his home country income taxes.

The paper estimates the gross-up of nonresident withholding taxes into higher government debt yields separately on the assumption that the investor is a resident of Germany, Japan, and the United States, respectively. Pretax interest rates appear to be most sensitive to withholding taxes imposed on investors resident in Japan. This finding reflects that either (i) Japanese holdings of international public debt are sizable enough to affect yields, or that (ii) Japanese investors receive relatively sparse offsetting income tax credits. The size of the gross-up changes over time and was more pronounced in 1991-93 than in 1989-90. This suggests that, as the state of the economy generally worsened from the late 1980s to the early 1990s, investors have anticipated relatively small offsetting foreign tax credits. The main role of international interest withholding taxes applied to government debt appears to be redistributive. Nonresident withholding taxes enable borrowing countries to capture part of the tax revenue associated with the interest income, at the expense of the lending country's tax authority. Coordination of nonresident withholding taxes thus appears desirable for reasons of international equity.

I. Introduction

Several industrialized countries levy withholding taxes on interest accruing to nonresidents. International withholding tax rates tend to vary with the residence of the interest recipient, but they also depend on the type of debt instrument, the length to maturity, and the status of the payer. Withholding taxes, in particular, generally depend on whether the payer is a corporation, a financial institution, or a government entity. 1/ At this point, several industrialized countries levy withholding taxes on interest from government debt paid to nonresidents, as shown in a recent survey by Gustavsson (1990). 2/ This paper examines to what extent these withholding taxes are reflected in a higher pretax cost of public borrowing.

The mark-up of withholding taxes into higher interest rates on the public debt generally depends on a number of factors. First, it depends on whether there are obvious holes in the withholding tax system, in the form of a third country that can act as a low withholding tax conduit or in the form of tax-exempt institutions, such as banks, that can act as intermediaries. The financial intermediary channel, however, has the disadvantage of introducing additional credit risk, and may,therefore, be less relevant at currently low levels of withholding tax. Second, the extent of the gross-up depends on whether the investor receives a domestic income tax credit for withholding taxes paid on foreign interest. At one extreme, there is expected to be no gross-up, if the investor receives a full tax credit for his foreign source withholding tax. At the other extreme, the pretax interest is grossed up by the full tax, if there is no foreign tax credit allowed at all.

The evidence in this paper shows that international pretax T-bill yields are more sensitive to withholding taxes imposed on Japanese investors than to withholding taxes on German and U.S. residents. About half of the tax withheld on Japanese investors is reflected in higher pretax interest rates. This result reflects the importance of Japanese international portfolio investments as well as possibly limited foreign tax credits available to Japanese investors relative to American and German investors, The degree of the mark-up generally rises over the 1989-93 period, which suggests that in recent years international investors have anticipated less generous foreign tax credits from their home tax authorities.

Previously, Gros (1990) has modeled the impact of interest withholding taxes on the spread between onshore and offshore corporate bond yields. Onshore and offshore bond markets are shown to coexist, if market participants have heterogeneous costs of accessing the offshore market. Without transaction costs, all credit activity shifts to the offshore market, which is subject to the lower effective tax on financial

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1/ For a detailed compendium, see KPMG (1988).
2/ See Gustavsson (1990), Table 5, p. 54.

intermediation. The choice of credit market, however, is essentially different for governments than for corporations, as governments themselves are the ultimate recipients of the withholding tax revenues. Governments, therefore, may prefer to issue debt in their domestic credit markets, even if the domestic pretax interest rate is higher than the offshore rate.

Empirical work on the impact of withholding taxes on required rates of return on international porfolio investments has been limited. The effects of developing country interest withholding taxes on these countries' commercial bank credit rates has been examined by Huizinga (1991). Commercial banks are shown to have charged relatively low net of tax interest rates to developing countries that have charged relatively high interest withholding taxes. Demirgüc-Kunt and Huizinga (1993), further, have investigated the impact on dividend and capital gains withholding taxes imposed by developing countries on pretax equity returns in these countries. It is shown that only withholding taxes on capital gains have a discernible impact on pretax equity returns. The latter result is consistent with the generally limited creditability of nonresident capital gains withholding taxes in the United States and other major capital exporting countries.

