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Optimal Tax/Expenditure Competition Strategy of Governments in the Presence of Time Inconsistency: The Case for Investment Tax Abatements

Prepared by Daniel P. Hewitt *

Authorized for Distribution by Ke-young Chu

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Abstract

Businesses which seek the location that offers the highest profitability are likely to consider tax incentives and the level of government services available. However, once a business commits itself to a locality, high moving costs render it vulnerable to future tax increases or denial of government services. Fear of time inconsistency will lower expected business profitability in a region. This paper indicates that a developing country or locality can attract a higher level of capital with a tax abatement scheme which provides a subsidy (funded by a capital income tax) equivalent to moving/setup costs.

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Contents

Summary

A business contemplating setting up operations in a country or in a locality will naturally assess the impact existing and future policies on expected profits. Expectations of unfavorable time-inconsistent policies will diminish expected profits.

This paper examines the optimal tax/expenditure competition strategy of a local government attempting to attract business capital. In the first case considered, because business capital is costlessly mobile, stable government policy prevails. The welfare-maximizing government policy is to impose a zero tax on business profits and to supply an attractive level of business government services (such that the sum of the benefits equals the marginal costs).

If established firms face substantial moving costs, a local government might find it beneficial to pursue a time-inconsistent strategy by attracting business through favorable policies and then later imposing taxes on established firms or decreasing public expenditures on services. Potential entrants will be aware of this temptation, however, and factor such inconsistent policies into their calculation of expected profits. Thus a time-inconsistency dilemma arises. Greater freedom in policy formulation diminishes community welfare because fewer firms are willing to locate in the community.

This study suggests a tax abatement policy to solve the time-inconsistency dilemma. The policy entails an initial subsidy to new businesses equivalent to setup/moving costs--i.e., the nonmalleable portion of capital investment. The community funds the subsidy via a business income tax set at exactly the same proportion of income as the initial subsidy was to total investment. This scheme eliminates the time-inconsistency option for the government. If the community increases its business income tax in the future, firms could exit the community and make better profits elsewhere.

These results can be applied with caution to developing countries trying to stem capital flight and attract foreign investors. Residents often invest funds abroad because they are unsure of future government policies. The tax abatement policy provides a form of insurance against time-inconsistent government policies. Capital controls over capital flight have the opposite effect. Since such controls increase moving costs for firms, they limit the entry of foreign capital and encourage domestic capital flight. Thus, a tax abatement scheme could induce welfare-enhancing investment in a small open economy. Limited access to capital markets and an associated shortage of funds may, however, limit the ability of developing countries to institute such a policy.

I. Introduction

A business firm's location decision is one of the many extremely important choices that determine profitability. Economic analysis indicates that businesses will, on average, seek the nation or locality that offers the highest intertemporal rate of return. The factors that influence the expected profitability within a community can be partitioned into three categories. The first category consists of the physical attributes of a location, such as geographic proximity to sales markets or the presence of natural resources. The second category consists of the market-determined attributes such as the cost of local inputs. The third category consists of the politically determined attributes, such as the level of business taxes and government amenities. Although the exact impact of government policies on profitability is empirically difficult to quantify, it is clear that they can have an enormous influence on local capital formation--capital flight from certain nations and certain depressed regions is evidence of the potential negative effects of government policy on business locational decisions. 1/

This paper investigates the intertemporal optimal tax/expenditure policy of government in a small open economy. Within the community, production is carried out using two factors. One factor is in fixed supply, land. The other is a partially mobile factor, business capital, which seeks the community that provides the highest expected profits. The local government competes for capital by choosing the level of a local (nonrival) business public good and tax rates on capital and on land. The goal of the community is to maximize the value of land or, equivalently, the steady-state (net of tax) level of returns to the fixed factor. Although the analysis is framed in an urban setting, the results can be equally applied to a small nation which competes with other nations for business investments. In the international setting, since national boundaries place limits on the degree of labor mobility, the factor that is in fixed supply is labor. The goal of government

