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by

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March 2016 Discussion Paper No. 21

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Draft: February 2016

ABSTRACT

Tax incentives for investment are very popular among developing countries but they are costly and unlikely to compensate for other shortcomings. One of the reasons many governments often uses when expanding the tax incentives is that their tax incentives are inferior relative to those of competitors. This study examines the impacts of those tax incentives on the tax competitiveness using the case study of Thailand. It takes into account important tax provisions under both standard and preferential tax treatments, and computes effective average tax rates (EATRs) applied to the country's focused industries. It then compares Thailand's EATRs with those of ASEAN peers. Such industry-specific lens is crucial since the tax benefits offered as well as the composition of investment assets can vary substantially between industries. It finds that, Thailand's investment incentives are broadly comparable to those offered by its ASEAN peers. Under the maximum incentives, the EATRs range from 6-9% depending on the investment intensity in each industry. This suggests that, with the exception of targeted incentives for the biotec industry, the government should refrain from throwing any more tax or monetary incentives and focus on fixing structural shortcomings. The results also indicate that accelerated depreciation and investment tax allowance are two options that may perform better than the tax holiday in term of minimizing the incentive redundancy.

Key words: Effective average tax rate, Investment incentives, Tax holiday JEL classifications: H25, H32, K34

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1. Introduction

Tax incentives for investment are very popular among developing countries. Thailand is no exception. Its government has implemented several tax incentives. Examples are the activity-based incentive systems, the special economic zones, and the investment acceleration measures. Those measures have come on top of the statutory tax cut over 2012 to 2013 which brings the tax rate to 20%.

Those tax incentives, however, are costly and unlikely to compensate for all of the country's shortcomings. According to the Fiscal Policy Office's estimate, the tax expenditures associated with the incentives handed out by Board of Investment account for 1.7% of GDP in 2014 and are just smaller than total personal income tax revenue (see Figure 1). More importantly, although empirical evidence suggests that tax does matter significantly on firms' investment location decision (see, for example, Devereux and Griffith, 1998), it is just one of the determinants. Other factors such as resource availability, policy continuity and ease of doing are also at play. It is unlikely that tax incentives will be able to compensate for all of the country's shortcomings.



Figure 1: Thailand's Estimate of Tax Expenditure associated with BOI Incentives

Source: Budget Bureau, FPO

It is, therefore, important to know where the country's tax incentives stand relative to its competitors.¹ This will allow policymakers to efficiently design the system of tax incentives for investment by expanding incentives for only the inferior pockets. And if the tax incentives are deemed to be sufficiently attractive, i.e. able to compete with neighboring countries, then the

¹ In practice, many factors could influence the tax competitiveness of a country. These include, for example, tax burden and the amount of time taken to comply with tax regulations. This study focuses on only the tax burden aspect.

government can refrain from throwing tax breaks and focus on addressing other important weaknesses.

In practice, the tax incentives come in many formats. In the standard treatment, there are statutory tax rates, depreciation allowances, and various tax credits. Preferential tax regime includes not only tax holiday but also tax exemption cap and investment tax allowance. For policy-making purpose, it is useful to be able to summarize the impact of taxation on the incentives concerning location choices in a single measure.

In this study, I investigate 2 questions: 1) how does Thailand's tax incentives compete with its ASEAN peers?, and 2) Is there any sign of redundancy in the current incentive system? I answer these questions by computing the effective average tax rate (EATR) using the methodology proposed by Devereux and Griffith (2003). The EATR is a forward-looking tax rate and it measures the average tax rate a firm might expect to face on an investment over the possible distribution of profitability. It informs location choices. I then apply that framework to the tax context of four ASEAN countries which are the largest recipients of net FDI inflows (excluding Singapore). These countries are referred to as ASEAN4 throughout this article and include Indonesia, Malaysia, Thailand and Vietnam.

