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June 3, 1983

To: Members of the Executive Board

From: The Secretary
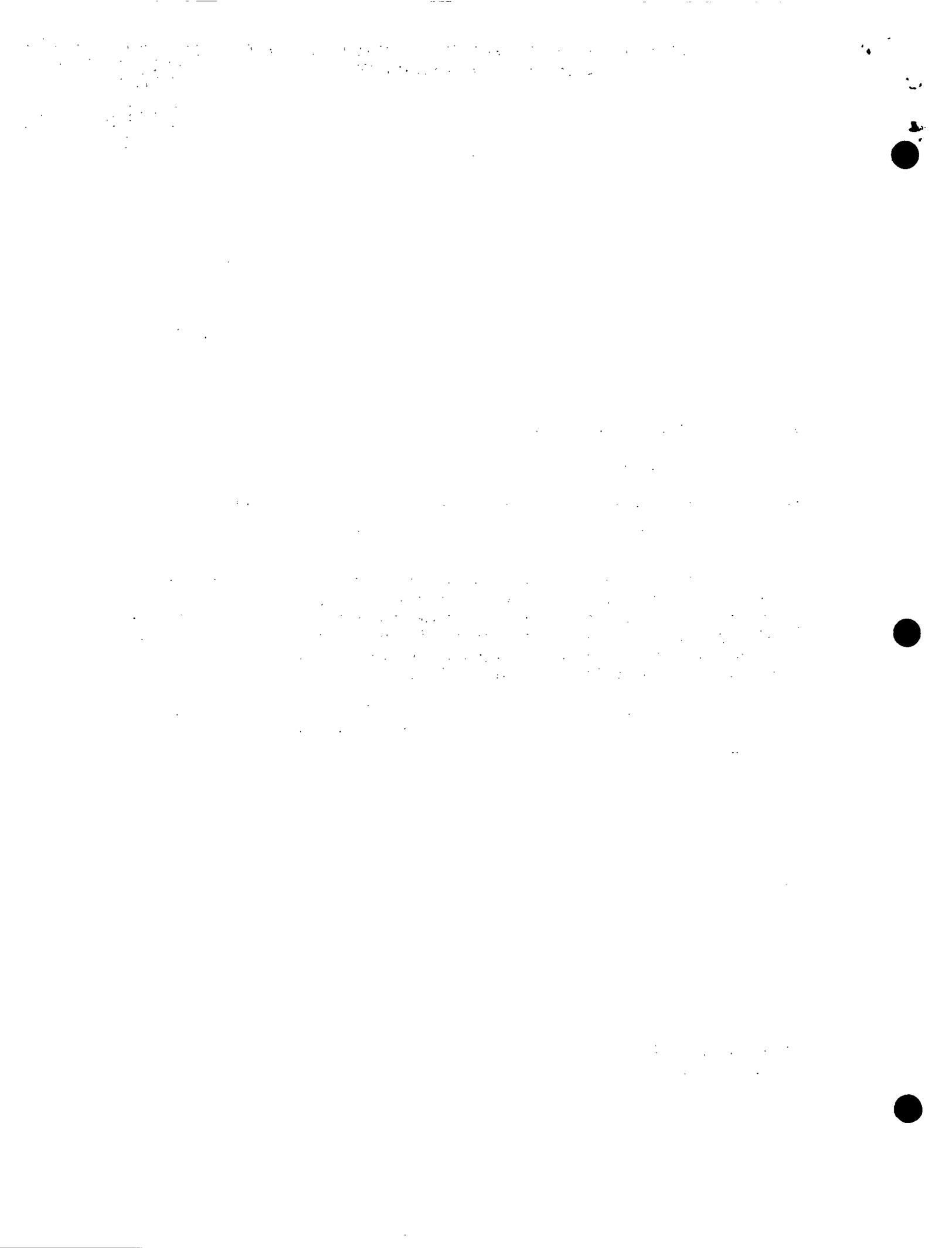
Subject: Interest Rates and Tax Treatment of Interest Income and
            Expenses
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            As agreed at Meeting 83/51 on March 21, 1983 during Executive
Board discussion of the work program, the attached paper on interest
rates and tax treatment of interest income and expenses is to be brought
to the agenda if called for by members of the Executive Board. Executive
Directors wishing to do so are requested to inform the Secretary by the
close of business on Friday, June 10, 1983.

            If Executive Directors have technical or factual questions
relating to this paper, they should contact Mr. Gandhi (ext. 74954) or
Mr. Tanzi (ext. 73733).

Att: (1)

Other Distribution:
Department Heads

INTERNATIONAL MONETARY FUND

Interest Rates and Tax Treatment of Interest
Income and Expenses

Prepared by Fiscal Affairs Department
(In consultation with other departments)

Approved by Vito Tanzi

June 1, 1983

I. Introduction

1. Origin of the paper

In recent months Executive Directors have expressed concerns
regarding the effects on the level and variability of interest rates
arising from differential tax treatment of interest incomes and
expenses across countries. They have also expressed concerns regarding
the effects of these and other related tax provisions on the effective-
ness of policies of monetary restraint and on international capital
movements. Some of these concerns were expressed during discussions
of the 1981 and 1982 reports on Article IV consultations with the
United States (SM/81/157 and SM/82/141) and the paper, "International
Aspects of Policies of Monetary Restraint" (SM/81/210). Executive
Directors also asked the staff to assess the role of tax factors in
the high levels of interest rates in the United States and other major
industrial countries that prevailed at that time. 1/

The situation has changed somewhat since the foregoing concerns
were expressed. Nominal interest rates have come down considerably in
the United States and elsewhere, but real interest rates have remained
high. Some industrial countries have started taking a closer look at
those tax provisions that have a bearing on savings and capital forma-
tion. Attention has focused on the influence of taxation on the after-
tax costs of investments and returns on savings, especially in an
inflationary situation. Furthermore, the tax deductibility of interest
payments unrelated to income-earning activities (viewed by some observers
as a "tax expenditure") has come under close scrutiny in the United
States and other industrial countries.

Nevertheless, tax reforms have been slow. Different tax policies,
frequently dictated by traditions and national goals of individual
countries, continue to be the rule. Therefore, insofar as tax factors

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1/ The Board discussion is reported in EBM/81/109, EBM/81/110,
EBM/81/111, EBM/81/145, and EBM/81/146; and the chairman's summing up,
82/146 (of August 19, 1982).

do affect significantly the level and volatility of interest rates in a closed (domestic) economy, and differential tax regimes affect exchange rates and international capital movements in an open (international) economy, the concerns expressed by the Executive Directors remain valid and significant.

Tax factors have generally been given little importance in the literature on monetary theory and international finance. Consequently, the professional body of knowledge in this area is limited. Theories of interest rate determination and of demand for money are often discussed in terms of pretax variables and omit reference to taxation of interest incomes or to deductibility of interest payments from taxable income. Similarly, the literature on interest rate parity and purchasing power parity theorems has largely ignored the effects of tax factors. On the other hand, public finance literature has focused on the microeconomic (allocative) and equity (redistributive) effects of taxes and has ignored their macroeconomic effects. 1/

As is often the case, the research effort involved in preparing the present study, as well as the previous ones, while answering many questions, has raised many more and has made the staff more aware of the many problems in this area.

First, there is little unanimity in the profession on the determinants of interest rates and international capital movements. As a matter of fact, no single theory of interest rate determination has been advanced that is readily accepted by the majority of economists and that explains the unusually high levels of real interest rates in recent years.

Second, the interrelationship between nominal or market interest rates and their determinants, particularly expected inflation, has been unstable over time, so that no specific conclusions can be reached about the precise quantitative effect of inflation on interest rates.

Third, the available empirical evidence on the interrelationships between taxation, inflation, and interest rates is sketchy. For the United States and one or two other industrial countries, the evidence that does exist is often conflicting or ambiguous.

1/. Surveys of recent works on the effects of taxation on interest rates and international capital movements have been carried out in the Fiscal Affairs Department; see DM/82/88 and DM/82/89. Other relevant papers prepared by the Department are included in the Selected Bibliography in Appendix I. The present paper relies heavily on findings and conclusions contained in those papers.

Fourth, the tax provisions bearing on interest rates and international capital movements of individual countries tend to be highly complicated and thus subject to a variety of qualifications and interpretations. (Some of these problems are described in Appendix II.) Furthermore, recent ad hoc legislative efforts aimed at adjusting the tax systems for inflation have created uncertainties of their own.

Finally, little statistical information is available on the taxes actually paid by groups of savers and investors in individual countries. In addition, the existence of many possibilities for tax avoidance (e.g., tax breaks for savers and tax deferrals for investors) and tax evasion (resulting from shortcomings in national tax administrations and the existence of tax havens abroad) makes the legal information available of doubtful usefulness (see Appendix II).

The research on the subject, carried out in the Fiscal Affairs Department and elsewhere, can therefore claim to have reached at best tentative conclusions subject to the above-mentioned limitations.

2. Outline of the paper

The paper focuses on the following questions:

a. Does the tax treatment of interest incomes and payments differ markedly among major industrial countries? Do other tax provisions affecting interest rates and international capital movements also differ markedly?

b. How does the tax treatment of interest incomes and payments influence the level and volatility of interest rates, especially in an inflationary environment? If there is an influence, what is the direction of effects of these and other relevant tax factors?

c. How do potential international movements of capital and related tax provisions alter the results of changes in tax treatment regarding interest incomes and expenses initiated by a single country?

d. What implications does the tax treatment of interest incomes and expenses and related tax policies have for the impact of changes in the degree of monetary restraint?

e. What are the consequences for the volatility of interest rates of tax policy and procedures for changing it?

Sections II, III, and IV attempt to answer these questions and to describe the empirical evidence that is available. Section V brings together the major conclusions of the paper and their implications for Fund activities.

3. Summary of major conclusions

Section II, supported by three tables in Appendix III, shows that, even though the taxation of interest income is nearly universal and that these incomes are generally taxed at ordinary income tax rates, the tax regimes of major industrial countries differ in some major respects. The marginal rates of income taxation differ among industrial countries, and the tax breaks offered to savers by individual governments also differ markedly. Furthermore, the changes that have been made to income tax structures in response to inflation in most industrial countries have been ad hoc and incomplete. As a result, the effective rates of taxation of real interest incomes differ among industrial countries, although no estimates for these rates are available.

The differences in the tax treatment of interest payments are even more marked. Out of sixteen industrial countries surveyed, 1/ seven offer deductibility from taxable incomes of all interest payments, including those for income-earning activities, mortgage payments, and consumer loans; eight allow tax deductibility of all interest payments for income-earning activities and for mortgages but none for consumer loans; one country does not allow any deduction for either mortgages or consumer loans.

The tax treatment of foreign exchange gains and losses also differs among industrial countries, although the legal provisions on this are more complex. In some countries gains are treated as capital receipts and are thus subjected to capital gains taxes, which are generally levied with lower rates; in other countries they are treated as current receipts and are subjected to regular income taxes.

Section III suggests that, even in the absence of income taxes, the one-to-one relationship between expected inflation and nominal interest rates (the basic Fisher hypothesis) may not be valid for a variety of reasons. The existence of expected inflation may, in fact, lower the rate of return on real investment and consequently the real rate of interest, thereby limiting the increase in nominal interest rates.

The introduction of the taxation of nominal interest incomes and the tax deductibility of nominal interest payments, which typically exist in many industrial countries, can theoretically cause a more-

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1/ Australia, Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Ireland, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States.

than-proportional increase in nominal interest rates as a result of a given expected rate of inflation. But this increase will also be limited by the existence of many other tax factors, including the tax treatment of other capital incomes and capital gains that limit the investor's capacity to avoid taxes, the tax depreciation allowances and inventory procedures that increase taxation on companies and thereby reduce their ability to pay higher interest rates, the existence of tax-exempt lenders and borrowers, tax evasion, tax havens, etc. Because of these factors the positive impact of the tax treatment of interest incomes and payments on interest rates is likely to be somewhat reduced. Empirical investigations in this area are scarce but they do tentatively suggest that, when all factors are taken into account, the nominal interest rate, on average, does not increase more than proportionately with expected inflation (e.g., see Table 1, Section III). But this empirical result does not rule out the possible existence of tax effects.

Many proposals have been made to restrain the positive effect of the "typical" tax treatment of interest incomes and payments on nominal interest rates. In particular, these have included a complete inflation adjustment of interest incomes and expenses for taxation purposes, the elimination of taxes on interest incomes simultaneously with the elimination of the tax deductibility of interest payments, and, finally, limiting the tax deductibility of interest payments. The discussion in Section III suggests that the first two proposals will have the largest effect on interest rates but are unlikely to be adopted by many countries and, because of capital flows, it may not be in the interest of large single countries to do so. The last proposal--limiting the tax deductibility of interest payments for nonbusiness purposes--seems to hold the most promise in reality; it is administratively feasible, would reduce the fiscal deficits, and would have beneficial effects on capital formation. Its effect on interest rates would, however, not be too significant.

Section IV considers some extensions and qualifications of the discussion in Section III. Differential taxation across countries is shown to affect the levels of interest rates and induce international capital flows. In addition, lower tax rates on foreign exchange gains (and losses) than on interest income would lead to an increase in the pretax nominal interest rate differential, for an international equilibrium of credit markets to exist. A change in the tax treatment of interest incomes and expenses through inflation adjustment would lower the effective tax rates on interest incomes for any single country taking such steps. As the nominal interest rates would also fall, some capital outflows would result. A new equilibrium nominal interest differential would thus emerge based on the relationship between the new effective tax rate on nominal interest and the tax rates applied to foreign exchange gains and losses.

Economic theory and empirical evidence suggest that expected inflation causes a decline in the after-tax real interest rates. When this relationship is considered in the context of policies of monetary restraint, it implies that real rates may stay high for some time after the initiation of monetary restraint. Initially this may be due to negative liquidity effects when money growth is first slowed, and then it is due to a rise in the real rate resulting from a combination of the wealth effect and tax policy.

Section IV also examines the causes of the higher volatility of interest rates since 1979 (see Table 2, Section IV). The tax treatment of interest incomes and expenses, coupled with "bracket creep," has probably enhanced the impact on the volatility of interest rates of changing inflationary expectations in recent years. Since interest rates are determined in forward-looking markets by investors and savers interested in future, after-tax, real returns, any event that tends to broaden the range of possible future outcomes for inflation, fiscal deficits, and the tax code itself will increase interest rate volatility.

Section V brings together the major conclusions of the paper and reflects on their implications for Fund activities. It argues for the use of opportunities offered by Article IV consultations to review, especially in inflationary circumstances, important tax reforms in areas such as tax treatment of interest incomes and expenses and taxation of foreign exchange gains and losses. Control of inflation should be an important objective of all governments, failing which, and subject to the country's budgetary and other constraints, the possibilities for inflation adjustment of income taxation, including the tax treatment of interest incomes and payments, should be explored. Such an exercise should also simultaneously review the scope for (a) curtailing discretionary, and often distortionary, tax incentives given to the recipients of capital incomes and (b) improving the efficiency of collection of income tax from such incomes so as to reduce the scope for tax avoidance and tax evasion. The possibilities for narrowing the differences in the tax treatment of foreign exchange gains and of interest incomes should also be explored.

