

1992 TDRI Year-End Conference on
Thailand's Economic Structure: Towards Balanced Development?

**Required Returns on Investment by
Small and Large Firms in Thailand: Case of
Capital Differentials and the Fiscal Environment**

The 1992 Year-End Conference

***THAILAND'S ECONOMIC STRUCTURE:
TOWARDS BALANCED DEVELOPMENT?***

Background Report

**Required Returns on Investment by
Small and Large Firms in Thailand:
Case of Capital Differentials and the Fiscal Environment**

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**December 12-13, 1992
Ambassador City Jomtien,
Chon Buri, Thailand**

Contents

	Page
List of Tables	v
List of Figure.....	vi
1. INTRODUCTION	1
2. ARGUMENTS FOR INVESTMENT INCENTIVES IN GENERAL.....	2
2.1 Externalities of Investment	2
2.2 Second best Arguments.....	3
2.3 Information and Credibility.....	4
3. ARGUMENTS FOR PREFERENTIAL INCENTIVES TO SMALL FIRMS	5
3.1 Capital Market Difficulties	5
3.2 Externalities	6
3.3 Barriers to Entry	6
3.4 Fiscal Disadvantages	6
3.5 Regulatory Bias.....	6
3.6 Second best Arguments.....	7
3.7 Conclusion.....	7

4. POSSIBLE SOURCES OF ANTI-SMALL-FIRM BIAS IN THAILAND	7
4.1 The Corporation Income Tax	8
4.2 Indirect Taxed.....	9
4.3 Trade Policies	10
4.4 Application of Discretionary Policies.....	13
4.5 Difficulties on Attracting Workers and Entrepreneurs.....	15
5. SMALL AND LARGE FIRMS IN THAILAND: SOME STYLIZED FACTS.....	15
6. THAILAND'S FISCAL SYSTEM.....	18
6.1 The direct Tax System	18
6.2 The Indirect Tax System	20
6.3 The Board of Investment.....	20
7. MEASURING FISCAL DISTORTIONS: AN INTRODUCTION	
TO MARGINAL EFFECTIVE TAX RATES	23
8. THE MEASUREMENT OF R_G AND R_N FOR DIRECT TAXES	26
8.1 Case 1: Profit-Making Unpromoted firms.....	29
8.2 Case 2: Profit-Making Promoted firms	29
8.3 Case 3: Promoted firms in Temporary Loss Positions	31
8.4 Post-Tax Returns on Savings: The Effective Marginal Personal Tax	33
9. DATA AND ASSUMPTIONS	34

10. ESTIMATES OF HURDLE RATES OF RETURN TO INVESTMENT.....37

11. TAXES AND HURDLE RATES OF RETURN.....43

Appendix: Debt-Equity Ratios and Hurdle Rates of Return.....48

Bibliography.....53

List of Tables

	Page
Table 1 Average Level of Registered Capital (Excluding Land) for BOI Promoted Firms	17
Table 2 Average Level Registered (Excluding Land) for New Firms	17
Table 3 Hurdle Rate of Return, Case 1: Unpromoted Profit-Making Firm	38
Table 4 Hurdle Rate of Return, Case 2: Promoted Profit-Making Firm	38
Table 5 Hurdle Rate of Return, Case 2A: Promoted Profit-Making Firm (with Depreciation Carry-Forward)	39
Table 6 Hurdle Rate of Return, Case 3: Promoted Firm in Temporary Loss Position	39
Table 7 Marginal Effective Tax Wedge, Case 1: Unpromoted Profit-Making Firm	45
Table 8 Marginal Effective Tax Wedge, Case 2: Promoted Profit-Making Firm	45
Table 9 Marginal Effective Tax Wedge, Case 3: Promoted Firm in Temporary Loss Position	46

List of Figure

	Page
Figure 1 Marginal Effective Tax Wedge.....	25

Required Returns on Investment by Small and Large Firms in Thailand: Cost of Capital Differentials and the Fiscal Environment¹

1. INTRODUCTION

The purpose of this study is to investigate differences in the investment environments faced by small and large firms in Thailand. We begin by reviewing the various possible sources of bias against small firms, and discussing some of the policy issues raised by these biases. We then present a methodology which is used to estimate differences in the required rates of return for different types of investment for both small and large firms in Thailand. We finish by estimating of the direction and magnitude of the biases imparted by Thailand's fiscal system and investment promotion policies. The fiscal system, broadly defined, includes direct and indirect taxes, the instruments of trade policy, economic regulations, such as those administered by the Board of Investment (BoI), and various forms of licensing of economic activities.

¹ This work has been financed under an institutional cooperation agreement between TDRI and Queen's University, funded by the Canadian International Development Agency (CIDA). We are especially indebted to Dr. Mingsarn Kaosa-ard and Khun Thitima Songsakul of the Sectoral Economic Studies Program at TDRI for their assistance in gathering data necessary for this study, and to Christopher LeBlanc at Queen's for computational help.

In evaluating these effects of the fiscal system, there are two separate, but related issues to consider. The first is whether the fiscal system itself imparts a negative bias against small firms either explicitly or implicitly. If so, the “playing field” is not level and a case could be made on policy grounds for making it so. The second is that there may be reasons why the fiscal system should treat small firms *preferentially*. The operation of the market economy itself may be biased against small firms, thereby making it efficient for policy to compensate. Or, there may be certain externalities that result from the operation of small firms which might justify preferential treatment. The first few sections will serve to put the study into context by reviewing briefly the sorts of arguments which might justify fiscal incentives to small firms. Our focus throughout will be on the interaction of fiscal incentives with the investment, or capital, decisions of firms, although some of the same arguments apply to current decisions as well.

Incentives for investment are widely used policy instruments, and can take a variety of different forms. In developing countries, common instruments are tax holidays, investment tax credits, import tariff remissions on capital equipment and raw materials, protection from imports, and assistance in financing, including low interest loans and equity participation. There are a variety of economic reasons that can be given for investment incentives, although it will be ultimately a matter of judgment as to whether the incentives are justified in a given case. It is useful to begin by summarizing the arguments for providing fiscal incentives to investment in general before turning to the treatment of small firms in particular.

2. ARGUMENTS FOR INVESTMENT INCENTIVES IN GENERAL

The arguments for providing fiscal incentives for investment can be classified in three different types as follows.

2.1 Externalities of Investment

Recent literature on growth theory has stressed the fact that the rate of technical progress may be linked directly to the rate of investment.² There are various reasons for this connection between the rate of productivity growth and investment. One is simply that new technology is embodied in new investment. Another is that investment is associated with the

²See Lucas (1988), and Romer (1986)

development of entrepreneurship and with learning by doing. Also, new investment may be accompanied by new products. Finally, there may be economies of scale and network externalities associated with agglomerations of capital invested in a given location. For investment incentives to be justified on this basis, it must be the case that the rewards from the technological advances which come with new investment are not entirely appropriated by the firm doing the investment. That is, there must be externalities. This will be so if the technical change involves the dissemination of knowledge and information which becomes more widely available than to the firm undertaking the investment. Also, if the innovation involves learning by doing on the part of entrepreneurs or workers, this can also benefit other firms if the persons involved change employers.

2.2 Second Best Arguments

Subsidies to investment might be justified if distortions elsewhere in the economy imply that investment is below its second best optimal level. The literature on cost-benefit analysis has traditionally emphasized this rationale for investment incentives, or equivalently for attributing a shadow price to investment which is below its market price. There are several sorts of distortions which might be used to justify this. Capital markets themselves may be distorted. In a particular country, capital markets may be "thin" and inefficient, so that savings are not effectively mobilized and risk is not traded efficiently. There may be too little saving because of tax and other fiscal distortions, or because there are externalities from saving itself. A common one mentioned in the literature concerns the fact that there may be an externality involved in saving for future generations which individuals do not take into account e.g., see Sen (1967), Marglin (1963). There may also be distortions on other markets which causes investment to be too low. Underemployment and unemployment of labour may cause the wage rate to over-cost labour. Similarly, trade distortions may overvalue the exchange rate. In these cases, investment incentives which encourage employment and which apply to tradable goods and services sectors may be called for. Monopoly distortions in output markets or monopsony distortions on input markets may also result in too low levels of activity. Public policies may be used to encourage competition in these markets. Finally, distributive considerations might justify investment incentives. In developing countries, the instruments for redistributive policy may not be well-developed. In this case, encouraging the employment of labour through investment incentives may serve distributional objectives. Many of these arguments for intervention may be found in the classic cost-benefit manuals of Little and Mirrlees (1968) for the OECD, and Dasgupta, Marglin and Sen (1972) for UNIDO,

and have been recounted since by other authors (e.g., by various persons in the World Bank such as Ray (1984) and Squires (1989)).

While it is relatively easy to think up possible second-best arguments for subsidizing investment, it is not so easy to say whether they apply in a given set of circumstances. To give an example, the existence of widespread unemployment as well as wage differentials between rural and urban sectors has commonly been used to justify the claim that shadow wages are below market wages. However, these differentials may be equilibrium phenomena which ought not to be corrected by policy. In applying second-best arguments for fiscal incentives, the onus should be on the proposer to identify clearly the way in which the market is behaving inefficiently. Otherwise, the incentive can introduce inefficiencies of its own. Furthermore, if an inefficiency is identified as being, say, the result of some policy of the government (such as trade policy), it is generally more efficient to change the offending policy directly rather than to address its consequences indirectly through fiscal incentives.

2.3 Information and Credibility

A related argument for fiscal incentives arises from their use to convey information to potential investors. The origin of this argument is the application of information and game theory to economics, particularly the so-called principal-agent approach. There are two related themes to this argument. The first is that potential investors, in deciding where to invest, may not have full information about the potential rate of return in various countries because of conditions that are specific to each country. These conditions may include the public policy climate and the state of local labour markets. Investment incentives can be used as a "signalling device" to show potential investors the benefits of investing in the country. Better countries are able to signal themselves as better by offering better incentives. Of course, there is a cost to signalling since the country has to give up resources to be convincing. It naturally raises the question as to whether there are cheaper ways for investors to become informed about a country. If several countries are comparable in their ability to signal, the use of tax incentives could result in competitive bidding for investment (i.e. tax competition) which ultimately works to the benefit of the investor alone.

The second reason for using investment incentives to convey information concerns the *inability of governments to commit themselves to future policies*. Once investors have entered a country, their capital becomes essentially a fixed factor. It is, therefore, tempting for governments to capture the rewards of that fixed factor by taxation, expropriation or other

policies. Governments face what is referred to as a “time consistency” problem. Since potential investors recognize that governments are time inconsistent and cannot commit their successors to future policies, the end result is underinvestment. In these circumstances, investment incentives can be a rational response.

3. ARGUMENTS FOR PREFERENTIAL INCENTIVES TO SMALL FIRMS

The above reasons for investment incentives do not necessarily apply to small firms in particular, although they may call for selectivity of policies to particular forms of activity. Since we are concerned in this study with reasons for addressing policies to small firms in particular, it is worth identifying the sorts of arguments that could be used to justify using fiscal incentives specifically for these types of firms. Again, whether the arguments will apply in a given case is a matter for judgment. The following is a list of possible reasons why we may want to be especially concerned with small firms. Most of them rely on arguments as to why small firms are put at a disadvantage in markets rather than by government policies.