This paper contributes to the literature in two important ways. First it takes into account relevant features in the tax code used in the ASEAN countries. Examples are Thailand's tax holiday with the cap on tax exemption and Malaysia's extra allowance on investment cost (Investment Tax Allowance). Second it examines the tax competitiveness with industry-specific lens. Previous studies have looked at maximum incentives or broad types of incentives such as those given to high-tech sector or those given to manufacturing industry. The tax benefits offered as well as the composition of investment assets, however, can vary substantially between industries. This will likely produce significant impacts on the effective average tax rates. This study looks at Thailand's focused industries. These are the group of industries that have been chosen by the Thai government as its short and medium term priorities. It consists of Auto, Biotec, Electronics, Processed Food, and Tourism.

The remainder of this paper is organized as follows. The next section describes related studies. Section 3 illustrates how the impact of taxes on the investment incentives is measured. The results and their policy implications are discussed in Section 4. The final section concludes the study.

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2. Related Studies

This study is related to two sets of literature (see Table 1). The first set is on the formulation of the forward-looking effective tax rate on firm's investment decision. Auerbach (1979) and King and Fullerton (1984) have developed an approach to measuring the effective marginal tax rate (EMTR). This approach essentially assumes a profit-maximizing firm with risk-neutral shareholders and calculates the cost of capital (the minimum pre-tax rate of return necessary to earn zero post-tax economic profit) associated with its investment. The cost of capital is then used to construct the EMTR, which is relevant for decision on the firm's investment scale. For Thailand, Aemkulwat (2008) has estimated the EMTRs classified by funding methods and investor types.

Table 1: Related Studies

	Formulation of Forward-Looking Effective Tax Rates					
	Auerbach (1979), King and Fullerton (1984)	Effective marginal tax rate (EMTR), applicable for marginal investment				
	Devereux and Griffith (2003)	Effective average tax rate (EATR), applicable for an investment project with positive economic profit				
4	Computation of EATR for AS	Computation of EATR for ASEAN				
	Klemm (2012)	Extending the DG framework to long-term investment				
	Botman et al. (2010)	Focus on the Philippines; Max incentives				
	Abbas and Klemm (2013)	Suggest 'partial' race to bottom; Max incentives				
	Suzuki (2014)	Find some evidence of tax competition; Typical incentives				
	Wiedeman and Finke (2015)	Consider max incentives, incentives targeted at regional development and incentives targeted at high-tech activities				

An important limitation of the EMTR is the fact that it assumes zero economic profit—making it applicable only for marginal investment projects in which the last unit invested yields just enough pre-tax return to break even after taxes. In many situations, however, a firm faces a choice between two projects that each earn more than its cost of capital. This includes cases when a firm with certain specific advantages, such as innovation and patents, decides where to locate its plants.

Devereux and Griffith (2003) has addressed this limitation by proposing the effective average tax rate (EATR). It computes the EATR by considering an investment project with positive economic profit and identifying the wedge between pre- and post-net present value (NPV) of the investment project. It thus helps inform policymakers on the measurement of the impact of taxes on the investment location decision. Many studies including Devereux and Griffith (1998) and Bellak and

Leibrecht (2009) have found that the EATR has a significant impact on firms' decision regarding where to invest abroad.²

The second set of literature is on the computation of the effective average tax rates for ASEAN countries. Over the past several decades, ASEAN countries have adopted tax holiday incentives in order to attract foreign direct investment. Klemm (2012) has extended the Devereux and Griffith EATR framework to accommodate those tax holiday incentives. Botman et al. (2010) computes the EATR for ASEAN countries with its focus on the Philippines' tax policy options. It considers maximum incentives and finds that the corresponding EATRs are comparable in the region. Abbas and Klemm (2013) studies the development of the EATR from 1996 to 2007 of 50 developing countries including many ASEAN countries. Similar to Botman et al., it also considers the EATR associated with maximum incentives. The study concludes that those countries have competed over the special tax incentives, so called the partial race to bottom. It, however, does not explicitly report the EATR. Suzuki (2014) estimates the EATR of 12 countries in East ASIA and considers the typical incentives, which are defined as average tax incentives for a typical project based on actual usage. It finds some evidence of tax competition over the period of 1991-2012. Wiedemann and Finke (2015) computes the EATR for Asia-Pacific countries including nine ASEAN countries. It also considers the EATRs associated with three types of tax incentives: maximum incentives, incentives targeted at regional development and incentives targeted at high-technology activities.

