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# A Value-Added Tax (VAT) in Thailand: Who Wins and Who Loses?[1]

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## I INTRODUCTION

**D**uring the last few years, the Thai government has been planning the introduction of a value-added tax (VAT) in the country. If and when this tax is implemented, Thailand will be among the more than 40 countries in the world that have adopted a VAT (Gillis et al. 1990). The primary reason for introducing a VAT is that existing indirect taxes—such as Thailand's business tax—have a "cascading" effect. As an ad valorem tax levied on every transaction, the business tax accumulates along the chain of production. Thus, an initial tax rate of 10 percent can lead to an effective rate of over 25 percent. Furthermore, the effective rate will vary across goods depending on the number of intermediate stages in their production. This leads to at least two problems. First, the business tax distorts production decisions by causing the tax rate to vary across goods. Second, it creates an incentive for vertical integration. Finally, the business tax discriminates against exports. Even if exporters are exempt from paying the tax, they pay tax-ridden prices for their inputs, which undermines their competitiveness in world markets.

By replacing the business tax with a VAT, Thailand can in principle achieve a more uniform tax rate throughout the economy. Several other aspects of the government's proposal, however, will lead the effective tax rate to vary across commodities. The proposed VAT will use the "credit method," whereby enterprises pay the tax on their gross output but receive a rebate (or "credit") for the taxes paid on their inputs. For example, suppose the VAT rate is 10 percent. An enterprise buys 60 baht worth of inputs, processes them and sells the processed good for 100 baht. The enterprise pays 10 baht worth of taxes on its output (10 percent of 100 baht) but receives a rebate of 6 baht for the taxes paid on the inputs (10 percent of 60 baht). The net tax paid by the enterprise is 4 baht, which is 10 percent of the value added by the processing (100 minus 60).

The credit-method VAT will result in a uniform rate only if all the enterprises in the country are part of the VAT system. If an enterprise is exempt, it not only pays no VAT on its output, but it also does not receive the rebate on the VAT paid on its inputs. In this case, the net tax paid will no longer be 10 percent of value added. The government's proposal calls for several exemptions: enterprises with an annual turnover of less than 240,000 baht; traditional agriculture; producers of major agricultural inputs (fertilizers, insecticides); transport; education; health; and some professional services. In addition, three major groups will be "zero-rated:" not only will they pay no VAT on their output, but they will also receive a rebate for the taxes paid on their inputs. These groups are exporters, producers of investment goods, and utilities selling to residential customers. They will truly be paying a VAT rate of zero.

What, then, will be the impact of the VAT on the Thai economy? Who will gain and who will lose? What will be the effect on output, prices and incomes? To investigate these questions, we present some simulations with a computable general equilibrium (CGE) model of the Thai economy.[2]

We choose a multisector, general equilibrium model for this analysis because it captures the very effects we wish to study. As a result of the incomplete coverage of Thailand's VAT, the total tax burden will not be equal across-the-board, but depend on the input-output structure of production. Hence, a multisector

model, incorporating the economy's intermediate demand pattern is called for. For the same reason, we model the credit system explicitly, rather than assume the VAT is a tax on value added. This is also why we choose a general, rather than partial equilibrium model for this exercise. Furthermore, as a tax instrument, a VAT affects the economy through its influence on prices and incentives. Our model solves for the set of market-clearing prices and wages in the presence of a VAT.

We describe the model, data and experiments in the next section of this article. Section III reports on and interprets the results of simulations with the model. Section IV contains some concluding remarks.

## II THE MODEL, DATA AND EXPERIMENTS

As with all CGE models, ours solves for the set of market-clearing goods and factor prices, given the supply and demand behavior of the various agents in the economy. There are seven labor markets and two capital markets, all of which are assumed to clear. Our results therefore describe a medium-term equilibrium for the economy, when factors have moved to eliminate differentials in their rewards across sectors. Total factor supplies are assumed fixed and inelastic. Production of each sector's output is determined by a constant returns to scale CES production function in factors and fixed coefficient technology in material inputs. All producers maximize profits and perfect competition rules throughout.

On the demand side, consumer demand is determined by a linear expenditure system (LES), with one variation: each household type's savings rate is a nonlinear function of its disposable income. There are nineteen different types of household, so that the distributional implications of the VAT can be captured. Government consumption and investment demand are exogenous. Export demand is a constant elasticity function of Thai export prices relative to world prices. Finally, imports are assumed to be imperfect substitutes for Thai goods in the same sector. Given the last two assumptions, domestic prices in Thailand will not equal world prices but will nevertheless be influenced by them.

Most of the parameters of the model are calibrated from a benchmark data set, which is a social accounting matrix (SAM) of Thailand for 1987. In order to calibrate the model, certain elasticities have been estimated or assumed.[3]

Turning to the experiments, we aim to simulate the replacement of the business tax with a VAT. The government's proposal calls for a VAT rate of 10 percent. It also claims that the tax change will be "revenue-neutral"—that is, the VAT will generate as much revenue as did the business tax (35 billion baht, or 16 percent of government revenue in 1987). We find these two propositions inconsistent. Given reasonable assumptions about the share of each sector's output, which will be in the VAT net (see Table 1), we find that a VAT of 5.8 percent will generate enough revenue to replace the business tax. This will, therefore, be our base experiment, or **Case 1**.

Introduction of a VAT raises the tax rate on some commodities (such as tobacco, alcohol and fuel) that are already subjected to an excise tax. **Case 2** involves lowering the excise tax rates on these commodities so that the total tax burden (per unit of output) is the same as before the VAT was introduced.

