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Tax Policy, Regulated Interest Rates, and Saving

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I. Introduction

In many developing countries nominal interest is institutionally fixed at a rate beneath that generated by competitive markets. 1/ While there is considerable variability between countries, a significant factor that exacerbated the interest rate distortions in many countries was the onset of higher rates of inflation in the early 1970s. These distortions to the interest rate reduce the reward to saving and the cost of financing investment leading to an inadequate supply of saving and, potentially, a misallocation of funds between investment opportunities. 2/ While resolution of these problems might be achieved by removing interest rate restrictions, there are circumstances when, for political, legal, or institutional reasons, only partial relaxation of interest rate constraints is deemed possible. This paper considers whether a temporary tax instrument can be employed to generate a level of savings comparable to what would be experienced if the interest rate were set competitively. 3/

The policy setting in which this problem is likely to arise is that of a stabilization plan. In these circumstances, concern will be directed not only toward improving the efficiency of capital markets but also toward strengthening the government's fiscal position and reducing the demands the government places on domestic credit. 4/ As tax revenue measures are likely to be an element of the stabilization plan, the possibility of designing a tax policy with the merit of enabling adjustment of interest rates while being consistent with other stabilization objectives is investigated. More generally, even if the conditions for a competitive financial sector are present, or are likely to develop, the

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1/ For example, in a study of 19 Latin American countries Galbis (1979) found that 17 had used interest rate ceilings more or less comprehensively for the period 1967-76. With the onset of higher rates of inflation in the 1970s most of the countries studied experienced increasingly negative real rates of interest. See Chandavarkar (1971) for an examination of interest regulations in Asia. Further, in other countries independent interest rate adjustments are not available by virtue of their membership of currency unions.

2/ In addition, a "low" rate of interest may result in a flow of financial savings out of the country generating a balance of payments problem.

3/ The use of taxes in this fashion has a well-established tradition. In welfare economics the presence of externalities calls for the use of taxes and subsidies to generate prices that reflect the social opportunity cost of using a resource. Similarly tax-subsidy policies have been considered as an alternative means of achieving exchange rate adjustment. For a discussion of this issue, see Laker (1981). Regarding the interest rate ceilings raised in this paper, the administered interest rate does not reflect the social opportunity cost of current consumption and, as a first step, the possibility of a temporary tax policy to alleviate that distortion is being investigated.

4/ See Beveridge and Kelly (1980) and Kelly (1982) for a discussion of the importance, and nature, of the fiscal content of Fund programs.

direct adjustment of a discretionary interest rate policy to a market-determined policy may not be possible for legal and institutional reasons. 1/ Consequently, in designing an adjustment policy there will be a case for short-run discretionary policy in assisting the transition to a market-determined interest rate. In addition, even if a competitive financial sector arises in the absence of regulation, there may be political factors that mean a viable commitment to deregulation can only be gained by designing an appropriate transitional policy. The probability of attaining political commitment to an adjustment policy will increase if a broader mix of policy instruments can be employed. In sum, a tax policy designed to alleviate interest rate distortions may be useful as part of an adjustment program involving deregulation of the financial sector. While adjustment policies often involve increases in taxes to restrain aggregate demand and/or to improve a government's fiscal position, this paper attempts to show that some tax policies will assist adjustment more effectively than others.

It is concluded that, theoretically, it is possible to devise a temporary consumption tax rate structure resulting in a rate of return to saving equivalent to that experienced if the interest rate were set competitively. These tax rates (which may take the form of a temporary surcharge on the existing consumption tax) can be derived from information on the administered rate of interest, the existing consumption tax rate, the inflation rate, and the "appropriate" real interest rate.

1/ This conclusion is reached by Galbis (1981) p. 15. He goes on to provide the following example of problems which may emerge if such constraints are not recognized: "Consider, for instance, the case where a stabilization plan is put into effect, consisting of a programmed reduction in the rate of increase of domestic credit aggregates (aided by a sound fiscal stance) and a general rise in interest rates designed to sustain the flow of financial resources moving through the financial system and thus increasing investment financing and efficiency. If interest rate controls are simply removed without having yet enacted the set of complementary measures ... to create a competitive financial environment, then interest rates might not be increased significantly by market forces, or still worse, financial institutions might increase the loan rates without noticeably increasing the deposit rates. Thus, this crucial part of the financial reform, necessary to sustain the rate of economic growth during the execution of a stabilization plan, could fail and create short-term difficulties for financing growth from domestic sources together with excessive (destabilizing) capital inflows, and perhaps ultimately cause the stabilization efforts to fail."

In order not to overemphasize the likely effectiveness of the proposed tax policy, some limitations are noted at the outset. First, just as the interest rate may be "sticky," tax rate increases may become "sticky" too, while for the policy to have the desired impact, taxpayers must believe these increases are temporary. Second, the policy will be most effective the broader the base of the consumption tax. Third, the policy is directed toward encouraging the appropriate level of saving and does not influence the cost of borrowing. 1/ Finally, if the policy is to have any impact, the elasticity of saving with respect to the rate of return must be positive and significant. 2/ This is not a limitation of tax policy alone. If the elasticity is either negative or insignificant, the policy concern for the interest rate itself will have a weaker foundation. The policy is not suited to cases where, for political or social reasons, the constrained rate of interest is viewed as permanent. 3/ This results because the policy depends for its effect on relative reductions in tax rates. As such changes cannot be sustained indefinitely, this is yet another limitation.

The paper is organized as follows. In Section II alternative tax instruments that may be employed are considered. Taxes vary in their consequences for the intertemporal price ratio and, hence, for taxpayer consumption and saving behavior and it is concluded that consumption taxes are most suited to influencing the rate of return on saving. Section III examines how broad-based consumption taxes (such as retail sales and value-added taxes) may alleviate interest rate distortions. An assessment of factors influencing the effectiveness of the policy is presented. Section IV considers the consequences of the policy for consumption, saving, and tax revenue. Finally, Section V presents some general conclusions.

1/ This restriction means that the policy can generate the appropriate level of saving, but that it may be misallocated between competing uses. This question is examined in the Appendix.