Other than taxes, capital controls can forge a wedge between onshore and offshore interest rates on loans in the same currency. Dooley and Isard (1980) have shown that the difference between onshore and offshore Deutschmark interest rates in the 1970s can be explained, in part, by actual and prospective German capital controls. In a general equilibrium approach, Goulder (1990) has recently examined the prospective impact of a reintroduction of the U.S. withholding tax on interest. The macroeconomic effects, and in particular the increases in U.S. interest rates, depend importantly on the U.S. share in the international capital market, and on the substitutability of U.S. and other assets.

The remainder of this paper is organized as follows. Section 2 describes the tax environment facing an international portfolio investor, and derives the estimating equation relating the spread between the T-bill rate and the Eurocurrency rate to the international tax regime. Section 3 describes the data, and presents the empirical results. Section 4 concludes.

II.   The International Tax Environment

This section relates the spread between the yield on national T-bills and the Eurocurrency rate on credits in the same currency to the international tax regime. The T-bill issuing government imposes a withholding tax at a rate r_w on interest payments accruing to nonresidents. Interest payments on Eurocurrency credits, instead, are not subject to a withholding tax. The international portfolio investor is required to pay home country income taxes on his worldwide interest income. Let r_p be the marginal income tax rate in the investor's home country applied to foreign source interest income.

In principle, the foreign interest withholding tax is creditable against the international investor's home country income taxes. Major capital exporting countries, such as Germany, Japan, and the United States, allow a foreign tax credit only up to the amount of (precredit) income tax due on the foreign source income. If actual foreign source taxes exceed the foreign credit limitation, then the international investor is in an excess credit position. Let γ generally be the fraction of foreign withholding taxes that is creditable if foreign withholding taxes are marginally increased. With $\gamma = 0$, the investor is in an excess credit position. In this instance, the investor pays no home country taxes on foreign source income, and the marginal, post-credit, domestic tax rate on foreign source income, r_p, is zero. Throughout, we will assume that the effective double taxation of interest income does not preclude the international ownership of a country's T-bills. Other than taxes, there are assumed to be no barriers to international portfolio investments. 1/

In the empirical work, we will estimate the creditability parameter, γ, for investors resident in Germany, Japan, and the United States. While these three countries all apply the general rule that foreign tax credits are limited to domestic taxes on foreign source income, there are some differences in the precise calculation of the foreign tax credit limitation. In Germany, specifically, the foreign tax credit is determined separately for each foreign country, and unused foreign tax credits cannot be carried forward or back. Japan, instead, allows the foreign-tax credit limitation to be calculated on the basis of worldwide foreign source income, and unused credits can be carried forward for three years. In the 1986 tax reform, the United States has introduced the alternative of an income basket approach to determining allowable foreign tax credits. At the time, a separate basket was created for foreign source interest income that is taxed at a withholding tax rate equal to or greater than 5 percent. The available tax credit is determined separately for each category of income. Effectively, this legislation prevents foreign tax credits associated with high foreign interest withholding taxes from reducing U.S. tax revenues from other foreign source income. The basket approach is a policy response to the high-interest withholding taxes that developing country borrowers, especially Brazil and Mexico, impose on interest payments to the U.S. commercial banks. Within each separate income basket, unused foreign tax credits can be carried forward for five years and back for two years.

The statutory top personal and corporate income tax rates in the major industrialized countries far exceed the interest withholding tax rates of around 10 percent, if any, imposed by the eight countries considered below. This suggests that the international portfolio investor will never be in an excess credit position. This reasoning is faulty, however, as income taxes are applied to an indiviual's or a corporation's net of expense income

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1/ None of the countries in the sample underlying the empirical work have restricted the German, Japanese, or American ownership of their domestic government debt.

rather than to gross interest income. Allowable expenses associated with a portfolio investment frequently include the cost of funds necessary to finance the investment. If so, the investor's foreign source net of expense income may be very low. This suggests that the investor can easily be in an excess credit position, even if his income tax rate far exceeds the foreign interest withholding tax rate.