3.1 Capital Market Difficulties

It can be argued that small firms face more difficulties in obtaining access to capital markets than large firms for a variety of reasons. The markets themselves may be thin and underdeveloped and may not offer the types of financing that are most valuable to small firms, such as venture capital financing. There may be fixed administrative costs associated with getting outside financing (preparing a prospectus, engaging lawyers and accountants, obtaining a license, etc.) which reduce their ability to obtain finance. Small firms may have much more reliance on outside funding than large firms since they do not have accumulated profits and their cash flows are often small or negative because they are starting to grow. To the extent that collateral is required by the banking system, they may be less able to provide it since they have less previously accumulated assets. They may also be relatively risky compared with large firms and capital markets may not be efficient at trading risk. Large firms can to a much greater extent insure themselves by diversification.

3.2 Externalities

Small firms may also be more susceptible to some of the externalities of growth than large firms. They are the training ground for new entrepreneurs and are more likely to be doing new investment rather than replacement investment. New investment may incorporate relatively more innovation and new technology than replacement investment. They might also be more important in terms of training new workers for the broader market since workers may have less attachment to them than is the case for larger established firms. These are presumably the sources of the so-called infant industry arguments in the trade literature. Small firms, after all, are the large firms of the future.

3.3 Barriers to Entry

Small firms may also face special barriers to entry and growth in the market economy because of the ways in which particular industries are organized. If the industry already has large firms in it, the latter may be able to impose barriers to entry and growth of small firms. These include not only natural barriers to entry arising from fixed costs, but also artificial barriers in the form of predatory pricing and advertising.

3.4 Fiscal Disadvantages

The fiscal system of the country may discriminate against small firms, if only implicitly. For example, the tax system may work to the disadvantage of firms which are in a loss position, or which engage in riskier activities, and these conditions may apply relatively more to small firms. The tax system may also favour firms with internally-generated equity financing (retained earnings) or outside debt financing rather than with new equity. The same might be true of the trade policies of the government. For example, large firms may be better able to obtain tariff remissions (duty drawbacks) than small ones.

3.5 Regulatory Bias

The regulatory process itself may favour large firms. It might be easier for large firms simply to obtain licenses. If the country operates its investment incentives system by the use of discretion rather than automatic rules, and most developing countries do so, large firms may be better treated either intentionally or otherwise.

3.6 Second Best Arguments

Finally, small firms may have certain characteristics which call for preferential treatment on second best grounds. For example, they may be more labour intensive than large ones, and they may employ lower income workers. Thus, if the shadow prices of their labour is lower for these reasons, preferential treatment may be justified.

3.7 Conclusion

These various arguments suggest that special attention should be given to assisting small firms on one of two grounds. First, small firms may be facing policy-induced disadvantages in the existing fiscal system. Second, small firms may be worth giving preferential treatment to on either externality grounds or on the grounds that they are discriminated against by the market. Whether the latter exists is a matter of judgment. However, a good case can be made for ensuring at least that the policy playing field is a level one.

Our intention in this study is not to argue which of these conditions apply in Thailand. Those more familiar with the institutions of the country will be in a better position to judge that. We would instead like to lay out some information which will assist advisors and policy makers in making these judgments. As well as documenting some of the potential sources of discrimination against small firms that may exist in Thailand, we will present some illustrative calculations to show the possible types of distortions than exist in one part of the fiscal system — the tax system.

4. POSSIBLE SOURCES OF ANTI-SMALL-FIRM BIAS IN THAILAND

It is important to identify sources of discrimination faced by small firms as a prelude to recommending corrective policies since the appropriate policies will vary with the former. Thailand's fiscal system as well as the state of development of its capital and labour markets is similar to that of other developing countries. It offers investors incentives to invest through the Board of Investment (BoI). This is done on a discretionary basis although the criteria for promotion are well documented. It also operates a protective trade policy and offers some incentives to firms through exemption from such policies. Much of its tax revenues are obtained from indirect taxes, particularly the recently-introduced value-added tax (VAT). Its

financial markets are still in the early stages of development. For example, its stock market activity has recently expanded rapidly, and the entire financial system has undergone considerable deregulation. Finally, its redistribution policies are essentially based on employment creation rather than the tax system or the provision social services. We will discuss in more detail the specifics of the fiscal system in the next section.

In an economy such as Thailand's, there are many possible sources of bias against small firms. Some of the possible disadvantages faced by small firms include the following.

4.1 The Corporation Income Tax

The corporate tax system in Thailand is not unlike that in many countries. As such, it contains various biases against small firms. The most obvious of these is the absence of full loss offsetting. That is, firms in a loss position are not able to claim immediate credit for their "negative" tax liabilities. They can carry forward losses for a number of years. However, they do so without interest, and the length of time they can carry losses forward is limited. Since small firms are more likely to be in a loss position, they are likely to be especially adversely affected by this. Furthermore, given that small firms may have difficulty getting access to outside capital, cash flows are particularly important to them. Thus, the inability to make good on negative tax liabilities is of particular cost to them.

The corporate tax system may also inadvertently discriminate against small firms as a result of its structure. In particular, there may be certain types of deductions which are fairly generous but which small firms are unable to take advantage of to the same extent as large firms. One example of this is the interest deduction. This is of great advantage to firms that use debt financing, especially in times of inflation since it is based on nominal rather than real interest rates. However, its value to small firms is limited by the fact that they are less able to finance by debt. Other types of deductions which are favourably treated by the tax system are certain capital costs which are allowed to be written off quickly even though their value accrues over a longer period of time. Examples include intangible capital costs such as advertising and marketing costs, research and development expenditures, and the costs of training labour. These are all basically written off immediately even though they are capital costs. They are also likely to be of more value to large firms since they tend to be fixed costs. Indeed, some of them can be viewed as artificial barriers to entry used by dominant firms to compete with smaller ones. Thus, in a sense, the tax system supports barriers to entry to small firms. Finally, the asset structure of small firms may be such that the tax system puts them at a

disadvantage. For example, they may have relatively more inventory capital which tends to be treated unfavourably relative to depreciable capital.

The interaction of the personal and the corporate tax system may also favour large firms. If the personal tax system taxes payments from the firm to shareholders, there will be a tax advantage to the firm from retaining earnings in the corporation. This is referred to as the “trapped equity effect”. Essentially, it provides a tax advantage to firms which invest using more internal financing relative to external. As such, it favours large over small firms.

Of course, to the extent that small firms can escape the tax net entirely, they avoid many of the disadvantages mentioned above. It is hard to know the extent to which this is true. Furthermore, an important distinction must be drawn between *average* taxes and *marginal* taxes. Firms which are taxpaying (i.e. which have positive average tax rates) may nonetheless face negative marginal tax rates. That is, they may have an incentive to invest despite the fact that they pay taxes on their infra-marginal profits. Thus, avoiding taxes may or may not result in a higher level of investment.

4.2 Indirect Taxes

The indirect tax system may also implicitly impose a bias against small firms. Indirect taxes, such as excises, which apply only on revenues and take no account of costs may put small firms at a disadvantage. Small firms may be more strapped for cash flows, and taxes on outputs may strain that further.

The more important issues apply to the operation of the VAT. Firms that have negative cash flows are likely to be in a credit position. That is, their input tax credits are likely to be greater than their tax liabilities on sales. In this case, they should receive a rebate from the government. To the extent that the rebate takes some time to process, and there is some suggestion that this is the case in Thailand, firms in a credit position are put at a disadvantage. Again, this is likely to be of more concern to small firms than to large ones, especially those small firms for whom cash flow is a real constraint. Furthermore, it will be of more importance to firms that are capital-intensive, since they are likely to be the ones which are in a negative cash flow position. Of course, to the extent that firms are small enough to opt out of the VAT entirely, they are neither liable for VAT on their output nor are they able to claim credit for VAT payments on their business inputs. In the long run, these firms are at an advantage since they avoid the tax on their value added. However, in the short run, when their value added for tax purposes is negative, they face a disadvantage relative to firms which

are able to claim credits. Larger firms are less likely to be in a credit position overall, even though they may be on certain projects, since they have tax liabilities elsewhere in their operations against which to offset the credits.

The VAT has been in operation only since the beginning of 1992. Prior to that the main indirect tax was the business tax. The business tax was a turnover tax levied on business transactions at a typical rate of 9 percent. Sectors where there are many stages of production faced a particularly high burden, because of the cascading of the tax. That is, at each stage of production, businesses paid a tax not only on value added, but also on the value of the inputs, which, in turn, had been taxed at an earlier stage. The cascading of the business tax was particularly unfavourable to large manufacturers. However, under the business tax system, there were also further potential disadvantages faced by small firms. The business tax imposed particularly high rates of tax on business inputs, including capital equipment. Firms which were successful in being promoted by BoI were typically given exemption or 50 percent reduction in business taxes and import duties on machinery. This made it particularly attractive for capital intensive and presumably large firms to apply for BoI promotion. To the extent that large firms were more able to attain promotion than small firms, this tax exemption provided considerable advantage. In moving from the business tax to the VAT, this source of possible distortion should in principle be partly removed since all taxes on business inputs should be creditable (subject to the above discussion). That would leave only the tariff on business machinery as a possible source of preferential advantage from the indirect tax system. Thus, the move from the business tax to the VAT should have levelled the playing field in this as well as in many other dimensions.

4.3 Trade Policies

The greatest enemy of the birth and growth of new, small firms is an anti-competitive policy environment. A major component of a restrictive policy regime is a system of trade policies which reduce competition from abroad and reinforce anti-competitive domestic policies. By the standards of most newly-industrializing countries, Thailand has been blessed in recent years by a relatively liberal trade policy regime. This is one of the major explanations for the overall success of Thailand's economic performance in recent years.

Trade policies comprise taxes and various forms of regulations and incentives related to imports and exports of goods and services. Import policies include tariffs applied to imports of goods and services, other non-tariff restrictions on imports, and various measures

providing for exemptions to these measures in particular instances. As we have already indicated, an important part of the BoI incentive package traditionally has been exemptions from import duties on machinery and equipment and on raw materials. Another important case of such exemptions has been the duty drawback and exemption scheme on imported raw materials used in production of goods for export. Although we are not aware of any careful study of this program, it is widely believed that this is one of the most important measures contributing to Thailand's remarkable growth in manufactured exports in recent years. Other export policies include export credit arrangements, and the allocation of quotas for goods subject to non-tariff import barriers in major Thai export markets. Finally, an explicit criterion with respect to the granting of BoI privileges since the early 1980's has been the extent of a firm's orientation to export markets.

Import tariffs are almost always product-specific, and do not vary according to the characteristics of firms producing or importing the goods in question. Therefore the tariff system *per se* does not lead to any direct biases with respect to firm size. Non-tariff import barriers usually do have firm-specific effects which are often biased against small firms. Fortunately Thailand's trade policies have relied very little on non-tariff barriers in recent years. However, the system of import protection clearly discriminates in a major way across sectors. Import protection on a sector's output can provide a substantial subsidy to domestic sales of that product. And restrictions on imports of important inputs can impose a serious penalty on domestic producers who are users of those inputs. The net subsidy, positive or negative, provided by the structure of import protection is commonly measured by the *effective rate of protection (ERP)*. Recent TDRI studies³ have shown ERPs to vary considerably across sectors of the Thai economy. We are not aware of any systematic study of the extent to which this structure of protection is biased in relation to sectors characterized by small and large firms. There can be little doubt, however, that recent policies to promote investment in and production of large scale, capital-intensive basic industrial raw materials, such as plastic resins and their primary inputs, together with other petro-chemical products shifts the balance away from what are characteristically much smaller and more labor-intensive downstream producers of intermediate products and basic consumer goods. The background paper for the 1992 Year End Conference describing a case study of Thailand's plastics sector documents this phenomenon in some detail.

³ See the papers prepared in connection with TDRI's Year-End Conference in 1989 on the general issue of *Thailand in the International Economic Community*.