2/ There is some evidence to suggest that financial savings are responsive to interest rate variation. In 1975, before Argentina relaxed its interest rate regulation, the inflation-adjusted interest rate had reached -68 per cent. The real value of time and savings deposits declined by over 70 per cent in 1975. In subsequent years when interest rates were allowed to rise, deposits rose rapidly and in 1977 they more than doubled in real terms.

3/ Hence, for example, it may not be useful in Islamic countries. For a consideration of financial intermediation in such countries see Karsten (1982).

II. An Examination of Alternative Tax Instruments

This section considers the merits of the income tax and consumption taxes as fiscal instruments for removing the effects of interest rate ceilings. These taxes will be considered in the context of the standard model of intertemporal consumption behavior outlined briefly in the first part of this section.

1. A model of intertemporal consumption behavior

The individual's consumption-saving choice is modeled in a two-period setting. 1/ The individual commences with an endowment in period 1 (say, labor income), denoted by the term Y, and has the decision of allocating the consumption opportunities provided by that endowment between the first and second periods, C_1 and C_2, respectively. Saving implies the decision to consume in the second period and is rewarded by a given real interest rate, r. The consumer maximizes his utility function, which has first- and second-period consumption as its arguments, subject to his budget constraint. The important first-order condition to come from this choice by the consumer is the intertemporal price ratio between C_1 and C_2, which is $(1 + r)$.

The allocation of consumption opportunities between the first and second periods is a function of the real interest rate. At the margin the contribution to well-being from period-2 consumption is $(1 + r)$ times that in period 1. For a given utility level, a higher real interest rate will mean a reduction in period-1 consumption and an increase in saving.

The introduction of an interest rate ceiling results in current consumption becoming less costly in terms of forgone future consumption. Define R^A as the nominal administered interest rate ceiling and r^A as the resulting administered real interest rate. The intertemporal price ratio becomes $(1+r^A)$ and, hence, the distortion is $(r-r^A)$. Just as an interest rate ceiling influences consumption-saving decisions by its effect on the intertemporal price ratio, taxes can have similar consequences through their influence on intertemporal prices, and it is these that will be examined in subsection 2 of this section. To negate the consequences of an interest rate ceiling, a successful tax policy must introduce a counteracting effect on the intertemporal price ratio.

1/ These periods can be of any length. For example, they may be a year or, as in the life-cycle model, be working life and retirement.

2. Alternative tax instruments

a. Income tax

A comprehensive income tax discourages saving and this effect is made worse by the introduction of an interest rate ceiling. To demonstrate the interaction of the income tax and the interest rate ceiling on the intertemporal price ratio, first the income tax is examined in the presence of a competitive market interest rate. Second, it is demonstrated that, while it is theoretically possible to manipulate an income tax so as to overcome an interest rate ceiling, the procedure will be inconsistent with stabilization objectives and impose losses in terms of revenue forgone.

An income tax levied at an equal rate, t^Y, on labor and capital income implies the following budget constraint

$$C_1^Y + C_2^Y/(1+r-t^Y r) = (1-t^Y)Y \qquad (1)$$

where C_i^Y is consumption in period i. As a consequence, the rate of return from postponing consumption is no longer r but $r(1-t^Y)$ and the new intertemporal price ratio is

$$1+r-t^Y r \qquad (2)$$

Income taxes, therefore, discourage saving by reducing the reward to postponing present consumption.

This simple analysis can be developed in several directions. If, for example, an income tax treats capital income favorably (say, by exempting some interest income or capital gains) this tends to reduce the distortion associated with taxing capital income (the $t^Y r$ term) although the distortion to portfolio composition (domestic financial assets versus physical assets) will increase. The introduction of inflation will accentuate the distortion against capital income if income tax is imposed on nominal, as distinct from real, capital income, for then the intertemporal price ratio will become

$$1+r-t^Y R \qquad (3)$$

where R is the nominal rate of interest. 1/ In this case there would be an added distortion against future consumption, as $t^Y R$ is greater than $t^Y r$.

1/ In this paper the Fisherian assumption is adopted by which the competitively determined nominal rate of interest incorporates the rate of inflation so that $R = r + \pi$, where π is the rate of inflation. The interaction term $r\pi$ is ignored.

The introduction of the interest rate ceiling means that the intertemporal price ratio becomes $1+r^A-t^y r^A$. The interest rate ceiling generates an added distortion. While the gross rate of return is reduced ($r^A < r$), so also is the distortion associated with the taxation of capital income ($t^y r^A < t^y r$). Nevertheless, the ceiling on the interest rate increases the income tax distortion in favor of further increases in current consumption and against saving. 1/ If the income tax is levied on nominal interest income then the distortion against future consumption is increased by the tax rate times the inflation rate. 2/

There is a presumption that, as the rate of return to saving has been reduced by both of these factors, there is excessive current consumption. 3/ While the income tax can be manipulated to overcome this effect it is not well suited to this purpose. 4/ Nevertheless, it is useful to consider such a policy for it focuses on a measure of the interest rate distortion and the role of inflation in magnifying those problems.

1/ Define the distortion in terms of the change in price from the neutral case. The distortion with a competitively determined interest rate is

$$(1+r) - (1+r - t^y r) = t^y r$$

and where the interest rate is administered, it is

$$(1+r) - (1+r^A - t^y r^A) = r-r^A (1-t^y)$$

This latter distortion will be greater than the former, or,

$$r-r^A (1-t^y) - t^y r > 0$$

To see this, note that this expression is equal to $(r-r^A)(1-t^y)$, that $r>r^A$, if the interest rate constraint is binding, and that the income tax rate is less than 100 per cent.

2/ The intertemporal price ratio is $1+r^A - t^y R^A$, which implies a distortion of $r-r^A + t^y R^A$. Subtracting the standard income tax distortion of $t^y r$ from this, the expression $(r-r^A)(1-t^y) + t^y \pi$ is derived. Contrasting this with the expression derived in the no-inflation case, the extra positive term $t^y \pi$ is found.

3/ Although if the income effect is significant this may not be so. For a discussion of this issue, see Section IV.

4/ The United States has employed income tax surcharges for stabilization purposes. The major effect of such changes is an income effect with substitution or price effects being of lesser importance. Consequently, adopting a standard life-cycle and permanent income theories of consumption significant changes in consumption behavior would not be expected to be observed. For a discussion of the 1968 income tax surcharge see Springer (1975) and Okun (1977). The analysis in this paper is consistent with their views and suggests that, had consumption taxes been employed, the outcome might have been different. For a statement of this view see Branson (1973).