3. Conceptual Framework

The analysis in this study measures the impact of taxation on location choice incentive by computing the EATR based on Devereux and Griffith (2003)'s methodology. In this section, I first discuss how the effects of tax on investment incentives are typically measured before illustrating the EATR computation framework.

3.1 How to measure the effects of tax on investment incentives

There is quite a large literature on how to measure the effect of taxes on incentives to invest. It is, however, important to distinguish between backward- and forward-looking tax measures. Both are useful but they are suitable for different objectives.

The backward-looking tax measures such as average tax rates are typically calculated using observed tax payments and scaling it with a measure of profit. They are simple and can capture

² In particular, Devereux and Griffith (1998)'s results indicate that a percentage point drop in the UK EATR would raise the probability of a US firm placing its investment in the UK by one percent.

many complexities of the tax code. They are also very good measures for distributional analysis of tax burden. However, the major drawback associated with the backward-looking measures is the fact that they do not reflect the effect on the incentives. Indeed, the tax liabilities of a firm at any point in time reflects the history of its investment up to that point through deductions of depreciation and losses carry-forward. This can induce endogeneity bias into regressions. For example, a period of high investment is likely to generate high depreciation allowances. This will lower the taxes paid and creates reverse causality in the regression.

On the other hand, the forward-looking tax measures such as effective tax rates are calculated for a hypothetical investment and can be computed for any well-defined investment project. They typically take into account all present and future values of cashflows associated with the project. Consequently, they are generally preferred measures when looking into the impact on incentives. The main drawback is that they are computed for a specific type of investment financed in a specific way. This makes it difficult to capture impacts when investment across projects is aggregated. Here I focus on the forward-looking effective tax rate approach.

3.2 Computation of the EATR

The computation of effective tax rates in the study is based on a methodology, which was originally developed by King and Fullerton (1984) and Devereux and Griffith (2003), and later modified by Klemm (2012). It considers a profit-maximizing behavior of a firm with risk-neutral shareholders. For simplicity, the analysis here assumes 1) no capital income at the personal income tax level and 2) equity finance is adopted to finance the investment.

Suppose a firm invests in period *t* and hence increases its capital stock by one unit. The resulting capital stock is assumed to be slowly disinvested over time through depreciation. The cost of the investment is assumed to be one unit. The net present value (NPV) of the investment can be calculated as:

$$R_{t} = dV_{t} = \sum_{j=0}^{\infty} \frac{dD_{t+j}}{(1+i)^{j}},$$
(1)

where R_t is the net present value to the shareholder of the investment, V_t is the equity value of the firm, D_t is the dividend paid by the firm, and *i* is the discount rate. Note that, abstracting from risk, the discount rate equals the nominal interest rate: $(1 + i) = (1 + r)(1 + \pi)$, where *r* = real interest rate and π = inflation rate.

The allocation of funds remaining from the investment can depend on the way in which the project was financed. If the project was financed by retained earnings, the analysis assumes that all remaining funds are returned to shareholders in the form of dividend payment. If the project was financed by new equity, it assumes that the firm repurchases its shares using the same amount of money and leaves the total number of outstanding shares unaffected. In the absence of personal taxation, both types of equity financing yield the same return.