Finally, interest is only one form of capital incomes-dividends, capital gains, business profits, and property rentals are some of the other important forms. Ceteris paribus, the tax treatment of interest incomes and payments relative to the tax treatment of other capital incomes tends to have important allocative effects in an economy, 1/ and their differential tax treatments across countries can affect the form which international capital movements will take and the sectors to which the international capital will flow. This paper does not deal with these important and complex allocative questions, nor does it deal with the effects of taxes in countries, developed and developing, where most interest rates are regulated.

1/ See DM/83/12.

II. Survey of Tax Treatment of Interest Incomes and Expenses

The tax treatment of interest incomes and expenses varies among major industrial countries. 1/ The differences are due partly to historical reasons and partly to the different weights that policymakers attach to the objectives of tax policy, viz., revenue, equity, and efficiency. Prima facie, the differences among industrial countries in the taxation of incomes, and particularly in the tax treatment of interest incomes and payments, appear to be so large 2/ as to defy generalization. However, on closer look, and subject to the problems described in Appendix II, some basic similarities are discernible.

1. Basic similarities

Almost all of the industrial countries

  -    treat nominal interest incomes, including that received from abroad, as any other source of income and thus tax it at the progressive global income tax rate; 3/

  -    exempt interest incomes earned by certain institutional recipients, such as pension and retirement funds, selected financial institutions, certain government bodies, and most charitable and nonprofit institutions (see Table 3, Appendix III).

  -    exempt, with or without limits, interest on certain debt instruments, such as specified government securities, deposits with selected savings institutions, and bonds of certain public enterprises (see Table 3, Appendix III).

  -    often exempt specified amounts of interest and/or dividend income for administrative reasons or to promote savings (see Table 3, Appendix III);

1/ This section is based on the survey of tax systems of sixteen industrial countries: Australia, Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Ireland, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States. See Appendix III for more detail.

2/ The tables in Appendix III show only major differences and are not comprehensive.

3/ In reality, withholding of income tax at the source for selected interest incomes can introduce a schedular element.

- allow full deductibility of interest payments on all borrow-
ings for income-generating activities (see Table 4, Appendix III);

- permit deductibility, with or without limit, of mortgage
interest payments on at least one owner-occupied house (see Table 4,
Appendix III);

- generally tax interest paid to nonresidents at final with-
holding tax rates (frequently well below the typical marginal tax
rates for individuals and corporations); nonresident taxpayers can
generally rely on a foreign tax credit to avoid double taxation in
their country of residence (see Table 5, Appendix III).

2. Major differences

Despite the similarities, there are some major differences:

- While most countries tax nominal interest incomes at the
normal income tax rates, Japan, Italy, and France permit withholding
taxes on them to become final taxes. Some of these rules are pragmatic
measures to ensure compliance. The United Kingdom, on the other hand,
has a supplementary tax of 15 per cent, over and above the income tax,
on all investment incomes, including interest income.

- While most countries exempt interest incomes earned on selected
debt instruments within reasonably low limits, and sometimes subject
to a ceiling on the taxpayer's total income, 1/ the exemption of interest
incomes is relatively generous in Japan (see Table 3, Appendix III).
Exemptions of interest on savings, up to a cumulative nominal amount
of US$56,000 2/ are statutorily permitted to each household for bank
deposits, postal savings deposits, certain government bonds, and savings
for formation of employee's assets. In addition, in Japan there is no
ceiling on taxpayer's income to qualify nor is a taxpayer limited to
having only one savings account. In the United States, too, there is
no restriction on a taxpayer's holding of state and local government
bonds. The selected debt instruments (government bonds and savings
deposits) whose interest tend to be exempt from taxation generally
carry lower interest rates, when adjusted for risk, than taxable debt
instruments of equal maturity. 3/

1/ See Table 1. See also DM/75/118.
2/ Based on a rate of exchange of ¥ 250 = US$1.
3/ In the United States, for example, the risk-adjusted difference in
the interest rates on taxable and nontaxable bonds has historically been
of the same magnitude as the average tax rate on interest incomes.

-    While all countries allow tax deductibility of business-related
interest payments, subject to few restrictions, only the United States,
the Netherlands, Switzerland, and the Scandinavian countries permit the
tax deductibility of interest payments on consumer loans and without
any limit (see Table 4, Appendix III). The degree to which consumer
loans are readily available or the degree to which taxpayers habitually
use them, of course, varies between these countries. The imposition
of some limits on, and even a complete elimination of, this "tax expen-
diture" has at one time or another come up for consideration in the
United States, the Netherlands, and the Scandinavian countries.

-    While many countries allow tax deductibility of mortgage
interest on owner-occupied housing (see Table 4, Appendix III), they
either tax the imputed incomes from housing or limit the amount of mort-
gage interest that can be deducted, or both. The United States, the
Netherlands, Switzerland, and the Scandinavian countries do not limit
the tax deductibility of mortgage interest. Furthermore, Canada,
France, Japan, Switzerland, the United Kingdom, the United States, and
a few other industrial countries do not tax the imputed income from
such owner-occupied housing.

-    While most countries have withholding taxes on interest
incomes, 1/ Australia, Canada, and the Scandinavian countries have no
such taxes (see Table 3, Appendix III). The United States also does
not have a withholding tax on interest incomes but is debating its
introduction in the near future.

-    While most countries tax long-term capital gains of individ-
uals, either under a separate tax (e.g., the United Kingdom) or under
the regular income tax after exempting a certain proportion of capital
gains (e.g., Canada, Sweden, and the United States) most industrial
countries apply lower rates of tax on long-term capital gains than
on ordinary incomes. The Federal Republic of Germany, Japan, and the
Netherlands, on the other hand, treat long-term capital gains much as
ordinary income. The tax treatment of long-term capital gains realized
by companies also differs between countries.

-    While most countries tax interest earned by nonresidents, some
countries provide for selective exemptions. For example, France, Ireland,
and the United Kingdom exempt interest earned by nonresidents on certain
government securities, and the United States exempts interest earned by
nonresidents from banks and other savings institutions, as do Belgium,
Denmark, and the Netherlands (see Table 5, Appendix III). Withholding
taxes on interest payments to nonresidents, if imposed at all, are
typically much lower than normal income tax rates, but they apply to

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1/   The existence of withholding taxes often reduces the scope for tax
evasion.

gross payments rather than to net income and are often final tax payments
in the source country. Capital gains of nonresidents are usually taxable,
especially if they are related to real property or business but, France,
the Federal Republic of Germany, and the United Kingdom exempt capital
gains of nonresidents on all but a few assets. Such provisions can
encourage foreign capital inflows for selected purposes.

-     While most countries tax only the realized foreign exchange
gains of their residents, legal provisions frequently tend to be complex
and subject to different interpretations. Some industrial countries
treat these gains as capital receipts and subject them to the rates of
capital gains tax; others treat them as current receipts and apply the
rates of income tax. In most countries, the tax treatment becomes a
subject for court decisions, and the case becomes law. The final outcome,
though consistent with prevailing accounting practices in individual
countries for tax purposes, tends to affect capital flows between
countries.

3.   State of inflation adjustment

To the extent that the bases of income tax, corporation tax, and
capital gains tax of industrial countries are not adequately adjusted
for inflation, the effective tax rates on real amounts of interest
incomes, corporate profits, and capital gains would tend to rise. At
the same time, the effective benefits from the tax deductibility of
nominal interest payments and various tax incentives for savings and
investment would also rise. Although certain industrial countries have
in recent years introduced some adjustment schemes, none seems to have
fully adjusted its personal income tax and its corporate income tax for
inflation.

The most comprehensive adjustment schemes for the personal income
tax exist in Canada and the Netherlands, but even these schemes are
limited to tax-brackets adjustment and do not extend to the tax bases.
In Canada, income tax brackets and personal allowances are automatically
changed annually with changes in the consumer price index. In the
Netherlands, income tax brackets are adjusted annually by at least 80
per cent of the increase in the consumer price index of the previous
year. Several other industrial countries, for example, Australia,
Denmark, France, Sweden, and the United Kingdom, have also introduced
inflation adjustments. In France, inflation adjustments are discre-
tionary and limited to years when the inflation rate exceeds 5 per cent.
The U.K. adjustments are also discretionary and have been limited to
personal allowances and deductions. Sweden also has an automatic index-
ation of exemptions and bracket limits, but recent legislation has res-
tricted the application of the system. The United States has legislated
the indexation of income tax brackets and personal exemptions to infla-
tion beginning in 1985. Italy has also experimented with occasional
bracket adjustments.

Selective information collected on changes in the income tax systems of eight industrial countries (Austria, Canada, France, the Federal Republic of Germany, Italy, Switzerland, the United Kingdom, and the United States) suggests that, since 1973, personal allowances (or tax credits) and income deductions have generally been adjusted by less than the rates of inflation in these countries.

With respect to capital gains taxation, Ireland and the United Kingdom have made legal provision for the adjustment of the cost of acquiring assets with reference to the consumer price index over the holding period of the asset. Sweden and France also have such a provision, but it is applicable to only certain categories of assets.

Tax provisions for a comprehensive adjustment of business and corporate profits for inflation do not exist in any industrial country, although a few industrial countries (e.g., Japan, the Netherlands, and the United States) do allow use of the last-in, first-out method of inventory accounting. In all industrial countries except Denmark, depreciation of assets is still allowed on an historic cost basis rather than on a replacement cost basis. Most countries have, however, liberalized their investment incentives (accelerated depreciation allowances, investment allowances, income tax credits, tax-free reserves, grants, free write-offs, etc.,) in recent years, 1/ often allowing more than 100 per cent of the original cost of acquisition of assets or have adopted other means of reducing the growth of real tax burdens on corporate entities. The value of such tax subsidies to capital have varied from country to country; they seem to be more generous in Italy, the United Kingdom, and the United States and less generous in the Federal Republic of Germany and Japan. 2/

In conclusion, the tax regimes of major industrial countries are different, both as a result of different traditions and as a result of the mix of domestic objectives pursued by policymakers. Yet the taxation of interest incomes is nearly universal, and practically everywhere these incomes are taxed on nominal rather than real magnitudes. The changes that have been made in response to inflation in the structure of income taxes (e.g., the rates, income brackets, personal allowances, and one or more of personal deductions) have been ad hoc

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1/ The conventional forms of accelerated depreciation are, however, inadequate substitutes for depreciation based on replacement costs; the larger the anticipated rate of inflation and the longer the life of the asset, the wider the gap. The investment allowances and income tax credits, on the other hand, favor short-lived assets, because every time such assets are replaced the investor receives these in addition to full depreciation.

2/ See DM/80/60.

and incomplete. The effective rates of taxation of interest incomes, therefore, have tended to differ between industrial countries as a consequence of (a) different legal provisions, (b) different degrees of tax compliance, (c) different rates of inflation, and (d) different degrees of exemption accorded to these incomes.

The tax treatment of interest expenses differs even more markedly between industrial countries. Some countries offer deductibility from taxable income of all interest payments (for business, homeownership, and consumer credit), while others allow it only for income-earning activities, and still others for business purposes as well as homeownership, the latter generally in a restricted fashion. But, then, the deductions for interest payments are nearly everywhere for nominal amounts, making the tax benefits of available deductions differ even more significantly from country to country, depending on the rate of inflation.

Interest payments to nonresident taxpayers are subject to withholding taxes in most industrial countries, but foreign exchange gains and losses are not treated uniformly. In some countries, they are treated as capital receipts and are subjected to (lower) capital gains taxes while in other countries they are treated as current receipts and are subjected to (relatively higher) regular income taxes.

The possible implications of the above-mentioned and other differences in tax regimes on (a) the level and variability of interest rates and the effectiveness of monetary restraint in a given economy and (b) interest rate differentials between countries and international capital movements are discussed in Sections III and IV.

III.   Effects of Taxes and Inflation on Interest Rates

The typical tax treatment of interest incomes and expenses—taxing nominal interest received and allowing a deduction for nominal interest paid—can have, in an inflationary environment, a significant impact on the level of interest rates and can also affect interest rate volatility. As inflation distorts the base for the tax on interest income, and increases the effective tax rates on incomes in general, this impact is likely to be magnified over time as long as the rate of inflation does not fall. The tax treatment of interest incomes and expenses may also alter the redistributive impact of monetary restraint and may affect capital flows across countries.

The survey in Section II of taxation of interest incomes has indicated that by and large the industrial countries (a) tax nominal interest incomes without allowing any adjustment for its inflationary component, (b) allow a deduction for interest expenses, again without any adjustment for their inflationary component, (c) permit the issuance of tax-free financial assets by public bodies, and (d) do not tax the incomes received by particular institutions (such as charitable, educational, and religious ones).

However, these generalizations hide important differences, described in Section II and in Appendix III. For example: (a) France, Italy, and Japan collect withholding taxes (levied at lower rates than marginal income tax rates) that become final taxes. For taxpayers with high taxable incomes, this is an advantage that may induce them to supply loanable funds at lower rates than they would otherwise do; (b) Japan provides more generous levels of exemptions for interest income than other countries, again potentially reducing the offer price (the interest rate demanded) for funds; and (c) the Netherlands, Scandinavian countries, Switzerland, and the United States permit tax deductibility of interest payments on consumer loans and also do not limit the tax deductibility of mortgage payments. 1/ Thus, one would expect that the rate of interest would be higher in the latter countries and that a potentially larger share of investment would go toward these tax-advantaged investments.

In recent years, the potential effect of taxation on the level of interest rates in an inflationary situation has attracted the attention of some economists. Two major conclusions have come out of this literature.

1/ For fiscal 1984, the tax revenue loss from deductibility of interest on consumer loans in the United States is estimated at about $8 billion. The revenue loss from deductibility of mortgage interest on owner-occupied houses is estimated at about $28 billion.

In a situation where there is inflation and the income tax is imposed on nominal interest incomes, while nominal interest payments are deductible expenses, taxation should have a positive effect on the nominal rate of interest. Of course, to the extent that part of the interest received is not taxed, or part of the interest paid is not tax deductible, this tax effect would be reduced.

As the rate of inflation is likely to be negatively correlated with the real rate of interest (for reasons given in subsections 1 and 2 below), the positive effect on interest rates associated with the existence of taxes may not be apparent in simple quantitative analysis.