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1/ There is extensive controversy regarding the responsiveness of businesses to fiscal incentives. Originally, empirical studies were unable to confirm the impact of fiscal incentives, see Gramlich (1977) and Mueller (1979) for a review of these negative findings. However, subsequent research has found support for the efficacy of such incentives; for example, see Papke and Papke (1986), Bartik (1986), and Eberts (1986). Furthermore, government policymakers certainly give serious attention to these effects.

policy is then to maximize the steady-state level of wages in the country (net of taxes). 1/

In the first case examined, capital is costlessly mobile. The initial results confirm previous findings [Gerber and Hewitt (1987a, 1987b), Zodrow and Mieszkowski (1987)] that the optimal local policy is to supply the public good at a level that equates marginal costs with the marginal community output increase (associated with the last unit of the government service). 2/ Furthermore, government supplies the business public good at no cost to businesses; funding comes entirely from a tax on returns to the factor in fixed supply.

The second case studies government policy where business capital is only partially mobile. Although the notion that new businesses are relatively mobile is widely accepted, once a business commits itself to a region or nation its mobility is limited by the extent of relocation costs and the presence of nonmalleable capital. High moving costs render businesses vulnerable to policy whims of present and future governments, for example, tax increases, denial of government services, nationalization. In a completely static community (or a shrinking community that does not expect new capital formation) government will find that the option to pursue a time-inconsistent strategy dominates maintaining fixed expenditure/tax policies. The government can best serve its objective of maximizing the average return to the fixed factor by first attracting businesses to settle in the locality with a zero tax regime and generous levels of public services and then by switching tax/expenditure regimes to provide tax relief to local residents.

The possibility of a change in policy regimes creates a dilemma. When a community has a reputation problem, business fears of a policy change will lower the expected rate of return. Consequently, a lower level of business capital will choose to locate in the community. In certain cases, it may prove to be impossible for a community to attract business capital, even if viable competitive investment opportunities exist, and thus, business fears of time inconsistency could force

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1/ In the case of a nation, the intuitive interpretation of the mathematical formulation is less appealing because the government maximizes the asset value of an input. In the case of labor, the concept of an asset value is meaningless. However, asset values are simply a means of quantifying an intertemporal flow of income. Thus the objective of the government is to maximize the discounted returns to labor without regard to the timing of these returns.

2/ This supply rule exactly coincides with the Samuelsonian rule for the provision of public goods if the object of government were to maximize community output and the quantity of capital were fixed.

localities to subsidize businesses in order to bolster local capital formation. 1/

The analysis below offers a solution for a community with a reputation problem; a tax abatement scheme which, by altering the timing of tax payments, eliminates the adverse consequences of the time inconsistency option. The tax abatement scheme initially provides new businesses with a subsidy equivalent to setup/moving costs. The community subsequently imposes the maximum tax on the firm: the highest tax that does not induce exit. Because the level of the maximum tax is a function of the setup costs, expected tax revenues will just equal the cost of the subsidy. For this reason, the scheme is financially equivalent to a zero tax on businesses. The scheme provides insurance against time inconsistency because the firm has the option to exit the community if government raises taxes above the announced level or if the community withholds expected government services. In this manner, the community can induce more firms to enter without having to provide an intertemporal subsidy. 2/

Several other papers have offered different justifications for tax holidays. In Gerber (1986), risk averse firms have a known probability of going bankrupt each year. Since a tax abatement policy lowers the variance associated with profits, it diminishes business risk without altering the average expected return. In Bond and Samuelson (1986), the productivity of a country is unobservable and a revenue-neutral tax holiday can attract more firms by providing a signal of the profitability of a community. Thus the analysis herein is unique in that the tax abatement scheme is shown to increase expected return to businesses in a community by eliminating the time inconsistency option.

The study is organized in the following manner. Section II presents the framework of the analysis. Section III analyzes the tax abatement policy. Section IV examines the implications of the results for developing countries. Section V then discusses some further implications of the tax abatement policy.

II. The Behavior of Government and Businesses

Consider a small open economy: either a locality within a federation or a small national economy. Local production is carried out

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1/ Furthermore, communities in a more precarious financial state will have to provide more generous subsidies because businesses will be more fearful of a crisis that will precipitate a change in policy regime.