The dividend paid is, in turn, determined by the firm's flow of funds equation. In absence of taxes, this can be written as:

$$D_{t} = F(K_{t-1}) - I_{t},$$
(2)

where K_{t-1} is the capital stock, I_t is the investment undertaken, and $F(K_{t-1})$ is output of the investment. Furthermore the additional unit of capital stock is assumed to generate $F'(K_{t-1}) = p + \delta$, where p = the real rate of return on the investment and δ is the economic depreciation rate.

The pre-tax NPV of the investment (R_t^*) is:

$$R_t^* = -1 + \frac{(1+\pi)(p+\delta)}{(1+i)} \sum_{j=0}^{\infty} \left(\frac{(1+\pi)(1-\delta)}{(1+i)}\right)^j = \frac{p-r}{r+\delta}$$
(3)

In the presence of taxes, the computation is a little more complicated. The dividend in equation (2) becomes:

$$D_{t} = (1 - \tau)F(K_{t-1}) - I_{t} + \tau \phi (I_{t} + K_{t-1}^{T}), \qquad (4)$$

where τ denotes the statutory corporate income tax rate, and ϕ denotes the depreciation tax allowance rate, and K_{t-1}^T is the capital stock for tax purposes. Note that, for tax purposes, the capital stock is assumed to evolve according to $K_t^T = (1 - \phi)K_{t-1}^T + I_t$. The post-tax NPV (R_t) can then be written as

$$R_{t} = \frac{(p+\delta)(1-\tau)}{r+\delta} - 1 + A, \qquad (5)$$

where $A \equiv \tau \phi \sum_{j=0}^{\infty} \frac{dI_{i+j} + K_{i+j-1}^{T}}{(1+i)^{j}}$ denotes the present value of the depreciation allowances.³

Now consider the three terms on the right hand side of equation (5). The first term represents the present value of the investment returns. The second term represents the present value of the cost of investment which equals 1. The final term represents the present value of the depreciation allowances and its value depends on the depreciation method chosen. For declining balance method, *A* becomes

$$A = \tau \phi \sum_{j=0}^{\infty} \left(\frac{1-\phi}{1+i} \right)^j = \frac{\tau \phi(1+i)}{\phi+i} .$$
(6)

If the allowance is instead given at the same rate in subsequent periods on a straight line basis until the whole cost of the investment had been allowed, then the allowance will be given for T periods

where $T = \frac{1}{\phi}$. A then becomes

$$A = \tau \phi \sum_{j=0}^{T-1} \left(\frac{1}{1+i} \right)^j.$$
(7)

The effective average tax rate (EATR) is computed as the present value of the corporate income paid (the difference between the pre-tax and post-tax values of the investment) divided by the net present value of the income stream in the absence of tax. That is,

$$EATR = \frac{R^* - R}{p \sum_{j=1}^{\infty} \frac{(1-\delta)^{j-1}}{(1+r)^j}} = \frac{R^* - R}{p/(r+\delta)}.$$
(8)

Tax holiday

The analysis so far assumes that the statutory tax rate (τ) remains constant throughout. It is possible to allow for time-varying tax rates (τ_j). The tax holiday scheme adopted by many developing countries is the case where there is a period of Y years at the beginning of the investment project during which the statutory tax rates (τ_j) are set to zero.

³ Note that the analysis implicitly assumes that the firm has sufficient taxable profit to absorb this allowance.

With the tax holiday of *Y* years, Klemm (2012) has shown that the post-tax NPV of equation 5 becomes:

$$R_{t} = \frac{(p+\delta)}{(r+\delta)} \left[1 - \tau \left(\frac{1-\delta}{1+r}\right)^{Y} \right] - 1 + A$$
(9)

where $A = \tau \phi \left(\frac{1+\iota}{i+\phi} \right) \left(\frac{1-\phi}{1+i} \right)^{Y+1}$ for declining balance method and

$$A = \begin{cases} \frac{\tau\phi(1+i)}{i} \left[\left(\frac{1}{1+i}\right)^{Y+1} - \left(\frac{1}{1+i}\right)^{1/\phi} \right] & \text{if } Y < \frac{1}{\phi} - 1 \\ 0 & \text{otherwise} \end{cases} \text{ for straight-line method.}$$

Incorporating special incentive schemes employed by ASEAN4 into this framework is relatively straightforward. My analysis has taken into account the following schemes: tax rate reduction after holiday expiration (all countries), tax holiday with cap on the tax exemption (Thailand), accelerated depreciation (Malaysia), and investment tax allowance (Malaysia).