1. Effects of inflation on interest rates in the absence of income taxes

For convenience, the discussion in this subsection is organized around the Fisher equation which simply states that the nominal (or market) rate of interest, i, equals the sum of the expected real rate, r, and the expected rate of inflation, π.

$$i = r + \pi \qquad (1)$$

In the absence of expected inflation, the real and the nominal rate of interest will be the same. As expected inflation acquires a positive value, the Fisher hypothesis asserts that if the expected real rate is constant and therefore independent of expected inflation, each percentage point rise in the expected rate of inflation results in a percentage point rise in the nominal rate of interest. This hypothesis is usually expressed as

$$i = r + \beta\pi \qquad \text{with } \beta = 1 \qquad (2)$$

It must be emphasized, however, that equation (2) represents a quite rigid or extreme view of how inflation is likely to affect interest rates. [1] In reality, there are several reasons why β would not be equal to one. (It should be stressed that the existence of taxes is still being ignored.)

a. Real balance effect

The real balance effect, associated with Robert Mundell and James Tobin, postulates a negative relationship between the real rate of interest (r) and the expected rate of inflation (π). In Tobin's

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[1] Fisher himself is reported to have had doubts about this extreme version of his theory.

formulation, a rise in expected inflation causes a shift out of money balances and into real capital, thereby depressing the marginal product of capital and the equilibrium real rate of interest. In Mundell's formulation, a rise in the expected rate of inflation reduces the real cash balances of individuals, making them feel poorer. They react by raising the steady-state level of saving. By so doing, they push down the real rate of interest.

b. Liquidity effects

As additional money is injected in the economy, individuals may for a while experience excess liquidity, particularly if the increase in the money supply is not fully anticipated. Thus, before prices and inflationary expectations fully adjust upward, the impact of excess money may, as Keynes argued long ago, lead to a lowering of the rate of interest. However, when the money increase is fully anticipated, as it would be when the rate of inflation has stabilized, this effect disappears. In an economy that has been undergoing inflation for some time, this liquidity effect is unlikely to be of significance. By the same token, the real rate of interest may increase if there is a drastic and not fully anticipated cut in the growth of the money supply.

c. Economic activity effect

Various nominal rates of interest can be associated with the same inflationary expectation provided that the level of economic activity varies. The demand for loanable funds is likely to be lower during recessions, or during periods of low economic activity, when many investments are postponed; on the other hand, it will be higher during booms, when optimism is prevalent and investment high. Thus, a slowdown in economic activity is likely to pull the rate of interest below the level that, ceteris paribus, would exist if economic activity were at a "normal" level. This effect might be reflected in the nominal rate not adjusting enough for the expected rate of inflation.

d. Institutional constraints

There is probably no country where all interest rates are completely free to adjust to the level that the market determines. To varying degrees, the movement of interest rates is constrained by legal or institutional limitations, so that the observed rates may be lower than the rates that would prevail in the absence of any limitations.

e. Money illusion

Although economists have become increasingly skeptical about the existence of money illusion, there must be at least some individuals who, especially when the rate of inflation is low or when inflation is a new phenomenon, confuse nominal rates with real rates. As long as some hold this illusion, nominal rates may tend to increase by less than expected inflation.

f. Fiscal deficits

Fiscal deficits can influence the rate of interest in various ways. If they change the level of economic activity in the country, they would affect the rate of interest in the same way as described in paragraph c, above. If they change the supply of money in the economy, they will affect the expected rate of inflation, π, and may also influence the rate of interest through the liquidity effects described in paragraph b., above. 1/ However, a more direct effect is through the demand for loanable funds. As the government sells bonds to finance the deficit, the supply of bonds will, ceteris paribus, increase. The price of bonds will fall, and the rate of interest will rise. If these fiscal deficits occur during a recession, when private sector borrowing is depressed, the effect of the deficit on the rate of interest may not be obvious. If the fiscal deficit continues into a boom, its effect on interest rates may become more evident, as public borrowing will be added to the higher level of private borrowing thus pushing upward the total demand for loanable funds.

g. Uncertainty

Empirical evidence indicates that higher inflation tends to be associated with a greater variance of relative prices. As investments are essentially commitments to a given set of future realistic prices, this implies that the risk factor associated with investing rises. This induces a negative shift in the borrowing schedule which, per se, would imply a lower real rate of interest. On the other hand, similar considerations also reduce the willingness of lenders to lend, thus bringing about a negative shift in the lending schedule. It is thus an empirical question whether, on balance, uncertainty reduces or increases the real rate of interest.

To summarize: The most basic and extreme theory of the behavior of interest rates in an inflationary situation is that the nominal rate of interest will increase pari passu with the expected rate of inflation, that is, the real rate of interest would not change. However, recent amendments to that theory indicate that (even in the absence of income tax) the Fisher hypothesis of a close correspondence between expected inflation and nominal interest rates may not be valid. For several reasons discussed above, and for others not mentioned, when the expected rate of inflation is increasing, nominal interest rates

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1/ If people expect that the fiscal deficits will be monetized in the future even though they are not monetized in the short-run, the fiscal deficit may keep long-run rates high which in turn, through arbitrage, may also keep the short-run rate high.

are likely to adjust by less than the expected rate of inflation. 1/
This implies that, in terms of equation (2) above, the coefficient
of π, β, will be less than one. Putting it differently, a rise
in expected inflation is likely to reduce the real rate of interest.
Only if a substantial fiscal deficit comes to coexist with a strong
boom will the nominal rate of interest increase by more than the
expected rate of inflation. Or, alternatively, only if the rate of
inflation decelerates significantly will the real rate of interest
increase.

In a period of accelerating inflation, and in the absence of
income taxes, borrowers will, ceteris paribus, face lower real costs of
borrowing, and lenders lower real rates of return, than during a period
of price stability. But, as inflation is likely to affect the efficiency
of the economy, the rate of return on real investment will also be lower.

2. Effects of inflation on interest rates
   in the presence of income taxes

Within the framework outlined above, it is now assumed that nominal
(rather than real) interest incomes are fully taxed, at a marginal rate
equal to τ, and that nominal (rather than real) interest expenses are
fully deductible from the taxpayer's income before the tax is assessed
on his taxable income. This is in conformity with the tax laws of most
of the countries surveyed in Section II which ignore the distinction
between real and nominal values of interest incomes and expenses.

It becomes necessary to make a distinction between a before-tax
real rate of interest, r, and an after-tax real rate, r*. For simplicity
it is assumed that the tax rate, τ, is the same for all taxpayers, that
is, the income tax is a proportional tax. 2/ If, given the tax rate, τ ,
the net-of-tax expected real rate of interest, r*, is to remain unchanged
in the face of a rise in the expected rate of inflation, π, the nominal
rate of interest must rise by more than π. More specifically, 3/ the
Fisher equation must be modified and rewritten as follows:

$$i = r + \frac{\pi}{1 - \tau} \tag{3}$$

1/ And, by the same token, when the expected rate of inflation is
falling, the nominal rate is expected to fall by less than the rate of
inflation.

2/ See DM/77/16 for a discussion of the implications of progressive
taxes.

3/ See, in particular, FAD/75/3.

In this equation, the effect of π on i is magnified by the existence of taxes. The higher is τ, the greater will be the impact of π on i; τ can, of course, range between 0 and 1. In the United States, in recent years, the tax rate on interest incomes has been close to 40 per cent. Adjusting for exemptions and evasion, the effective tax rate may be closer to 25 per cent. This would imply that, ceteris paribus, a 1 percentage point increase in the expected rate of inflation would result in a 1.33 percentage point increase in the nominal rate of interest. And, of course, a 1 percentage point fall in the rate of inflation would result in a 1.33 percentage point fall in the nominal rate of interest. This example shows how taxes can potentially increase the volatility of the nominal rate of interest in situations where inflationary expectations are rapidly changing.

In considering the combined impact of expected inflation and income taxation, it is assumed that lenders and borrowers agree on a 4 per cent real interest rate, r, in the absence of inflation; that the effective income tax rate is 25 per cent 1/ and that the real rate of interest is independent of expected inflation; and that expected inflation rises from 0 per cent to 6 per cent. Equation (3) implies that the nominal rate of interest would have to rise to 12 per cent in order to maintain the purchasing power of a 4 per cent interest rate, with no expected inflation. To be more specific, the lender is paid 12 per cent, of which he pays one fourth, or 3 per cent, in income taxes and "loses" another 6 per cent to inflation. He is thus left with an expected after-tax real interest rate of 3 per cent, which is the same as he would have received in the absence of inflation but in the presence of income tax. The same after-tax real interest rate will also result for a borrower expecting the same inflation rate and paying the same tax rate. Obviously, a lower income tax rate would lead to a lower increase in the nominal rate of interest, while a higher inflation rate would lead to a higher nominal rate.

The theoretical example provided above gives an exaggerated view of the expected change in the nominal rate of interest when income taxes are present and the expected rate of inflation is positive. The various factors that make the nominal rate of interest less responsive to changes in expected inflation than would be expected from equation (2) were discussed in subsection 1. There are some tax-related factors that reduce further some of the magnification effect implied by $\pi/1-\tau$ in equation (3) and these are described now.

1/ Thus the net-of-tax real rate is 3 per cent.

a. Taxes on other assets

Equation (3) implies that there are alternative and untaxed channels of investment available to the lender, so that he will be willing to lend the same amount as before only if he does not suffer any reduction in his net-of-tax real interest income. But suppose alternative uses of his funds, i.e., real or other financial investments, are also taxed even though at lower rates. (Some of these other taxes may simply be the capital gains taxes on realized gains from real property or from bond holdings.) In this case his options are limited, and he may be willing to accept a lower rate of return on all his financial investment. This would imply that the effect of π on i will be less than $\pi/1-\tau$. If the average tax rate on all other operations is indicated by θ, then the effect of π on i will be $\dfrac{\pi(1-\theta)}{1-\tau}$. Of course, should θ be equal to zero, then one would be back to the situation described by equation (3). If $\theta = \tau$, then there is no tax effect. In general θ, will be lower than τ but higher than zero.

b. Taxes on borrowers

The theoretical result of equation (3) must also be qualified to take into account the fact that the borrowers themselves may experience tax increases associated with expected inflation that will reduce their willingness to pay the nominal rate shown by equation (3). For example, if depreciation is estimated on the basis of historical costs, and if inventories are evaluated on the basis of first-in, first-out accounting methods, as is the case in most industrial countries, corporations will find their tax burden increased during an inflationary period. Therefore, they will not be willing to pay the nominal rate implied by equation (3). Thus, again, the nominal rate of interest is likely to be lower.

c. Existence of tax-exempt lenders and borrowers

As all financial markets frequently include many lenders who do not pay taxes on interest received, and many financial instruments that, because of the nature of the issuers, pay tax-free interest (see Table 3, Appendix III) the impact of taxes on interest rates will be reduced. It is unlikely that tax-free institutions are marginal lenders; nevertheless, this factor will again reduce the role of taxation in interest rate determination. In the United States in 1976, the latest year for which this information is available, the proportion of tax-exempt incomes to total interest incomes was 15.

d.   Tax evasion

The tax systems of all countries require that interest incomes be
taxed. In reality, however, owing to the absence of withholding provi-
sions in the tax systems of many countries, including the United States,
the existence of bearer's shares, and the inability of the tax authorities
to ascertain all interest incomes paid, some interest incomes are not
reported to the tax authorities. Thus, the potential effect of taxation
on interest rates may be reduced by tax evasion. Here, again, it must
be realized that it is the tax treatment of the marginal lender (and
borrower) that will be significant. But to the extent that tax evasion
brings about a rightward movement in the supply schedule of funds, it
will reduce the nominal rate of interest.

e.   Capital inflows

If taxes magnify the effect of inflation on nominal interest rates
in a given country, these rates could become attractive to foreigners,
especially if the latter can avoid being taxed in their own countries
and are not taxed in the country in which they invest their money.
Furthermore, capital will flow in from "tax-haven" countries, exerting
a downward pressure on the interest rate, which will help to make the
rate diverge from the theoretical results of equation (3).

To sum up: The presence of income taxes, that is, the taxation of
interest income and tax deductibility of interest expenses, tends to
magnify the effect of inflation on interest rates and many economists
have come to expect that $\beta > 1$. In reality, there are many tax-related
as well as nontax-related factors (listed in this and the previous sub-
section) that tend to dampen the value of β. Consequently, the fact
that an increase in the expected rate of inflation does not always
increase the nominal rate of interest more than proportionately cannot
be taken to mean that tax factors do not matter; it could simply be
that the positive impact of the tax treatment of interest incomes and
expenses may be partially or fully neutralized by the other factors
mentioned above.

3.   Empirical investigations

Empirical investigations of interest rates have improved the level
of understanding about their determinants but have not yet fully
explained the behavior of real rates of interest. In addition, those
attempting empirical investigations of interest rate behavior had to
struggle with the very difficult problems of accurately measuring
expected inflation and expected real rates in terms of observable
variables. These efforts have progressed through three stages.

The first stage of concerted empirical investigation of interest rate behavior in the postwar period was centered on the simple Fisher equation (equation (2) above). The approach employed was to regress nominal interest rates on various measures of expected inflation. Most investigators were, thus, testing a joint hypothesis of market efficiency, whereby a percentage point rise in expected inflation would result in a percentage point rise in nominal interest, conditional on the hypothesis that the expected real rate was independent of expected inflation. As with all empirical investigations of interest rate behavior, it was also necessary to assume that behavior of expected inflation was being "accurately" measured. Many of these investigations conducted during the 1960s and early 1970s found a less-than-proportional impact of expected inflation on nominal interest; that is, the estimated values of β were found to be persistently below one. 1/

The second phase of empirical investigation of interest rates, begun during the late 1970s, incorporated the taxation of interest incomes and deductibility of interest expenses into a modified Fisher equation (equation (3) above) and hypothesized a greater-than-proportional rise of interest rates to changes in expected inflation. Given the persistence of a less-than-proportional response of interest rates to expected inflation, the gap between theory and reality was widened even further. 2/ This forced investigators to re-examine the hypotheses of constancy of real rates and their independence from expected inflation.

The third phase of empirical investigation of interest rates derived expressions for nominal interest rates from more comprehensive models. This approach enabled investigators to incorporate into interest rate equations those variables, other than expected inflation, that theory suggested ought to help determine the behavior of real rates. 3/ A number of these variables were discussed above. This broader approach also indicated more clearly the precise nature of the relationship between interest rates, expected inflation, and variables such as taxes, real balance effects, economic activity, and uncertainty, all of which determine the real rates of interest.

The comprehensive approach to modeling interest rates has also helped to resolve the paradox which arose from consideration only of tax treatment of interest incomes and expenses in the context of the simple Fisher equation. The incorporation of tax treatment of interest incomes and expenses into the analysis of the relationship between

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1/ It must be recalled that this was generally a period of rising inflation.

2/ This led some researchers to argue that there may have been monetary as well as fiscal illusion at work during the period.

3/ For an example of such an approach, see DM/82/81.

nominal interest rates and expected inflation suggested a magnified impact of the latter on the former, that is, $\beta > 1$. Failure to discover such a magnified impact led some analysts to conclude that the effective tax rates on interest incomes and expenses must be very low. But this interpretation was questionable for, at least, three reasons: First, empirical results usually find a coefficient of 0.7 to 0.9 on anticipated inflation; even if effective tax rates were only 10 per cent, the coefficient ought to be about 1.1. Second, information on the holdings of tax-exempt financial assets or of tax-exempt interest income suggests that, in the United States, such tax-exempt securities constitute only 10 to 15 per cent of total holdings. Third, and most important, a comprehensive framework of interest rate determination has also yielded a value for the coefficient on anticipated inflation, β, in the 0.7 to 1.0 range.