There are a number of ways in which the different types of duty exemption/drawback schemes and the general move towards export promotion in Thailand's trade and investment policies might be argued to be biased in favor of larger firms.

1. Duty exemptions and remissions on capital equipment as a means to promote industrial development are much more valuable to large, capital-intensive firms than to small, labor-intensive ones. Furthermore, our (limited) casual evidence seems to suggest that smaller firms are likely to use relatively simple types of machines that are domestically made and in which Thailand might not have a strong comparative disadvantage. Thus, the (lack of) opportunity to buy imports is not seen to be of much consequence for such firms. This is much less likely to be the case with large investors.

2. All other things equal, firms producing for export markets will generally tend to be larger than those producing primarily for the domestic market. This is true in part because of economies of scale, which make smaller firms much less likely to be competitive in global markets than they can be in protected (naturally, due to transport costs, and also due to import protection) domestic markets. But this is also due to the likely existence of significant fixed costs involved in overseas marketing that are much less likely to be able to be borne by smaller producers. Thus, even controlling for the type of industry, exporters are likely to be larger, on average, than import substitution producers. Thus any change in the policy regime in favor of exporters will tend to be of greater benefit to large producers.

3. Unlike import protection, most export promotion policies tend to have at least some discretionary component. This is true of duty drawback and exemption schemes, export credit policies, and export quota allocation mechanisms. As we discuss elsewhere, for a firm to avail itself of such discretionary policies usually entails incurring certain fixed costs, similar, in a sense, to those required to establish marketing relationships in export markets. In the same manner, therefore, the discretionary nature of export policies introduces an additional bias of such policies in favor of large firms.

Against these arguments must be weighed several considerations.

1. To the extent that export promotion policies remove the biases of other policies against exporters, they should be thought of more as simply levelling the playing field rather than introducing a new bias. Similarly, it might be argued that duty exemptions on imported capital equipment reduce the biases against large capital-intensive firms due to policies designed to protect the local capital goods industry. This does not affect the arguments made

above about the biases of *discretionary* policies. Nor does it apply to policies which do more than remove the biases of other policies or do so by introducing new biases. For instance, duty exemption schemes for exporters might be administered, inadvertently or as a matter of deliberate policy, in such a way that there is some “leakage” of raw materials intended for export production into the domestic market. This constitutes a pure subsidy to exporters rather than simply levelling the playing field for them. To the extent that exporters tend to be larger than import substitute producers, and/or those who manage to benefit from such leakages are larger than other exporters, the system is biased in favor of larger firms.

2. Although export design and marketing generally involve significant fixed costs and hence tend to be borne more easily by large firms, these costs do not always have to be incurred directly by the domestic firms who produce goods for export. For instance, the method through which a certain amount of athletic clothing and footwear is produced for export is for large foreign buyers to bring ready-made designs and internationally-recognized brand names to Thailand, and to contract out local export-oriented production to large numbers of domestic firms. These foreign buyers might actually prefer to diversify their local production in order to insure against risk and also to generate competition among potential local suppliers. In any case, the local producers in this case do not have to shoulder the fixed costs of export marketing, and can compete solely on the basis of quality and cost of production. To the extent that this mechanism is employed, any biases against small firms that are independent of considerations of efficient scale of production are largely eliminated. Both the quota allocation mechanisms and the duty exemption/drawback schemes for exporters do not seem to impose any significant barriers against this method of organizing export production in Thailand.

4.4 Application of Discretionary Policies

Large firms may find it easier to get investment licenses and to get promoted by BoI (which typically includes duty remissions) than small firms simply because they are better able to cope with the administrative costs of a successful application. Such applications may require the use of accountants and lawyers, and this may be costly for a small firm.

Furthermore, the policies themselves may inadvertently affect small firms adversely. For example, upstream firms may be larger than downstream firms in some industries. If the upstream firms succeed in getting promoted by the BoI, this may well entail protecting their outputs from foreign competition. (Of course, this may happen independently of whether or

not the upstream firms are promoted.) This will make it more costly for downstream firms to operate; that is, it will give them “negative effective protection”. Whether this happens or not depends upon the industry in question. For example, in the petrochemical industry the large upstream firms obtain protection, and this may make it more costly for smaller downstream plastics firms to operate. Of course, in this case, the downstream plastics firms also obtain significant tariff protection. The same argument can also go the other way. If it is the downstream firm which obtains promotion and protection, upstream firms will automatically also be protected to the extent that the former rely on domestic suppliers for their inputs.

It may also be the case that the ability to get promoted by BoI depends upon the size of firm. There is a minimum size of firm that can achieve promoted status. In several industries, that size is fairly small and is, therefore, unlikely to rule out most small growing firms. However, the sorts of incentives offered by BoI might not be of much value to small firms anyway. An important one of these — tax holidays — is of limited use to small firms who are in a non-taxpaying position. Duty remission on capital inputs is likely to be of more value since it offers cash up front and operates like an investment tax credit. To the extent that these firms face cash flow problems, this is a valuable incentive.

As mentioned above, significant import duty protection has been afforded to the capital equipment industry in Thailand. At the same time, import duty remissions have been available to firms which export their products. Capital-intensive firms have a great deal to gain from obtaining duty remissions. To the extent that these are large firms and that they are better able to negotiate with public officials to obtain duty remission, this will put other firms, including smaller ones at a considerable disadvantage since they will have to pay duty-inclusive prices for their capital equipment. Perhaps more important, smaller firms may rely relatively more on domestically-produced capital equipment than larger firms do. If so, they would not be eligible for duty remission, but would effectively face a market price which is essentially the same as the duty-inclusive import price. This would put them at a cost disadvantage to large firms who are able to obtain the duty remission. Equivalently, if smaller firms do not export their outputs, they would be ineligible for the duty remission as well. For all these reasons, the operation of the selective system of duty remissions could work to the disadvantage of small firms.

4.5 Difficulties in Attracting Workers and Entrepreneurs

Small firms may face more difficulties in attracting high-quality workers and entrepreneurs than large firms since they are unable to offer some of the non-wage benefits that large firms can offer. This can take various forms. One is social insurance plans for health care and disability. Another is on-the-job training, which increases the value of a workers or entrepreneurs skills. This will also put small firms at a relative disadvantage.

Furthermore, encouraging foreign direct investment through the use of tax incentives can affect the ability of local small entrepreneurs to compete, because the prices of land, raw materials and skilled labour will rise.

The importance of the each of the possible sources of discrimination against small firms in Thailand is a matter of judgment. It is useful to inform that judgment by some stylized facts. We turn to this next.

5. SMALL AND LARGE FIRMS IN THAILAND: SOME STYLIZED FACTS

There are several ways one might distinguish between a large or small firm. Commonly used criteria include number of employees, level of sales and size of capital stock. We focus on the fixed capital dimension for several reasons. First, the criteria for investment promotion by the BoI are stated mainly in terms of capital requirements. Second, the BoI's employment objectives have been very much overshadowed by its concern for the perceived benefits of large and typically foreign sourced investments. Hence, we define a small firm as one that has less than 10 million baht in registered capital, excluding land costs and working capital. An extension of this definition to include firms of up to 20 million baht will not change the substance of our analysis and findings. In Thailand, 95 percent of newly registered companies in 1991 had under 10 million baht (U.S. \$500,000) of registered capital and less than one percent of new companies had over 100 million baht. This, in itself, would seem to indicate the importance of small firms as a potential source of economic progress.

Between 1988 and 1990 there were 3,545 firms receiving BoI promotion, with an average value of investment of Bht 272 million and an average of 273 employees. Of the listed industries, the one with highest number of promoted projects was the rubber products industry, followed by electronic products, plastics, machinery, textiles, and processed metal.

Table 1, which is based on a sample of 200 promoted firms listed in the 1991-92 BoI directory of promoted companies, gives an indication of the average size of the promoted projects for certain industries in terms of the amount of registered capital involved (excluding land). Petroleum refineries had the highest average level of registered capital, followed by paper products and printing, and non-metallic products, such as ceramics and cement. The only industry with typical promoted projects that can be considered small is the beverage and tobacco industry. Nonetheless, specific examples of small companies that are BoI-promoted can be found in most industries. Our sample data suggests that promoted companies with less than Bht 10 million are most likely to be in the machinery, food, and mining and quarrying industries.

Table 2 is based on a sample of 400 newly registered companies from 1989 to 1991. The typical level of registered capital in these new enterprises is considerably smaller than in the sample of promoted firms. However, the rank of each industry by average project size is quite similar to the rank in the BoI-promoted sample. Among newly established firms between 1989 and 1991, only 6% had more than Bht 10 million in registered capital and 94% of the new firms had under Bht 1 million in registered capital. The largest firms were in the petroleum sector, followed by companies in the paper products industry, machinery (including autos), chemicals, ceramics and glass, rubber and plastics, metal products and the textile industry. Mining and quarrying, beverages and tobacco, and food were the smallest. The largest newly registered companies in our sample were a paper product company that had Bht 600 million, which is similar to the figure for BoI-promoted firms, an automobile and machinery manufacturer that had Bht 1 million in registered capital, and a petroleum exploration company with Bht 100 million. It turns out that none of the firms in our sample are BoI-promoted. If automobile parts are excluded from the machinery sector, a large number of machinery companies have under Bht 1 million in registered capital, as is the case in the metal products sector, and in the food industry. We conclude that typical start-up firms are very small, compared to BoI-promoted firms and that small firms exist in almost every industry. Furthermore, it appears comparatively rare for small firms to obtain BoI-promotion.

Table 1 Average Level of Registered Capital (Excluding Land) for BOI Promoted Firms *

Industry	Registered Capital (million baht)
1. Petroleum (Explorations & Refining)	1010.0
2. Paper Products & Printing	194.2
3. Non-Metallic Products	187.7
4. Basic Metal Products	149.5
5. Fabricated Metal	117.0
6. Textiles	83.3
7. Machinery	71.3
8. Food	50.1
9. Mining & Quarrying	28.8
10. Chemical Industry	27.7
11. Rubber & Plastic	21.8
12. Beverage & Tobacco	10.0

Note: * Based on a sample of 300 companies listed in BoI Company Directory for 1991-92

Table 2 Average Level Registered (Excluding Land) for New Firms*

Industry	Registered Capital (million baht)
1. Petroleum (Explorations & Refining)	34.7
2. Paper Products & Printing	16.0
3. Machinery (Including Autos)	8.2
4. Chemical Industry	3.0
5. Non-Metallic Products (Ceramics, Glass)	2.8
6. Rubber & Plastics	2.4
7. Fabricated Metal	2.3
8. Textiles	2.3
9. Mining & Quarrying	2.2
10. Basic Metal Products	1.7
11. Beverage & Tobacco	1.7
12. Food	1.3

Note: * Based on a sample of 400 companies from 1989-1991 obtained from A.R. Consultants, Bangkok, July, 1992

6. THAILAND'S FISCAL SYSTEM

Those parts of the fiscal system that we shall concentrate on are the tax system and the system of trade protection. The most relevant components of the tax system include the income tax, especially that applying to corporations, and the VAT. Trade policy instruments include tariffs as well as duty remissions on traded business inputs. Special treatment under the tax and tariff systems is also available by obtaining promoted status from BoI. In this section we briefly describe the main elements of the direct and indirect tax systems, the tariff system and the operation of the BoI.