Calibration

To be consistent with previous studies, I assume that the investment yields 20% profit. I also assume real interest rate of 5% and headline inflation of 2%. Following Suzuki (2014), economic depreciation rates are assumed to be 12.25% for machines and 3.6% for building. I calibrate the shares of investment assets employed by each industry using the Office of National Economics and Social Development Board's Input-Output Table of Thailand (2010). As expected, Auto, Biotec and Electronics are heavily machinery-intensive, whereas tourism puts more emphasis on structures (see Figure 2).



Figure 2: Share of Investment Assets by Industries

Share of investment assets

Source: Author's estimate based on NESDB data

Limitations

The framework here provides a helpful way to summarize the effects of tax policy on investment incentives. However, it is important to note its limitations. First it considers only taxation at the domestic corporate level and does not take into account personal and international taxations. Since the analysis focuses essentially on the small open economy context, it is possible that the marginal providers of funds are foreign firms or individuals and their tax treatments may differ from that of domestic investors. In order to evaluate the country's industry-specific tax competitiveness, it would therefore be sensible to abstract from capital income taxes at the personal income level. Future studies focusing on investment decisions associated with particular home countries could take a look at the international taxation aspect.

Second this study assumes equity financing. Debt-financing is likely to yield lower EATR because of the ability to deduct interest expenses in all countries. It is, however, unlikely to materially impact the competitiveness evaluation.

4. EATR Estimation and Implications

In this section, I first examine how each country fares under the standard tax treatment. I then show how preferential tax regimes have lowered effective average tax rates for the focused industries. Finally, I investigate the incentive redundancy of the current incentive system.

Standard Tax Treatment

An investment project typically requires a combination of investment assets. The mix of investment assets varies across industries and it also affects the incentives. For example, producing Solid State Drive (SSD) would emphasize investment in machinery, whereas launching a hotel would require relatively more structures. The tax code allows relatively higher rate of depreciation allowance for machinery investment. That explains why the EATR for manufacturing is 17.7%, about a percentage point lower than services (see Figure 3). The EATR for a typical (or average) investment is 18.2%.

Figure 3: How the standard tax treatment affects investment incentives across industries



⁽Thailand, 2016)

Comparing the EATR on typical investment with the other ASEAN4 countries (see Figure 4), I find that Thailand's standard tax treatment currently appears to be the most competitive among the ASEAN5 nations (Figure 5). Combining Thailand's statutory tax rate of 20% to the very generous depreciation allowance results in the EATR being slightly above 18%. This is significantly below the average EATR of 20.9%. Interestingly, Vietnam has the same statutory tax rate as Thailand but its depreciation allowance rate on machinery is about half of Thailand. That results in its EATR being over 19%.

Source: Author's estimates



Figure 4: Overview of Standard Tax Treatments across ASEAN4

Source: PWC, Deloitte and documents from national tax authorities





EATR under standard tax treatment across ASEAN4 (2016; Typical Investment)

Looking back over the past decade puts Thailand's recent tax cut into perspective (Figure 6). The tax development in the region is characterized by rounds of tax cuts. The first round appears to occur around the global financial crisis in 2008. All countries except Thailand has cut their statutory tax rates. Three years later, Thailand has aggressively cut its statutory tax rate from 30 to 20%. This delayed response from Thailand has potentially triggered another round of 'race to the bottom'. Vietnam and Malaysia have already resumed cutting their tax rates.