The income tax (in the presence of interest rate ceilings) generates an intertemporal price ratio, $1+r^A-t^y r^A$, while the neutral pretax intertemporal price ratio is $1+r$. If the income tax is to stimulate intertemporal neutrality, it must exempt capital income (i.e., become a labor income tax) and provide a capital income subsidy to offset the interest ceiling. In other words, the intertemporal price ratio must become $1+r^A + sr^A$, where s is the rate of subsidy on capital income, and this expression must equal $1+r$. The required rate of direct subsidy (solving from this equality) is

$$s = (r-r^A)/r^A \tag{4}$$

While the rate of subsidy is independent of the income tax rate it is, not surprisingly, a function of the difference between the competitive interest rate and the administered rate.

If the interest rate distortion was significant, the corresponding subsidy would be large. However, it is when the specter of inflation is considered that the possibility of enormous subsidies on capital income arises. The income tax price ratio is $1+R^A-\pi-t^y (R^A-\pi)$ if levied on real capital income and $1+R^A-\pi - t^y R^A$ if levied on nominal capital income. If the tax is levied on real capital income the subsidy, s, can be expressed as

$$s = (r - R^A + \pi)/r^A \tag{5}$$

If, more realistically, the income tax is levied on nominal capital income the subsidy can be expressed in terms of the nominal administered interest rate. The subsidy is

$$\begin{aligned} s &= (r - R^A + \pi)/R^A \\ &= (R-R^A)/R^A \end{aligned} \tag{6}$$

The foregoing illustrates that the income tax is not suited to generating intertemporal adjustments to consumption behavior. The scheme is simply not feasible in the context of an economy considering an adjustment policy involving fiscal restraint. This policy would involve substantial budget expenditure and, forgone tax revenue and would generate income effects that run counter to restricting aggregate demand. Nevertheless, the subsidy measure is useful in comprehending the distortion generated by a ceiling on interest rates. It demonstrates the proportional increment to the administered rate that would be required to gain intertemporal neutrality and, with a measure of capital income, some insight into the money value of reduced capital income incurred as a result of the interest ceiling.

b. Consumption tax

The introduction of consumption taxes into the model neither introduces nor alleviates any distortions to consumption and savings decisions. Hence, the distorting effect of an interest rate ceiling on the intertemporal price ratio is unaffected by consumption taxes. Nevertheless, manipulation of the rates of consumption taxation does provide a mechanism by which such taxes can influence the intertemporal price ratio.

If we impose a consumption tax at rate t^c on consumption, C_i^c in each period i, the budget constraint is

$$(1-t^c)\ C_1^c + t^c C_1^c + (1-t^c)\ C_2^c/(1+r) + t^c C_2^c/(1+r) = Y \qquad (7)$$

Maximizing the utility function subject to this budget constraint leaves the first-order conditions the same as in the pretax case and, hence, the relative price of consumption is unchanged. The intertemporal price ratio in the presence of an interest rate ceiling will be $1+r^A$, which implies, relative to a competitively determined interest rate, that it is less expensive to consume currently and, ignoring income effects, that period-1 consumption will be higher and saving lower. The distortion to the intertemporal price ratio is simply $(r-r^A)$, as it is in the absence of taxes. In sum, the consumption tax is intertemporally neutral and, when interest rates are constrained, the resulting intertemporal distortion is not influenced by the consumption tax.

This result depends on the assumption that tax rates are constant throughout. The intertemporal consequences of a consumption tax are particularly sensitive to the tax rates chosen as they directly affect the reward to saving. 1/ An increase in the tax on present consumption is the same as an increase in the interest rate, both of which can be viewed as a subsidy to future consumption. 2/ Both actions generate relative price effects that reduce the price of future consumption. When tax rates vary, the budget constraint associated with a consumption tax becomes

$$(1-t^c{}_1)\ C_1^c + t_1^c C_1^c + (1-t^c{}_2)\ C_2^c/(1+r^A) + t_2^c C_2^c/(1+r^A) = Y \qquad (8)$$

where $t^c{}_1$ is the consumption tax rate in period 1 and $t^c{}_2$ the rate in period 2. 3/ The intertemporal price ratio resulting from the maximiz-

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1/ See, for example, Nellor (1983).

2/ This equivalence is in terms of substitution effects. Income effects differ and this can have important policy implications. This is discussed in Section IV.

3/ The tax rates discussed are the effective tax rates at the retail level. Consequently, if a tax is levied at the manufacturer's or wholesale level, the rates would have to be adjusted to gain the same effect as outlined here.

ation problem is

$$(1+r^A)\ (1-t^c_2)/(1-t^c_1) \tag{9}$$

This equation indicates that the values of t^c_1 and t^c_2 determine whether the consumption tax either encourages or discourages current consumption. For example, if t^c_1 is greater than t^c_2 the intertemporal price ratio is greater than $(1+r^A)$, which suggests that present consumption is discouraged and saving encouraged. The effect of a temporary surcharge on the general consumption tax rate, equal to $(t^c_1 - t^c)$, is to provide the taxpayer with a return for postponing present consumption. For example, if a good, with a consumption tax surcharge, costs $1.10 in year 1 and $1.00 in year 2 when the surcharge is removed, there is an implicit return of approximately 9 per cent (0.10/1.10) to postponing current consumption.

III. Tax Policy and Interest Rate Distortions

The preceding section demonstrates that adjustments in consumption tax rates influence the intertemporal price ratio and hence consumption-saving choices. This section examines how this quality of consumption taxes can be used to alleviate the savings consequences of interest rate ceilings. It concludes that the best approach is to introduce a temporary tax surcharge on the current tax rate with the supporting legislation specifying the lifetime of the surcharge. 1/ If successful, such a policy will remove a significant proportion or even all of the inefficiency generated by interest rate ceilings. The Appendix shows that the remaining welfare cost can derive from a misallocation of funds between different investments. The operation of the proposed policy is, however, subject to many restrictions and some of these are also considered.