A recent paper by the Fiscal Affairs Department has investigated the relationship between interest rates and inflation (simple Fisher equation) and the effects of taxation on this relationship (modified Fisher equation) for a sample of eight industrial countries. 1/ Subject to various limitations described in the paper, the paper investigates the extent to which interest rates have responded differently to changes in expected and actual inflation rates in different countries with different legal tax treatments of interest incomes and payments. 2/

The eight countries were divided into three groups according to the degree of taxability of interest incomes and deductibility of interest payments. The first group consisted of Canada, the Netherlands, and the United States, all of which treat interest incomes and payments literally in a way that would imply a relatively high value of β (greater than one). The second group consisted of France, the Federal Republic of Germany, Italy, and the United Kingdom with more moderate tax treatment of interest incomes and payments. The third group consisted of Japan, with a more generous tax treatment of interest incomes and an implied low value of β (smaller than one).

The estimation results for 1971-81 given in Table 1 indicate that the response coefficients of nominal short-term interest rates to _actual_ inflation, adjusted for changes in real interest rates, were not significantly different from unity for Canada, France, the Federal

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1/ DM/83/24. The eight industrial countries are Canada, France, the Federal Republic of Germany, Italy, Japan, the Netherlands, the United Kingdom, and the United States.

2/ These differences refer to the legal treatment alone, since differential possibilities of evasion could not be assessed. Furthermore, the capital gains taxes, that determine the value of θ are assumed to apply to realized gains on a yearly basis.

Table 1. Eight Industrial Countries: Impact of Taxation on
Adjustment of Interest Rates to Inflation, 1971-81 [1]

Country	$\dfrac{1}{1-\tau}$	$\dfrac{1-\Theta}{1-\tau}$ [2]	β (of π^e) [2]	β (of π) [3]
Canada	1.176	0.906	0.991	0.879
France	1.493	1.120	1.022	0.973
Germany, Fed. Rep. of	1.515	0.970	0.991	1.050
Italy	1.429	1.072	1.030	0.505
Japan	1.075	0.860	1.162	0.818
Netherlands	1.299	—	0.984	0.283
United Kingdom	1.316	0.921	0.997	0.061
United States	1.299	0.909	0.993	0.968

Source: DM/83/24, Table 4.

[1] The average income tax rate applicable is denoted by τ and that of the capital gains tax by Θ.

[2] The tax rates used here are given in DM/83/24, Table 15. The difficulties of calculating the effective tax rates are well known; hence, a variety of approaches had to be adopted for estimating these rates. The method used, as well as its limitations and the biases it creates, is given in DM/83/24, p. 15.

[3] The coefficients β (of π^e) and β (of π) represent the Fisher effect for expected and actual inflation rates, respectively.

Republic of Germany, and the United States. The estimated response coefficients were found more moderate for Italy and Japan, low for the Netherlands, and insignificant for the United Kingdom.

The response coefficients of nominal short-term interest rates to expected inflation were significantly greater than unity for Japan but not significantly different from unity for the other seven countries. 1/

For long-term interest rates, the response coefficients to expected inflation were about unity for the United States, moderate for France, and low for all other sample countries (see Table 1). The response coefficient of long-term interest rates to actual inflation was found to be well below unity for Canada, France, Italy, the Netherlands, and the United States, and insignificant for the Federal Republic of Germany, Japan, and the United Kingdom.

In general, while there is some variation across countries in the value of β, none of the coefficients is significantly above one. This suggests that the positive impact of typical tax treatment of interest incomes and expenses on interest rates is perhaps frequently neutralized by the impact of many other factors, mentioned in subsections 1 and 2 above. This can be treated as no more than a tentative hypothesis at this stage, and further empirical work alone can establish the validity of this hypothesis.

4. Policy implications

The preceding sections have argued that high effective taxes on interest incomes and liberal tax deductibility for interest payments can, at least theoretically, have a significant impact on the level and variability of interest rates. To reduce this potential tax effect, three alternative policies have been suggested at one time or another: (a) Tax only real interest incomes and allow a deduction only for real interest expenses. This implies the removal of the inflation component from both interest incomes and expenses. (b) For individuals, at least, eliminate all interest incomes from income taxation and, at the same time, do not allow any deduction for interest expenses. 2/ (c) Reduce the range of deductibility of interest expenses at least for consumer loans and possibly for mortgages for owner-occupied houses. Some of the implications of these policies are discussed below. On the basis of existing "technology" it is not possible to give robust or reliable

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1/ This is puzzling, since the tax effect should have been lowest in Japan.

2/ This policy has recently been introduced in Iceland. The basic justification for this policy change seems to have been that interest rates have approximated the inflation rate for most years, implying that real interest incomes and expenses have been close to zero.

estimates of the effects of the above changes on the levels of interest rates. However, on the basis of some plausible assumptions, some guesses will be made. Some of these are derived from a simple theoretical loanable fund model, outlined in Appendix IV.

a. Inflation adjustment of interest incomes and expenses

The distortions created by the typical tax treatment of interest incomes and expenses in an inflationary environment are due primarily to the taxation of nominal rather than real magnitudes. Full inflation adjustment would require that the inflation rate be subtracted from the nominal interest rate received by lenders before calculating the taxes due. It would also require that the inflation rate be subtracted from the interest rate paid by borrowers before a deduction for interest expenses could be claimed.

Such a correction would shift the demand and supply schedules of loanable funds in ways that would lower the equilibrium nominal interest rate associated with a given rate of inflation. The supply of funds schedule would shift to the right as lending becomes more attractive. The demand for funds schedule would shift to the left as borrowing becomes less attractive. In the numerical example discussed earlier, in connection with equation (3), a nominal interest rate of 12 per cent was required to yield an after-tax real rate of 3 per cent, given a tax rate of 25 per cent and an expected inflation rate of 6 per cent. If the expected rate of inflation is equal to the actual rate of inflation, and if the tax applies only to the real rate of interest, a 10 per cent interest rate will now yield the same after-tax real rate of 3 per cent. Thus, in this extreme example, the nominal rate of interest could fall by 2 percentage points.

Realism would require that, first, the negative impact of expected inflation on interest rates be recognized and, second, that the qualifications discussed on pages 19-20 be taken into account. When this is done, perhaps the reduction in the nominal rate of interest would be less than 2 percentage points. However, even if the fall in the nominal rate were 1 percentage point (a figure that can be considered conservative), it would still leave important effects. It would, for example, by reducing interest costs on the public debt, reduce the U.S. fiscal deficit by $8 billion, and it would reduce the cost of borrowing of developing countries by considerable amounts. Furthermore, the reduction would benefit disproportionately more those borrowers (including losing enterprises, low-income taxpayers, and developing countries) who had not been in a situation whereby they could deduct their interest expenses from taxable incomes.

The effects from this policy change would not naturally be all positive. A few potentially negative ones deserve mention.

First, inflation adjustment of taxable interest incomes would reduce tax receipts on interest earnings; however, this impact would be partly or totally offset by the gain in receipts, owing to the deductibility of (lower) real rather than (higher) nominal interest payments from taxable income. The net effect would depend on the average tax rates of lenders versus borrowers, with the net revenue impact being positive if the tax rates of borrowers on average exceed that of lenders. 1/

Second, the results would also be affected by enactment or nonenactment of inflation adjustment in other developed economies. If only one economy, even one as large as the United States, adopted such a change, the downward pressure on interest rates would be significantly reduced by capital outflow to markets where the absence of full adjustment of interest taxation continued to keep the interest rates higher.

Third, inflation adjustment of tax treatment of interest incomes and payments, which lowered equilibrium nominal interest rates, would confer windfall gains on lenders holding loans contracted at fixed nominal interest rates required in the preindexing environment and windfall losses on borrowers who issued such contracts.

Fourth, even after indexation of interest incomes and payments for tax purposes is carried out some distortions will still remain. The unindexed tax treatment of inventory and depreciation allowances, for example, will continue to affect the after-tax profitability of investment, inducing negative shifts in the investment schedule and, as a consequence, reducing the equilibrium rates of interest. Furthermore, indexation, to reduce distortions in the after-tax costs and benefits of financing by means of debt, will also have considerable effects on domestic equity markets as well as on the flow of debt and equity capital abroad.

Finally, and most important, the indexation of interest incomes and expenses for tax purposes would create nightmares for income tax administrations. No country has adopted or even attempted complete indexation of interest incomes and payments, despite the theoretical attractiveness of the proposal. Thus, it would be utopian to expect that countries would agree to such a change just for its effect on interest rates.

1/ An empirical study for the United States has shown that gains and losses would approximately balance out. See DM/77/16.

b.   Eliminating taxes on interest incomes and
      tax deductibility of interest payments

Total elimination of taxation of interest incomes, together with
the total elimination of deductibility of interest payments, is the
easiest solution administratively. It would be a desirable policy
from the standpoint of lowering nominal interest rates. In fact, the
reduction in nominal interest rates associated with this policy would
most likely exceed that associated with the taxation of real interest
rates, as discussed above. Such a policy would produce a zero net
impact on tax revenues in countries where the level of domestic
borrowing and lending and the tax rates applicable to borrowers and
lenders are equal. If it were carried out by all countries, it would
also equate effective real interest rates in different countries,
assuming equality of expected inflation rates.

Yet, such a policy is unlikely to be adopted by many countries.
It will convert the existing global income taxes, under which all
sources of incomes are treated equally, into a schedular income tax.
With the exemption of interest incomes, pressures would be created for
the exemption of other capital incomes as well, on the grounds that
such a policy distorts the flows in the financial and capital markets.
Such a policy might be seen as unjust and inequitable between earners
of labor incomes and capital incomes, especially at present when the
real rates of interest and thus the incomes associated with financial
assets are very high. In any case the main justification for this
policy--that the rate of inflation is about equal to the nominal rate
of interest--is clearly not valid at this time for many of the large
industrial countries. Thus, the policy could be justified in particular
countries but not in others.

c.   Limiting the tax deductibility of interest expenses

A realistic proposal would be to eliminate, or at least limit, the
deductibility of interest payments for particular purposes, viz., in-
terest on consumer credit and mortgage interest payments by households.
To what extent this would result in a drop in the equilibrium nominal
interest rate in a given country will depend on the elasticity of
supply of and demand for funds. Since the elimination of the deducti-
bility of household interest costs will cause a downward shift in the
demand for funds, the downward pressure on interest rates will be higher
the lower is the ratio of supply elasticity to demand elasticity. No
estimates of these elasticities are available; however, on certain
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will not fall by a large amount. 1/

1/ Assuming that households constitute roughly 40 per cent of total
borrowing, that the elasticities of the supply and demand schedules vary
between 0.2 and 0.8, respectively, that the expected real rate of
interest is 3 per cent, and that the expected rate of inflation is 6
per cent, it can be estimated by the model in Appendix IV that the
policy change will reduce the nominal rate by less, and in most cases
by much less, than 1 percentage point.

If deductibility of interest payments from home mortgages were preserved and only the deductibility of interest on consumer credit were eliminated, the impact would be even smaller. In the United States, mortgage borrowing, while volatile, usually constitutes well over half of total household borrowing. A policy that eliminated only nonbusiness and nonmortgage interest payments from deductibility would hardly reduce the equilibrium interest rate.

The elimination of nonbusiness and nonmortgage interest deductibility, despite its relatively small impact on the equilibrium level of nominal interest rates, would still produce significant effects on resource allocation, since resources would be directed more toward capital formation. It would also have some revenue effects, which would produce a moderate reduction in fiscal deficits. The revenue-enhancement effect of such a policy change for the United States is estimated to be about $8 billion a year. In addition, a 0.5 per cent drop in interest rates could also lower the annual U.S. debt service by about $4 billion annually. An overall reduction in the fiscal deficit for the United States of up to $12 billion annually would thus be possible.

In conclusion: Inflation adjustment of interest rates for tax purposes or the nontaxation of interest incomes would have the largest effect on interest rates. The other, more modest, policy discussed would still have some effect, but it would be somewhat more moderate. Implementation of such policies by any single economy, while helpful, would result in capital outflows. Even if prevention of such flows were deemed desirable, it would be difficult to achieve in view of existing statutes in most industrial countries and in view of extensive arbitrage opportunities offered in the Eurocurrency markets.

The elimination of deductibility of interest payments for nonbusiness and/or nonmortgage (consumption) household purposes seems to hold the most promise in reality. It would produce beneficial effects in the form of enhanced capital formation and some moderate reduction in fiscal deficits but probably would not have a significant impact on interest rates in any country.

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IV. Extensions and Qualifications of Analysis

This section considers some extensions and qualifications of the analysis in Section III. First, consideration is given to the implications for open economies of tax policies pursued by single countries and to the effects of introducing explicitly the tax treatment of foreign exchange gains and losses. Second, the implications of tax policies for the impact of monetary restraint are discussed. Finally, consideration is given to implications of tax policy for volatility of interest rates and related uncertainty regarding expected after-tax real interest rates.

1. Role of international differences in tax regimes

Insofar as capital is able to move between countries, both domestic and foreign tax policies regarding interest incomes and expenses will affect the level of interest rates in any given country. Further, since foreign exchange transactions are involved in arbitrage among a menu of international financial assets, taxation of foreign exchange gains and losses will also play an integral role in determining the level of interest rates. To the extent that a country's capital market is isolated, by controls or other means, from world capital markets, cross-country differences in tax policies will, of course, be less relevant. 1/

Perhaps the best way to consider the international implications of the differential tax treatment of interest incomes and expenses is to examine the impact of different tax policies on the after-tax interest parity condition. That condition states that, in equilibrium, the difference between after-tax interest rates must be equal to the after-tax gain (loss) from expected appreciation (depreciation) of domestic against foreign currency. In the absence of tax considerations, and if exchange rates are determined mainly by purchasing power parity, interest parity can be approximated by an interest differential equal to an expected inflation differential.

Suppose initially that interest parity holds under conditions where countries experience the same rate of inflation and, therefore, the expected change in the exchange rate is set at zero, effective tax rates are equal, and both domestic and foreign governments tax interest receipts and allow full deductibility of interest payments. If, as an example, the domestic economy now exempts from taxation all or part of the interest income of households and no longer allows a deduction for all or part of the interest expenses, the direct result is to lower the equilibrium nominal interest rates in the domestic economy. 2/ As

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1/ For a discussion of the effects of financial market taxation on international capital flows, see DM/83/28.