2/ This paper offers the tax abatement policy as a solution to the time inconsistency dilemma for communities that do not in fact intend to utilize a time-inconsistent strategy. An analysis of when the tax abatement strategy will dominate a time-inconsistent strategy is left to future research.

with an immobile (nontradable) factor, A, which could be either land or labor, and a partially mobile factor, K, which represents capital. 1/ In the case of a community within a federation, A is land--labor is available in unlimited quantities at a fixed price. In the case of a small (developing) country, the nontradable factor might be thought of as labor--land is available at a fixed price because of the option of converting agricultural land to industrial use. 2/

The community produces a composite consumer good, X,

$$X = F(A,K;G), \tag{1}$$

where G is the level of a local public good. The local public good consists of transportation facilities and other forms of social overhead capital that improve the milieu for production in a community; it is nonrival, increased levels of K do not cause congestion in the use of G. The production function is assumed to be homogeneous of degree one with respect to A and K, given the level of G. The analysis examines the per unit output of A, x, as a function of k, the capital-land ratio,

$$\begin{aligned} X/A &= x, \\ K/A &= k, \\ x &= f(k;G) . \end{aligned} \tag{2}$$

The market factor prices are equivalent to the marginal productivity of A, α, and the marginal productivity of capital, ρ,

$$\begin{aligned} \rho &= df/dk, \\ \alpha &= x - kdf/dk . \end{aligned} \tag{3}$$

1. Government optimization

The above framework leads to an uncontroversial goal for the government: maximization of the value of the fixed asset, A, or equivalently maximize the steady-state return to A. In the case of a community within a federation, this amounts to maximizing the land value of the community. In the case of a country, this means maximizing the

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1/ The community may or may not actually own some of this factor itself. It is irrelevant to the problem analyzed in this paper.

2/ All production functions implicitly incorporate unlisted inputs which are considered of secondary interest, such as raw materials and intermediate goods, in the functional form. In this analysis, the production function changes form in terms of which factors are implicit and which are explicit depending upon the type of community being analyzed.

steady-state level of wages. 1/ The goal is equivalent to maximizing community net income or disposable income and therefore welfare. The mobility of capital means that domestic capital income is determined by world market conditions.

Government tax revenues are obtained from a two-part tax on business capital. The first part, σ, is an initial levy (or subsidy when negative) on incoming businesses that is proportional to the level of the initial investment, K. 2/ The second part, θ, is a proportional tax on capital income (ρK) or a corporate income tax. In addition, the community employs a proportional tax, τ, on returns to the fixed factor (αA) .

The analysis examines alternative equilibria. Therefore, the underlying values of F and K remain constant in each steady state. 3/ Furthermore, the government policy parameters, θ, σ, τ, and G remain the same over time, once they are chosen. This construction ensures that both α and ρ remain constant, and allows the analysis to proceed by determining asset values rather than yearly totals. 4/ The steady-state asset value of tax revenue, R, from a tax regime instituted at time zero is,

$$\begin{aligned} R &= \sigma K + {}_0\int^{\infty} \theta\rho K e^{-rt} dt + {}_0\int^{\infty} \tau\alpha A e^{-rt} dt \\ &= \sigma K + \theta\rho K/r + \tau\alpha A/r \ , \end{aligned} \tag{4}$$

where r is the government's opportunity cost of capital and t is time. Thus, R represents the present value of future tax payments to the community in the steady state determined by the production function, F, the level of capital, K, and the level of A.

Government expenditures can be characterized as yearly payments needed to maintain a given quality of infrastructure. Although, in

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1/ The analysis herein is consistent with the traditional public finance objective of identifying optimal government behavior without examining the motivations of government per se. The object of this research is to provide a basis for advising governments on the policies that will maximize the welfare of citizens. Although there is no need to suppose that governments actually function in this manner, there are compelling reasons why government might want to maximize the community income.

2/ Throughout, this will be an initial subsidy which represents the value of the tax abatement.

3/ It is possible to incorporate such factors as technological advances, depreciation, and growth into the analysis. However, the added complexity is unwarranted in this case.

