

DRAFT FOR DISCUSSION PURPOSES

CALCULATING THE BASE FOR A VALUE-ADDED TAX (VAT)

In discussing VATs, there are three different methods of calculating the tax liability -- the **invoice method**, the **addition method** and the **subtraction method** -- any one of which can be used to achieve the same result. There are two other aspects of VATs that have more substantive consequences. One aspect deals with the question of which jurisdiction taxes which transactions or activities. In this respect taxes may be based on **origin** or on **destination**. The second aspect of VATs deals with the definition of the tax base. In this respect VATs may use a **gross value added** base, a **net value added** base, or a **consumption** base.

In the following, the differences in the definition of the tax base and which jurisdiction taxes a transaction will be discussed for each of the three methods of calculating tax liability. To illustrate the equivalence of the different methods of calculation, numerical illustrations will be based on the following assumed values for a "representative" firm:

Gross sales (excluding VAT)	\$100.0 million
Purchases of intermediate goods (excluding VAT)	\$ 35.0 million
Capital expenditures (excluding VAT)	\$ 4.2 million
Profit	\$ 12.0 million
Labor compensation	\$ 30.0 million
Interest paid	\$ 4.1 million
Rent paid	\$ 1.0 million
Depreciation	\$ 17.9 million
Tax rate	10% (This is high but makes the math easy.)

The Invoice Method

With the "invoice method" of calculating value-added taxes, the tax rate is applied to gross sales and businesses take a tax credit for the tax paid on purchased intermediate and capital goods (as shown on invoices). This is the method European countries use for their VATs. Francis (1993) argues that the existing administrative structure of state sales taxes could easily be adapted to implement this method.

The European VATs are "destination based" taxes in which taxes are imposed by the jurisdiction in which the buyer is located. Exports are not taxed by the jurisdiction in which the goods are produced; imported goods are taxed by the jurisdiction in which they are sold. If a firm imports intermediate goods from another country and uses them in its production process, there is no tax on the invoice for these intermediate goods to take as a credit against the tax on the value of the goods the firm produces.

The tax base for VATs used by European countries is **consumption**. For the invoice method this means that the firm would receive a credit for the tax shown on invoices for capital good purchases as well as for intermediate goods.

Case 1. Suppose our "representative firm" sells all of its output to consumers within its own country and buys all of its intermediate and capital goods from domestic suppliers. It would add the 10% VAT to the invoices for the goods it sells, and the firms supplying intermediate and capital goods would have also added the 10% VAT to their invoices. How much tax our representative firm actually remits to the government is determined as follows:

Total tax on invoices for goods sold	\$10.0 million
- credit for tax on invoices for intermediate goods purchased	- 3.5 million
- credit for tax on invoices for capital goods purchased	- .42 million
 Tax remitted by the representative firm	 \$ 6.08 million
 Tax remitted by suppliers	 \$ 3.92 million

Case 2. All of the intermediate and capital goods purchased by the representative firm were imported and the representative firm sold all its output to domestic consumers. The representative firm would include a total of \$10.0 million in tax on invoices for the goods it sold to consumers, but there would be no taxes on invoices from suppliers for which it would receive credit. Thus the representative firm would remit \$10.0 million to the government.

Case 3. All of the intermediate and capital goods were purchased from domestic suppliers and 20% of the representative firm's output was exported. The representative firm would only include the VAT on the \$80 million of goods sold to domestic consumers, so its remittance to the government would be calculated as follows:

Total tax on invoices for goods sold	\$ 8.0 million
- credit for tax on invoices for intermediate goods purchased	- 3.5 million
- credit for tax on invoices for capital goods purchased	- .42 million
 Tax remitted by the representative firm	 \$ 4.08 million
 Tax remitted by suppliers	 \$ 3.92 million

As illustrated by the three cases above, European VATs apply to consumption (rather than production) within a country.

In order to tax business activity within a state, an origin-based tax is used. The invoice method of calculating tax payments could still be used, but the tax would have to be applied to the value of all goods produced within the state ("exports" would be included) and credit would be given for taxes on intermediate goods produced in other states and used by firms within the state. However, if other states are not using a similar method of taxation, invoices for these "imported" intermediate goods will not show any taxes to credit, resulting in inconsistent treatment of businesses using intermediate goods purchased in-state and out-of-state. The calculations would be similar to Case 1 above

except only domestic suppliers of intermediate and capital goods would be remitting taxes to the country of the representative firm and it would not matter whether the representative firm was selling its output to domestic or foreign buyers.