1. Adjustment of consumption tax rates

The rates of a consumption tax can be set so that the distortion generated by a ceiling on the interest rate is overcome. The tax rates can be solved by making the consumption tax intertemporal price ratio equal to the neutral pretax price ratio and by rearrangment. Such an exercise suggests that the period-1 tax rate should be

$$t^c_1 = 1 - (1-t^c_2)\ (1+r^A)/(1+r) \tag{10}$$

or, when inflation is relevant,

$$t^c_1 = 1 - (1-t^c_2)\ (1+R^A - \pi)/(1+r) \tag{11}$$

1/ If a country had no consumption tax the same outcome could be achieved by introducing a temporary consumption tax or by introducing a consumption tax with the initial tax rate being higher than that to be subsequently employed.

Setting this period-1 consumption tax rate, or placing a surcharge on the normal tax rate, will influence the intertemporal price ratio in such a way as to offset the interest rate ceiling. For example, consider the following illustration. Assume that the consumption tax rate is 5 per cent, the real market-determined interest rate 2 per cent, the constrained nominal interest rate 5 per cent, and the inflation rate 10 per cent. Then, from equation (11) a first-period tax rate of 11.5 per cent, or a surcharge of 6.5 percentage points, will result in intertemporal neutrality. 1/

There is, however, nothing unique about the tax rate chosen for the first period. The same result could be achieved by announcing, in advance, a reduction in the second-period tax rate or by some combination of increasing t^c_1 and reducing t^c_2. It is evident from equation (9) that the consumption tax intertemporal price ratio is determined by the relative values of the tax rates not by their absolute magnitude. However, this choice will have implications for future tax revenue and the likely effectiveness of the policy.

2. Taxpayer expectations and consumption behavior

A consumption tax surcharge operates as a rate of return on postponing consumption just as the interest rate does. 2/ As noted previously, if a good, with the consumption tax surcharge, costs $1.10 in period 1 and $1.00 in period 2 when the surcharge is removed, there is an implicit rate of return of 9 per cent by postponing current consumption. However, the consequence of this rate of return depends on taxpayer expectations of the tax rate change. The policy developed to generate differences in the tax rates must be credible to taxpayers. Taxpayers must believe that the consumption tax surcharge is temporary.

1/ In both the theoretical and empirical analyses, that follow, it is assumed that one period is a year. For a given tax surcharge the shorter the period over which it applies the greater the effective annual rate of return on saving.

2/ A similar symmetry exists in the use of the tax/subsidy approach to treating externalities. For example, a polluter can be taxed at the marginal social cost of his polluting activity or he can be offered a per-unit subsidy equal to the marginal social benefit of a reduction in pollution for reductions in his activity. Both approaches are equivalent from an efficiency perspective. See Head (1974).

Consequently, while the policy can be designed by various combinons of increases in period-1 tax rates and reductions in period-2 rates, these approaches are unlikely to be equivalent in terms of ir credibility. It seems that a temporary consumption tax increase islated at present would lead to greater taxpayer certainty than a omised future tax rate reduction. Second, this tax policy is only kely to be useful in the short run, because taxpayers are unlikely be convinced of the viability of the long-term relative tax rate ductions required to overcome a permanent interest rate ceiling.

Magnitude of tax rate change

The feasibility of the policy will, among other factors, depend the magnitude of tax rate adjustment required for neutrality. If is adjustment is substantial, then the use of the policy will, correpondingly, be diminished. However, this concern should be kept in rspective for the tax policy may be one element of a program that uld include some interest rate deregulation. In fact, one advantage the tax policy is that it provides a further adjustment instrument, th the consequence that less reliance and, hence, less drastic changes e required for any one policy instrument. Consequently, the following scussion of the magnitude of tax rate change should be viewed as preenting an extreme case, one where complete reliance is placed on the x policy to achieve adjustment to a competitive rate of return on ving. 1/

An indication of the required tax rate variation is shown in Table 1. om equation (10) we can conclude that intertemporal neutrality (defined terms of the competitive interest rate) requires equality between the io $(1-t^c_1)/(1-t^c_2)$ and $(1+r^A)/(1+r)$. Estimates of the second of these pressions is derived from Galbis (1979), who provides a measure of pected real rates of interest on savings deposits, which are used here the r^A term and where r is assumed to be 2 per cent. Given the ues for $(1+r^A)/(1+r)$ in Table 1, the solution for either t^c_1, or , is derived by specifying the tax rate for either period. The closer number, derived in Table 1, is to 1, the smaller the interest rate tortion and, therefore, the smaller the tax rate variation required intertemporal neutrality. Second, the higher the existing consumpn tax rate the smaller, in percentage terms, is the required surcharge. example, consider Argentina in 1971. If the normal consumption tax e was 20 per cent, an 8 percentage-point, period-1 surcharge was uired for intertemporal neutrality, while if the normal tax rate s 10 per cent, a 9 percentage-point, period-1 surcharge was necessary.

1/ The possibility is not considered that an income tax exists and is posing a further distortion on the rate of return. If this is true and e consumption tax is to bear the burden of the income tax distortion, ger changes in tax rates will be required.

Table 1. Estimate of Ratio of Expected Real Rate of Interest to Competitive Real Rate of Interest $(1+r^A)/(1+r)$, 1967-76

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Argentina	0.84	0.84	0.84	0.88	0.90	0.91	0.87	0.85	0.71	0.61
Bolivia	0.98	0.98	1.00	...	...	...	0.99	0.91	0.92	0.90
Brazil	n.a.	n.a.	0.84	0.93	0.99	0.99	0.99	1.00	n.a.	n.a.
Chile	0.78	0.78	0.78	0.80	0.81	0.75	0.53	0.79	n.a.	n.a.
Colombia	0.90	0.89	0.92	0.94	0.93	0.96	0.96	0.93	0.94	0.94
Costa Rica	1.00	1.00	1.00	1.00	0.99	0.99	0.97	0.93	0.92	0.93
Dominican Republic	0.99	1.00	...	...	1.00	0.99	0.97	0.95	0.93	0.92
Ecuador	0.98	0.98	0.98	0.99	0.99	0.98	0.97	0.94	0.93	0.92
El Salvador	...	...	...	...	...	...	1.00	0.98	0.95	0.95
Guatemala	...	...	...	...	...	...	...	1.00	0.99	0.98
Haiti	0.97	0.97	0.97	0.99	0.98	0.99	0.96	0.95	0.92	0.92
Honduras	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.98
Mexico	1.00	1.00	1.00	0.99	0.99	0.99	0.97	0.94	0.92	0.90
Panama	...	...	...	...	...	1.00	1.00	0.97	0.97	0.97
Paraguay	...	...	...	...	...	...	1.00	0.96	0.96	0.95
Peru	0.94	0.92	0.92	0.93	0.94	0.94	0.94	0.94	0.91	0.87
Uruguay	0.70	0.62	0.62	0.64	0.66	0.66	0.66	0.71	0.71	0.88
Venezuela	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.97	0.97

Source: Computed from Table 5A in Galbis (1979). Omitted data points signify cases where the expected real rate of interest exceeds our measure of the competitive real interest rate.