2/ As argued in Section III, this tax-induced fall in interest rates may not be too large.

a consequence of this fall in interest rates in the domestic economy, capital begins flowing abroad, thus mitigating the initial drop in interest rates and inducing a reduction in the rate of the foreign country. 1/

The flow of capital from domestic to foreign markets will continue until the after-tax interest rates are again equalized, although at some lower level. These effects would be accentuated in an inflationary environment if, for example, the taxpayers in the foreign country experienced bracket creep while the taxpayers in the domestic country avoided it through indexation. This configuration would produce a steady upward drift of borrowing and lending schedules. Equilibrium would require an ever increasing flow of capital from domestic into foreign markets.

So far, expected changes in the exchange rate have been set at zero by assuming equal inflation across countries or, alternatively, a system of fixed parities. When this condition is relaxed, and expected changes in exchange rates are allowed, tax policy regarding foreign exchange gains and losses becomes relevant in determining the levels of equilibrium interest rates and exchange rates. Suppose that tax rates applied to such gains and losses are below the tax rates applied to interest incomes. 2/ The result of such a tax policy is to allow interest differentials to exceed expected appreciation or depreciation of currencies. Suppose, for example, that domestic currency is expected to depreciate against foreign currency at a 3 per cent annual rate and the domestic interest rate is also 3 per cent higher than the foreign rate. If the tax rate applicable to domestic residents on their expected foreign exchange gain is below that applicable to their interest income (regardless of its source), the tax liability to domestic investors on their foreign exchange position would be lower than the income tax liability incurred on the positive interest position. It would, therefore, induce capital outflows. As a result, the equilibrium posttax interest differential, which would not induce further capital movements, would have to be above the pretax level. If, say, the capital gains tax rate were 20 per cent while the income tax rate were 50 per cent, a 3 per cent pretax interest

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1/ The degree of reduction in the interest rates in the domestic country and the increase in the rate in the foreign country is determined by the relative size of both countries.

2/ This assumption approximates the conditions in Canada, the United Kingdom, and the United States where realized foreign exchange gains and losses are treated as capital gains and losses and the returns on assets held longer than a statutory minimum period are taxed at lower rates than interest earnings, which are taxed as ordinary income.

differential would have to be matched by a 4.8 per cent posttax interest differential (a factor of 1.6, derived as $((1-0.2)/(1-0.5)) = 1.6$). 1/

An alternative to achievement of an after-tax equilibrium, by means of interest rate changes, would be a reduction in expected depreciation of the domestic currency or a rise in the domestic spot price of foreign currency. That is, if the spot rate rose by enough to cut expected depreciation to 1.875 per cent, the initial 3 per cent pretax interest differential would not be altered by the differential tax treatment, since $3 = 1.6 (1.875)$. Notice, however, that a reduction in the expected rate of devaluation, without changes in the underlying interest differentials, implies a deviation from purchasing power parity which has been caused by differential tax treatment of interest income and foreign exchange gains.

Actual equilibrium would likely result from a combination of a change in the interest differential and a change in expected depreciation of currency, with both accompanied by some capital movements. Whatever the mode, the basic conclusion is that, like tax policy on interest incomes and expenses, tax policy on foreign exchange gains and losses can significantly affect the equilibrium levels of interest rates and exchange rates.

The effect just described, on equilibrium interest and exchange rates, of tax policy on foreign exchange gains and losses could be removed by taxing foreign exchange gains and losses and interest incomes at equal rates. Given the widespread tendency to treat interest as ordinary income, as indicated in Section II, this would require treating foreign exchange gains and losses as ordinary income as well. 2/

The realization that neutrality of tax policy calls for a tax treatment of exchange gains and losses similar to that of ordinary income, suggests an important asymmetry regarding after-tax interest parity. Consider the example given above and designate as Country 1 the case where a 3 per cent interest differential satisfies only pretax equilibrium and a wider interest differential, or a smaller currency depreciation, is required as lower (20 per cent) tax rates are applied to foreign exchange gains and losses. If Country 2 applies, from its perspective, equal tax rates (50 per cent) to both interest income and foreign exchange gains and losses, the 3 per cent differential constitutes an after-tax as well as a pretax equilibrium. The equilibrium

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1/ Here, the size of the actual gap between tax rates is exaggerated for purposes of illustrating the impact. In practice, a very small expected return on an after-tax basis can generate large flows of capital.

2/ This practice is followed in the Federal Republic of Germany, France, Japan, and some other industrial countries.

interest differential that will emerge in this circumstance would prob-
ably result in simultaneous movements of capital in opposite directions
between Countries 1 and 2. At anything above a 3 per cent interest
differential, or its exchange equivalent, capital will flow out of
Country 2 into Country 1. At anything below a 4.8 per cent interest
differential, or its exchange equivalent, capital would flow out of
Country 1 into Country 2. Any equilibrium in between would result in two-
way capital flows. If the situation persisted long enough, equilibrium
could eventually be achieved by means of an adjustment of relative
real interest rates through changes in the stock of real capital. The
burden of adjustment would fall more heavily on the smaller economy.

Operation of the phenomenon just described may be manifested in the
unexpected strength of Country 1's currency against that of Country 2.
Given Country 1's tax policies, equilibrium would be analogous to the
4.8 per cent interest differential, just described, while Country 2's tax
policies would imply an equilibrium analogous to the 3 per cent interest
differential. The result would be a flow of capital from Country 2 to
Country 1. Even a drop in Country 1's rates would not necessarily stem
the flow (and therefore the pressure on currency 2 to depreciate against
currency 1) unless an analogue of the 3 per cent equilibrium differential
for Country 2 were reached. The asymmetry could be eliminated by align-
ment of tax policies whereby both countries treat foreign exchange gains
and losses as ordinary income.

To sum up: differential tax regimes between countries can result
in either an increase or a decrease in the pretax equilibrium interest
rate differential. Ceteris paribus, countries introducing policies
that imply a lower taxation of interest incomes and a lower deduction
for interest expenses will, in isolation, have lower interest rates
relative to countries that have higher tax rates. However, the negative
impact of such policies on interest rates will be mitigated by capital
outflows. For small countries acting singly, this impact could be
eliminated completely. Finally, countries levying taxes on foreign
exchange gains lower than those on interest incomes are likely to ex-
perience a greater posttax differential in interest rates vis-à-vis
other countries. Clearly, different combinations of tax treatment
will result in different outcomes, but a central issue is that real
interest rates may also be affected by differential tax policies through
their effects on capital flows.

2.   Implications of tax policy for the effectiveness
      and international impact of monetary restraint

Abrupt application of monetary restraint will operate for a time
to depress aggregate demand for domestic output through the positive
impact on real interest rates outlined in Section III and through the
impact on the real exchange rate. In the absence of taxes applied to

nominal interest rates, the result of abrupt and unanticipated monetary restraint would be to raise the market interest rate by the amount of the increase in the real interest rates as long as the initial impact of abrupt monetary restraint does not affect inflationary expectations. Since the full increase in the nominal interest rate would typically be taxed, attempts at preservation of the higher expected real, after-tax, rate of return on the part of lenders would require that market interest rates rise by more than the increase in the real rate. The increase may be more easily accepted by borrowers, provided that they can fully deduct interest payments from taxable income. Such a magnification effect is analogous to that displayed in response to a change in expected inflation in the tax-adjusted Fisher equation (equation (3)) discussed in Section III.

However, owing to a somewhat interest-elastic demand for funds by borrowers and the depressing effect of monetary restraint on overall economic activity, the increase in nominal interest rates may be somewhat dampened. Still, the existence of the taxation of interest incomes and the deduction of interest expenses will be to produce a larger positive impact of monetary restraint on interest rates than would otherwise have occurred.

Viewed in this way, the effect of a typical tax policy on interest incomes and expenses is not so much to reduce the effectiveness of monetary restraint per se as to require that a large rise of market interest rates result from a given monetary restraint if aggregate demand is to be reduced. Tax policy does have implications for the effectiveness of monetary restraint across income tax brackets, however. Households, enterprises, and nations, facing effective tax rates below the average tax rate that has been incorporated in the level of interest rates, will experience a sharp rise in their after-tax real rates relative to those facing above-average tax rates. In sum, the effectiveness of monetary restraint is enhanced by tax policy for individuals and enterprises facing below-average tax rates and is reduced by tax policy for those facing above-average tax rates.

Tax policy regarding interest incomes and expenses, in a country applying monetary restraint, will also have international implications, particularly if the country concerned is large. If a large country, which has relatively high tax rates for financial market participants—that is, which fully taxes interest incomes and allows liberal deductions of interest payments—applies monetary restraint, there will be a relative increase in after-tax real interest rates. Countries whose investors (including the public sector) have access to international capital markets and whose interest incomes are domestically taxed at lower rates or whose interest expenses are less liberally deductible will suffer as well. This result will be signaled by capital flows into the country applying monetary restraint. Such inflows are a normal response to monetary restraint, but they are enhanced by differential tax policies on interest incomes and expenses.

As noted above, the discussion so far has focused on the initial
impact of monetary restraint, prior to any reduction of expected infla-
tion. Once expected inflation begins to fall, the effect of tax treat-
ment of interest incomes and expenses is, symmetrically, to magnify the
negative impact on interest rates. Since the drop in interest rates
reflects the average tax rates, it will raise after-tax real rates
faced by those in above-average tax brackets relative to after-tax
real rates faced by those in below-average tax brackets. Likewise,
countries that experience a relative increase in after-tax real rates,
as a result of monetary restraint, will experience a relative reduction
in after-tax real rates, once lower inflationary expectations begin to
reduce interest rates.

The overall implication is that the fluctuations in after-tax real
rates resulting from changes in monetary policy tend to be exacerbated
for domestic and foreign borrowers and lenders in lower tax brackets,
given the differences in tax policy regarding interest incomes and
expenses.

The corollary for international capital flows is an enhanced out-
flow/inflow pattern for countries whose capital markets are closely
tied to those of the country executing a policy of monetary restraint.
Depending on the degree of intervention, exchange rates may be
expected to be somewhat more volatile as well, in view of the tax
policies under discussion here. Overall, differential tax policies
regarding interest incomes and expenses may increase the volatility
of interest rates, exchange rates, and international flows of capital
in the wake of application of monetary restraint in a large economy.

The sudden easing of monetary restraint would produce exactly
opposite results compared with those caused by the sudden imposition of
monetary restraint. Given the taxation of interest incomes and the
deduction of interest expenses, a greater fall in interest rates would
result from monetary ease if aggregate demand is to increase. The
initial liquidity effects of monetary ease will lower the after-tax
real rates for those who are subject to below-average tax rates relative
to those who are subject to above-average tax rates. Subsequent expecta-
tions effects will cause a relative increase in after-tax real rates
for those in lower tax brackets, with the net result that those in
below-average tax brackets (including borrowers in developing countries)
are likely to experience more volatility in after-tax real rates given
either the easing or the imposition of monetary restraint.

A qualification to the analysis of the impact of monetary restraint
or ease is called for in the light of possible effects of tax policies
beyond those concerning interest incomes and expenses and the empirical
evidence of a negative relationship between expected inflation and real
rates. The effect of tax policies taken as a whole and associated

phenomena may be to mitigate the negative pressure on nominal interest rates arising from a drop in inflationary expectations. A large body of empirical evidence suggests that the expected after-tax real rate may be negatively related to the level of expected inflation. This result implies that the initial rise in real rates attendant upon the effect of constrained liquidity may be prolonged later on when monetary restraint begins to result in lower inflationary expectations. Conversely, the initial drop in real rates resulting from monetary ease may be prolonged if the appearance of higher inflationary expectations is coupled with a drop in real rates. The exact timing and stability of such relationships is not understood, but the view is consistent, although crudely, with the recent U.S. experience with imposition and relaxation of monetary restraint.

3.   Volatility of interest rates

Discussion by the Executive Board has often included expressions of concern regarding the particularly high degree of interest and exchange rate volatility since the late 1970s. An effort is made here to explore the possible role that tax policy and its administration may have played in the increased volatility of interest rates, with the implied increase in exchange rate volatility taken for granted.

Interest rates are determined in forward-looking markets for assets that represent a claim on a nominal stream of interest payments and return of principal over some future period of time. Interest rate volatility about some mean level during a period of time (the variance of interest rates) reflects the volatility in the outlook for inflation and for the expected after-tax real rate of interest. A high volatility of expected inflation or of the expected after-tax real rate means that a wide range of possible future outcomes for these variables is contemplated. This is a formal characterization of uncertainty. An increase in such uncertainty entails risks for savers and investors for which they must be compensated. Viewed in this way, increased uncertainty attendant upon increased volatility of interest rates represents an additional cost of capital formation that lowers productivity growth and growth of real output and in turn enhances inflationary pressures. In view of such costs and their relationship to interest rate volatility, it is useful to consider the sources of increased volatility of interest rates.

It is clear from Table 2 that, in addition to reaching historically high levels since 1979, U.S. interest rates have been more volatile. This phenomenon has appeared in varying degrees in most industrial countries. The increased volatility has a number of sources. The two proximate determinants of interest rates, viz., expected after-tax real rates and expected inflation, have been unusually volatile, with

the former probably dominating the volatility of the latter in its impact on interest rates. Volatility of real rates in the United States may have been further increased by the volatility in the unanticipated portion of money growth associated with the change in the conduct of monetary policy in October 1979, the imposition and removal of credit controls during 1980, and the implementation of a new policy mix under the new administration during 1981. Another factor which may have increased the volatility of real rates is increased uncertainty about fiscal deficits and a wide range of tax provisions associated with debate over the passage and the modifications of the Economic Recovery Tax Act of 1981 and the Tax Equity and Fiscal Responsibility Act of 1982.

Table 2. Level and Volatility of U.S. Interest Rates

(Monthly Data)

Sample Period	Treasury Bill		Medium-Term Government Bond		Long-Term Government Bond	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
1964-69	4.79	1.09	5.20	1.06	5.00	0.77
1970-74	5.95	1.68	6.69	1.02	6.83	0.79
1975-79	6.67	2.01	7.79	1.25	8.31	0.66
Jan. 1980- Jan. 1983	12.02	2.73	12.88	2.01	12.62	1.48

Source: Federal Reserve Bulletin (various issues).

Increased volatility of interest rates can, like the level of interest rates, be partially attributed to tax treatment of interest incomes and expenses. The simplest approach, which parallels the discussion in Section III of effects of these policies on the level of interest rates, is to derive an expression for the variance of nominal interest rates based on the tax-adjusted Fisher equation. Such an

expression, which appears in Appendix IV (as equation (8)), describes the variance of nominal interest as a weighted sum of the variances of after-tax real rates and expected inflation plus a covariance term. The weights rise with effective tax rates faced by borrowers and lenders. In effect, if two countries experience identical levels of volatility of after-tax real rates and expected inflation, the country with the higher tax rates will experience more volatility of nominal interest rates. If bracket creep raises the effective tax rates in a given country, that change by itself will, ceteris paribus, increase the volatility of interest rates.