Figure 6: Development of EATR under the standard tax treatment across ASEAN5





Preferential Tax Regimes

The standard tax treatment alone does not give complete picture about the region's tax landscape. All ASEAN4 countries offer tax-holiday type of incentives. They vary on the number of years. Several countries modify the tax holiday incentives. Thailand, for example, imposes the limit on the amount of tax exemption during the holiday. Malaysia interestingly gives 2 options: 1) tax holiday and 2) investment tax allowance (ITA) which works by granting an allowance of 60 percent of total investment cost. This allowance can be set-off against 70 percent of the pre-tax income each year until fully utilized. The ITA is given on top of the standard depreciation. The incentive scheme in Vietnam consists of basic rate, preferential basic rate and temporary reductions. This results in a tax system with effectively four tax rates over the investment horizon.

First I look into the 5 focused industries and assigned maximum incentives to each of them. For Thailand, all industries except biotec will receive the tax holiday of 8 years with the exemption cap plus the extra 5 years of 50% tax rate reduction (see Figure 7). Biotec is the only industry that is not capped by the tax exemption limit. This reflects the emphasis of the government.

	Examples of Qualified Activities	Max Incentives	
Auto	 High-tech auto parts, ABS, tires Decentralization merit, SEZ 	 8-year holiday (With cap) Extra 5 years of 50% rate reduction 	
Biotec	 Biotec Activities Need to locate in approved scientific parks 	 8-year holiday (No cap) Extra 5 years of 50% rate reduction 	
Electronics	Electronics designDecentralization merit, SEZ	 8-year holiday (With cap) Extra 5 years of 50% rate reduction 	
Processed Food	 Medical food and food supplements Decentralization merit, SEZ 	 8-year holiday (With cap) Extra 5 years of 50% rate reduction 	
Tourism	 Recreation park, Conference center, Racing car stadium Competitiveness, Decentralization merit, SEZ 	 8-year holiday (With cap) Extra 5 years of 50% rate reduction 	

Figure 7: Thailand's Maximum Incentives across Focused Industries

Under the maximum tax incentives, Thailand's EATRs are significantly lower than that under the standard treatment. They range from around 6-9% depending on the investment intensity (see Figure 9). The first four industries are relatively intense in machinery and their EATRs are around 6-7%. Tourism, on the other hand, puts more emphasis on structures and its EATR is around 9%.

	Indonesia	Malaysia	Thailand	× Vietnam
Auto	 Holiday = 10 Extra 2 years of 50% CIT rate reduction 	 Holiday = 10 Or 100% ITA 	 Holiday = 8 (w/ cap) Extra 5 years of 50% CIT rate reduction 	 Holiday = 4 Years 5-9: tax 5% Years 10-30: tax 10%
Biotec	 Holiday = 10 Extra 2 years of 50% CIT rate reduction 	 Holiday = 10 Or 100% ITA Extra 10 years of 20% CIT rate 	 Holiday = 8 (w/o cap) Extra 5 years of 50% CIT rate reduction 	 Holiday = 4 Years 5-9: tax 5% Years 10-30: tax 10%
Electronics	 Holiday = 10 Extra 2 years of 50% CIT rate reduction 	 Holiday = 10 Or 100% ITA 	 Holiday = 8 (w/ cap) Extra 5 years of 50% CIT rate reduction 	 Holiday = 4 Years 5-9: tax 5% Years 10-30: tax 10%
Processed Food	 Not Prioritized Standard treatment applies 	 Holiday = 10 	 Holiday = 8 (w/ cap) Extra 5 years of 50% CIT rate reduction 	 Not Prioritized Standard treatment applies
Tourism	 Not Prioritized Standard treatment applies 	 Holiday = 10 Or 100% ITA 	 Holiday = 8 (w/ cap) Extra 5 years of 50% CIT rate reduction 	 Not Prioritized Standard treatment applies