4/ This implies that the community has free access to capital markets to borrow or invest funds at the going rate of interest, r.

practice, providing infrastructure normally involves a large upfront payment and smaller maintenance expenditures in subsequent years, these expenditures can be translated into a yearly cost, γ. The total level of government expenditures over time, E, can be represented as,

$$E = \int_0^{\infty} \gamma G e^{-rt} dt = \gamma G/r \qquad (5)$$

Thus, E is the present value of the total expenditures required to maintain the level of infrastructure represented by G. 1/

Given this framework, government seeks to maximize the value of the community's fixed asset, V,

$$V = \int_0^{\infty} \alpha A(1 - \tau) e^{-rt} dt = \alpha A(1 - \tau)/r$$

by choosing the level of σ, θ, τ, and G. In order to evaluate this maximization problem, further consideration of the behavior of firms is required.

2. The behavior of firms

Business capital seeks the location that offers the highest rate of return. Given the production function above, the attractiveness of a region is determined by local input prices, α, the quality of local infrastructure, G, and the level of local business taxes, σ and θ. All of these are outside the influence of an individual business and, for the present, businesses expect them to remain at their present level in the future. The expected return that a firm receives when investing a unit of capital into a locality is,

$$\pi = \int_0^{\infty} \rho(1 - \theta) e^{-rt} dt - \sigma = \rho(1 - \theta)/r - \sigma, \qquad (6)$$

given a steady-state level of ρ (the marginal product of capital) and a constant tax regime. Total business profits consist of πK while total tax payments are $K(\sigma + \rho\theta/r)$. The firm will not enter a community unless it expects to receive a level of return that is at least as high as the expected return in the next best alternative. The worldwide expected level of return is designated as π^*.

III. Steady-State Solutions

1. Time-consistent policies

Government seeks to maximize the steady-state rate of return to the fixed factor, subject to the constraint that its budget balances

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1/ By necessity, γ incorporates government inefficiencies in production resulting from mismanagement and corruption--γ is not an idealized minimum cost of supply but rather the actual anticipated cost.

($R \geq E$) and that the expected profits in the community are high enough to attract and retain business investments ($\pi \geq \pi^*$). Given the above framework, the government maximization problem is,

$$\text{Max } V(\sigma,\theta,\tau,G) = \alpha A(1 - \tau)/r + \Gamma(\pi - \pi^*) + \mu(R - E), \tag{7}$$

where Γ and μ are Lagrangian multipliers. Substitution from (2), (3), (4), (5) and setting $R - E = 0$ yields, 1/

$$\text{Max } V(\sigma, \theta, G) = [X - \rho K(1 - \theta) - \gamma G]/r + \sigma K + \Gamma(\pi - \pi^*). \tag{7'}$$

Additionally, from (6) and by defining K so as to set $\pi^* = 1 = \Pi$ yields,

$$r/\rho = (1 - \theta)/(1 + \sigma), \tag{8}$$

and, through substitution,

$$\max V(\sigma, \theta, G) = (X - \gamma G)/r - K. \tag{7''}$$

The solution is,

$$\frac{\partial V}{\partial \sigma} = \frac{\partial X}{\partial K}\frac{dK}{d\sigma}\frac{1}{r} - \frac{\partial K}{\partial \sigma} = 0 \tag{9a}$$

$$\frac{\partial V}{\partial \theta} = \frac{\partial X}{\partial K}\frac{dK}{\partial \theta}\frac{1}{r} - \frac{\partial K}{\partial \theta} = 0 \tag{9b}$$

$$\frac{\partial V}{\partial G} = \left(\frac{\partial X}{\partial G} + \frac{\partial X}{\partial K}\frac{\partial K}{\partial G} - \gamma\right)/r - \frac{\partial K}{\partial G} = 0, \tag{9c}$$

which from equation (3) yields,

$$\rho = r \tag{9b'}$$

$$\partial X/\partial G = \gamma + (1 - \rho/r) . \tag{9c'}$$

From (8) and (9b'), it is apparent that $\theta = -\sigma$ and consequently, from (4) and (9b'), no net taxes should be collected from businesses. The simplest case would be to set $\theta = \sigma = 0$ and thereby avoid the cost of administering the tax. However, the steady state will be unaltered by different alternative combination of taxes that maintains the relationship $\theta = -\sigma$ (recall that $\sigma < 0$ means that businesses receive an initial subsidy or tax abatement). 2/

Substituting (9b') into (9c') yields the second optimality rule, $\partial X/\partial G = \gamma$. This rule matches the standard Samuelsonian supply rule for public goods: choose G such that the marginal community output

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1/ Since $\alpha A(1 - \tau) = (X - \rho K)/r - \tau\alpha A$ and $\tau\alpha A/r = \gamma G/r - \sigma - \theta\rho K/r$.