T-bills and Eurocurrency credits generally differ in their tax treatment as well as in their credit risk. In this regard, we will assume that T-bills are riskless, while Eurocurrency loans carry some credit risk. In particular, let us assume that the expected credit losses associated with Eurocurrency loans are equal to a fraction θ of the contractual interest income from these assets. The international investor is assumed to be risk neutral. Let i_g and i_e be the pretax interest rates on T-bills and on Eurocurrency loans, respectively. The international investor is indifferent between investing in the two types of assets if, 1/

$$(1 - \tau_p)i_g + (\gamma - 1)\tau_w i_g = (1 - \tau_p)(1 - \theta)i_e \qquad (1)$$

The first term in (1) is the net of income tax, interest receipt per unit of currency invested in T-bills per period. The second term subtracts the part $1 - \gamma$ of the foreign withholding tax, $\tau_w i_g$, for which no foreign tax credit is available to offset home country income taxes. The final term in (1) is the expected, net of income tax, Eurocurrency interest receipt per unit of currency invested per period. The expression reflects that the expected credit loss, θi_e, can be deducted from the investor's home country taxable income. For empirical purposes, let us also assume that ex ante the creditability parameter γ is a random variable with a mean $\hat{\gamma}$.

Using (1), we can now find that,

$$S = \alpha + \beta T + \epsilon \qquad (2)$$

where,

1/ The assumption of risk neutrality implies that foreigners are willing to hold any quantity of T-bills provided the pretax interest rate, i_g, is at least as large is implicit in (1). Contrary to (1), however, foreign demand for a country's T-bills may well be elastic, if, for instance, only a limited pool of potential foreign tax credits is available that investors wish to materialize by purchasing international T-bills.

$$S = \frac{i_g - i_e}{i_g}$$

$$T = \frac{\tau_w}{1 - \tau_p}$$

$$\alpha = -\frac{\theta}{1 - \theta}$$

$$\beta = \frac{1 - \hat{\gamma}}{1 - \theta}.$$

The variable S is the spread of the T-bill rate over the Eurocurrency rate divided by the T-bill rate. The variable T is the interest withholding tax rate, τ_w, grossed up by a factor $1/(1 - \tau_p)$. The random term ϵ reflects uncertainty regarding ex post creditability and measurement error. The parameters of interest, $\hat{\gamma}$ and θ, are related to the regression equation coefficients, α and β, in (2) as follows,

$$\theta = -\frac{\alpha}{1 - \alpha} \tag{3}$$

$$\hat{\gamma} = 1 - \frac{\beta}{1 - \alpha} \tag{4}$$

If the investor is not expected to be in an excess credit position, that is, if $\hat{\gamma} = 1$, then we expect to find β equal to 0. 1/ In this instance, the marginal, post credit income tax rate, τ_p, is positive. Alternatively, the investor is expected to have excess credits so $\hat{\gamma} = 0$. In this instance, the marginal tax rate, τ_p, is zero, and the tax variable, T, in (2) collapses to the withholding tax rate, τ_w. According to (2), we should now find β equal to $1/(1 - \theta)$. Interestingly, the same value of β arises, if the investor does not obtain foreign tax credits, because he

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1/ The empirical work ignores that in practice γ is bound between 0 and 1.

evades income taxes altogether. From the data, we cannot tell whether an absence of foreign tax credits is due to the foreign credit limitation or to international tax evasion. As a third possibility, the investor is expected to obtain a partial foreign tax credit with $0 < \hat{\gamma} < 1$. In this instance, we see that the parameter β equals $(1 - \hat{\gamma})/(1 - \theta)$, which is greater than zero and less than $1/(1 - \theta)$.

In sum, we can identify three possible tax regimes: (i) full foreign tax credits available, and no home country tax evasion; (ii) partial foreign tax credits available, and no home country tax evasion; (iii) no foreign tax credits available, either because of the credit limitation or of home country tax evasion. The first regime is consistent with an estimate of β equal to zero, if S is regressed either on T (with τ_p assumed to be positive) or on τ_w. The second regime is consistent with finding β to be positive, but less than $1/(1 - \theta)$, if S is regressed on τ_w. Finally, the third regime is consistent with finding β equal to $1/(1 - \theta)$, if S is regressed on τ_w. In conclusion, we can infer the nature of the tax regime from the regression coefficient β by regressing S on τ_w.