Table 2 illustrates the first-period tax surcharges required for intertemporal neutrality. The values along the top of the table are the existing consumption tax rates, while on the left-hand side the ratio $(1+r^A)/(1+r)$ is shown. As it is assumed that the competitive real interest rate is 2 per cent, this implies particular values for the administered real rate of interest. These interest rates are listed in the second column (r^A%). The table shows that if, for example, the administered real interest rate is negative 8.2 per cent and the normal consumption tax rate 20 per cent, a period-1 tax surcharge of 8 percentage points would be required to yield intertemporal neutrality. For a given administered interest rate the magnitude of the tax surcharge falls geometrically with higher tax rates, while the rate of reduction is greater the lower the administered interest rate. With a given tax rate, the tax surcharge increases geometrically with the interest distortion but the rate of increase is lower the higher the normal consumption tax rate. In conjunction with Table 1, this table can be used to determine the appropriate surcharge for a particular country. Table 1 provides the value of $(1+r^A)(1+r)$ and, together with the normal consumption tax rate, the tax surcharge is defined in Table 2. For example, Mexico has a value-added tax with a 15 per cent rate. In 1970 when the ratio specified in Table 1 is 0.99, a tax surcharge of 0.85 of 1 percentage point would be appropriate. This would result in a temporary tax rate of 15.85 per cent. In 1976 when the ratio had fallen to 0.9, the required tax surcharge was 8.5 percentage points, suggesting a tax rate of 23.85 per cent.

IV. Implications for Consumption, Saving, and Tax Revenue

1. Interest elasticity of saving

Proposals for deregulating interest rates are made so frequently it appears that there is some benefit inherent in the act of deregulation. Of course, it is the economic consequences of market-determined interest rates on which such proposals are based. It is suggested that permitting interest rates to rise to their market level will encourage saving in general, diverting more savings into a financial form, thereby enabling greater resources for investment. This outcome is not, however, guaranteed, as private saving may either rise or decline in response to an increase in the interest rate. An increase in the interest rate raises the price of present consumption relative to consumption in the future and, as a consequence, the magnitude of future consumption must increase (the substitution effect). Nevertheless, the level of saving--the quantity of resources currently put aside for future consumption--may rise or fall depending on whether or not the income effect of the change in the interest rate dominates the substitution effect toward future consumption. An increase in the interest rate generates a positive effect on income and, hence, encourages additional present consumption.

Table 2. Tax Surcharges

(In percentage points)

$\frac{(1+r^A)}{(1+r)}$	r^A%	t^c%										
		5	7.5	10	12.5	15	17.5	20	22.5	25	27.5	30
0.990	0.98	0.950	0.9250	0.900	0.8750	0.850	0.8250	0.8	0.7750	0.750	0.7250	0.70
0.975	-0.55	2.375	2.3125	2.225	2.1875	2.125	2.0625	2.0	1.9375	1.875	1.8125	1.75
0.950	-3.10	4.750	4.6250	4.500	4.3750	4.250	4.1250	4.0	3.8750	3.750	3.6250	3.50
0.900	-8.20	9.500	9.2500	9.000	8.7500	8.500	8.2500	8.0	7.7500	7.750	7.2500	7.00
0.800	-18.40	19.000	18.5000	18.000	17.5000	17.000	16.5000	16.0	15.5000	15.000	14.5000	14.00
0.700	-28.60	28.500	27.7500	27.000	26.2500	25.500	24.7500	24.0	23.2500	22.500	21.7500	21.00
0.600	-38.80	38.000	37.0000	36.000	35.0000	34.000	33.0000	32.0	31.0000	30.000	29.0000	28.00
0.500	-49.00	47.500	46.2500	45.000	43.7500	42.500	41.2500	40.0	38.7500	37.500	36.2500	35.00
0.400	-59.20	57.000	55.5000	54.000	52.5000	51.000	49.5000	48.0	46.5000	45.000	43.5000	42.00
0.300	-69.40	66.500	64.7500	63.000	61.2500	59.500	57.7500	56.0	54.2500	52.500	50.7500	49.00
0.200	-79.60	76.000	74.0000	72.000	70.0000	68.000	66.0000	64.0	62.0000	60.000	58.0000	56.00

Source: Author's calculations.

In other words, a higher interest rate permits additional future consumption but with a reduction in saving owing to the greater interest income from any given level of saving. Whether or not an increase in the rate of interest will increase saving or not (i.e., a positive or negative saving elasticity) depends on whether the elasticity of demand for future consumption exceeds unity. The more inelastic the demand for future consumption the less likely that saving will increase in response to an increase in the interest rate.

The savings elasticity is consequently a central issue in considering the consequences of tax policy for consumption, saving, and tax revenue. The traditional view, sometimes referred to as Denison's "Law," is that saving is interest inelastic. This view is supported in the review of literature and evidence by David and Scadding (1974) leading to the conclusion that an increase in current taxation will result in a reduction in current consumption of equal magnitude, leaving saving unchanged. In other words, the implication is that taxes and present consumption are perfect substitutes. More recently, however, the view has been expressed that present and future consumption are closer substitutes than suggested by these studies and that, in fact, the savings elasticity is moderately positive. In one notable study Boskin (1978) estimates U.S. elasticities of private saving to be in the 0.3-0.4 range. Others have suggested even higher long-run savings elasticities. 1/ These empirical studies are all based on U.S. data and may not apply, assuming they are correct, to other countries. If we examine developing countries it is not difficult, however, to document cases where financial savings have been responsive to changes in interest rates. 2/ Nevertheless, these experiences do not give any indication whether there is a change in aggregate saving or simply a change in its composition, i.e., an increase in financial saving at the expense of other forms of accumulation. Evidence on the responsiveness of aggregate saving to interest rate variation in developing countries is harder to come by. Mikesell and Zinser (1973) in their survey of the literature on savings behavior in developing countries conclude by noting there is "substantial agreement among the investigators that saving in developing countries is negatively related to net capital imports; that saving is positively associated with exports; and that measured saving is responsive to changes in the real rate of interest" (p. 19) (emphasis added). They go on to note, however, that there is little understanding of the causality involved in these relationships and that there cannot be such an understanding until more adequate data become available. 3/ In sum, it seems reasonable to conclude that the

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1/ See, for example, Summers (1981).