2/ Gerber (1986) obtains a similar result in a slightly different setting.

equals the marginal cost of supply. The efficiency properties and the intuitive meaning of these results have been examined in Gerber and Hewitt (1987a, 1987b). In the simplest terms, the community's mission of maximizing return to its fixed factor implies no tax on the variable factor and supplying the optimal level of infrastructure to business at no charge (provided the consumption of G is nonrival). 1/ The community should neither offer a subsidy in order to attract firms nor impose revenue-raising taxes on business. The subsidy would induce businesses to enter that would impose a net burden on the community; 2/ the tax would deter businesses from entering that would provide net benefits.

2. Moving cost and time inconsistency

The above results depend crucially on costless mobility of capital. In the case of the location of new businesses or new branches of established businesses, the mobility assumption is a reasonable approximation. However, established businesses normally have considerable moving/setup costs associated with changing locations. These create an opportunity for the locality to take advantage of the established firms by imposing a revenue-raising tax on businesses or decreasing infrastructure expenditures.

Consider a business that is already established in a given community with a capital base of k and potential moving costs of m per unit of capital (total moving costs of mk). The moving costs present the locality with the opportunity to impose a revenue-raising tax on the firm; the level of the revenue-raising tax on business is limited only by the extent of the moving cost (too high a tax will induce firms to relocate). The maximum tax, $\bar{\theta}$, is the minimum tax that will induce the firm to relocate,

$$\pi^*(1 - m) > \rho(1 - \bar{\theta})/r. \qquad (10)$$

If all businesses in the community are identical, and the community is in the steady state where $\rho = r$, the maximum tax that the community can impose on the business is $\bar{\theta} = m$. 3/ This policy would raise taxes with a present value equal to $m\rho K/r$ and lead to a higher steady-state rate of

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1/ The corollary to this is that to the extent that a business does impose a cost to the community via externalities, Oates and Schwab (1988) or via congestion, Baum (1987) and Gerber and Hewitt (1987b), the tax on business capital should be an effluent charge or a congestion fee.

2/ Several articles indicate that when substantial unemployment is present, the community may find it beneficial to subsidize new business entrants. Gerber and Hewitt (1987a) indicates that a redistribution motivation could warrant subsidizing businesses.

3/ There is a set of maximum taxes that depend on the value of ρ in the community relative to r. However, below it will be clear that $\bar{\theta} = m$, the supremum, is relevant for this analysis.

return to the fixed asset because of a lower tax rate, $\tau' = \tau - mk\rho/\alpha$. Thus the community could raise the annual return to A by $m\rho K$ or raise property values by a factor of $m\rho K/r$. This clearly superior outcome results from loosening the constraint in (7'). Any locality in a static steady state has an incentive to engage in the time-inconsistent strategy of imposing the maximum tax on business profits. 1/ However, such a policy will have a reputation/expectational effect on prospective new investors in the community.

3. Optimal tax/expenditure policy with time inconsistency

The time inconsistency option for communities will alter the expected return to firms. 2/ Consider the case where a firm expects that at some time in the future, i, the locality will change policy regimes and impose the maximum tax on the firm. The expected profits of the firm are now altered to

$$\pi = {}_0\int^{i}\rho(1-\theta)e^{-rt}dt + {}_i\int^{\infty}\rho(1-m)e^{-rt}dt - \sigma$$

$$= \frac{\rho(1-\theta)}{r}\left[1 - (m-\theta)e^{-ir}\right] - \sigma \quad . \qquad 3/ \qquad (11)$$

The level of i represents the business' mean expected date of the government's change in policy regime; its level is dependent on the nature of the government, the present fiscal situation in the community, and the anticipated future fiscal situation.