To conclude this section, it is straightforward to see how a withholding tax rate change affects the pretax and post-tax T-bill interest rates. First, from (1) we can derive the following,

$$\frac{di_g}{d\tau_w} = \frac{(1 - \gamma)i_g}{1 - \tau_p + (\gamma - 1)\tau_w} \tag{5}$$

Equation (5) shows that the pretax interest rate, i_g, is invariant to the withholding tax rate, τ_w, for the case of full crediting, i.e., for $\gamma = 1$. Otherwise, a higher withholding tax rate engenders a higher government pretax cost of funds. Let us, finally, consider how the withholding tax rate, τ_w, affects the net of tax government interest rate, $i_g(1 - \tau_w)$, which is denoted i_g^n. We can find that,

$$\frac{di_g^n}{d\tau_w} = - i_g \frac{1 - \tau_p + \gamma - 1}{1 - \tau_p + (\gamma - 1)\tau_w} \tag{6}$$

The derivative in (6) is equal to $-i_g$ with full crediting, that is, with $\gamma = 1$. As shown above, in this instance the government can levy a higher withholding tax to reduce its net of tax cost of funds, without affecting its pretax cost of funds. At the other extreme, we find that a change in the withholding tax does not affect the net cost of funds, if the

investor is in an excess credit position, that is, if $\gamma = 0$ and $r_p = 0$, as expression (6) then equals zero. 1/

III. Data and Empirical Results

The data set consists of monthly interest observations from July 1989 to June 1993 for eight countries: Australia, Italy, Germany, Japan, Spain, Switzerland, the United Kingdom, and the United States. 2/ The public interest rates used in this study are T-bill rates, to enable us to pair them with comparable offshore interest rates on credits in the same currency. The offshore interest rates are the Eurocurrency (ask) rates. 3/ For each country, the government T-bill rate is paired to a Eurocurrency rate that is as similar as posssible, as regards its length to maturity and whether it is a period average or a period end interest rate. The withholding tax rates are available on an annual basis. The Appendix describes the interest rates in the sample in some detail, and lists the data sources.

Of the eight countries in the sample, Australia, Italy, Japan, Spain, and Switzerland apply nonresident withholding taxes to interest paid on government securities. Table 1 summarizes the withholding tax rates imposed by each of these countries in 1993 on interest paid to residents of Germany, Japan, and the United States. Withholding tax rates, where they are positive, are around 10 percent. The table also provides the interest withholding tax rate imposed in the absence of a bilateral tax treaty, and the lowest treaty withholding tax rate. A third country, benefiting from the lowest treaty rate, can potentially serve as a conduit for international interest income. Only Australia and Japan impose positive nonresident withholding taxes on recipients of all nationalities. The table, finally, reports the withholding tax rate on domestic interest accruing to domestic residents. As shown, the domestic withholding tax rates tend to be higher than the nonresident withholding rates. The domestic withholding taxes of 12.5 percent and 20 percent for Italy and Japan, respectively, are final taxes. Britain, Germany, and the United States are the three countries in the sample that do not impose nonresident withholding taxes on public interest payments. Of these countries, only Britain imposes a domestic withholding tax, at a rate of 25 percent. Domestic interest withholding taxes, other than in Italy and Japan, are fully creditable against domestic income taxes.

1/ If a partial credit is allowed, that is, with $0 < \gamma < 1$ and $r_p = 0$, we see that $d\, i_g^n/dr_w$ is negative, between 0 and $-i_g$.

2/ The exact availability of interest rates, especially for the first half of 1993, differs somewhat for the eight countries in the sample.

3/ For the United Kingdom, the offshore interest rate is the London Interbank Offer Rate.

Table 1. Interest Withholding Tax Rates, 1993

Destination	Germany	Japan	United States	No Treaty	Lowest Treaty	Domestic
Source						
Australia	10	10	10	10	10	- -
Italy	- -	10	12.5	12.5	- -	12.5
Japan	10	. . .	10	20	10	20
Spain	10	10	10	25	- -	25
Switzerland	- -	10	5	35	- -	35

Source: See the Appendix.