A more comprehensive approach to interest rate determination which includes open-economy effects (after-tax interest parity) and a wide range of tax policies that result in inflation-induced changes in real incentives to work, save, and invest would reveal a more pervasive basis for tax policy to affect interest rate volatility. A given array of effective tax rates on all forms of income, including interest, labor income, profits, capital gains and losses, and foreign exchange gains and losses, is what determines the impact on nominal interest rates of changes in expected inflation and other variables. An environment of high and/or volatile rates of inflation, given the taxation of nominal values, results in numerous and frequently unpredictable changes in effective tax rates, which themselves contribute to the volatility of after-tax real as well as nominal interest rates. In addition, ad hoc efforts to address tax-policy-induced distortions that are magnified in an inflationary environment serve to increase the uncertainty attached to the future path of interest rates owing to the volatile political process to which such proposals must be subjected.

V. Concluding Remarks

This section draws some conclusions from the study and discusses their implications for Fund activities.

1. Conclusions of the study

While tax regimes of major industrial countries vary widely with respect to specifics governing treatment of interest incomes and expenses, some subsidy to consumption implicit in the liberal deductibility of household interest payments is prevalent, with policies of the United States among the most liberal and those of Japan among the least liberal. These and related tax policies may have significant effects, not only on the level and variability of interest rates and the effectiveness of monetary restraint in a given country but also on exchange rates and international capital movements. Although there has been some empirical research on these subjects, a large amount of work remains. This work should help to provide a fuller understanding of the behavior of real and nominal interest rates since 1979 and should allow a better quantification of a full range of effects arising from changes in tax policy. The simulation methodology required for a comprehensive analysis of the effects of changes in tax policies is just being developed.

Despite these qualifications, it is useful to set out two basic conclusions to emerge from this study.

(1) Full inflation adjustment, by developed economies acting as a group, of interest incomes to be taxed and of interest payments to be deducted from taxable income probably constitutes the single most effective tax policy measure for lowering nominal interest rates in developed economies and for lowering effective real rates in developing economies. However, inflation adjustment of interest incomes and expenses is very difficult administratively for any country. It is thus unlikely that a concerted action of this type will take place.

(2) Removal of deductibility of interest payments for some or all household consumption borrowing by developed economies would lower equilibrium interest rates and the gap between effective real interest rates in developed and developing countries, but by much less than full inflation adjustment. It would, however, result in removal of a consumption subsidy, with effects on resource allocation akin to those of increases in taxes on consumption. Some enhancement of revenues and reduction in fiscal deficits would result, depending on the share of household borrowing deemed ineligible for tax deductibility.

The corollary to proposition (1) is that all of its desirable aspects can also be achieved by eliminating or at least reducing inflation and with it the distortionary effects on after-tax incentives to save and invest in both developed and developing economies. Viewed in this way, the reduction in inflation and inflationary expectations in the United States from the 11 to 12 per cent level prevalent at the end of 1980 to the 3 to 5 per cent level prevalent during the first half of 1983 has helped a great deal to reduce distortions arising from tax treatment based on nominal instead of real interest rates. Still, it is necessary to recall that, since interest rates are set in forward-looking markets, it is the outlook for future inflation rates and related variables, coupled with the knowledge that potential distortionary effects of taxing and deducting nominal interest rates remain in most tax systems, that produces continued uncertainty regarding the outlook for effective after-tax real rates. In sum, it might still be desirable in the current environment to contemplate changes in tax policy aimed at reducing the <u>potential</u> of tax systems to magnify the impact on interest rates of further possible changes in the level of inflation. But, of course, tax policy is pursued for other objectives. The effect of tax policy on interest rates has been ignored in the past, and it is not likely that it will be given much weight in the future.

2. Implications for Fund activities

While tax policies of most countries are determined by domestic considerations, the present study suggests that they may have important international implications as well, especially for exchange rates and international capital flows. In addition, they may also have implications for real debt service burdens of developing countries. The Fund may, therefore, have a role to play in making national authorities more aware of the implications of their domestic tax policies for the international economy. The Fund's surveillance activity and Article IV consultation discussions provide a valuable opportunity to review important tax provisions in areas such as the tax treatment of interest incomes and expenses and the taxation of foreign exchange gains and losses.

In particular, if in an inflationary situation the aims are to dampen the effects of taxation on the level and volatility of interest rates, and to alter the redistributive impact of monetary restraint, adjustments may have to be made in the current tax treatment of interest incomes and payments, which typically ignores the existence of inflation. Such adjustments as may be carried out will need to ensure a "reasonable" after-tax real interest incomes to the lenders (i.e., remove "excessive" taxation) and a "reasonable" after-tax real cost of interest payments to the borrowers (i.e., remove "excessive" subsidy), without incurring severe budgetary consequences. This will call for removing many of

the gaps in the tax base which exist in the form of exclusions, exemptions, and other tax incentives provided to interest incomes and payments and which are frequently justified on the ground that the tax system is not duly adjusted for inflation. A policy on inflation adjustment of taxable interest incomes and payments should go hand in hand with the elimination of special tax breaks for interest earners and interest payers. This general principle is valid not only for interest incomes and interest payments but also for the incomes and payments of all participants in the capital market and other taxpayers as well. In the final analysis, government budgets should rely more on the "fiscal dividend" of the rate of economic growth than on the rate of inflation in the economy. It goes without saying that the best solution is for governments to lower and stabilize inflation rates so that the need for the inflation adjustment of the tax system is minimized.

If the aim is to neutralize the effects of tax factors on international capital movements and exchange rates, indirect as they may be, adjustments of the tax treatment of foreign exchange gains and losses relative to the tax treatment of ordinary interest incomes also become relevant. Differences between the tax treatment of the former relative to the latter, wherever it exists, should be discouraged. Simultaneously, this will also call for adoption of measures and tightening of administrative machinery in individual countries to improve tax compliance of incomes earned on international operations.

Finally, the tax treatment of interest incomes and payments relative to the tax treatment of other forms of capital incomes and payments tends to have important allocative effects. This paper has dealt with these important questions only in a very limited way and has not attempted to analyze the effects of taxes in countries, many of which are developing countries, where interest rates are regulated.

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Tax Treatment of Interest Incomes and Interest Payments:
An International Survey

Current analyses of money market developments and the use of interest
rates as instruments of economic policy tend to include one or more aspects
of taxation. One example is the tendency (shown by DM/82/81) of a typical
tax regime for interest income to exacerbate the interest rate fluctuations
induced by inflation. Another example, and of a more institutional kind,
is how withholding taxes imposed by some countries on interest paid to
recipients abroad may affect Eurocurrency and similar markets. A third
example, and seemingly one of growing interest, is how the interest rate
affects the behavior of savers and borrowers.

Taxes may also influence interest rate structures inasmuch as certain
types of interest may be exempt, wholly or partly, from tax, certain
groups of investors may be exempt from tax, and, on the opposite side,
certain types of interest expenditure may be deductible within certain
limits or without limits.

Any analysis of these issues, based on available information on the
tax systems, will suffer from three serious shortcomings. One is the
interpretation problem often aggravated by language difficulties, more
bothersome than these are the institutional differences and deviations
between the law as practiced and the statutes as published. Another is
the quantification problem; while some few countries, the United States
among them, have detailed statistics based on representative samples of
tax returns, other countries have no statistics at all or have only vague
estimates of the revenue importance of particular features of their tax
laws. Finally, there is the question of how national differences ·in tax
compliance may affect the effectiveness of the provisions of the law.
To take just one example: if individual interest income in a country is
notoriously underreported, to a point where few if any taxpayers care to
comply, a mandatory withholding tax, even if it is imposed at a relatively
low rate and is final, may imply a higher effective taxation on interest
income than before. This may occur even though an anlaysis of the legal
provisions may lead the innocent reader to believe that the change meant
relief.

1.   Taxation of interest

     a.   Exemptions for certain types of income

Interest income, as a general feature, forms part of the income
tax base. This is self-evident in tax systems based on a global income
concept. Systems developed from schedular systems may occasionally
retain a final withholding tax on certain interest incomes as a remnant
from the schedular system.

One type of exemption is mainly a _de minimis_ rule. In countries
applying pay-as-you-earn types of income tax, it is seen as desirable to
avoid deviations from the withholding tax, particularly if the system is
based on the pay-as-you-earn being final and a tax return being unneces-
sary in the majority of cases.

Similarly, interest on postal savings bank accounts and accounts
with similar institutions may be exempted, usually up to some maximum
level; the background may well be that the interest rate on these
accounts is low and that the tax exemption in a fashion compensates for
this while at the same time the rule simplifies the tax system.

The same motive can play a role for exempting interest on savings
bonds issued to small savers.

There is, however, no clear distinction between this type of _de
minimis_ exemption, and those exemptions offered as measures to promote
savings. Often the latter take the same legal form, that is, an exemp-
tion for a given amount of interest earnings (legally defined as gross
earnings or net earnings after interest deduction, depending on other
features of the system) or, alternatively, an exemption for interest on
particular types of investment.

If it is sometimes difficult to distinguish between _de minimis_
provisions and savings promotion schemes, the picture is further blurred
by exemptions based on constitutional grounds, such as in the United
States the exemption from federal income tax for interest on state and
local government bonds. The constitutional issue might not be the only
consideration; the exemption for these bonds is more often than not seen
as a means (of disputable effectiveness) of subsidizing the local govern-
ments or the activities the bonds are issued to finance.

b.   Exemptions for certain recipients of income

More often than not, the institutional investors playing the major
part in the bond market are social security institutions, pension funds,
and the like, working under tax rules exempting them from tax on interest
income. The exemption may be constructed as a deferral rule; pension
funds are allowed to be tax exempt, but beneficiaries will be taxed once
they receive their pension payments. Or the institutional investor may
be regarded as part of the government, exempt from tax under the somewhat
dubious assumption that a government should not pay tax to itself. Other
institutional investors may be insurance companies; the interest income
of these may be subject to a lower tax than the usual corporate income
tax rate under the assumption that the interest is accruing in the inter-
est of policyholders and should be taxed at their representative average
income tax rate or perhaps at a preferential rate aimed at stimulating
insurance savings.

Whereas the institutional investors may benefit from preferential tax rules of this kind, they might well have to pay a price in the form of compulsory placement rules. There are many countries where the bond market, or at least the market for government bonds, is limited de facto to institutional investors that are forced by law to invest their funds in gilt-edged securities. If such rules are used to keep the market bond rate down at an artificial level, the tax exemption may be an insufficient compensation for the loss of potential investment income caused by the compulsory placement rules.

Other tax-exempt recipients of interest income are charities. Whereas tax laws often provide for income tax to be paid on business profits, arrived at in competition with fully taxable subjects, there is a general tendency to allow charitable trusts and foundations to enjoy interest income without paying tax. Once again, the existence of important investors in this category tends to dilute the effects a more general tax might have on the security market.

Finally, there are vast discrepancies in the treatment of interest paid to recipients abroad. Some countries abstain from any claim to such tax, presumably under the assumption that the tax withheld on foreign interest payments would be shifted to the domestic borrowers. Other countries impose withholding taxes on some or all interest payments, presumably under the assumption that the interest income has its source in the country and hence legitimately forms part of its tax base; there might also be a secondary argument that an exemption would make foreign borrowing too cheap and affect the relative prices of capital and labor in a direction undesirable at least in countries with substantial unemployment. Attitudes to these withholding taxes are affected by the existence of banking centers in tax havens and elsewhere that can be used to circumvent the interest withholding taxes of other countries; for competition's sake, countries are unwilling to go too far in introducing withholding taxes, even if it is argued that in their absence the field is open for international investors to evade tax altogether. A certain moderation in interest withholding taxes is dictated also by another reason: it is argued that a withholding tax levied on gross interest income may easily exceed a reasonable level if it is related to the actual net income of an investor who himself has borrowed some or all of the capital lent.

c.   Discrimination

Interest income may also be given less lenient treatment than other income. One traditional way of doing this is by applying earned-income relief to other types of income, such as salaries and wages, but denying the same relief to interest income and other unearned income. The U.K. tradition in this respect is old. The United States used to apply a maximum marginal tax rate of 50 per cent to earned income only, while allowing the top marginal rate to get higher for unearned income. The basic effect is the same.

Other countries achieve the same purpose by net wealth taxes. In a country subjecting interest income to preferential treatment, the interest-bearing bank accounts may at the same time form part of the taxable net wealth. The former provision may be aimed at promoting savings, the latter at redistributing net wealth. The effectiveness of net wealth taxes in this respect is not great, however. Carried too far, net wealth taxes may channel savings into unproductive outlets of a type difficult to tax, such as art, jewelry, and stamps, or they may give an incentive to spend the money rather than to keep it.

Death duties also form part of redistributive taxation. For both these duties and the net wealth taxes--and the two taxes are often seen as substituting for one another--there is a conflict between the redistributive purpose of the law and the potential undesired consequences in the form of dissaving or escape into tax-exempt assets or assets difficult to tax. It is conceivable, though difficult to quantify, that the propensity to save in interest-bearing instruments may be affected by these taxes.

2.   Deductibility of interest payments

Some concepts of taxable income include interest payments as an element of negative income, deductible from the positive income in order to arrive at the proper tax base. The argument may be one of pure theory, referring to the periodical nature of the interest payments; more often, it seems as if this type of deduction is granted with respect to the reduction of the taxpayer's disposable income and hence the ability to pay. Some may also have argued that, lacking tax relief for negative net wealth, debt-ridden taxpayers should at least have the benefit of a deduction for interest.

Other concepts of taxable income put interest payments on a level with other expenses. In other words, a deduction for interest is granted when the debt has been incurred to acquire or maintain an income-generating investment and refused when the debt has been incurred to cover costs of living or investment in assets not generating any income. The implications of this approach vary a good deal with what is understood by income-generating investment. The typically most important deduction for individual taxpayers is mortgage interest. If the imputed income of the taxpayer's own residence is assessed as an income item, the residential investment is obviously income generating, and the mortgage interest should be deductible according to the basic principle. However, even in many countries assessing imputed income of this kind, it is felt that the assessment is not quite up to the market value. Hence, a limit might apply to the mortgage interest deductible, either at a level preventing the home investment from rendering a deductible net deficit, or at a level representing a maximum for what is seen as normal. It is noteworthy that a country such as the United States, while not taxing imputed income of residences, offers unlimited deduction

for mortgage interest, whereas several of the European countries that impose income tax on imputed income nevertheless apply limitations to the deduction for mortgage interest.

A common problem in applying this type of rule is the proper allocation of loan interest to the corresponding investment. A rule attaching the debt to the collateral, and refusing a deduction for home mortgage interest, would prevent a homeowner from deducting interest paid on a mortgage taken up, say, to finance his business. On the other hand, requiring specifics about the original purpose of a loan, while often possible, might lead to incorrect conclusions if the loan was originally taken to finance income-generating investment but repayment has been postponed in order to use the money for other purposes. Finally, it is often argued that the nondeductibility of interest on consumption loans or mortgages discriminates against those of limited means, who have to borrow, and favors those who can draw down their income-generating assets in order to finance their consumption or their home investment. The former will get no tax relief; the latter will enjoy a reduction in income tax.