The Addition Method For VAT

Implementing the addition method of calculating an origin-based VAT would be based on information currently used in calculating taxes on business income. The value added by a business equals the sum of the incomes of those who supplied labor and capital to the business. Thus we could add

Profit (before federal income tax)	\$ 12.0
+ Compensation (wages, salaries & fringe benefits)	30.0
+ Interest paid (less interest received)	4.1
+ Net rent paid	1.0
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= "Net value added"	\$ 46.6

Or, to get "gross value added," we could also add depreciation.

$$\text{Gross value added} = 46.6 + 17.9 = \$64.5$$

The value-added taxes used in Europe and Michigan's "Single Business Tax" adopted in 1975 are "consumption type" VATs, i.e. they effectively exclude investment expenditures from the VAT. Using the addition method, this result is achieved by deducting capital expenditures from the tax base:

Profit (before federal income tax)	\$ 12.0
+ Compensation (wages, salaries & fringe benefits)	30.0
+ Interest paid (less interest received)	4.1
+ Net rent paid	1.0
+ Depreciation	17.9
- Capital expenditures	-4.2
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= Tax base for consumption-type VAT	\$ 60.8

The tax liability would then be calculated by multiplying the tax base by the tax rate.

Tax remitted by the representative firm	\$ 6.08 million
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Note that this is the same amount as the consumption-type VAT calculated by the invoice method for Case 1 in which all of the output of the firm was sold and all of the intermediate and capital goods were produced within the jurisdiction, so the distinction between origin and destination based taxes does not matter in this particular case. In other cases the origin-based addition method may not be equivalent to a tax on consumption within the jurisdiction even though the consumption-type definition of the tax base is used.

Michigan's Single Business Tax (SBT)

Michigan's SBT departed from this definition of a consumption-type VAT calculated by the addition method in several ways. The major differences were:

- 1) Rent paid was not included in the tax base, and rent received was not subtracted.
- 2) There was a "gross receipts reduction" that limited the tax base to 50% of gross receipts. This benefited firms with a high ratio of value added to gross receipts such as professional services and vertically integrated firms.
- 3) There was a "labor intensity reduction" that reduced the tax base by the amount that labor compensation exceed 63% of value added. This benefited labor-intensive businesses such as construction and retailing.

If value added were considered to be the "appropriate" tax base, all of these departures from that concept would be regarded as inappropriate.

For multi-state businesses a state VAT, like a state corporate income tax, requires apportionment of the tax base among states. Michigan's SBT used a three-factor formula based on the proportions of property and payroll located in Michigan and the proportion of sales with Michigan destinations to apportion compensation, net interest payments and profit. For the capital expenditure deduction, investments in real depreciable property in Michigan were deducted and investments in depreciable personal property were apportioned according to two factors, payroll and property. (From the standpoint of encouraging investment in the state of Michigan, it would have been better to deduct investments in personal property that were actually located in Michigan.)

The Subtraction Method

This method can be used for either an "income-type" VAT (on net value added) or consumption-type VAT. For an origin-based tax, "gross receipts" included all receipts for goods produced within the jurisdiction; for a destination-based tax only sales to buyers within the jurisdiction would be included. Under this method the tax base for a consumption-type VAT is calculated as

Gross receipts	\$100.0
- Cost of intermediate goods purchased	- 35.0
- Cost of capital goods purchased	- 4.2
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= Tax base for consumption-type VAT	\$ 60.8

The tax liability would then be calculated by multiplying the tax base by the tax rate.

Tax remitted by the representative firm \$ 6.08 million

Again, this is the same amount as the consumption-type VATs calculated by the invoice or subtraction methods.

The tax base for an income-type VAT is calculated as

Gross receipts	\$100.0
- Cost of intermediate goods purchased	- 35.0
- Depreciation	- 17.9
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= Tax base for income-type VAT	\$ 46.6

The tax liability would then be calculated by multiplying the tax base by the tax rate.

Michigan imposed a "Business Activities Tax" from 1953 to 1967 that was an income-type VAT using the subtraction method for calculating the tax liability.

Strauss (1987, 108) suggests that a VAT using the subtraction method might be less vulnerable to a constitutional challenge in Washington than a VAT using the addition method because the former looks more like a sales tax while the latter looks like an income tax, although in an economic sense they are identical. Indeed the VAT tax proposed for Washington by Rep. Dan Grimm in 1988 used the subtraction method of calculating a consumption-type VAT.

Advantages of VAT Taxes

In comparison with a tax on corporate profits, the advantages of a VAT like the SBT are:

- It is neutral with respect to the form of business organization, corporate or unincorporated.
- It is neutral with respect to financing, debt or equity.
- Revenues are more stable over the business cycle.

In comparison with a tax on gross receipts like the B&O tax, Oakland and Testa (1996) point out two advantages of a VAT:

- In the absence of taxes more precisely based on the costs of providing government services to businesses and on the external costs businesses impose on the community, taxes related to the size of a business as measured by value added may be a reasonable approximation of these costs.
- VATs avoid the "pyramiding" of taxes that occurs with gross receipts taxes in which purchased inputs are taxed and the cost of these inputs included in the price of the product is taxed again when the product is sold.

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