**Case 3** has all the ingredients of Case 2, except that the VAT rate is 10 percent; we solve for the participation rates in each sector, which are consistent with this rate and revenue neutrality (see Table 1).

Finally, **Case 4** represents an extreme scenario, where the VAT replaces both the business tax and the excise tax. Here the revenue-neutral VAT rate is much higher—almost 15 percent.

## III RESULTS

The economywide effects of introducing the VAT in Thailand according to the four cases are presented in Table 2. As a proxy for the change in efficiency, we look at the percentage change in GDP. Note that in Case 1, GDP actually falls; it rises slightly in the other three cases. This is because there are other taxes in the system. While it eliminates the cascading nature of the business tax, introducing a VAT may not

necessarily make the tax burden more uniform. In particular, the presence of excise taxes acts as a distorting element, which the VAT fails to counterbalance.

Table 2 also shows the effects of a VAT on the average price level and the distribution of income in the economy. The one percent increase in the price level should be interpreted with care. There is occasionally a presumption that the introduction of a VAT will fuel inflation. Both theory and empirical evidence suggest that this is not true (Tait 1988). A one-shot tax change may increase the price level that year, but there is no reason to suspect that, by itself, this policy will lead to a persistent increase in prices year after year. Therefore, this one percent increase should be interpreted as the amount by which we would expect the domestic price level to be higher in the year the tax was adopted. In other words, from the inflation rate of that year, we can attribute about one percentage point to the VAT.

Finally, the improvement in income distribution (reduction in the Gini coefficient) can be interpreted only in light of the changes at the household and sectoral level, to which we now turn.

Table 3 shows the effective tax rate (as a percentage of value added) across the 27 sectors for the four cases as well as for the Thai economy without a VAT. Note that agriculture and the export-oriented sectors (canned foods, clothing, wood-plastic-tires and appliances) enjoy a reduction in their tax burden, while others (basic industries and slaughtering) undergo an increase. This is due to the exemptions and zero-rating under the VAT, as shown in Table 1. Note further that the variation in effective tax rates (represented by the coefficient of variation) under Case 1 is actually higher than without the VAT. This is because of the continued existence of excise taxes, whose effect is exacerbated by the introduction of the VAT. When excise taxes are lowered (Cases 2 to 4), so is the coefficient of variation. Indeed, the pattern of the coefficient of variation in effective tax rates mirrors the changes in GDP or efficiency across the four cases (see Table 2). Whenever the tax change lowers the coefficient, it reduces the production distortions and increases efficiency.

The effects of introducing the VAT on sectoral output reflects the changes in effective tax rates. Those sectors whose effective tax burden fell increase their output; conversely, those whose effective tax rate rose decrease their output. The winners appear to be agriculture and the export-oriented manufacturing sectors. Recall that these are the sectors either exempt or zero-rated in the VAT proposal. The losers are some of the nontradable service sectors. Finally, note that the dramatic increase in the beverages and tobacco sectors under Case 4 is due to the elimination of excise taxes that are targeted at those sectors (Table 4 and Table 5).

The income distributional implications of the VAT can be discerned from changes in the sectoral pattern of output. Overall, there is a slight improvement in the distribution of income. This result stems from the fact that the "winning sectors" (agriculture and exported manufactures) employ a higher proportion of the poor than do the "losing sectors." In particular, agricultural incomes decline by less (in real terms) than do nonagricultural incomes. Furthermore, within the nonagricultural sector, there is a shift in favor of poorer households because these households are more heavily involved in export-oriented activities (Table 6 and Table 7).

## IV CONCLUSION

This simulation analysis of a value-added tax in Thailand has yielded several conclusions. First, the government's proposal of replacing the business tax with a 10 percent VAT rate will probably not be revenue neutral; it will result in an increase in revenues. Second, the efficiency gains of the proposed VAT will be negative unless excise taxes are reduced as well. In any event, the VAT will not lead to a uniform tax rate across the economy, given the myriad of exemptions and zero-rated sectors. Third, the winners from the VAT will be those sectors that are either exempted or zero-rated, especially to the extent that these were not excluded from the business tax. Specifically, these tend to be agriculture and the export-oriented manufacturing sectors. Fourth, the VAT will have a slightly favorable effect on the distribution of income in Thailand because the winning sectors employ a greater share of the poor than do the losing sectors.

To be sure, the conclusions from our modeling exercise should be interpreted carefully. The results are not a forecast of the future. The Thai economy is also affected by changes in the external environment, which we have held constant in our analysis (Table 8). Our purpose has been to isolate those effects that can be attributed to the VAT alone and to express them in the context of a consistent view of how the Thai economy functions. Moreover, we have left out several aspects of the VAT. Implementing a credit-method VAT requires new administrative methods, which can in turn alter the coverage and efficiency of the tax. We have ignored the administrative dimension entirely. In addition, utilization of the VAT in other countries has shown that because the credit method creates an incentive to declare one's earnings honestly, income tax evasion also declines when a VAT is introduced. We have not included this effect in our simulations.

Nevertheless, our general equilibrium analysis has shown that the consequences of a VAT in Thailand may not be exactly those intended by the policy makers who proposed the tax, particularly if the VAT is to replace only the business tax. Furthermore, this conclusion was reached with a model that is nothing more than a quantitative representation of the implicit model used by policy makers in making a case for the VAT.

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