Some initial information about the relationships between the spread variable, S, and nonresident withholding tax rates is provided by the correlation coefficients reported in Table 2. The withholding taxes are those applied to residents (foreign) in Germany, Japan, the United States, and residents in a country benefiting from the lowest treaty tax rate. The reported correlations are positive and statistically different from zero in all cases, apart from the tax imposed on German residents. The correlation coefficients among the withholding tax rates themselves, also reported in the table, indicate that nonresidents' withholding tax rates tend to be strongly positively correlated across recipient countries. The correlation coefficient between withholding tax rates on American and Japanese investors, for instance, is estimated at 0.74.

Table 2. Correlation Coefficients Between Interest
Spreads and Withholding Tax Rates

	S	τ_w^{ge}	τ_w^{ja}	τ_w^{us}	τ_w^{lo}
S	1.00	-0.04 (.49)	0.46 (.00)	0.21 (.00)	0.19 (.00)
τ_w^{ge}		1.00	0.50 (.00)	0.54 (.00)	0.51 (.00)
τ_w^{ja}			1.00	0.74 (.00)	0.35 (.00)
τ_w^{us}				1.00	0.13 (.02)
τ_w^{lo}					1.00

The significance level at which the null of a zero correlation can be rejected is in parentheses. See the Appendix for data sources.

As set out in the previous section, we can infer the nature of the tax regime, regarding tax evasion and the availability of foreign tax credits, by regressing the spread variable, S, on the interest withholding tax rate, τ_w. Of course, the appropriate value of τ_w depends on where the interest recipient is assumed to reside. In turn, we will assume the interest recipient is domiciled in (i) Germany, (ii) Japan, (iii) the United States, (iv) in a lowest treaty rate country, or (v) the payer country itself. In the latter case, we are testing whether the withholding taxes that countries impose on domestic residents affect domestic T-bill yields. The five

hypotheses give rise to five corresponding regression equations, as reported in Table 3. 1/

Table 3. Regressions of the Interest Spread on Withholding Tax Rates

Tax Rate	τ_w^{ge}	τ_w^{ja}	τ_w^{us}	τ_w^{lo}	τ_w^{d}
α	-0.039 (.00) **	-0.085 (.00) **	-0.056 (.01) **	-0.055 (.00) **	-0.059 (.00) **
β	-0.047 (.07)	0.599 (.07) **	0.188 (.05) **	0.336 (.09) **	0.065 (.03) *
R^2	0.00	0.31	0.05	0.04	0.02
N	315	321	312	360	360

The dependent variable is S. Standard errors are reported in parentheses. * and ** denote that the coefficient is significantly different from zero at the 5 and 1 percent levels, respectively. See the Appendix for data sources.

As expected, the estimated α's throughout are small and negative, at around -0.06. This suggests that the expected credit loss, associated with Eurocurrency transactions, is around 6 percent of the interest charged on such credits. The regression equation with the withholding tax imposed on German residents, τ_w^{ge}, yields an estimate of β that is close to zero and is statistically insignificant. This suggests that German taxpayers are in regime (i), characterized by full foreign tax credits, and no home country tax evasion. The β estimates in the regressions of τ_w^{ja}, τ_w^{us}, τ_w^{lo}, in contrast, are all positive and significant, with a value just short of 1.06, as an estimate of $1/(1 - \theta)$. These results suggest that residents in Japan, the United States, and the lowest treaty tax rate country are in regime (ii), characterized by partial foreign tax credits, and no home country tax evasion. *Investors in these countries, thus, are estimated to be in excess credit positions.*

The final regression equation, reported in Table 3, tests whether domestic withholding taxes affect domestic T-bill rates. With respect to

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1/ Not reported are the results of a regression based on the assumption that the interest accrues to an investor that resides in a country with which the payer country does not have a tax treaty. Such a regression shows an inappropriately negative estimate for the parameter β.

domestic taxpayers, only two of the three possible tax regimes outlined in the previous section appear plausible. To be precise, the domestic investor either reports domestic interest income and receives a full tax credit for any previous withholding taxes, or he does not report domestic interest income and receives no credit at all. The first regime implies that β is equal to 0, while the second regime is consistent with β equal to $1/(1 - \theta)$. The reported estimate of β, at 0.07, is close to zero, which suggests that residents report their domestic public interest income. 1/ Investors may, in fact, report their interest income from the public debt, since their ownership of this debt is known to the authorities.