Consider now a community that does not intend to use a time-inconsistent strategy. In the presence of business expectations of time inconsistency, the community is faced with two different constraints. The annual tax rate must not exceed the maximum tax, (10), and expected profits must match or exceed the return available elsewhere, (11). The community maximization problem, (7'), is thus,

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1/ Alternatively, consider a steady state that is not static, for instance, when depreciation requires continual new investment to maintain a given level of capital. In this case, the community would benefit from imposing the revenue-raising business tax on established firms while exempting new capital expenditures.

2/ Due to the nature of the maximum tax described above, there is no trigger strategy that firms could use to prevent time inconsistency. A threat by firms to exit if the government uses a time-inconsistent strategy would not be credible. Provided the tax is set such that $\theta < m$, it is always more profitable for businesses to continue operation in the community until the plant totally depreciates.

3/ This assumes no risk aversion, see Gerber (1986) for an analysis of a setting where risk aversion in the presence of a risk of bankruptcy leads to the use of tax abatements.

$$\text{Max } V(\sigma,\theta,G) = \frac{(X - \gamma G)}{r} - \frac{pK(1 - \theta)}{r} + \sigma K \qquad (12)$$

$$\text{subject to:} \quad (1 - m) \leq (1 - \theta)\rho/r \,,$$

$$\frac{(1 + \sigma)}{1 - (m - \theta)e^{-ir}} \leq \frac{\rho(1 - \theta)}{r} \,.$$

Since the first constraint functions as a boundary condition on the second constraint, it can be shown that the optimum is the corner solution characterized by $m = \theta = -\sigma$. 1/

The above finding, the main result of the paper, proves that a tax abatement strategy is the optimum in the presence of substantial moving costs. The fear of time inconsistency on the part of a firm, all other things equal, lowers the expected rate of return in a community; in effect, the time inconsistency threat causes the constraint on the community to become worse, equation (11). The community would therefore like to foreswear time inconsistent policies in order to return to the maximization problem in (7''). However, there is no way to provide such a guarantee legally. A new political party or a new regime might renege on inherited commitments. Furthermore, even if a constitutional protection exists preventing a tax increase, the locality could implement a time-inconsistent strategy by decreasing infrastructure expenditures. No such guarantee is feasible on the infrastructure side. Even without specific intentions to engage in a time-inconsistent strategy, a fiscal crisis would precipitate an increase in the marginal cost of government funds, which would induce a decrease in the optimal level of expenditures on infrastructure. Such a policy would in turn lower the average rate of return to capital.

The tax abatement policy, the solution to (12), offers an alternative policy for the community because (7'') and (12) are equivalent at $m = \theta = -\sigma$. The tax abatement policy eliminates the possibility of time inconsistency on the part of the community. This comes about because the initial subsidy, σ, is so high that θ has to be set at its maximum, i.e., equal to m, in order for the community to recover the cost of σ (since $\sigma < 0$, it is a subsidy). If the locality attempts to raise its business income tax rate above the prescribed level, or lower infrastructure expenditures, the firm can simply move to another community and receive a higher expected rate of return. Certainly the established firms will now have a credible threat to thwart time inconsistency tendencies of the government. Thus the community is providing insurance against its own time-inconsistency problem.

1/ The solution is obtained by evaluating V at $\theta = m$ and at $\theta = 0$ and noting that the former exceeds the latter. In addition, $\partial V/\partial\theta > 0$ throughout. Therefore, $\theta = m$ is the maximum.

The tax abatement policy can be characterized as a joint venture operation. Essentially, the community and the firm become business partners. The community assumes a portion of the initial capital costs in exchange for the right to the same portion of the future profits, collected in the form of tax receipts. If the community tries to increase its share of profits, the business can relocate and secure its expected share of the profits.