6.1 The Direct Tax System

The direct tax system consists of the corporation and the personal tax systems. Both are taxes based on the income of the taxpayer. In the case of the corporation income tax, the base is defined to be the difference between revenues and costs, both defined on an accounting or accrual basis (as opposed to a cash basis). Revenues include all accounts receivable from sales as well as interest, dividends, capital gains, royalties and rents received from assets owned. Costs can be of a current or capital nature. Current costs are those on items which are used in the same period in which they are purchased and include such things as wages and salaries, fuels and materials, utilities, insurance, rents, fees, etc. Capital costs represent those on assets which are of a lasting nature in the sense that they yield services over more than one period. There are various categories of capital and each of them is treated somewhat differently. However, the general idea is to allow as a deduction the cost of holding and using capital over the tax period. For all types of assets, interest payments on debt used to finance the asset is tax-deductible. However, the costs of equity finance (e.g., dividends paid or shares repurchased) are not deductible. For this reason, the corporate income tax is typically viewed as being a tax on equity income. Note also that the interest deduction is based on nominal interest. This implies that in periods of inflation, when the interest rate includes a component which compensates for the fact that inflation erodes the principal value of the debt being repaid, the interest deduction actually includes a component of repayment of principal. In addition to the cost of interest, there are other costs which may be deducted for capital. For machines and buildings, a depreciation deduction is allowed. In Thailand, it is done using the straight line method. The rate for buildings is 5% (implying a write-off period of 20 years), and for machinery and equipment it is 20% (which is a five-year write-off period). There are a small number of other categories for special types of depreciable capital, but for

most investments the above two rates apply. Unlike in many countries, developing and otherwise, accelerated depreciation provisions are generally not available as investment incentives. Some expenses which are, to an economist, of a capital nature are treated as if they were current costs and written off immediately. These are expenditures on intangible forms of capital and include such things as advertising and marketing expenses (which create goodwill), research and development (which create knowledge) and investments in human capital such as the on-the-job training of workers.

The tax rate applicable to this base is generally 35 percent. Exceptions to this include firms who enjoy a tax holiday as a result of being promoted by BoI, as discussed further below. As well, firms which are listed on the Thai Stock Exchange pay a preferential tax rate of 30%. It may be the case that small firms do not pay the statutory tax rate, but negotiate a rate based on their profits.

The Thai corporate tax applies to Thai firms on their worldwide income as well as to foreign firms on the income they earn in Thailand. Taxes paid abroad can be deducted from taxable income if a tax treaty exists.

There is a withholding tax paid on dividend disbursements at the rate of 20%. Resident recipients can receive a partial credit if their personal tax rate is less than that by filing a full tax form. There are also a variety of withholding taxes paid on capital income taken out of the country, including dividends, branch office profits, interest, rents and royalties, and capital gains. Of course, where a tax treaty exists, credit may be obtained for these abroad. The same applies more generally for the corporate income tax levied on foreign firms.

Firms in a loss position are not treated symmetrically with those in a taxpaying position. That is, they do not receive full credit for their negative tax liabilities. Instead, they may carry their losses forward for a period of five years. This is of particular importance for the treatment of growing firms and those in capital-intensive and risky activities. Many of these will be small firms.

An important aspect of international tax treaty arrangements is the existence of so-called tax-sparing agreements. In the absence of such agreements, foreign firms operating in Thailand would be liable to pay full taxes in their home countries less any taxes paid in

Thailand.⁴ Any tax reductions or incentives would simply reduce the taxes paid in Thailand and the credit that may be claimed abroad. Full liability for taxes paid in the home country would remain. Thus the effect of a tax incentive would be to transfer tax revenues from Thailand to the treasury of the foreign firm's home country and could have little effect on investment. (To the extent that tax liabilities at home are postponed until repatriation, there could still be some effect from investment incentives in this case.)⁵ Tax sparing arrangements between creditor and debtor nations allow for tax incentives to be passed through from the host country to the home country thereby avoiding the tax transfer and making tax incentives effective. Thailand has a tax-sparing agreement with Japan, its principal source of foreign investment, as well as with several other countries. However, Thailand does not have a tax-sparing agreement with the United States, nor with certain members of the E.C., such as France and Germany.

6.2 The Indirect Tax System

The indirect tax system consists of excise taxes, the business tax, and tariffs and duties. Prior to 1992 the business tax was levied on most business transactions at a typical rate of 9 percent. Because the business tax did not provide a credit for the purchase of inputs, the burden of the tax was highest in the industries with many stages of production, notably the manufacturing sector. In 1992 the business tax was replaced by a value added tax. The VAT is levied on consumption, and a credit is given to businesses equal to the value of inputs used in the production process. The VAT is comprehensive in its coverage, excluding only the financial services sector. Some small businesses may escape the VAT, because the maximum revenue level for a company's exclusion from the VAT system is relatively high.

6.3 The Board of Investment

The BoI is an agency of the Thai government that is used to support the social and economic objectives established in the government's Five-Year Plan. The BoI offers a variety of tax incentives, protection measures, guarantees and additional benefits to promote foreign, local and joint venture investments in the country. In 1990 alone the BoI approved 915

⁴Their tax liabilities at home may be postponed to the extent that they are not taxed until profits are repatriated.

⁵See, e.g., Leechor and Mintz (1991).

investment projects worth Bht 467 billion. The current policy guideline favours investments that satisfy some of the following criteria: export-oriented production; domestic resource development and energy conservation; employment creation; basic industries that give rise to industrial linkages; and other projects that meet special government concerns. In practice, the BoI has focused on inducing transfers of modern technology, rather than employment creation. The designated industries for promotion include all types of agriculture, mining, manufacturing and services.

The fiscal incentives offered by the BoI mainly consist of corporate income tax holidays and reductions of indirect tax. The corporate income tax may be exempted for three to eight years with permission to carry forward losses and deduct them as expenses for up to five years. The income tax holiday is restricted to five years, unless an investment has a long gestation period, typically because of its large size. Dividends received from promoted enterprises during the tax holiday period are excluded from personal income taxation. Promoted companies may also receive a five year exemption on the withholding tax on goodwill, royalties or fees remitted abroad. Duties on imported machinery may be exempted or reduced by 50 per cent, and by up to 90 per cent for imported raw materials. There were similar reductions in the business tax until the recent tax reform in Thailand replaced the business tax with a VAT and also lowered the import duties on machinery and raw materials. These changes substantially reduce the value of receiving BoI promotion. The tax reform is part of a long-term reorientation of the BoI's role in the economy. According to the 1992 *BoI Directory of Promoted Companies*, the role of the BoI will eventually change from granting tax incentives to providing technical assistance on investment-related issues.

There is a hierarchy of tax incentives designed to encourage companies to locate outside the principal industrial areas, particularly Bangkok. Zone 1 consists of Bangkok and five of its surrounding provinces; Zone 2 consists of ten provinces surrounding Zone 1; Zone 3 contains the rest of the country plus the Eastern Seaboard Development Region. In 1990, 38 percent of newly promoted businesses located in Zone 1; 27.2 per cent in Zone 2, and the rest in Zone 3. A company that locates in Bangkok, or elsewhere in Zone 1, is entitled to an exemption on machinery duties only if it produces mainly for export, or supplies intermediate goods to manufacturers of engines, machinery and electrical products located in the same zone. A three year exemption on corporate income tax contains the additional requirement that the enterprise in Zone 1 locates its factory in an industrial estate or promoted industrial zone.

Investors are encouraged to locate their factories in less attractive areas by better incentives. A firm locating in Zone 2 is entitled to at least a 50 percent reduction on machinery duties, while the tax holiday may be extended to five years under certain circumstances. The most lucrative incentives are for enterprises that locate in Zone 3. In this case, machinery taxes are completely exempted, while exemption of duties on raw materials are similar to those above. For companies in Zone 3 the tax holiday may be extendable yearly for up to eight years if the project meets criteria that could only be satisfied by comparatively large projects. In particular, net foreign exchange earnings must be at least US \$1 million a year; or, the project must be agro-based, or employ over 200 full-time workers; or, finally, the project must be located in an industrial estate or promoted industrial zone. It may also be possible for a project in Zone 3 to obtain special privileges, such as a further 50 percent reduction in the corporate income tax for another five years, a double deduction for on utilities and a deduction of 25 percent of the costs of installation or construction of the project's infrastructure facilities.

The generous benefits for companies that locate in Zone 3 reflect the high private costs of locating away from the main economic areas and the low level of infrastructure outside Bangkok. According to a BoI publication, the BoI places a priority on promoting small scale industries — especially agro-based industries — to the provinces in order to diversify the region's industrial base and use indigenous natural resources there.

In addition to the criteria for receiving promotion in each of the zones discussed above, the applicant must satisfy certain minimum requirements regarding the size of the project, the percentage of Thai shareholders in the project and the percentage of sales value that derives from exports. Most categories of businesses must have at least 51 per cent Thai ownership and export at least 80 per cent of production in order to qualify for promotion. Notable exceptions to the stringent export requirement are in metal processing, mechanical and electrical equipment, and paper products. The minimum capital investment requirement (MCR) ranges from Bht 1 million to Bht 4 billion of registered capital. Generally, foreign investors must bring in not less than Bht 10 million in a new project to be considered for promotion. The MCRs vary considerably across industries, primarily, though not exclusively, to reflect the BoI's view of the efficient scale in the industry.

The BoI's minimum capital policy is meant encourage new firms to attain economies of scale immediately and to use the latest technology. However, MCR levels imposed by the BoI are not based on a careful research of the efficient scales of production, and so are vulnerable to error. Generally, within the class of private industrial goods the petrochemical industry has

the highest MCR (Bht 1 billion), while agricultural products and machinery and equipment have the lowest (under Bht 10 million). The chemical, paper and non-metallic products industries have minimum capital investment requirements usually between Bht 10 and 100 million.

If the size of an enterprise is gauged by the absolute size of its investment, then the only industries in which small firms can obtain promotion are in food products, machinery and equipment, certain types of ceramics, and a few rubber and plastics industries. On the other hand, from a policy perspective, what may matter most is the size of the minimum capital requirement *relative to the size of the market*. It may be that even in the industries where the MCR is under Bht 10 million a promoted firm may dominate the market if its scale of production is large relative to the market size. This situation can easily arise when the promoted firm produces a new product. On the other hand, it is less likely when the firm produces for export, or when the domestic market is well established.

The BoI recognizes that the private sector is likely to be the best judge of the efficient plant size in a given industry, and is apparently contemplating a substantial reduction in the MCRs across-the-board. One possible rationalization of the use of minimum capital investment requirement is that it could serve to ensure a foreign investor's long-term commitment to a project. In the absence of commitment the foreign investor may be a so-called "footloose firm" that would operate in Thailand only as long as the tax incentives existed. If the cost of liquidating the project rise with the size of the initial outlay, then there may be a rational economic basis for minimum capital investment requirements, even when markets are functioning well.

There is an Office for Small Industries that is responsible for granting small firms (currently defined by the Office as less than Bht 10 million, but soon to be changed to 20 million) technical advice and low-interest loans. However, the agency has a very small budget. Furthermore, a conversation with one of their officials revealed that the agency has been completely dormant in the past year (since the 1991 coup).

7. MEASURING FISCAL DISTORTIONS: AN INTRODUCTION TO MARGINAL EFFECTIVE TAX RATES

Unless there is a good reason for distorting the cost of capital, the tax and regulation policies should remain neutral with respect to the size of the enterprise. On a "level playing

field," private sector competition will ensure, at least in the long run, that the market structure and performance in each industry operates as efficiently as possible given the technology, resources and market size. When a tax system drives a wedge between the cost of capital in different industries simply on the basis of their typical scales of production, economic growth may become too concentrated in the favoured firms and/or industries. An industry that operates best on a small scale may fail to develop if the fiscal incentives are skewed against small firms, while industries with large-scale technologies can become overcapitalized. Capital market arbitrage will direct capital to industries where the cost of capital is lowest. An inter-industry distortion arises from BoI activities to the extent that the minimum capital investment requirement for obtaining promotion may exceed the optimal plant size in a given industry, or that the BoI excludes from the list of designated industries one that operates with small plants. Furthermore, the types of BoI incentives that are offered may be of more benefit to industries with large enterprises than to industries characterized by smaller ones.