The deduction for interest payments, when the debtor is a corporation, creates a considerable difference in treatment of the yield of an investment between equity and debt capital. Dividends are very rarely a deductible item for corporation tax; on the contrary, there is often a double discrimination against dividends, inasmuch as there is not only no deduction for the dividends but they are often also subject to a higher withholding tax, when paid to foreign recipients, than interest payments. With regard to this preferential treatment of debt, it is natural that many countries have been compelled to set up rules against "thin capitalization," treating loans from shareholders or from creditors affiliated with them as disguised equity, the interest on which should be treated as dividends.

3.   Interest income and capital gains

Most countries offer either tax exemption or a more favorable tax treatment to capital gains than to ordinary income; the definition of what is a capital gain as distinct from ordinary income varies, however, with a tendency for the capital gains concept to be wider in countries taxing capital gains while the concept of current income tends to be wider in countries exempting capital gains.

One such definitional problem concerns interest. Inasmuch as bonds are issued at a discount, the effective interest may exceed the nominal interest. In some countries, issuers of bonds have used the capital gains tax treatment for bond discounts to get a favorable tax treatment. Legislative measures have been taken to stop this type of abuse by redefining interest to include bond discounts. There is still a problem,

however, insofar as bonds are marketable and can be sold at a gain representing the discount to some exempt entity; if the gain on the sale is defined as a capital gain, the transaction may be a successful avoidance scheme. As usual in this area, legislation reflects taxpayers' inventiveness with some delay.

4.   Interest income and foreign exchange gains

If a loan transaction affects two countries with different currencies, there is the possibility that repayment is offered at a different exchange rate than that prevailing at the time the credit was made. Depending on whether the creditor or the debtor has given or taken up the credit in a foreign currency, he may stand to gain or lose, respectively, depending on the development of the foreign exchange rate.

In a great number of countries, the tax rules governing foreign exchange gains and losses are in a state of flux. First of all, there might be a difference between credits taken up or given in the course of a taxpayer's business, and nonbusiness investment transactions. Second, even within the business sector, some countries recognize a capital gains and loss sector, and there have been cases in which a court has found a taxpayer taxable on his foreign exchange gain on lending in a foreign currency that has appreciated, while at the same time deprived of a compensating loss deduction for corresponding borrowing in the same currency! Even if this type of incongruity is rare, it is still conceivable that borrowing for investment purposes is regarded as a capital transaction, the foreign exchange loss being a capital loss with the restrictions applied to its deductibility. In this respect, a difference is often made between different lines of business.

Even in those cases where the business character of foreign exchange gains and losses is recognized, the timing may be a crucial factor. The traditional accounting principles may prescribe a recognition of losses, while at the same time prohibiting the immediate accounting for not yet realized gains; this kind of incongruity has, however, caught the attention of the authorities in several countries, and efforts are under way to establish accounting rules satisfactory both to the accounting profession and to the tax authorities. At present, it is difficult to say what are the prevailing rules even for one particular country. An international comparison of the tax treatment of foreign exchange gains and losses is a forbiddingly complicated subject.

Table 3. Selected Industrial Countries: Aspects of Tax Treatment of Interest Income

| Country | Tax Exemptions of Interest Income | | | Withholding Tax on Interest Incomes of Residents 1/ | | |
	"Tax-exempt" debt instruments 1/	"Tax-exempt" recipients 1/	General tax exemptions (in national currencies, with equivalents in US$)	Whether interest is subject to withholding	Withholding tax rates (in per cent)	Debt instruments whose interest earnings are not subject to withholding
Australia	. Certain commonwealth or state bonds . tax-free savings certificates . certain bearer debentures of companies, issued abroad	Credit unions; savings banks; provident and other retirement funds; municipal corporations; nonresidents (in part) 2/	--	No	Nil	All debt instruments
Austria	. Certain government bonds (in part) 3/ . savings deposits (in part) 3/	State railways and monopolies (in the national bank; Postal savings bank; retirement and pension funds; nonresidents (in part) 2/	--	Yes	20	Corporate bonds; government bonds ordinary loans; mortgage loans;4/ bank deposits
Belgium	. Certain government loans . certain government-guaranteed debt issues 5/ . savings deposits 5/ . investments in co-operatives 5/ . fixed interest non-indexed bonds	Financial companies (in part); credit associations; 6/ and state-owned enterprises; 6/ nonresidents (in part) 2/	—	Yes	30	Mortgage loans 4/
Canada	--	Municipal and other bodies; public enterprises; 7/ trusts and corporations for: (a) profit-sharing plans, (b) pensions and retirement savings, (c) homeownership savings, (d) education plans.	Up to Can$1,000 ($815)	No	Nil	All debt instruments
Denmark	. Compulsory savings instituted by law	Cooperatives; building societies; certain banks; public utilities; certain superannuation funds; mutual insurance societies; nonresidents	Up to DKr 3,500 ($600) to persons over the age of 67 8/	No	Nil	All debt instruments
France	. Certain government bonds . savings bank deposits (in part) 9/ . certain bank deposits in foreign currency . special deposits 9/ . long-term savings schemes 9/	Agricultural and mutual credit funds; cooperative building societies; investment companies; pension and superannuation funds (in part); 10/ nonresidents (in part) 2/	F 3,000 ($610) on French fixed interest bonds	Yes	10-25 11/	State government bonds; ordinary loans; mortgage loans; 4/ bank deposits
Germany, Fed. Rep. of	. Certain federal government bonds 12/ . homeownership savings 12/ . employee savings schemes 12/	Federal railways; postal service; certain banks and financial institutions; pensions funds; nonresidents (in part) 2/	DM 600 ($255) 13/	Yes	25	Corporate bonds; government bonds; ordinary loans; mortgage loans;4/ bank deposits
Ireland	. Post office savings bank deposits (in part) 14/ . Commercial bank deposits (in part) 14/ . Loans to public manufacturing and export companies (in part) 15/ . National savings bonds 16/ . Public sector (govt., local authority and some public enterprise) bonds 16/	Approved superannuation funds; savings banks; National Insurance (health and unemployment) Funds; nonresidents (in part) 2/	--	Yes	35	Bank deposits; profit-sharing bonds
Italy	. Certain government bonds 17/ . certain post office bonds . selected companies' debt instruments 18/	Certain small cooperatives; Mezzogiorno Fund (in part); credit institutions for loans to regions (in part); pioneering enterprises in Mezzogiorno (in part); nonresidents (in part) 2/	--	Yes 19/	15, 20	Government bonds; selected other instruments

Table 3 (continued). Selected Industrial Countries: Aspects of Tax Treatment of Interest Income

Country	Tax Exemptions of Interest Income			Withholding Tax on Interest Incomes of Residents [1]		
	"Tax-exempt" debt instruments [1]	"Tax-exempt" recipients [1]	General tax exemptions (in national currencies, with equivalents in US$)	Whether interest is subject to with-holding	With-holding tax rates (in per cent)	Debt instruments whose interest earnings are not subject to with-holding
Japan	. Bank and savings deposits [20] . certain bonds and debentures [20] . certain central or local government bonds . savings for formation of employees' assets [20]	Local governments; fully government-owned corporations (railways, tobacco, and salt enterprises); National Health Institutes	--	Yes [19]	20, 35	None
Netherlands	--	Real estate companies; public utilities undertakings; all pension funds; unemployment and sickness insurance funds; investment organizations; non-residents (in part) [2]	f. 700 ($270) [21]	Yes	25	Corporate bonds; government bonds; ordinary loans; mortgage loans; bank deposits
Norway	. Deposits with domestic banks [22] . Deposits with certain savings institutions [22] . Government savings bonds [22] . Bonds issued by debtors [22]	Cooperatives; mutual insurance companies; building societies; savings banks; nonresidents	--	No	Nil	All debt instruments
Sweden	-- [23]	Local authorities; pension funds; benefit (death, unemployment compensation, etc.), societies; nonresidents	SKr 1,600 ($275) [23]	No	Nil	All debt instruments
Switzerland	. Savings deposits [24]	Social security; compensation and staff welfare or provident funds; transportation enterprises; nonresidents (in part) [24]		Yes	35	Ordinary loans; mortgage loans
United Kingdom	. National savings certificates . national savings bank deposits (in part) [25] . certain stocks and loan issues [26] . contractual savings, SAYE [26]	Local authorities; savings banks; issuing departments of certain foreign central banks [27]; approved superannuation funds; nonresidents (in part) [2]	--	Yes	30	Bank deposits; profit-sharing bonds; [28]
United States	. State and municipal government bonds . savings certificates of certain depository institutions (in part) [29]	Pension plans; farmers' co-operatives; nonresidents (in part) [2]	$400 [30]	No [31]	Nil	All debt instruments [31]

Table 3 (concluded). Selected Industrial Countries: Aspects of Tax Treatment of Interest Income

Sources: Income Taxes Outside the United Kingdom, H.M.S.O. (London, loose-leaf service); Foreign
Income Portfolios (relating to Austria, France, Germany, Italy, the Netherlands, and Switzerland)
Tax Management, Inc. (Washington, D.C.) (loose-leaf service); Information Guides on doing business in
countries surveyed (except Austria), Price Waterhouse & Co. (U.S.A.: latest editions); for Sweden and
Switzerland, World Tax Series, Harvard Law School (Chicago, 1959 and 1976), respectively; for Japan,
Taxation in Japan, Haskins and Sells, U.S.A. (1981), and Guide to Japanese Taxes, Yuji Gomi, Zaikei
Shoho Sha (Tokyo, 1981); for Australia, Income Tax Guide, E.F. and I.E. Mannix (Butterworths, Sydney,
1981); The Taxation of Private Investment Income, Guides to European Taxation, Vol. III, International
Bureau of Fiscal Documentation (Amsterdam, loose-leaf service). The rates of exchange of June 1982
(or the nearest month) published in International Financial Statistics are applied to derive the
U.S. dollar amount.

1/ Tax exemption is defined broadly here. It also includes preferential tax treatment, such as a
partial tax exemption, reduced rate of tax, refund of tax, and tax credit. The "tax-exempt" recipients
tabulated here are some of the major categories of recipients listed in the income tax codes of these
countries and are in addition to the charitable, social, and religious bodies, institutions of scientific
research, cooperative societies, agrarian collectives, organizations for low-cost housing, etc., which,
too, are by and large exempt in most of these countries. Neither the list of tax-exempt debt instruments
nor that of tax-exempt recipients is intended to be exhaustive. Withholding tax on interest is subject
to tax credit in all countries except Italy and Japan (see footnote 19 below).
2/ The categories of interest incomes of nonresidents to which the exemption relates are shown in
Table 5.
3/ Tax exemption applies to bond issues (including mortgage bonds) and local government loans of up
to S 100,000 ($6,050) and to interest on savings deposits of up to S 7,000 ($425) per taxpayer in each
case.
4/ But not mortgage bonds, which are subject to withholding.
5/ Guaranteed debt relates to pensions and retirement funds, road fund, and to public enterprises
(airways and railways). Savings deposit interest of up to BF 30,000 ($675). Interest received from
cooperatives of up to BF 1,500 ($35) if total income is below BF 350,000 ($7,890).
6/ Exemption is in the form of reduced rate of tax.
7/ Minimum required government ownership is 90 per cent.
8/ Thirty per cent of interest income of taxpayers with incomes below DKr 50,500 ($8,620), maximum
available deduction being DKr 3,500 ($600) per annum. For taxpayers with higher incomes, tax-exempt
interest is reduced by DKr 50 ($8.50) for each DKr 100 ($17) in excess of the specified limit
(DKr 50,500 or $8,620) which is adjustable annually in line with the price index.
9/ Limited to a maximum savings deposit of F 32,500 ($5,320); only one third of interest on special
deposit with the nonagricultural mutual credit institutions is subject to income tax, limit in regard
to the amount of long-term savings is up to F 20,000 ($3,310) or one fourth of the taxpayer's income,
whichever is higher.
10/ At a reduced tax rate of 10 per cent.
11/ Lower rate applies to issues after January 1, 1965.
12/ Mainly issues of the postwar period (1952-55); includes mortgage bonds and municipal government
debentures. Preferential treatment in respect of homeownership and employee savings schemes is
extended through the payment of limited amounts of tax-free bonuses by government to certain cate-
gories of taxpayers participating in these schemes. Eligible taxpayers under each scheme are those with
annual incomes of DM 24,000 ($10,260). Bonus for home acquisition savings scheme is equivalent to 14
per cent of the annual savings of up to DM 800 ($340) and for employee savings is 16 to 23 per cent on
savings of up to DM 624 ($193); interest earnings on savings under both schemes are, however, taxable.
Homeownership savings bonus is available only when taxpayers concerned do not claim such savings as
tax deductible contributions (see footnote 7 of Table 4).
13/ This exemption from tax applies only on income (joint return) from movable capital.
14/ Interest on commercial bank deposits up to £70 ($125) and from savings banks up to £150 ($270),
with a total ceiling of £150 ($270).
15/ One fifth of interest from such companies is tax exempt.
16/ Exemption usually extends to bonds held by persons not ordinarily resident in Ireland.
17/ As expressly provided in the laws sanctioning their issue.
18/ Under various laws for encouraging sectoral or regional investment in agriculture, mining,
industry, and low-cost housing.
**19/ Withholding tax on interest—in Italy and Japan—in Italy, on all debt instruments
except ordinary and mortgage loans and in Japan whenever the taxpayer has opted for a final with-
holding tax at the rate of 35 per cent.**
**20/ Interest exemption applies to interest received on bank deposits of up to ¥ 3 million ($11,950),
on postal savings deposits of up to ¥ 3 million ($11,950), on national or local government bonds up
to ¥ 3 million ($11,950), and on employee savings of up to ¥ 5 million ($19,920) deposited with
banks or security dealers under a contract, the total tax-exempt savings being ¥ 14 million ($55,770).**
21/ Available only on excess of interest receipts over interest payments, not gross.
22/ Combined interest income from only these sources are exempt up to NKr 4,000 ($660) on joint
return and half this amount on single return.
23/ Most government bonds bought by private investors in Sweden are premium (not interest-bearing)
bonds, winnings on which attract a flat-rate lottery tax of 20 per cent.
24/ Exemption is from the income tax imposed by cantons (not the federal government) as provided
in their respective legislation. Nonresidents are not subject to federal income tax except by way of
withholding tax on bonds, debentures, and interest on bank deposits, which is generally final (not
refundable).
25/ Up to £70 ($105) a year.
26/ The exempt interest relates only to payments received by persons not ordinarily resident in the
United Kingdom. SAYE is a "save as you earn" scheme under which employees participate in a scheme
to acquire shares at 70 per cent of their value by contributing £20 ($36) per month to the scheme;
indexed part of interest income is tax free.
27/ India and Pakistan.
28/ Interest on such instruments is treated as cash dividend.
29/ Applies to tax free savings certificates issued by certain depository financial institutions
(banks, thrift institutions, and credit unions), between October 1, 1981 and December 31, 1982.
Limit on interest earnings on a joint return is $2,000.
30/ This exclusion of dividends and/or interest income on joint returns for 1981 is now reduced to
$200 and relates only to dividends. Starting 1985, taxpayers will be able to exclude 15 per cent of
the net interest income up to $450, net income being net of nonbusiness, nonhome mortgage interest
payments.
31/ Effective July 1, 1983 all interest earnings other than those specifically exempted from
withholding, e.g., minimal interest payments (below $150), certain payments by qualified cooperatives,
and payments to exempt individuals and institutions, will be subject to a 10 per cent withholding tax.