2/ Brazil, Argentina, and Turkey, among others, come to mind.

3/ Hence, Singh (1975) in listing variables that are seen as possible determinants of saving in developing countries concludes, "Two other explanatory variables would have been the level and the change in the rate of interest, but it was not possible to obtain data on these."

view of most economists examining this question is that the savings elasticity is either zero or moderately positive with few, if any, suggesting a negative elasticity value.

2. Elasticity of saving and tax surcharges

The preceding results, while not directly applicable to the analysis carried out in this paper, provide lower bounds on the pertinent elasticity values (i.e., those arising from a surcharge rather than an increase in interest rates). The elasticities estimated by Boskin, and others, are "gross" elasticities of saving with respect to the interest rate that reflect the net effect of income and substitution effects. The rhetorical question being asked in these studies is, How do private savings vary with an increase in the rate of return? As noted previously, the variation in savings is the outcome of a substitution and an income effect that work in opposite directions. Consequently, the empirical elasticity estimates are lower bounds on the pure-substitution elasticity.

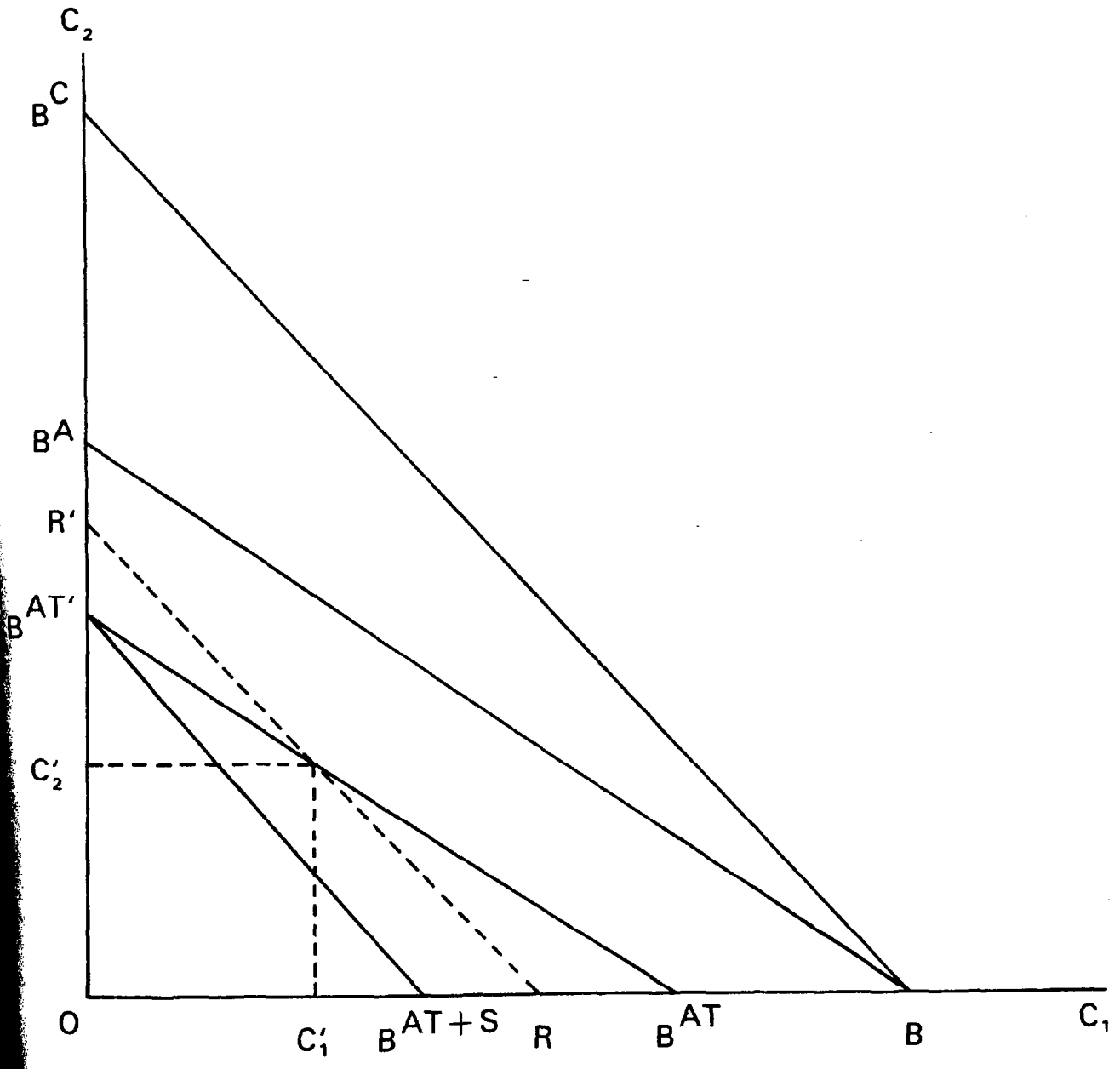
When the rate of return to saving is increased by imposing a tax surcharge on current consumption, the substitution effect operates in the same fashion as envisaged in the empirical studies but, in contrast, the income effect reinforces the substitution effect instead of acting against it. The tax surcharge reduces consumption possibilities leading to a decline in present consumption, which reinforces the substitution effect in favor of future consumption. Consequently, the conclusion, arrived at by empirical analysis, that interest elasticities of saving are zero or moderately positive, bears out with some confidence the statement that the elasticity of saving with respect to a tax surcharge is positive and, conceivably, significant. It is worth emphasizing that this conclusion could hold even if one takes the view that saving is empirically estimated to be interest inelastic. This is a strong result for it suggests not only that the tax policy outlined in this paper will be effective in encouraging saving but that, as a short-term measure, it could well be somewhat more effective than simply raising interest rates.