Figure 8: Maximum tax incentives by industries across ASEAN4

Source: PWC, Deloitte and documents from national tax authorities



Figure 9: EATR under maximum incentives across ASEAN4 (2016)

Thailand's maximum incentives are broadly comparable to ASEAN peers in most sectors (see Figure 8). Its EATRs for all sectors except biotec are the lowest or within 1-2 pp from the country with most attractive incentive (see Figure 9). One exception is Biotec where Malaysia has been putting a strong emphasis on. Its EATR is 5 percentage point lower than Thailand's. This suggests that, with the exception of targeted incentives for the biotec industry, the government should refrain from

throwing any more tax or monetary incentives and focus on fixing structural shortcomings.

Looking only at maximum incentives, however, could be misleading. Only a small number of firms may qualify or be willing to fulfill the requirements needed for the maximum incentives. To address this concern, I also look at 'general' incentives that are either incentives applying to typical activities in the respective industry or the most basic tax holiday (or equivalent) incentives given to that industry. As an example, for automobile industry, I pick manufacturing of auto parts to represent typical incentives. For processed food, I choose food manufacturing to represent typical incentives. Figures 10 and 11 show general incentives across the focused industries for Thailand and ASEAN4.

	Examples of Qualified Activities	General Incentives	
Auto	Manufacturing of auto parts	• 8-year holiday (With cap)	
2			
Biotec	Biotec Activities	• 8-year holiday (No cap)	
Electronics	General harddrives	• 5-year holiday (With cap)	
Processed Food	Food manufacturing	• 5-year holiday (With cap)	
Tourism	Hotel (over 100 rooms)	 No tax holiday (only exemption of import duty) 	
Source: BOI			

Figure 10: Thailand's general incentives across focused industries



		Malaysia	Thailand	Vietnam
	maonesia	waldysid	mananu	Victiani
Auto	 Holiday = 5 Extra 2 years of 50% CIT rate reduction 	 70% Holiday = 5 Or 60% ITA against 70% of income 	 Holiday = 8 (w/ cap) 	 Holiday = 4 Years 5-9: tax 5% Years 10-15: tax 10%
Biotec	 Holiday = 5 Extra 2 years of 50% CIT rate reduction 	Holiday = 10Or 100% ITA	• Holiday = 8 (w/o cap)	 Holiday = 4 Years 5-9: tax 5% Years 10-15: tax 10%
Electronics	 Holiday = 5 Extra 2 years of 50% CIT rate reduction 	 70% Holiday = 5 Or 60% ITA against 70% of income 	 Holiday = 5 (w/ cap) 	 Holiday = 4 Years 5-9: tax 5% Years 10-15: tax 10%
Processed Food	 Not Prioritized Standard treatment applies 	 70% Holiday = 5 Or 60% ITA against 70% of income 	 Holiday = 5 (w/ cap) 	 Not Prioritized Standard treatment applies
Tourism	 Not Prioritized Standard treatment applies 	 70% Holiday = 5 Or 60% ITA against 70% of income 	 No tax holiday Only exemption of import duty 	 Not Prioritized Standard treatment applies

Source: PWC, Deloitte and documents from national tax authorities

With the exception of electronics, Thailand's competitiveness picture is consistent with what we observe under maximum incentives. Its EATRs for the automobile, process food and tourism industries are either lowest or within 1-2 percentage points of the most competitive country (see Figure 12). Thailand's incentives given to the Biotec industry are again inferior to those offered by Malaysia. For electronics, Thailand's relatively higher EATR under the general incentives likely reflects its government's policy on shifting towards activities with larger value added.