This evidence against the domestic tax evasion hypothesis is in contrast to the work of Nöhrbass and Raab (1990), who have shown that the yield on German corporate bonds fully reflects the 10 percent withholding tax in force in early 1989. They argue that German nationals could underreport their interest income from such bonds with impunity by parking them in a German bank account. The lax disclosure requirements of German banks to their tax authorities guarantee German bond investors and tax evaders their anonymity. Gardner (1992) reviews other substantial evidence that a significant part of interest income in Germany and other European countries goes unreported. 2/

Regressions with a single withholding tax rate, as in Table 3, do not allow us to infer which country's investors are the marginal investors that effectively determine the required rates of return on T-bills in international credit markets. 3/ To this end, Table 4 reports a regression that includes all withholding taxes shown in Table 3, except for the rate imposed on German residents. The tax rate imposed on Japanese investors, $\tau_w{}^{ja}$, turns out to be the only statistically significant rate. The American withholding tax rate, in particular, has a coefficient that is close to zero and insignificant. The β coefficient associated with the tax rate on Japanese investors is estimated to be 0.60, with a corresponding $\hat{\gamma}$ estimate of 0.43. Somewhat less than half of foreign interest withholding taxes, thus, may be creditable for a Japanese investor, with the other half marked up into a higher pretax rate of return. The results in Table 4 suggest that the Japanese investor, in fact, is the marginal investor in international T-bills. Note, however, from Table 2 that withholding taxes imposed on American and Japanese residents are closely correlated, which cautions against strong conclusions that the relevant marginal investor can be identified with the available data.

1/ For citizens of Italy and Japan, the domestic withholding tax on interest from government debt is final. A regression that excludes these two countries gives results similar to those reported in the table.

2/ See Gardner (1992), p. 68.

3/ Equation (1) implies that nonmarginal international investors either invest all or none of their wealth in a country's T-bills, barring short positions.

Table 4. A Regression with Separate
Withholding Tax Rates for the Main Creditors

α	-0.065
	(.01) **
β^{ja}	0.603
	(.14) **
β^{us}	-0.079
	(.08)
β^{lo}	-0.018
	(.14)
β^{d}	-0.058
	(.04)
R^2	0.14
N	273

The dependent variable is S. Standard errors are reported in parentheses.
* and ** denote that the coefficient is significantly different from zero at
the 5 and 1 percent levels, respectively. See the Appendix for data
sources.

As mentioned before, German and Japanese taxpayers compute their actual
foreign tax credits on the basis of foreign source taxable income and
foreign taxes paid of various kinds. For these investors, the creditability
of foreign interest withholding taxes, thus, depends, in part, on the
presence of taxable noninterest foreign source income. The availability of
such taxable income can be expected to vary over the business cycle. In
particular, at the peak of the business cycle there can be expected to be
relatively high taxable incomes, giving rise to a relatively high
creditability of foreign interest witholding taxes. 1/ To test this, we
estimate equation (2), allowing for time varying β coefficients for each of

1/ The basket approach prevents American investors from using tax credits
stemming from foreign interest withholding taxes to offset U.S. taxes on
other types of foreign source income. Even American investors, however, may
have some leeway in the assignment of overall investment expenses to the
various sources of income that effectively allows them some cross income
type tax offset.

the years in the period 1989-93. The results are reported in Table 5. As before, there are separate regressions with the withholding taxes applicable to residents in Germany, Japan, the United States, and in a lowest treaty rate country. Withholding taxes imposed on German residents, again, have little power in explaining the variation in the interest spread variable, S. The β coefficients in the other three regressions are generally significant, and their values are clearly time dependent. For both Japan and the United States, the estimated values of β generally rise over the sample period. The estimates of β, in fact, are 0.30 and 0.05 for Japan and the United States in 1989, respectively, with corresponding estimates of $\hat{\gamma}$ of 0.72 and 0.95. By 1993, the estimates of β have risen to 0.73 and 0.33 for Japan and the United States, respectively, with corresponding estimates of $\hat{\gamma}$ of 0.33 and 0.69. The final regression in the table with the lowest treaty tax rate, τ_w^{lo}, displays time variation in the estimated β coefficients, but no clear upward trend.