3. Tax surcharges and saving

The operation of a surcharge on the current consumption tax rate is illustrated in Figure 1. The diagram depicts a representative taxpayer's choice between present and future consumption, C_1 and C_2, respectively. The pretax budget curve, reflecting the administered rate of interest, is shown as BB^A while the budget curve in the presence of competitively determined interest rates is BB^C. The slopes of these lines are those derived previously, namely, $-(1+r^A)$ and $-(1+r)$, respectively. An equi-revenue line RR' is drawn on the assumption that the government discounts tax revenue at the competitive rate of return. If the taxpayer equilibrates on RR', the present value of revenue will be BR. The taxpayer faces the after-tax budget curve B^{AT} $B^{AT'}$, which is based on the normal consumption tax rates. The consumption combination C_1 and C_2 is

Figure 1

PRESENT-FUTURE CONSUMPTION CHOICES: TAX SURCHARGE CASE



chosen by the consumer to maximize his well-being while exhausting his budget. Imposition of the first-period tax surcharge to achieve intertemporal neutrality pivots the budget curve around $B^{AT'}$ until it becomes B^{AT+S} $B^{AT'}$. This indicates that, while period-2 consumption possibilities are unchanged, those in period 1 are reduced. The additional present value of revenue received because of the surcharge (but not necessarily from it) is RB^{AT+S}.

The analysis of the preceding part of this section suggests that cases of zero or positive savings elasticities are the most appropriate to consider. If the savings elasticity is zero, period-1 consumption falls in proportion to the increase in period-1 taxation--unitary consumption elasticity--and total expenditure in period 1 will be unchanged. While period-1 consumption declines, it is replaced dollar for dollar by tax revenue and, as income is given, saving remains unchanged. In this case additional saving will only occur if there is public saving of the additional tax revenue raised. The other side of the coin is that the policy will reduce private demand but that aggregate demand will only be reduced should the government not spend the added tax revenue. On the other hand, if the savings elasticity is positive, period-1 consumption falls more than proportionately to the increase in period-1 tax rates. Total expenditure will fall and savings will rise. Period-1 tax revenue is lower, with period-2 tax revenue not only increasing by the surcharge revenue but also by revenue previously received in period 1. Not only is there an increase in saving but aggregate demand will decline independently of the government's propensity to consume out of current tax revenues, a concern that is applicable in the zero (and negative) savings elasticity case.

4. Tax base and tax surcharges

Many developing countries do not have a broad-based consumption tax, although they do tax consumer durable items and "luxury" items. In practical application of the tax surcharge this may not be an overriding concern, as the response of the taxpayer to the surcharge will depend on the weighted intertemporal elasticity of the items comprising his consumption expenditures. A reasonable distinction would be that nondurable items, such as food expenditures, are likely to be less elastic and, hence, less responsive to tax rate variation. On the other hand, expenditures on durable goods are likely to be more intertemporally elastic. Hence, shifts in durable consumption expenditure would be a predicted consequence of tax rate variation. Such shifts are likely to be larger the more temporary the tax surcharge. Should a general variation in sales tax rates on goods such as food be ruled out, a large measure of the intertemporal shifts in consumption may be achieved by varying tax rates on durables or, depending on the composition of imports, by varying import tax rates. Nevertheless, it remains true that the broader the consumption tax base the more effective the policy will be. If the base includes all consumption goods and rates are uniform, then the sole

substitution effect in consumption consequent on a tax rate change is intertemporal, if it is not, then there will be shifts across consumption goods within the period as well as intertemporal shifts. 1/

V. Conclusion

The object of this paper has been to consider a tax policy measure that could alleviate, if not eliminate, distortions associated with administered interest rates set beneath market-determined values. While the first best measure may well be to remove the interest rate controls, this may be viewed as unacceptable in the short term for either political, legal, or institutional reasons. As a consequence, it has been attempted to define a tax policy that could possibly assist a country's move toward financial deregulation. Such a policy should be viewed as either providing time to enable a country to develop the appropriate legal and institutional structures for financial deregulation or, even if that is not a concern, to provide an additional policy instrument so that the burden of adjustment can be distributed over more than one policy instrument.

While both income and consumption taxes can be employed to influence the rate of return on saving so that it approximates a competitively determined interest rate, the consumption tax is more suited to this task. The rates of the consumption tax can be adjusted to achieve this by placing a temporary surcharge on the current consumption tax rate. To set the appropriate tax surcharge the policymaker simply requires information that is generally available: an estimate of the inflation rate, the appropriate real interest rate, the administered interest rate, and the current consumption tax rate. For a given administered interest rate the tax surcharge is smaller the greater the normal tax rate. At any normal consumption tax rate, the tax surcharge increases geometrically with the interest rate distortion, although the rate of increase is lower the higher the normal consumption tax rate.

While theoretically straightforward, it would be misleading to suggest that the application of this policy would be equivalent to a deregulated financial sector. It would be necessary to consider whether it is at all possible to impose *temporary* tax rate increases, or more precisely whether taxpayers believe in the temporary nature of the surcharge. For the proposed tax policy to be effective, the consumption tax must have a broad base; to the extent this is not met, the policy will be less effective. On the other hand, the proposed tax policy can have some advantages over deregulated interest rates in relation

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1/ Unless the consumption of leisure is totally inelastic there will always be some substitution in the current period.

to a stabilization program. In the evaluation of the implications of the tax policy for saving it is concluded that, depending on government expenditure policy, a greater increase in saving than would be experienced as a result of interest rate deregulation might be expected. Second, while deregulating interest rates will generate additional budgetary problems, by increasing interest payments, the tax policy proposed avoids these problems and, in fact, adds to tax revenues and, therefore, is more likely to be consistent with a country's fiscal adjustment needs.