Figure 12: EATRs under general tax incentives ASEAN4 (2016)





Source: Author's estimates

Redundancy Examination

In addition to maintaining sufficiently attractive tax incentives, policymaker has to minimize the foregone revenue. One way to achieve that is to avoid potential redundancy in the incentive scheme. Here I investigate two questions. First, are the tax incentives more attractive for investing in short-lived assets? If that is true, then we may simply be drawing companies that tend to be foot-loose. Second, are the tax incentives more attractive for highly profitable firms? If that is the case, it is possible that they have invested even without the tax incentives offered.

In each question, I compare the resulting EATRs under the current tax holiday system to the alternative incentive system which involves accelerated depreciation and investment tax allowance (ITA). The accelerated depreciation scheme increases the depreciation rates during the first year of investment to 40% and 10% for machinery and building, respectively. The ITA proposed here is similar to the scheme employed by Malaysia. With the ITA, an investor can deduct 60% of the investment cost against 70% of pre-tax income each year until fully utilized. One advantage of the alternative system over the tax holiday is that it avoids providing tax planning opportunities for investors who may try to shift taxable income earned by associated firms into the tax-holiday firm.

With the tax holiday, the EATR declines significantly as economic depreciation rates increase (see Figure 13). It will be almost zero for an investment in which all assets completely depreciate just before the end of the holiday. In contrast, under the accelerated depreciation scheme, the EATRs do not decline as much when economic depreciation rates increase. This illustrates how the tax holiday tends to favor foot-loose industries. Consequently, if the goal is to attract long-lasting assets, the accelerated depreciation may be a better policy option.

Figure 13 EATR for Electronics Industry by depreciation rates,

General Incentives vs. Accelerated Depreciation (2016)



EATR for Electronics Industry by depreciation rates, General Incentives vs. Accelerated Depreciation (2016)

Notes Economic depreciation rates for machinery are 6.3%, 12.5%, 25% and 50%, while the rates for buildings are 1.8%, 3.6%, 7.2% and 14.4%. Source: Author's estimates

Another finding is that, under the tax holiday, the effective tax rates become significantly lower for firms with higher profits (see Figure 14). This possibly signals redundancy in the current incentive system. Incentives may be offered to firms that would have invested without them. Therefore, making the incentives well-targeted is very important when handing out the tax holiday without the tax exemption cap. With the cap, the effective tax rates are significantly higher for very profitable firms. Using the same Biotec example, the tax exemption cap starts kicking in at the profit of 140% and significantly raises the EATR for firms with very large profits. This supports BOI's practice in putting the tax exemption cap on the tax holiday given to most activities.

Figure 14: EATRs under maximum incentives for biotec industry by incentive instruments



Maximum incentives given to Biotec industry (EATR by profit level)

Source: Author's estimates

In addition to the tax exemption cap, a combination of accelerated depreciation and investment tax allowance can help minimize the incentive redundancy. As shown in Figure 14, for firms with moderate profit, the combination of accelerated depreciation and investment tax credit generates EATRs comparable to those under the tax holiday. On the other hand, for highly profitable firm, the combination generates substantially higher tax rates.

5. Conclusion

This study evaluates the impact of taxation on the location choice incentives using the EATR measure. It assumes the perspective of a firm adopting equity finance and takes into account tax provisions under both standard and preferential tax treatments. The results indicate that, from the taxation perspective, Thailand is an attractive destination for international capital. With the exception of the Biotec industry, its EATRs under the maximum incentives are lowest or within 1-2 percentage point of the most competitive country. Another important finding concerns the choice of tax instruments employed under the preferential tax treatment. It finds that the tax holiday tends to favor foot-loose companies as well as those with large profit. This finding supports BOI's practice in imposing the tax exemption cap on most activities. It also suggests that policymakers should also consider the scheme involving accelerated depreciation and investment tax allowance. Those two instruments are likely to outperform the tax holiday in term of avoiding the potential redundancy.

Acknowledgements

This project receives financial support from Chulalongkorn Economic Research Centre. I would like to thank the participants at the Asian Development Bank Institute Workshop (January 2016) for their helpful comments and suggestions.

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