Even when the BoI is correct in its assessment of the efficient plant size, the promotion system could lead to a distortion within an industry if the size of the market is relatively small, permitting a promoted firm to behave as a predatory monopolist. There is some evidence that promoted firms may over-invest in productive capacity in order to discourage the expansion of smaller competitors. In fact, studies show that small firms usually expand incrementally, rather than leaping from small to large. In that case, a requirement of a substantial minimum capital investment requirement in order to qualify for preferential tax treatment may prevent small firms from expanding at all.

Finally, even in the absence of explicit biases of this sort in the tax or incentive system, there are many features, as described earlier, that might implicitly bias the fiscal system in favor of large relative to small firms and/or industries.

In this section we develop a methodology for estimating the differences in investment incentives faced by different types of firms with respect to various types of investments. The principal concepts introduced are of the *hurdle rate of return* and the *marginal effective tax rate* on investment (METR). The former measures the minimum marginal rate of return required for any particular type of investment to be worth undertaking by a private investor. The METR is a measure of the overall incentive effect of the fiscal system on marginal investments in the private sector. In subsequent sections we present estimates of hurdle rates of return and METRs for Thailand. These estimates reveal that hurdle rates of return are generally higher for small firms than for large firms, and that the industrial strategy pursued by Thailand's Board of Investment (BoI), in conjunction with the tax and tariff policies of the

Ministry of Finance, is non-neutral with respect to firm size; the marginal effective tax rate (METR) is generally lower for large enterprises than for small ones.

The hurdle rate of return and the METR are closely related. The marginal effective tax measures the taxes paid on a marginal investment, as a proportion of the rate of return. A small open economy with relatively free international capital flows, such as Thailand, can lend or borrow at the prevailing (risk-adjusted) world interest rates. In that case the marginal effective tax rate due to the direct tax system can be conveniently illustrated in Figure 1. The corporate tax drives a wedge between the hurdle rate of return on capital, r_g , and the world rate of interest, r^* .⁶ The *marginal effective corporate tax*, t_c , is the difference between r_g and r^* . At the same time, the personal income tax introduces a wedge between the net return to savers, r_n , and r^* . The *marginal effective personal tax*, t_p , is the difference between r_n and r^* . The sum of t_c and t_p is the marginal effective tax. A tax incentive to encourage investment is a tax provision that reduces the marginal effective tax rate.

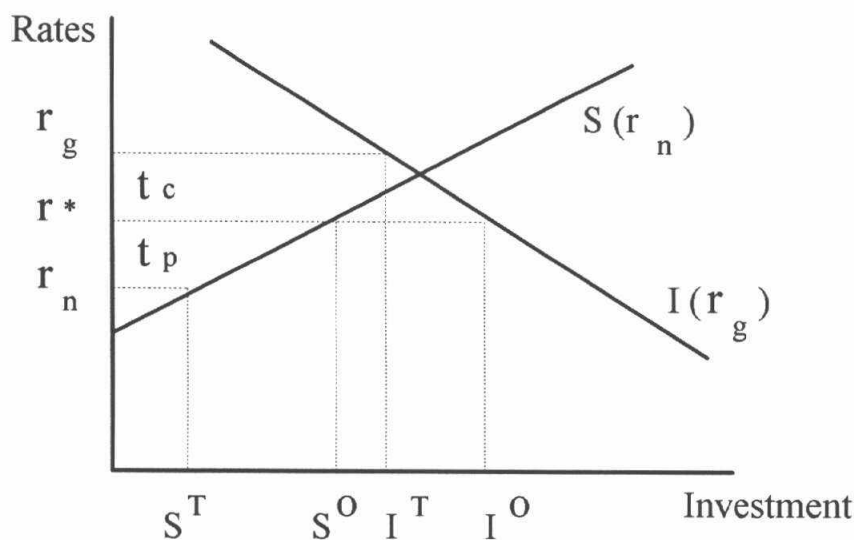


Figure 1 Marginal Effective Tax Wedge

⁶ For a review and discussion of the marginal effective tax rate literature, see Boadway (1985).

8. THE MEASUREMENT OF R_G AND R_N FOR DIRECT TAXES

Estimates of r_n can be obtained by deducting the relevant taxes on savings from the observed market rates of return on savings, such as corporate bond rates, rates of return on equity, and weighted combinations of them. The main difficulty in estimating the net returns is that various assets and persons are subject to different tax rates. For our purposes, it is sufficient to take the case of a "representative" saver's portfolio and personal income tax rate. The after-tax nominal rate of return to savers must also be converted into real terms by subtracting the expected rate of inflation.

The required before-tax rate of return on a marginal investment, r_g , is not directly observable. However, since a marginal investment, by definition, is one whose rate of return is just sufficient to cover all its costs after tax, we can infer its pre-tax rate of return by measuring the user cost of capital. This is the standard method of estimating marginal effective tax rates.

Several adjustments to the measure of the user cost of capital are required to take account of the effects of taxes. First, deductions must be made for the cost of holding capital. These include interest deductibility for the portion of the capital financed by debt, and depreciation deductions (or its equivalent on forms of capital such as inventory, depletable resources, etc.). The interest deduction affects the cost of finance, while the depreciation deduction affects the rate of economic depreciation. Second, the tax on revenues generated by the capital must be accounted for.

For a profit-maximizing competitive firm, the user cost of capital is equal to the pre-tax value marginal product of capital per dollar of gross investment in each period. This can be shown to be equal to the following expression:

$$(1) \quad VMP = \left(\frac{1}{1-u} \right) [(r - \pi + \delta - (\dot{q}/q)) (1-Z) + [1 + r - \pi - (\dot{q}/q)] Z] (1-\phi)$$

where VMP is the gross value marginal product of capital per dollar of gross investment, u is the firm's corporate tax rate, r is the firm's nominal post-tax cost of finance, π is the expected inflation rate, δ is the (proportional) physical depreciation rate of the capital good whose investment is being considered, q is the real price of investment goods, inclusive of the tariff on imported capital, Z is the present value of future tax depreciation allowances per dollar of

investment, and ϕ is the reduction in the gross price of a unit of capital due to a duty remission on imported capital goods.

In Thailand, the depreciation allowance is based on the straight line method, according to which the asset is written off in equal amounts over its depreciation life. Thus, if the depreciation life is T periods, a proportion $1/T$ is of the original asset cost, net of initial allowance, is written off each period. Given the tax rate, u , and the discount rate, r , the present value of future tax savings stream of depreciation on one dollar of investment is given by:⁷

$$(2) \quad Z = u \left[1 - \left(\frac{1}{1+r} \right)^T \right] (rT)^{-1}$$

Thus the depreciation rate is $100/T$ percent.⁸

The nominal cost of funds to the firm, r , is a weighted average of its after-tax borrowing costs and the cost of raising equity. Then the nominal cost of funds is given by:

$$(3) \quad r = \beta i(1-u) + (1-\beta)\rho$$

where β is the debt-asset ratio of the firm, i is the corporate lending rate, and ρ is the firm's nominal rate of return on equity. This rate, r , is the one at which the firm discounts its cash flows. It reflects the interest deductibility provisions of the corporate tax system, as well as the absence of analogous provisions for equity financing.

The user cost of capital represents the cost of using one dollar's worth of capital for one period, taking full account of taxes. Its components may be explained as follows. In the absence of taxes, the user cost is just $(r - \pi + \delta - q)$. This is the sum of the real cost of financing the dollar of capital $(r - \pi)$ and the economic depreciation on the dollar of capital $(\delta - q)$. The remaining terms capture the effects of taxes. The term $(1 - Z)$ represents the effective price of acquiring one dollar's worth of capital, after allowing for tax savings on depreciation and duty remission. Finally, the entire expression is grossed up by the effective

⁷Because the firm in this situation is operating under the long run steady state conditions, Z_t and Z_{t-1} are the same. Furthermore, expectations of cost of finance, inflation, changes in the capital goods price and the statutory corporate tax rate are all assumed to be stationary. Hence we can drop all time subscripts.

⁸It is assumed that depreciation begins the first period after the initial allowance is taken.

corporate tax rate, u , reflecting the fact that the revenues generated by the investment must cover the tax liabilities on the revenues generated.

Alternatively, VMP can be thought of as a return to investment that can be divided into three parts: that going to the tax authority, that which is used to maintain the real capital stock of the firm, and the remainder, which is a net return on investment. We define the pre-tax rate of return on investment, or the *hurdle rate of return*, as what remains after accounting for the second of the above components, economic depreciation. In other words, we define r_g using (1) as follows:

$$(4) \quad r_g = VMP - \delta + (\dot{q}/q)$$

By subtracting $(\delta - \dot{q})$ from VMP , we are effectively calculating the rate of return (before tax) that must be earned by a profitable investment in order to maintain the real value of capital stock. The return, r_g , is then split between the tax authority and savers. An investment (or type of investor) which has a relatively high hurdle rate of return, in other words, is one which requires a relatively high rate of return in order to be profitable. This can be taken as a measure of the biases inherent in capital markets and the fiscal system against this type of investment (or investor).

Hurdle rates of return are derived for several general cases which differ according to whether: a) the firm is currently in a profit- or loss-making position (measured by current taxable income), and b) it has been granted promotion status. Firms which are making losses are assumed to be in this position only temporarily. They are in the process of setting up or expansion and have insufficient revenues against which to offset capital costs. Typically, these would be small, growing firms. Large firms would be more likely to have revenues from other parts of their operations against which to offset investment expenditures.

Equation (2) serves as the basis for calculating hurdle rates of return and the marginal effective tax rates for all our scenarios. What distinguishes one type of firm from the other is the way in which taxes affect the right hand side of the expression. Each of the cases will now be considered. The key in each instance will be to derive expressions for u , r , and Z which incorporate the provisions of the Thai tax laws facing that type of firm. In general, the expressions for u , r , and Z are time-varying, to reflect the fact that tax incentives are temporary.

8.1 Case 1: Profit-Making Unpromoted Firms

We begin with the case of a well-established firm which earns positive taxable income in the current and all future periods.

Apart from the standard annual tax depreciation allowances, the firm does not enjoy any other special tax treatment. It is taxed at the full rate in each period. Therefore, the effective statutory corporate tax rate is simply the statutory rate, u , for all periods.

8.2. Case 2: Profit-Making Promoted Firms

We now consider firms operating with promotion privileges. We consider the case of a firm that locates in Zone 2 and meets the criteria for a five year tax holiday and a fifty percent reduction in duties on imported machinery and raw material. No taxes are paid by the firm during the tax holiday period. Depreciation allowances in Thailand may not be delayed until the end of the tax holiday. Should the firm decide to distribute any profits during the holiday period, the dividends received by its shareholders are also exempted from personal income taxes. The implication of exempting the dividends from personal taxes will be to reduce the effective personal tax rate.

The tax holiday provisions make Z , r and u all vary over time. The present value of tax savings, Z , from investing in period t will be different from that of period $t+1$. Similarly, the effective corporate tax rate will vary by period, and this will affect the cost of debt finance, and therefore r . This will imply a time-varying rate of return on capital. This will alter the firm's time pattern of investment. Indexing the time period with a subscript, we consider u_t , r_t and Z_t in turn.