Table 5. Regressions with Withholding Taxes for Different Years

Tax Rate	τ_w^{ge}	τ_w^{ja}	τ_w^{us}	τ_w^{lo}
α	-0.039 (.00) **	-0.085 (.00) **	-0.059 (.01) **	-0.057 (.00) **
β, 1989	-0.264 (.17)	0.303 (.13) *	0.048 (.10)	0.230 (.26)
β, 1990	-0.043 (.11)	0.532 (.10) **	0.120 (.06)	0.501 (.19) **
β, 1991	0.127 (.11)	0.701 (.10) **	0.254 (.06) **	0.517 (.19) **
β, 1992	-0.067 (.11)	0.669 (.10) **	0.373 (.09) **	0.400 (.19) **
β, 1993	-0.273 (.18)	0.723 (.15) **	0.332 (.14) *	0.217 (.32)
R^2	0.02	0.23	0.08	0.06
N	315	321	312	321

The dependent variable is S. Standard errors are reported in parentheses. * and ** denote that the coefficient is significantly different from zero at the 5 and 1 percent levels, respectively. See the Appendix for data sources.

Overall, the evidence suggests that the mark-up of withholding taxes into higher interest rates has increased in recent years. Correspondingly, the estimated creditability of foreign interest withholding taxes has decreased over the period. The decline in the estimated $\hat{\gamma}$'s, at least for Japan and the United States, has coincided with a general slowdown in economic activity in these two economies. This supports the hypothesis that the creditability of foreign interest withholding taxes is procyclical. This mechanism, unfortunately, amounts to an automatic destabilizer for borrowing governments: their cost of public funds rises in times of economic contraction and reduced domestic tax receipts. A similarly destabilizing relation between the international debt service burden and international economic activity beset developing country borrowers in the 1970s and early 1980s, as shown in Huizinga (1991).

The apparently limited influence of interest withholding taxes, applicable to German residents, on international T-bill rates can manifest that (i) German holdings of international T-bills are too insignificant to affect their rates of return, or that (ii) German investors are fully compensated for any foreign interest withholding taxes by way of foreign tax credits. These two explanations are mutually reinforcing in that small German holdings of foreign securities imply that foreign tax credits stemming from other income sources generally available in Germany are less easily exhausted. German international portfolio investments are, in fact, limited, as German insurance and pension funds are subject to a stringent foreign investment limit of 5 percent of their assets, as reported by the World Bank (1993). Japanese fiduciary investors, instead, can invest 30 percent of their portfolios abroad. 1/ Japanese institutional investors, indeed, have sizeable holdings of foreign securities, even if the 30 percent limits may not be binding. Restrictions on institutional investors in the United States are not uniform, with insurance companies generally regulated by the individual states. U.S. private pension funds are not restricted in their foreign investments.

Governments that consider changing their withholding tax regime to a large extent are interested in its impact on interest rates, as they affect the government budget. The empirical results suggest that an increase in nonresident withholding taxes reduces the net of tax interest rate necessary to attract international lenders. The results, however, are obtained for the current tax regime, where governments impose low-interest withholding tax rates of around 10 percent. At higher nonresident withholding tax rates, a lower share of these taxes can be expected to qualify for foreign tax credit offsets. As a consequence, the percentage mark-up into higher pretax interest rates may well increase with the rate of withholding tax. At this point, Britain explicitly limits the creditability of high foreign interest withholding taxes. Britain, in fact, only recognizes foreign tax credits for foreign interest withholding taxes up to 15 percent.

1/ Information in this paragraph is from the World Bank (1993), pp. 41-42.

Higher government yields, brought about by higher nonresident withholding tax rates, benefit domestic as well as international investors. Higher yields, offered to all investors, encourage the domestic demand for government securities. An increase in domestic demand for government debt necessarily reduces the foreign demand that is subject to the nonresident interest withholding tax, for a given fixed supply. The domestic demand for government debt, therefore, constitutes an effective constraint to a government that wishes to reduce its net of tax international cost of funds by way of higher nonresident interest withholding taxes. The problem, essentially, is that governments that attempt to use nonresident withholding taxes to reduce their international net of tax cost of funds, at the same time increase their domestic cost of funds. This dilemma provides governments with an obvious incentive to separate the domestic and foreign demands for their securities. To achieve this, governments could use direct quantitative controls. As a more appealing alternative, governments can try to separate the two markets by offering government securities denominated in different currencies. In practice, several governments issue government debt denominated in various currencies, although it is not clear that effective market separation can be achieved by such efforts.