Table 4. Selected Industrial Countries: Tax Deductibility of Interest Expenses of Individuals

Country	Owner-Occupied Housing			Income-Generating Investment	General Consumer Credit
	Whether imputed income taxable	Whether deductibility relates to interest payments, principal (or equivalent savings), or both	Whether deductibility limited	Whether interest payments deductible	Whether interest payments deductible
Australia	No	None 1/	--	Yes	No
Austria	No	Principal and interest 2/	Yes	Yes	No
Belgium	Yes 3/	Interest	Yes 3/	Yes 3/	No
Canada	No	Principal and interest 4/	Yes 4/	Yes 4/	No
Denmark	Yes	Interest	No	Yes	Yes
France	No	Interest 5/	Yes 5/	Yes 6/	No
Germany, Fed. Rep. of	Yes	Savings or interest 7/	Yes	Yes	No
Ireland	No	Interest 8/	Yes 8/	Yes 8/	Yes 8/
Italy	Yes 9/	Interest	Yes 9/	Yes 10/	No
Japan	No	Principal and interest 11/	Yes 11/	Yes	No
Netherlands	Yes	Interest	No	Yes	Yes
Norway	Yes	Interest	No	Yes	Yes
Sweden	Yes	Interest 12/	Yes 12/	Yes 12/	Yes 12/
Switzerland	Yes	Interest	No	Yes	Yes
United Kingdom	No	Interest	Yes 13/	Yes 14/	No
United States	No	Interest	No	Yes 15/	Yes

Sources: Income Taxes Outside the United Kingdom, H.M.S.O. (London, loose-leaf service); Information Guides on doing business in various countries under review, Price Waterhouse & Co. (U.S.A., latest editions); Foreign Income Portfolios, Tax Management, Inc.; Guide to Japanese Taxes by Yuji Gomi, Zaikei Shoho Sha (Tokyo, 1981). Exchange rates for June 1982 (or the nearest month) published in International Financial Statistics are applied to derive the U.S. dollar amounts below.

1/ Mortgage interest deduction ceased to apply to interest accruing after November 1, 1978.

2/ Since 1980, the contribution includes interest on borrowing connected with the building of a house up to a maximum of S 20,000 ($1,215) for taxpayer and spouse and S 5,000 ($303) for each child. Taxpayers are further entitled to receive an allowance for "extraordinary burden" (S 15,000, or $910, on joint return) arising from home acquisition in the first year.

3/ Cadastral income on property, which is not let, is assumed to be imputed income of owner-occupied property; mortgage interest payments are tax deductible in respect of a house occupied by taxpayer, the amount being BF 12,000 to BF 30,000 ($270-$675), depending on the size of the community in which property is situated and the local cost of living, and in addition, BF 1,000 ($22) for each dependent. Interest on income-generating investment is tax deductible to the extent that the deduction does not exceed income derived from property acquired through borrowings.

4/ Deductibility relates to annual contributions of up to Can$1,000 ($815) (lifetime maximum of Can$10,000 ($8,150)) paid to a Registered Home Ownership Savings Plan (RHOSP) for only one residential property to be limited to 20 years. Interest on income-generating investment is tax deductible only to the extent of income generated. However, such restriction is not applicable to investment in equity of a private company and to borrowing incurred prior to the 1982 budget for acquiring rental property.

5/ On interest for the purchase, construction, and major repairs of a principal residence at the rate of F 7,000 ($1,145) plus F 1,000 ($165) per dependent, for a maximum of 10 years.

6/ The deduction against real estate income is on the entire amount of mortgage interest. On income from movable property the deduction relates to the purchase of certain domestic financial assets, for example, shares in investment companies, officially quoted domestic securities, mainly company shares, or interest in a private company.

7/ Housing is usually acquired by means of savings with building associations first and mortgage loans from it thereafter. Homeownership savings contributions are tax deductible, provided taxpayer does not claim housing bonus thereon. Such contributions are, however, a part of "special expenditures" which are tax deductible only up to maximum amounts specified in the tax law. Interest on subsequent borrowing from the loan associations is tax deductible but only up to the amount of imputed income of the house to the owner, the latter being in practice considerably lower than the former.

8/ Except in respect of interest connected with rental income and interest on loans to pay death duties, deductibility of interest payments for all other purposes (currently under review) is restricted to £Ir 2,400 ($3,550) per annum on single returns and double that amount on joint returns. However, effective March 25, 1982, the relief will apply only to interest on mortgage loans for the purchase, repair, or improvement of sole or main residence, and on an interim basis (through 1984/85) on loans then in existence. For new loans thereafter, interest on general consumer credit will be deductible only on loans within specified limits of £Ir 25,000 ($37,000) and £Ir 5,000 ($7,400) for couples. Interest on income-generating loans now available only for trading and rental income and for investment in companies engaged in such activities and in professional partnerships.

9/ Notional income for each cadastral unit represents imputed income. Interest of up to a maximum of Lit 4 million ($3,080) paid on mortgage loans.

10/ The deductibility is limited to the total amount of interest payments multiplied by ratio of taxable to the total income (the latter inclusive of 90 per cent of the tax-exempt interest income).

11/ Two schemes are in existence: (a) an employee contributing to a savings scheme for residential housing for at least three years gets a tax credit of up to ¥ 50,000 ($205) a year; and (b) an annual tax credit equal to 7 per cent of the repayment of borrowing with a limit of ¥ 17,000 ($70) to ¥ 30,000 ($125) (higher amount is available where loan is raised by a formal loan agreement) for three years, based on an incomes mean test (annual incomes of ¥ 8 million, or $33,000, and below). Scheme (a) is being abolished under 1982 Tax Reform with reliefs for houses acquired prior to April 1982.

12/ Interest deductions, available on all borrowings, are restricted so as not to reduce the tax by more than 50 per cent even if the marginal tax rate is higher.

13/ Interest deductions are limited to a mortgage of £25,000 ($44,750) for acquiring a dwelling and for improvements thereto.

14/ Subject to one of the four conditions: (a) on commercial property, it must be on rent for at least six months in a year; (b) taxpayer applying proceeds of borrowing for acquiring a share in an enterprise must either have a material interest in it or act personally in the conduct of trade; (c) proceeds of borrowing are being applied to pay transfer tax or purchase a life annuity; and (d) borrowing is for purchasing or improving land.

15/ Interest on borrowings that are applied for the acquisition of tax-exempt investments (e.g., state and local government bonds) are not tax deductible. The deductibility of interest on all other borrowings is limited to the investment income generated. To the extent that such interest exceeds $10,000 (raised to $15,000 if investor is seeking to increase his minority stockholding in an enterprise to majority), the excess may be carried forward and may be deducted in the subsequent year subject to the same limitations as in the initial year.

Table 5. Selected Industrial Countries: Aspects of Tax Treatment of International Flows of Interest Incomes

| Country | Foreign Interest Income of Resident Individuals | | Interest Payments to Nonresident Individuals | |
	Taxable interest gross or net of tax paid in source country	Type of double taxation relief available	Withholding taxes applicable 1/	Tax exempt interest, if any
Australia	Gross 2/	Foreign tax credit	10	On certain bearer bonds
Austria	Net	Foreign tax credit (in part) and exemption (in part) 3/	0, 15 4/	On convertible bonds; on profit-sharing bonds; on borrowings on local real estate mortgage
Belgium	Net	Foreign tax credit	0, 10, 15	On bank deposits; on registered bonds of banks; on registered government bonds and debt; on registered government bonds and debt instruments
Canada	Gross	Foreign tax credit 5/	0, 15	None
Denmark	Gross	Foreign tax credit	Nil	All
France	Gross 6/	Foreign tax deduction or credit 7/	0, 15 7/	On certain government bond
Germany, Fed. Rep. of	Gross 5/	Exemption (in part); 8/ foreign tax credit (in part); 8/ deduction (in part) 9/	0, 10, 15, 25 10/	On all assets other than bonds
Ireland	Net	None 11/	0, 10, 15, 35	On certain government securities
Italy	Gross	Foreign tax credit 8/	0, 10, 12.5 15 7/	On public loans; on certain qualifying institutions' bonds; on certain bonds issued abroad; on certain public enterprises' bonds
Japan	Gross	Foreign tax credit or deduction	10, 15	None
Netherlands	Net	None 12/	Nil	All interest other than from loan mortgaged by local immovable property and from substantial interest company
Norway	Net	None 12/	Nil	All
Sweden	Gross	Foreign tax credit	Nil	All
Switzerland	Net	None 11/	0, 5, 10, 15	All interest except from bonds and certain registered loans
United Kingdom	Gross	Foreign tax credit 13/	0, 10, 15, 30	On certain government securities
United States	Gross	Foreign tax credit or deduction	0, 5, 10, 15, 30	On bank deposits

Sources: As in Appendix Tables 3 and 4; Corporate Taxation in Europe, International Bureau of Fiscal Documentation (Amsterdam: loose-leaf service); and International Tax Summaries, Coopers and Lybrand International Tax Network, John Wiley and Sons (New York: 1982).

1/ The rates given in the table apply only to interest flows from countries with which a given country has a double taxation treaty agreement. Almost all countries covered here have double taxation treaties with each other and the rates vary in each case depending on provisions of the treaty with specific countries.
2/ Under treaty provisions. For nontreaty countries, interest income that is already taxed in source country is no longer taxable in taxpayer's country of residence.
3/ Exemption of interest on mortgage loans from some specific countries.
4/ Withholding tax applies only to interest on profit-sharing bonds.
5/ Foreign tax credit is available only to the extent that interest earnings are subject to domestic income tax.
6/ With treaty countries; for other countries, on a net basis and no tax credit is granted.
7/ Foreign tax relief is usually by means of deduction of foreign tax paid, but foreign tax credit often applies under tax treaties. Withholding tax applies to interest on loans.
8/ Under some tax treaties, foreign income is exempt from taxation. Credit against domestic tax is prorated to the ratio of domestic tax due to the total taxable income (both foreign and domestic).
9/ At taxpayer's option, foreign tax paid may be deducted from the computation of tax liability in the country of taxpayer's residence.
10/ Only on interest on bonds and mortgage loans.
11/ However, if taxpayer had spent less than ten years in the foreign country from which interest income was derived, he may be allowed some foreign tax credit.
12/ Exceptions: (a) interest on mortgage loans, on foreign sites, immovable property on which tax reduction may be granted on a prorata basis stated in footnote 8 above; and (b) all of specified interest from some specific countries.
13/ Extends even to the applicable highest marginal tax rate.

Financial Sector Framework for Determination of
Interest Rates

1. Expression for the level of interest rates

This simplified framework equates borrowing and lending, each
determined by expected after-tax real interest rates and solves for a
nominal interest rate, i, in terms of an expected after-tax real rate,
r^*, and expected inflation, π.

The negative impact of expected inflation on the borrowing schedule
(indicated below by the negative "λ_1" term) reflects a depressing
effect of expected inflation on the level of investment which arises in
turn from a number of sources, some of which are tied to tax policy.
First, "excess" taxes result from the use of historical cost depreciation
and first-in, first-out inventory valuation in an inflationary environ-
ment. With such methods in use, as they are in the United States, a
rise in expected inflation results in a foreseeable reduction in after-
tax profits, thereby depressing investment. Second, higher expected
inflation has been found in the United States to be associated with
elevated uncertainty about relative prices. Relative price uncertainty
results in turn in reduced investment and a negative shift in the bor-
rowing schedule since most capital is not adaptable to a multitude of
uses. Investment really represents an increased commitment to a given
set of relative prices and is therefore made more risky by increased
uncertainty about relative prices. Finally, if a rise in expected
inflation depresses the equilibrium stock of desired money balances, a
negative wealth effect requires a lower equilibrium level of the after-
tax real interest rate. These effects are discussed, along with others,
in Section III above.

With these considerations in mind, lending and borrowing schedules
are written as

$$L_t = \alpha_o + \alpha_1 (i_t(1-\tau_L) - \pi_t) \qquad \alpha_o, \alpha_1 > o \qquad (4)$$

$$B_t = \beta_o - \lambda_1\pi_t - \beta_1 (i_t(1-\tau_B) - \pi_t) \qquad \lambda_1, \beta_o, \beta_1 > o \quad (5)$$

where $\beta_o > \alpha_o$ and

     t subscript denotes time

     L   = log of lending

     α_1 = elasticity of lending with respect to lender's expected
after-tax real rate, $i_t(1-\tau_L)-\pi_t$

τ_L = lender's tax rate

B = log of borrowing

λ_1 = elasticity of borrowing schedule with respect to expected inflation, which also captures all the other effects of taxation mentioned on pp. 19-20

β_1 = elasticity of borrowing with respect to borrower's expected after-tax real rate, $i_t(1-\tau_B) - \pi_t$

τ_B = borrower's tax rate

Setting equation (4) equal to equation (5) and solving for i_t gives:

$$i_t = \frac{1}{\alpha_1(1-\tau_L) + \beta_1(1-\tau_B)} \left[(\beta_0 - \alpha_0) + (\alpha_1 + \beta_1 - \lambda_1)\pi_t \right] \qquad (6)$$

The simple, tax-adjusted Fisher equation can be derived from equation (6) by setting $\tau_L = \tau_B = \tau$ and

$$\frac{(\beta_0 - \alpha_0)}{(\alpha_1 + \beta_1)} = r^*, \text{ the expected after-tax real rate.}$$

With these conditions satisfied and where $(\alpha_1 + \beta_1) = 1.0$

$$i_t = (\frac{1}{1-\tau}) \left[r^* + (1-\lambda_1)\pi_t \right] \qquad (7)$$

2. **An expression for the volatility of interest rates**

Equation (7) implies an expression for the variance of i (given $\lambda_1 = \tau$):

$$\sigma_i^2 = \left[\frac{1}{1-\tau} \right]^2 \sigma_{r^*}^2 + \sigma_\pi^2 + \left[\frac{2}{1-\tau} \right] \rho_{r_\pi^*} \sigma_{r_\pi^*} \sigma \qquad (8)$$

Since $(0 < \tau < 1)$ implies $[1/(1-\tau)]^2 > 1.0$, the effect of taxation of interest incomes and deduction of interest expenses is to magnify the impact on the variance of nominal interest, σ_i^2, of changes in the variance of r^*, $\sigma_{r^*}^2$. The variance of i_t is likely to be reduced by the negative covariance between r^* and π, $\rho_{r^*\pi} < 0$, which arises in connection with wealth, tax, and uncertainty effects.