The effective statutory corporate tax will be zero over the tax holiday period and the usual rate afterwards; i.e.

$$(5) \quad u_t = \begin{cases} 0 & \text{for } 0 \leq t \leq 4 \\ u & \text{for } t > 4 \end{cases}$$

The cost of finance is given by:

$$(6) \quad r_t = \beta i(1-u_t) + (1-\beta)\rho.$$

where, again, we treat the parameters β , i and ρ as fixed. This cost of finance will differ between promoted and unpromoted firms (and between the tax holiday and later time periods for promoted firms) because of the differences in u_t .

The calculation of the present value of tax savings due to depreciation due to depreciation must take into account the variable discount rate. The value of Z_t and will vary, depending upon when the investment is undertaken. For investments made during the tax holiday period, Z_t , is given by:

$$(7) \quad Z_t = \left(\frac{1}{1+r_t} \right)^{5-t} \left(\frac{u}{rT} \left[1 - \left(\frac{1}{1+r} \right)^{T-5+t} \right] \right) \quad 0 \leq t \leq 4.$$

For $t > 4$ the expression for Z_t is the same as in equation (4) above. Note that Z_t is monotonically increasing over time during the holiday period. Equations (5), (6) and (7), along with (2), can be used to calculate the time profile of the pre-tax rate of return on capital, $r_G(t)$, for a promoted firm. It will vary over the tax holiday period and will become constant after the transition to full tax-paying status.

Finally, the price of a unit of capital must be adjusted to reflect the 50 percent remission of duties for a promoted firm. Assuming that domestic and foreign capital are close substitutes, or that a promoted firm imports all its capital, the duty remission results in an additional term that is multiplied against the right hand side of (1). To see this, note that the expression VMP in (1) is defined as the marginal product of capital times the price of output, and divided by the gross price of capital q . If we let the net of tariff price of capital be represented by Q , and the tariff rate by τ , then $q = (1 + \tau)Q$. A 50 percent remission of duties on imported machinery and equipment given to a promoted firm results in a new gross of tariff price equal to $Q(1 + \tau) - 0.5\tau Q$. Hence, the effective price of capital faced by the promoted firm is given by , where is given by:

$$(8) \quad \bar{q} = q (1 - \phi).$$

ϕ is zero for an unpromoted firm, while in the case of a firm receiving a 50 percent duty remission, it is given by:

$$(9) \quad \phi = \frac{t}{(2+2t)}$$

8.3 Case 3: Promoted Firms in Temporary Loss Positions

Here we look at a firm that is making a temporary tax loss over the first few periods of its operation and a profit thereafter. Any unabsorbed losses can be carried forward for up to five years, without interest, until they are set off fully against future incomes. We consider the case of a firm which is making losses in the first five years of its operations; these losses are carried forward into the sixth year and set off against income in that year before taxes are paid. The only tax benefit that a promoted loss-making firm gains from being granted BoI-promoted status is the duty remission on imported machinery and equipment. The only possible exception would be if the period of temporary losses were shorter than the tax holiday.

We first consider the cost of finance. Since the firm is in a loss position, it cannot obtain the full benefits of the deduction of interest costs in the years in which the costs are incurred. Instead, the benefit is deferred until future periods when the loss carry-forward is offset against taxable income. This deferral reduces the value of the tax saving from the interest deduction, and therefore increases the after-tax cost of finance. Consider a firm that finances new investment entirely with debt. In this case, the effective tax rate applying to the interest deduction will be reduced because of the deferral of the interest write-off. Recall that all write-offs from the loss period can be offset against profits in the sixth period. The cost of interest finance in a period in which the firm is making losses, therefore, is given by:

$$(10) \quad r_t = i \left(1 - \frac{u}{\prod_{s=t}^4 (1+r_s)} \right), \quad t = 0, \dots, 4.$$

This expression reflects the fact that the tax savings from interest costs incurred in an early time period are postponed until the sixth period. This tax saving must be discounted back to period t to yield its present value as of the time that the interest cost is incurred. The tax saving in period 6 is evaluated at the full corporate tax rate, u .

Equation (8) gives relations for each of the five loss periods which must be solved simultaneously for the values of r_t in each period. This system can be solved recursively backwards. After the sixth period, once the firm is profit-making, the usual expression for r_t applies.

Similar principles apply when the firm uses some equity finance. In this case, r_t is given by:

$$(11) \quad r_t = \beta i_t + (1-\beta)\rho, \quad t = 0, \dots, 4$$

where

$$(12) \quad i_t = i \left(1 - \frac{u}{\prod_{s=t}^4 (1+r_s)} \right)$$

As above, this equation can be solved recursively for r_t during each loss period.

Analogous amendments must be made with respect to the effective corporate tax rate. Although tax-loss firms do not pay taxes during these loss periods, their effective tax rate is not zero. Any additional revenues during the loss period have the effect of reducing tax losses that can be carried forward into the future — in effect, they still bear taxes, but at a later date. Since these liabilities are carried forward without interest, the effective tax rate faced during the loss period is less than the statutory rate. To capture this effect, a discount factor must be applied to the corporate tax rate in (2). This gives a set of time-varying effective statutory corporate rates over the initial loss period. Using the discount rate as derived in (8), the effective corporate tax rate is:

$$(13) \quad u_t = \frac{u}{\prod_{s=t}^4 (1+r_s)} \quad t = 0, \dots, 4.$$

The present value of tax depreciation allowances will also be modified slightly to account for the fact that unabsorbed depreciation allowance may also be carried forward, but without interest, to be set off against profits from the same business source at a later date. We continue to assume that all depreciation allowances accumulated in the first five loss periods can be written off against income in period 6. In this case, the present value of depreciation deductions in respect of investments in each of the temporary loss periods is given by:

$$(14) \quad Z_t = \prod_{s=t}^4 \left(\frac{1}{1+r_s} \right) \left(\frac{(5-t)u}{T} + \frac{u}{rT} \left[1 - \left(\frac{1}{1+r} \right)^{T-5+t} \right] \right), \quad t=0, \dots, 4.$$

The first term is the initial allowance discounted back from period 6 to loss period t when the firm undertakes the investment. The second is the cumulated depreciation write-offs

between periods t and 5, also discounted back to t . The third is the usual depreciation write-offs incurred from period 6 onwards when the firm is earning positive profits. For $t \geq 5$, the expression for Z_t is again given by (4). As before, it can be shown that Z_t is increasing with time during the loss period. Using (8), (9) and (10) along with (2), the time profile of the rate of return on capital for the tax loss firm can then be calculated. For $t \geq 5$, the value of $r_g(t)$ will be as in case 1.

8.4 Post-Tax Returns on Savings: The Effective Marginal Personal Tax

So far, we have concentrated on the marginal effective rate of corporate tax, t_c . For investments which are domestically financed, this represents only part of the effect of income taxes on marginal investments. Returns to domestic asset owners are also taxed under the personal tax system. This gives rise to an effective personal tax which adds to the tax wedge on investments. Given the limited coverage of the capital gains tax and the imputation of corporate taxes against personal tax liabilities on dividends, we need only consider the distortionary impact of the personal income tax applied against interest income.

This simplifies the task of calculating the marginal effective personal tax. The effective personal tax is given by:

$$(15) \quad t_p = r^* - r_n$$

where r_n is the net-of-tax real rate of return to savers. This rate depends on the source of financing. A person holding corporate bonds receives an after-tax nominal rate of return of $i(1 - m)$, where m is the individual's personal tax rate. In the case of equity, the after-tax rate of return depends on whether the financing comes from retained earnings or new equity issues. New equity issues give rise to a stream of dividends which are taxed at the personal level after being credited for corporate taxes paid. The after-tax nominal rate of return on the new shares is $(1 - m + u)\rho$, where ρ , is the before-tax nominal rate of return from equity. In the case of retained earnings finance, the return is in the form of a non-taxable capital gain. Therefore, the after-tax rate of return to savers on retained earnings is simply ρ .

The overall after-tax rate of return on savings is a weighted average of those on the three types of finance:

$$(16) \quad r_n = \beta i(1-m) + (1-\beta)[a(1-m+u)\rho + (1-a)\rho] - \pi$$

where a is the proportion of equity finance coming from new share issues⁹.

9. DATA AND ASSUMPTIONS

Before presenting estimates of the hurdle rates of return facing different types of firms and of the influence of the fiscal system on these rates, it is important to describe both the data and the assumptions that were used in deriving them. From the methodology described above, it is clear that data are necessary on a wide range of fiscal and financial variables affecting firms' investment decisions.

There has been a substantial tax reform in recent years, carried out in a several phases. The biggest changes occurred in 1990, when the import taxes on machinery and equipment were substantially reduced, the corporate tax rate was reduced by 5 percent, and the personal income tax system was streamlined from thirteen categories to six, with a 15 percent reduction in the top rate. As of January, 1992, the business tax is replaced by the VAT. We provide calculations of hurdle rates of return for a five period preceding the tax reform, which corresponds to 1985-1989, and for the post-tax reform stage, including the replacement of the business tax with the VAT. The post-tax reform period requires us to forecast certain variables; we simply assume that expectations of all variables are static.

The following describes assumptions made about certain important parameters.

The Corporate Tax Rate: Prior to the tax change in 1990 the corporate tax rate was 40 percent for companies not listed on the SET, and 35 percent for those listed on the TSE. In 1990, both rates were reduced by 5 percentage points. In our calculations we assume that the company is not listed on the SET. Our assumption is not meant to imply that SET firms are not promoted — quite the contrary. But the number of companies listed on the SET is

⁹Although the after tax rate of return to savers is given by equation (12), data limitation permits only the consideration where the proportion of equity finance coming from new issues is either zero or unity. We report only on the case where $a = 1$

fairly small. Clearly, for a promoted firm that is listed on the SET, which is invariably a large firm, the tax wedge it faces will be slightly lower than our calculations indicate.

The Personal Tax Rate: Individuals currently face a progressive marginal tax rate on personal income across six income brackets. The lowest bracket is taxed at 5 percent, while at the top end, individuals earning over Bht 2 million are taxed at 50 percent. Prior to 1990, the highest rate was 65 percent. We use the top rate in our calculations.

Dividend and Capital Gains Tax Rates: Remittances of profit or dividends to non-residents face a 20 percent withholding tax. Branch office profits that are transferred to the parent company are taxed at 16.67 percent. Capital gains are taxed at 25 percent, except for countries that have double tax treaties. Capital gains changes in the real price of capital goods are based on a five-year average of the inflation-adjusted percentage change in the investment deflator for non-residential construction and machinery and equipment.

Inflation Rate: Our calculations use the actual inflation rates of the producer price index as a proxy for the expected inflation rate. We use a five year average rate for the pre-tax reform calculations, for lack of a better alternative.

Financing Ratios: We assume a debt-equity ratio of 0.45 for promoted firms, based on a sample of large firms from the company directory, *Thailand Company Information 1991-92*. There is evidence that a small firm must rely heavily on the personal savings of the company owner, because of imperfect capital markets. Therefore, we use a debt-equity ratio of 0.10 for small firms.

We use the earnings-to-price ratio for SET firms as the measure of the real return on equity for large firms. For small firms we use the fixed deposit rate as a measure of the opportunity cost of using personal savings as equity. The nominal cost of borrowing for a large uses the prime lending rate (MLR) plus 2 percent for large promoted firms and plus 4 percent for large unpromoted firms. This accords with the notion that one of the main benefits of receiving BoI-promoted status is that it gives the entity a good credit rating.