In this paper, we have only examined the relationship between short-term T-bill and offshore interest rates, for reasons of data availability. Most government debt, of course, has a maturity that exceeds a single year. This distinction matters, as there are two reasons to expect that the value of potential foreign tax credits associated with foreign witholding taxes, as perceived by financial markets, is lower for longer-term debt than for T-bills. First, short-term T-bills allow a good matching of the implicit demand for and supply of foreign tax credits, as investors can easily predict their short-term need for foreign tax credits implicit in T-bills subject to foreign interest withholding taxes. Second, short-term potential tax credits are worth more than longer-term credits, as changes in tax regulations that curtail allowable tax credits in the future are always a possibility. In line with this reasoning, the world's commercial banks have valued potential foreign tax credits implicit in short-term international loans more highly than those implicit in longer-term loans during the 1970s, as shown in Huizinga (1991). For loans with a maturity of three years or less, 60 percent of potential foreign tax credits, specifically, are discounted into lower interest rates, while for loans of a longer maturity, the figure is only 10 percent. 1/

An implication is that the mark-up of nonresident withholding taxes into higher before-tax interest rates is likely to be more pronounced for longer-term government debt than it is for T-bills. The prospective crowding out of foreign demand by domestic demand, following higher nonresident withholding taxes, is then also likely to be more severe. A potential way for a government to deal with a negative relationship between maturity and the value of potential tax credits is to offer a lower

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1/ See Huizinga (1991), p. 23.

withholding tax on interest from longer-term securities. Interestingly, the United States had an exactly opposite policy before 1984: at the time the United States imposed a general international interest withholding tax on interest portfolio income, but it excluded the interest on T-bills altogether.

IV.   Conclusion

This paper has shown that nonresident interest withholding taxes applied to the public debt increase before-tax interest rates by a fraction of tax withheld. Interest withholding taxes, thus, reduce the net of tax interest cost of public debt. This is the case as foreign source interest withholding taxes appear to be largely creditable against income taxes in the lender's home country. Nonresident withholding taxes to some extent represent a direct transfer of resources from the lender's tax authority to the borrowing government. The generally limited mark-up of interest withholding taxes into higher interest rates does not support the view that international investors by and large evade home country taxes on foreign source interest income. At the same time, there is little evidence that investors evade domestic taxes on interest income from holdings of domestic government debt. It follows that interest withholding taxes on the government debt may not be necessary to prevent income tax evasion. The public debt may be somewhat special in this regard, as the owners of public debts are mostly registered.

The main role of international interest withholding taxes applied to government debt appears to be redistributive. Nonresident withholding taxes, in particular, enable borrowing countries to capture part of the tax revenues associated with the interest income, at the expense of the lending country's tax authority. A harmonization of nonresident interest withholding taxes, therefore, appears desirable for reasons of international equity. Recent proposals by the European Commission (1989) to impose a minimum withholding tax on intra-EC interest flows are a step in this direction. Ideally, however, efforts to harmonize interest withholding conventions include all the major industrialized countries.

Data Description and Sources

Description of Interest Rates

	Eurocurrency Rate	T-Bill Rate
Australia	3 months; average period	13 weeks; average period
Italy	3 months; average period	3 months, average period
Japan	6 months; average period	6 months; average yield at issue
Germany	6 months; average period	12 months; end period
Spain	6 months; average period	12 months; average period
Switzerland	3 months; end period	3 months; yield of last issue in period
United Kingdom	3 months; average period	91 days; average period
United States	3 months; average period	3 months; average period

Data Sources:

1. Tax rates

   Individual Taxes: A Worldwide Summary, Price Waterhouse, various issues.

   Corporate Taxes: A worldwide Summary, Price Waterhouse, various issues.

   Guides to European Taxation, Vol. 3, "The Taxation of Private Investment Income," International Bureau of Fiscal Documentation (Amsterdam).

2. Interest rates

   International Financial Statistics, International Monetary Fund, various issues.

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