IV. Applications to Developing Countries

The analysis of capital mobility is of particular interest to developing countries. One factor often cited to explain low growth rates is insufficient capital formation due to capital flight and limited inflow of foreign capital. The analysis herein suggests that the low level of capital formation could be the result of a number of common government practices. Since investors are interested in obtaining a high rate of return, capital flight would be induced by a high rate of capital income taxation and fears on the part of domestic and foreign investors of time-inconsistent tax/expenditure strategy. Ironically, if time inconsistency is a factor, currency controls and capital controls will actually induce capital flight. Since these controls essentially increase moving costs associated with business ventures, they lower the equilibrium level of capital formation in the country. Thus, the results of this study suggest that free movement of capital as well as a tax abatement policy will increase capital formation. 1/ Another implication is that domestic investors should be accorded the same investment incentives as foreign investors.

An issue of particular importance in developing countries is the question of the discount rate for funds. One crucial feature of the proof of the desirability of the tax abatement policy is that the investor and the government have the same rate of discount. If the government has a lower rate of discount than the investor, the conclusions are reinforced; it is always advantageous for a government to lend money to legitimate investors if government funds are less costly than private funds. However, some might argue that a developing country that is undergoing a fiscal crisis has a high discount rate and any policy that sacrifices current government revenues would be difficult to implement. Indeed, the tax abatement policy is a long-run growth strategy. It entails a decrease in current revenues in order to increase the capital stock of the nation and thereby increase output and

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1/ In fact, a further implication is that capital controls will increase the initial cost of the tax abatement policy by increasing moving costs.

future tax revenues. 1/ Therefore, it may not be advisable as a short-term strategy. On the other hand, such countries may have a greater need than others for the tax abatement policy. Since the fiscal crisis itself is widely believed to be a deterrent to capital formation, the tax abatement policy could be a crucial ingredient to the long-run solution to the country's problems.

V. Conclusion

This paper has investigated the optimal intertemporal strategy of a community in the presence of partially mobile capital. The results indicate that a locality can attract the highest sustainable level of capital via a tax abatement policy. The policy provides an initial tax abatement or capital subsidy to each new business equivalent to moving/setup costs. The subsidy is then funded by a tax on capital income at a rate equivalent to the ratio of setup costs to the total initial investment. The system will provide businesses with a guarantee that they will not be subject to time inconsistency on the part of the government because the relocation costs for the business will at all times equal the present value of tax payments. Furthermore, the present value of total tax payments will just equal the cost of the subsidy for a business that earns normal returns. Therefore this system implies a zero intertemporal tax on new businesses.

The tax abatement scheme is in fact a modified version of a cash flow tax system. In a cash flow tax system, as opposed to an income tax system, businesses can deduct all expenditures, whether they represent direct costs of doing business or capital expenditures. However, normally there are no refund payments in the cash flow system when tax liability is negative (as is to be expected in the first years of operation). Instead, negative tax liability is used as a tax offset in future years. Such an arrangement does not provide sufficient protection against time inconsistency. The tax abatement policy works only if the companies actually receive an initial subsidy. Therefore, the results of this study suggest that local governments should institute a cash-based income tax system that provides for actual reimbursement by the government in the years when capital expenditures cause the tax liability of a business to be negative.

1/ Although the policy prescription bears a resemblance to what is popularly known as "supply side economics," the two models are fundamentally different. Supply side models generally operate in a closed economy and depend upon the saving response and labor response of domestic economic agents for growth. However, in the domestic market the income effect can offset the substitution effect and therefore the level and even the direction of the response is uncertain. In an open economy, economic growth is fueled by the immigration of economic inputs. Since in such a setting there is only a substitution effect, the results have a much firmer foundation.

A very serious administrative difficulty arises in the selection of the tax level for each business. Different businesses will have different ratios of setup cost to size of operation and therefore they should be assigned different subsidy-tax levels. Over-estimating the level of moving/setup cost could be quite costly. If the government were to provide an initial subsidy that is too high, firms will find it advantageous to accept the subsidy and immediately move to another locality. Therefore, there is a danger that governments will place themselves in a situation where businesses have the potential to exploit the community. A practical solution is for governments to establish different tax-subsidy rates for different categories of businesses. By constructing the categories so that firms are grouped by similarity of setup costs, the government can put in place a proper incentive system. Ironically, new businesses are likely to bargain for a higher rate of taxation in order to receive a higher subsidy. In order to protect against possible fraud, the government should be certain to use conservative estimates of set-up costs.

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