While small firms rely less on debt financing than large firms, they often pay a significantly higher interest rate and may even borrow from the underground lending market. One report cites an underground lending rate at 6.5 percent per month. We set the interest rate for a small unpromoted firm at 30 percent, roughly corresponding to credit card rates. In the case of a promoted small firm, we assume the borrowing rate is 26.67 percent.

Because of the tax deductions for interest payments, our calculations are sensitive to the debt-equity assumptions used. Hence, we also report calculations in the case where small firms use the same debt-equity ratio as large firms. In particular, we consider scenarios where both large and small firms use debt-equity ratios equal to either one or zero. This is revealing because it permits a separation of the effects of a tax holiday on the cost of capital from the effects on after-tax revenues. This is important, because of the asymmetrical tax treatment of debt versus equity costs of finance.

Tax Depreciation Rates: A straight line tax depreciation method is used with a 20 percent rate for machinery and equipment and a 5 percent rate for structures. We assume that these rates accord with physical depreciation rates, since there appears to be no special tax incentive associated with depreciation in Thailand.

Import and Export Shares: The pre-tax reform duties on imported machinery and equipment were substantial. Therefore, the calculations are affected by what assumption is used in regard to the import-share of machinery and equipment. In our calculations we assume that the share of machinery and equipment that is imported is the same for both promoted and unpromoted firms. This is a conservative assumption in that there may be reason to think that promoted firms are more likely to use imported technology.

Other Assumptions: We use data from 1984 to 1991 to calculate the METR for the direct tax system. We assume the firm is operating under long run steady state conditions, so that expectations of the cost of finance, inflation, changes in the capital goods price and the statutory corporate tax rate are all assumed stationary. Hence, we drop all time subscripts, except for changes in tax rates associated with the tax holiday. We assume that the promoted firm locates in Zone 2 and receives a tax holiday for 5 years, and a 50 percent deduction in duties on imported machinery and raw materials.

The values reported for periods one to four in the tables correspond to the pre-tax reform period, generally pre-1990. The period denoted by "post tax-reform" refers to the marginal effective corporate tax rate after the tax reform, which lowered the statutory corporate rate and tariffs, as described above. The post tax reform period corresponds roughly to post-1990. The steady state values in the tables in the following sections, denoted SS, refer to the situation faced by firms when they leave the tax holiday period, but are calculated using the pre-tax reform data.

10. ESTIMATES OF HURDLE RATES OF RETURN TO INVESTMENT

In this section we present our estimates of the hurdle rates of return for different types of investors and investments, leaving to the following section an analysis of the role played by the tax system in determining these rates. Tables 3 to 6 show hurdle rates of return for the three cases discussed above.

Case 1 is that of unpromoted profit-making firms. From Table 3, it is apparent that the hurdle rate of return for large unpromoted firms is almost one percentage point less than that for small unpromoted firms. This differential is about the same for investments in both machinery and equipment (M&E), and non-residential construction or structures (NRC). In the absence of any special tax incentives provided by BoI, small firms in Thailand appear to face a higher hurdle rate of return than do large firms. This is a significant disadvantage for small firms.

There are several features of the model that are likely to be important in producing this result. The role of debt is almost certainly one of these. Small firms suffer from the fact that they are constrained to rely less on tax-favored debt instruments than are larger firms; and they also are faced by higher interest rates, to the extent that they do rely on borrowed funds. In order to investigate some aspects of the role of debt, we calculated hurdle rates of return for under the assumption that small and large firms had identical debt-equity ratios. We considered two polar extremes — debt-equity ratios of zero and one. The results are reported in Tables A.1 and A.5 (see Appendix). These tables show that the relative disadvantage of small firms increases when they have the same debt-equity ratios as large firms. The size of the disadvantage, however, clearly increases with the size of the debt-equity ratio. With pure debt finance of investment ($\beta = 1$; Table A.5) the hurdle rate of return for small firms is about double that of large firms; the differential in the hurdle rates of return is 10 to 11 percentage points. The sorts of financing ratios that are actually observed, therefore, are part of a rational response of small firms to market conditions they face. These responses, however, are not sufficient to eliminate the disadvantage they face in capital markets relative to large firms.

Table 3 Hurdle Rate of Return, Case 1: Unpromoted Profit-Making Firm

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
Pre-tax Reform	6.89	7.56	7.64	8.40
Post-tax Reform	6.97	7.56	7.35	7.98

Source: Authors' calculations based on data listed in Section 9

Table 4 Hurdle Rate of Return, Case 2: Promoted Profit-Making Firm

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	8.17	7.20	7.44	6.24
2	7.82	7.20	7.03	6.24
3	7.42	7.20	6.58	6.23
4	6.95	7.20	6.07	6.23
SS	6.89	7.56	76.41	8.40

Source: Authors' calculations based on data listed in Section 9

Table 5 Hurdle Rate of Return, Case 2A: Promoted Profit-Making Firm (With Depreciation Carry-Forward)

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	2.28	5.91	1.37	4.91
2	1.77	5.78	0.84	4.78
3	1.23	5.63	0.30	4.64
4	0.67	5.47	-0.25	4.49
SS	6.89	7.56	7.64	8.40

Source: Authors' calculations based on data listed in Section 9

Table 6 Hurdle Rate of Return, Case 3: Promoted Firm in Temporary Loss Position

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	5.92	8.98	9.09	9.57
2	7.44	8.48	8.12	9.25
3	6.35	7.95	7.14	8.90
4	5.25	7.39	6.15	8.52
SS	6.89	7.56	7.64	8.40

Source: Authors' calculations based on data listed in Section 9

Case 2, reported in Table 4, is that of BoI-promoted profit-making firms. This is the case of firms who both receive promotion privileges and have what would otherwise have been positive taxable income during the tax holiday period. As in the previous case, we present estimates of the hurdle rates of return for both large and small firms. This table must be interpreted with care. We have argued that small firms are less likely to receive promotion, because of the minimum capital investment requirements and the export requirements. Furthermore, even if they do receive promotion, small firms are less likely than large, well established firms to have positive net cash flows in the early years of operation. However, if a small firm does obtain promotion, and does have positive taxable net cash flows in the early years, then Table 4 indicates what its hurdle rate of return would be.

The results for Case 2 are interesting and, at first glance, possibly surprising. Large firms turn out to have a *higher* hurdle rate of return when they receive BoI privileges than they do without promotion. The “disadvantage of promotion” is more pronounced for M&E investments than for NRC. Small firms, on the other hand, have a slightly lower hurdle rate when they are promoted than when they are not. The improvement is considerably greater for NRC than for M&E investments.

The most surprising of these results is that for large firms BoI promotion raises the hurdle rate of return. A principal reason for this has to do with the inability of an enterprise to carry forward its capital allowances incurred during the tax holiday into the post-holiday period. While a promoted firm enjoys a zero statutory tax rate on its revenues, there are also two effects that serve to raise the promoted firm's effective tax rate. First, firms are generally permitted to deduct their interest costs for tax purposes. Secondly, they effectively obtain a tax credit for the depreciation they are able to write off each period, which is equal to the write-off multiplied by the corporate tax rate. However, both of these benefits vanish during a tax holiday period, because the statutory corporate tax rate is zero.

In some other countries, such as Malaysia in the early 1980s, promoted firms have been permitted to postpone and accumulate their depreciation write-offs until they face a positive corporate tax rate. The absence of such a provision in Thailand appears to detract significantly from the benefits of promotion. This is clear from Table 5, which is based on the same assumptions as Table 4, except for the introduction of a depreciation carry-forward provision. In this case the benefits of promotion are substantial — the hurdle rate of return for large firms falls by 4 to 6 percentage points relative to non-promoted firms (Table 3). The benefits of promotion are even greater for small firms. Notice that the benefits of the depreciation carry-forward provision are considerably greater for machinery than for

construction investments. This is due to the fact that the longevity of structures ensures that most of the asset's depreciation occurs outside the holiday period. The lack of a depreciation carry-forward provision may explain why the cash flow effects of BoI promotion, and particularly the corporate tax holidays, have not been rated as an important incentive in surveys of Thai investors.

The value of capital gains on a firm's investment also influences the cost of capital and the effects of BoI promotion. During the second half of the 1980s the rate of appreciation of M&E prices considerably exceeded the rate of increase in producer prices. Such capital gains reduce the effective cost of capital by lowering the rate of economic depreciation. If, the real capital gains on M&E had been zero during the 1980s, we find that even for a large firm investing in M&E, BoI promotion lowers the hurdle rate of return, despite the drawbacks of promotion pointed out above.

We have already noted that, in comparing Case 1 (Table 3) with Case 2 (Table 4), there is a big difference between small and large firms. Although large firms investing in M&E face a higher hurdle rate of return when they are promoted than when they are not, the opposite is true for small firms. The reason for this has to do with the fact that small firms use less debt in financing a marginal investment. As explained above, interest on debt can be deducted from revenues as an expense, which implicitly yields a credit equal to the interest costs multiplied by the corporate tax rate. However, during a tax holiday the corporate tax rate is zero in any case, and so this implicit credit vanishes. Since large firms use more debt financing than small firms, they lose the most from this aspect of the tax holiday. Apparently, the combined effects of the lack of a depreciation carry-forward provision and the lost possibility of interest deductibility during a tax holiday, is so significant for large firms that these effects override the benefit of facing a lower statutory tax rate on revenues during a tax holiday period. This cost is much smaller for small firms, who use much smaller proportions of debt in financing their investments. A comparison of Tables A.5 and A.6 (see Appendix) shows that if a small firm were to use only debt financing for M&E investments, it too would face a marginally higher hurdle rate of return with BoI promotion than without this privilege.

Many firms, especially small start-up companies, face negative net cash flows in the early years following a major investment. *Case 3*, reported in Table 6, shows the hurdle rates of return for BoI promoted firms that are in a tax loss position during the course of the tax holiday, but achieve long run profitability after the holiday ends. It is apparent from the table that small firms in this status once again face higher hurdle rates of return than do large firms. The contrast is especially stark in the case of M&E investments, where the rate for

investments in the first year of the holiday period are more than 50 percent greater for small firms than for large ones. Large firms in a loss position, therefore, appear to gain more from promotion in these circumstances, than do small firms in similar circumstances. There are only two sources of the gain from promotion for temporary loss-making firms: a) the tariff rebate on imported capital equipment and b) the reduced interest cost arising from the market signals given by promotion. In this model, the latter is the most important factor.

A large firm in a temporary loss position that invests in M&E faces a lower marginal hurdle rate of return than promoted profit-making firms, because they are able to carry forward interest deductions and capital depreciation allowances incurred during the holiday period into the post-holiday period. They can do this, because in Thailand any firm (promoted or not) can carry forward accumulated losses for five years. Hence, a firm that is in a loss position during the holiday period carries forward the depreciation allowance for five years, which happens to coincide with the length of the tax holiday period. However, this carry-forward is done without interest, so its present value is less than in the case of a profit-making unpromoted firm that obtains the deduction in the immediate period. It is for this reason that the tables do not provide clear evidence on the value of receiving promotion.

The main results of this section can be summarized relatively succinctly.

1. In the absence of BoI promotion, small firms face a higher hurdle rate of return than do large firms. This result is true for investment in both M&E and NRC. The effects of BoI promotion depend very much on whether the promoted firms are in temporary tax loss positions during the BoI tax holiday period.

2. In the case where firms have positive taxable net cash flows immediately following start up (Case 2), large firms actually face a higher hurdle rate of return when they are promoted than when they are not. This "promotion penalty" is especially pronounced in the case of M&E investments. On the other hand, small firms in a similar position face lower hurdle rates with BoI promotion than without. The advantages of being promoted are much greater for NRC investments than for M&E. The promotion penalty faced by large firms disappears, and the small firm's gain from being promoted would be substantially increased if capital cost allowances could be carried forward to the post-holiday period.