Tax Policy as an Interest Rate Substitute

The interest rate has consequences for current consumption, saving, and investment behavior. For saving, the interest rate serves as the reward for holding assets and thus influences the individual's decision to consume or save out of current income. The interest rate influences investment by determining the cost of borrowing funds and/or the opportunity cost of investing funds already held. The interest rate also influences the composition of an individual's portfolio of assets between domestic financial assets, foreign financial assets, and physical assets that may be held for capital gain. At the margin the saver will seek to equate the after-tax rate of return from holding each of these assets. The equilibrium interest rate is equal to the marginal rate at which lenders are willing to exchange future for present consumption and to the real marginal rate of return expected on investment opportunities available to borrowers.

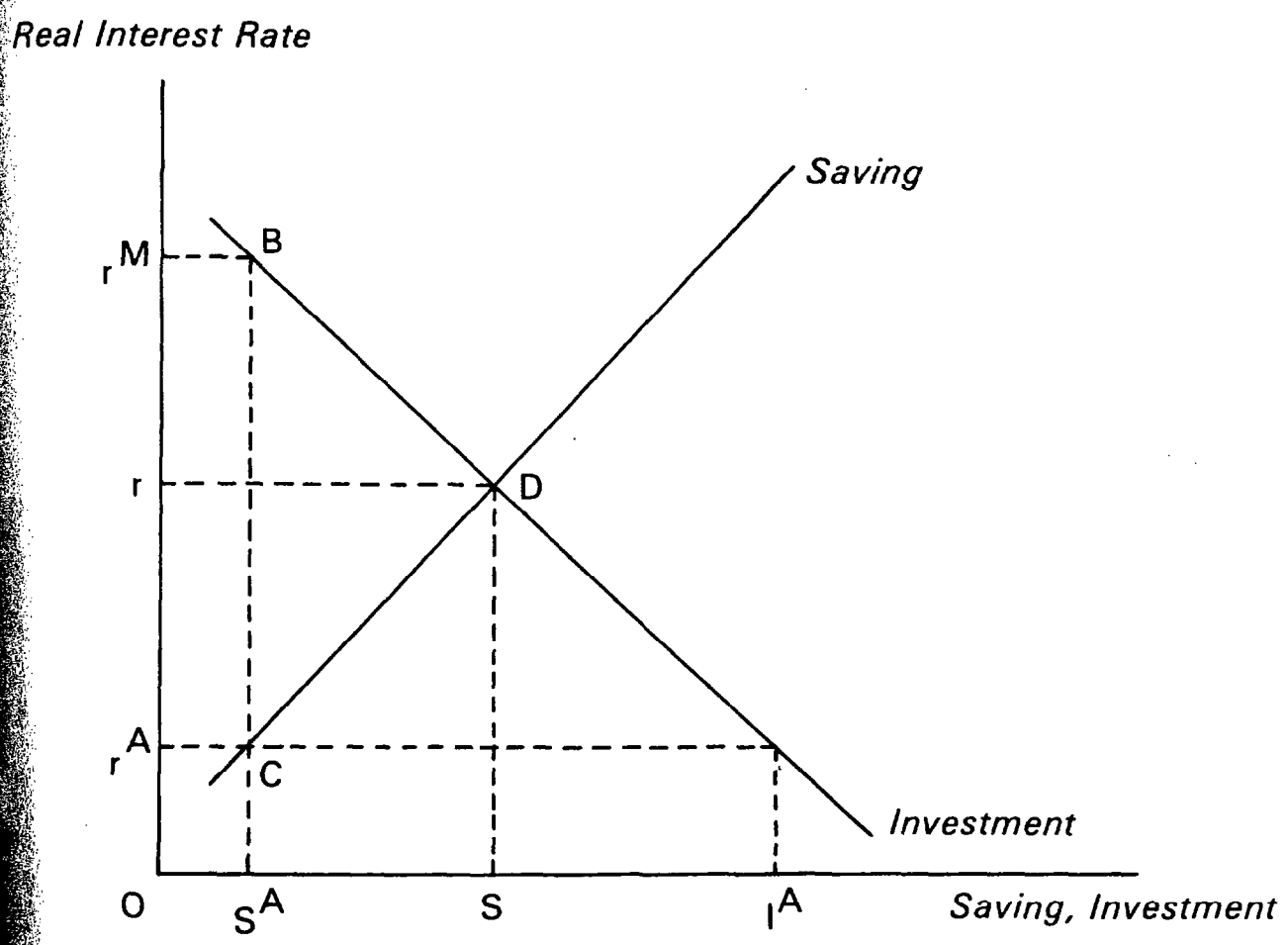
In this paper the analysis is partial and restricted to an examination of the saving, or lending, side of the market. As a consequence, while a tax policy to change the rate of return to saving may be employed, the cost of debt finance to investors remains the administered interest rate. The consequences of this differential treatment of savings and investment is illustrated in Figure 2 which shows the magnitude of saving as a positive function of the real rate of interest while investment demand varies inversely with the real interest rate. 1/ A competitive market generates a real interest rate, r, where the demand for funds from investors is equal to those provided by savers. If the interest rate is administered and set at the value r^A, the demand for funds is I^A, which exceeds the supply, S^A. The market clearing interest rate at that level of saving is r^M. With the interest rate restricted to r^A, however, some nonprice mechanism for rationing S^A between the I^A investments considered profitable at that interest rate will necessarily come into operation. The minimum welfare cost of the financial regulation is the triangle BCD. This measure assumes the most profitable of the I^A investments are successful in gaining finance. If this is not the case, the welfare cost of the administered interest rate policy will be higher. In other words, there are two dimensions to efficiency in this context--the magnitude of available investment funds generated by saving and, second, the allocation of whatever funds are available between the competing users.

If taxes can be designed to set the rate of return to savers equal to a competitive rate of return, r, it follows that the first form of inefficiency, the magnitude of available funds, can be eliminated. With

1/ The implications of the slope of the savings function are considered in Section IV.

Figure 2

SUPPLY AND DEMAND FOR FUNDS



savers experiencing a rate of return, r, they save S. Investment demand remains at I^A as investors still face the administered rate of return, r^A. Once again, nonprice rationing of available funds must take place. It is interesting to note in this case that <u>if</u> available funds go to the investments promising the greatest returns there is <u>no welfare cost</u> associated with the financial regulation. Consequently, a policy directed solely at saving would, if effective, remove a significant proportion, and at best all, of the inefficiency generated by administered interest rates.

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