3. If firms enter a period of temporary tax losses following the undertaking of promoted investments (Case 3), small firms face a higher hurdle rate with promotion than do large firms.

Except in the case of promoted firms who are in a continuous positive taxable net cash position, therefore, small firms in Thailand require a higher rate of return to undertake investments than do large firms. The case in which small firms appear to be in a relatively advantageous position, unfortunately, is precisely the one that is less likely to occur. First, small start-up firms are much less than likely than large, well-established firms, to have the benefits of positive net cash flows in the early periods following their initial investments. And second, given the minimum capital and other requirements set by BoI as necessary conditions for being approved for promotion, small firms are also much less likely than large firms to obtain BoI privileges in the first place.¹⁰

11. TAXES AND HURDLE RATES OF RETURN

The previous section provided estimates of hurdle rates of return for different types of investments and investors, promoted and unpromoted. In interpreting these results it seemed apparent that the tax system played an important role in determining differences in these rates. In this section we present an explicit analysis of the effects of taxes. The method, as described earlier, is to estimate the wedge introduced by the tax system between the pre-tax rate of return and the tax-inclusive rate of return to marginal investments. This tax effect was defined more formally earlier as the marginal effective tax wedge. For a small open economy, this wedge can be divided into two components — the effect of the personal tax system on the rate of return to domestic savings, and the effect of the corporate tax and indirect tax systems on the return to investment. Since the personal tax wedge is generally independent of the size of firm whose investment the savings ultimately finance, we abstract entirely from this effect of the tax system, and concentrate instead on the effects of taxes on the returns to different types of investments.¹¹

Tables 7 to 9 show our estimates of the marginal effective tax wedges corresponding to the cases shown earlier in Tables 3, 4 and 6. These tax wedges are simply the difference

¹⁰ It should be noted that all of our calculations assume that small and large firms are in a position to benefit equally from the BoI rebate on duties on imported machinery. To the extent that small firms actually rely much more on domestic machinery, their gains from being promoted are less. Therefore, this is another reason to think that our estimates overstate the benefits to small firms of being promoted.

¹¹ It might be argued that one of the characteristics that distinguishes small from large investors is the inability of the former to avail themselves of savings available in international capital markets. This would mean that ignoring the personal tax wedge on savings yields systematic underestimates of the tax-induced biases against investment by small firms.

between the gross-of-tax hurdle rates reported in the previous section and the tax-free rates that firms would face in the absence of any taxes on corporate income or imported machinery.

Table 7 shows the marginal tax wedge for unpromoted firms. For large firms, the table shows that the tax system provides a small subsidy to investments of all types. Prior to tax reform, the size of the subsidy was nine tenths of a percentage point on the hurdle rate of return for M&E investments, and about one quarter of a percentage point on the hurdle rate NRC investments. The size of the subsidy to M&E investments fell slightly as a result of the reforms. The reason for this negative tax wedge (or positive tax subsidy) for large firms is that the benefits from the ability to deduct *nominal* interest payments in a period of inflation outweigh the costs of being able to deduct only a portion of financing costs (costs of equity finance are not deductible). In the absence of inflation, the tax wedge facing large firms would become positive.

Small firms, on the other hand, face a considerable tax penalty on the hurdle rate of return — 1.35 percentage points for M&E and 2.11 points for NRC. The sizes of these tax penalties on the investments of small firms are reduced somewhat as result of the tax reforms. The absolute differential in the tax wedges faced by small and large firms is actually greater than the differences in the hurdle rates in the absence of promotion. This means that, in the absence of the tax system, small firms would actually face a lower hurdle rate than would large firms. The tax system reverses this situation and places large firms at an advantage relative to small firms.

Table 8 shows our estimates of the tax wedges facing promoted firms with a positive taxable net cash flow position throughout the tax holiday period. All such firms, whether large or small, face positive tax wedges on all types of investments. The tax wedge facing small firms is larger than that facing large firms in the case of M&E investments, but the order is reversed for NRC investments. The sign of the tax wedge for small firms is a bit of a puzzle in light of our earlier finding that such firms faced a lower hurdle rate of return on M&E investments with promotion than without. What Table 8 tells us is that it is *in spite of* the tax system that small firms can gain from promotion in these circumstances. The principal reason that small firms benefit from BoI promotion is not the corporate tax benefits that are received, but rather the signal to financial markets that permits them to borrow at lower interest rates, and the rebate of import duties on machinery.

Table 7 Marginal Effective Tax Wedge*, Case 1: Unpromoted Profit-Making Firm

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
Pre-tax Reform	-0.90	-0.23	1.35	2.11
Post-tax Reform	-0.82	-0.23	1.06	1.69

Source: Authors' calculations based on data listed in Section 9

Note: * Absolute tax-induced reduction in hurdle rate of return.

Table 8 Marginal Effective Tax Wedge*, Case 2: Promoted Profit-Making Firm

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	1.28	0.31	1.48	0.28
2	0.93	0.31	1.07	0.28
3	0.53	0.31	0.62	0.27
4	0.06	0.31	0.11	0.27
SS	0.00	0.67	70.45	2.44

Source: Authors' calculations based on data listed in Section 9

Note: * Absolute tax-induced reduction in hurdle rate of return.

In the “steady state” following the end of the promotion period, the tax-induced disadvantages faced by small firms become much greater than those faced by large firms. In the case of M&E investments, the tax wedge is zero, and so the tax system is essentially neutral with respect to large firms' investments. The differential tax disadvantage faced by small firms is about 1.7 to 1.8 percentage points on the rate of return for both M&E and NRC investments.

Table 9 presents the estimated tax wedges for promoted firms in a temporary tax loss position during the promotion period. As would have been expected from the earlier results, the tax wedge faced by small firms is substantially larger than that for large firms. While the tax system subsidizes large firm investments (almost one percentage point in the first year of the promotion period), it taxes similar investments by small firms (at a rate of over three percentage points on the rate of return). As with the case of unpromoted firms (Case 1) we find again here that the total tax wedge difference between small and large firms is actually greater than the differences in hurdle rates of return shown in Table 6. In other words, not only does the tax system differentially penalize small firm M&E investments (relative to those of large firms), it actually converts a small advantage of small firms into a significant disadvantage.

Table 9 Marginal Effective Tax Wedge*, Case 3: Promoted Firm in Temporary Loss Position

Period	(%)			
	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	-0.97	2.09	3.13	3.61
2	0.55	1.59	2.16	3.29
3	-0.54	1.06	1.18	2.94
4	-1.64	0.50	0.19	2.56
SS	0.00	0.67	1.68	2.44

Source: Authors' calculations based on data listed in Section 9

Note: * Absolute tax-induced reduction in hurdle rate of return.

The following is a brief summary of the principal conclusions of this section.

1. The tax system provides a net subsidy to investments by large, unpromoted firms, and net tax on the investments of small, unpromoted firms. The tax-induced differential in hurdle rates of return between small and large firms is 2.25 percentage points for M&E investments (1.88 percentage points post-tax reform), and 2.35 points for NRC investments (1.92 points post-tax reform).

2. For both large and small firms which are promoted and which have positive taxable incomes during the tax holiday period, the tax wedge is positive for both types of investment — i.e. the tax system offers a disincentive to investment. The size of this disincentive is larger for small firms than for large firms in the case of M&E investments. The relative disadvantage faced by small firms becomes much larger after the end of the promotion period. It is almost identical in the case of NRC investments. The earlier finding, that small firms face a lower hurdle rate of return with promotion than without, arises, not because of the tax system, but rather in spite of it.

3. Large promoted firms which have negative taxable incomes in the early years receive an investment subsidy from the tax system. Small firms in a similar position face a tax-induced investment disincentive. The tax system actually turns a relative advantage faced by small firms in this situation into a significant disadvantage.

Appendix

Debt-Equity Ratios and Hurdle Rates of Return

In determining the hurdle rates of return shown in Tables 3 to 6, it was assumed that small firms and large firms used different debt-equity ratios, in accordance with data available to us on investment financing by different types of firms. It is apparent from the results that the estimated hurdle rates are sensitive to this ratio. In order to give a sense of the magnitude of this influence, we recalculated the hurdle rates under two different assumptions about debt-equity ratios: a) small and large firms used no debt in financing new investments ($\beta = 0$), and b) they both financed new investment entirely with new debt

($\beta = 1$). For each of these assumptions we recalculated the new hurdle rates of return for the four cases considered in Tables 3 to 6. The results of these calculations are shown in Tables A.1 to A.8.

Table A.1 Hurdle Rate of Return, Unpromoted Profit-Making Firm; $\beta=0$

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
Pre-tax Reform	4.40	4.74	6.28	6.87
Post-tax Reform	4.07	4.35	5.86	6.34

Source: Authors' calculations based on data listed in Section 9

Table A.2 Hurdle Rate of Return, Promoted Profit-Making Firm; $\beta=0$

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	5.10	3.17	6.08	4.45
2	4.62	3.17	5.62	4.48
3	4.11	3.16	5.12	4.44
4	3.57	3.16	4.58	4.44
SS	4.40	4.74	6.28	6.87

Source: Authors' calculations based on data listed in Section 9

**Table A.3 Hurdle Rate of Return, Promoted Profit-Making Firm;
 $\beta=0$ (With Depreciation Carry-Forward)**

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	-1.66	1.68	-0.38	3.03
2	-2.08	1.58	-0.86	2.92
3	-2.50	1.48	-1.34	2.80
4	-2.90	1.37	-1.82	2.66
SS	4.40	4.74	6.28	6.87

Source: Authors' calculations based on data listed in Section 9

**Table A.4 Hurdle Rate of Return, Promoted Firm in Temporary Loss
Position; $\beta=0$**

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	3.42	5.47	7.38	7.72
2	4.53	5.31	6.57	7.53
3	3.84	5.13	5.76	0.73
4	3.16	4.94	4.96	7.11
SS	4.40	4.74	6.28	6.87

Source: Authors' calculations based on data listed in Section 9

Table A.5 Hurdle Rate of Return, Unpromoted Profit-Making Firm; $\beta=1$

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
Pre-tax Reform	10.02	11.10	20.49	22.79
Post-tax Reform	10.60	11.60	21.35	23.38

Source: Authors' calculations based on data listed in Section 9

Table A.6 Hurdle Rate of Return, Promoted Profit-Making Firm; $\beta=1$

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	12.08	12.18	20.59	22.72
2	11.85	12.19	20.45	22.72
3	11.54	12.19	20.21	22.71
4	11.14	12.19	19.84	22.69
SS	10.02	11.10	20.49	22.79

Source: Authors' calculations based on data listed in Section 9

**Table A.7 Hurdle Rate of Return, Promoted Profit-Making Firm;
 $\beta=1$ (With Depreciation Carry-Forward)**

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	7.07	11.10	16.95	21.94
2	6.47	10.93	16.20	21.74
3	5.81	10.74	15.29	21.48
4	5.08	10.53	14.20	21.16
SS	10.02	11.10	20.49	22.79

Source: Authors' calculations based on data listed in Section 9

**Table A.8 Hurdle Rate of Return, Promoted Firm in Temporary Loss
Position; $\beta=1$**

(%)

Period	Large Firm		Small Firm	
	M&E	NRC	M&E	NRC
1	9.32	14.00	28.12	30.38
2	11.51	12.95	25.25	28.22
3	9.79	11.82	22.02	25.73
4	8.02	10.62	18.47	22.93
SS	10.02	11.10	20.49	22.79

Source: Authors' calculations based on data listed in Section 9

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