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TAX POLICY

Tax-Credit and Subtraction Methods of Calculating a Value- Added Tax





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The Honorable Dan Rostenkowski
Chairman, Joint Committee on Taxation

The Honorable Lloyd Bentsen
Vice Chairman, Joint Committee on Taxation
Congress of the United States

This report discusses the advantages and disadvantages of the tax-credit and subtraction methods for calculating a value-added tax. Should Congress consider a value-added tax as a revenue option, one fundamental question will be which method to choose. The report was prepared, not at your request, but pursuant to GAO's basic statutory authority. We undertook the effort to assist Congress in its consideration of options for reducing the federal budget deficit.

We are sending copies of this report to the Secretary of the Treasury and the Director of the Office of Management and Budget as well as to appropriate congressional committees and Members of Congress. If you have any questions, please call me on (202) 275-6407. Major contributors to this report are listed in appendix III.

A handwritten signature in cursive script that reads "Jennie S. Stathis".

Jennie S. Stathis
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Executive Summary

Purpose

What are the revenue options for helping deal with the budget deficit? GAO expects this to be a topic of intense interest to Congress and is developing a series of reports on the options to help facilitate the debate. This report deals with one option—a value-added tax. A national value-added tax, imposed at a rate of 5 percent, could raise \$72 to \$125 billion annually, depending on how the tax base is defined.

GAO previously issued a report discussing consumption taxes, of which a value-added tax is one type. This report builds on that information by discussing the two principal methods for calculating a value-added tax. Policymakers, should they wish to consider the option of a value-added tax, will need this information to better understand how the method chosen for computing the tax influences

- the tax's ability to respond to the policy goals of maintaining international competitiveness and offsetting the burden of the tax on the poor and
- the compliance and administrative costs imposed by the tax.

Background

A value-added tax is a tax collected on the difference between a business' sales and its purchases, otherwise known as the business' "value added." For example, if a business buys \$100 worth of materials and equipment and produces a product that sells for \$200, its value added is \$100.

The two principal ways to calculate a national value-added tax are the subtraction method and the tax-credit or invoice method. The subtraction method calculates the tax using information on the total business activity of a firm. The benefit of the subtraction method is that firms only have to calculate their tax liability once during the reporting period. A firm determines its value added by subtracting its total purchases from total sales. Then it calculates the tax liability by multiplying its value added by the tax rate. The tax does not appear on sales or purchase invoices. The tax-credit method, on the other hand, calculates the tax for each transaction. A firm's tax liability is determined by adding up the taxes paid on all purchases and the taxes collected on all sales, and subtracting the total tax paid from the total tax collected.

Results in Brief

Whether or not a value-added tax achieves the policy goals established for it could depend, in certain cases, on the method chosen to calculate the tax.

There are advantages in designing a value-added tax to be as simple as possible and in applying it to the broadest possible base. However, there may be overriding policy concerns, such as offsetting regressivity or keeping the tax from harming exports, necessitating design features that would make the tax more complex or limit the tax base. These features might include exemptions, multiple rates, or eliminating the tax from certain sales.

The subtraction method is simple to calculate but may not be fully compatible with certain of the design features. For example, should policy-makers decide to alleviate regressivity by using multiple tax rates, the subtraction method for calculating the tax will not work properly. There is also some doubt about the subtraction method's effectiveness in precisely eliminating the tax on exports.

Conversely, the tax-credit method allows great flexibility in the design and use of a value-added tax, enhancing the tax's ability to respond to a variety of tax policy goals. To the extent this flexibility is used, however, the tax would be more complex both in terms of administration and compliance.

Little is known about what the administrative and compliance costs might be for a value-added tax in the United States. Better information on these issues would be needed to make informed decisions on a subtraction versus a tax-credit value-added tax.

GAO's Analysis

Offsetting Regressivity

A single rate value-added tax would be a regressive tax. Since low income households spend a larger part of their income on consumption than high income households, they would end up paying a higher percentage of that income in value-added taxes. Two alternatives for reducing the regressivity of a value-added tax are (1) providing a tax credit for low income people on their income tax return and (2) imposing multiple tax rates (e.g. tax necessities at a lower or zero rate and luxuries at a higher rate than the standard rate). (See pp. 27-30.)

Providing refundable tax credits is compatible with either the tax-credit or the subtraction method. However, only the tax-credit method is compatible with multiple rates. Multiple rates raise additional problems.

since they are complex and tend to increase administrative and compliance costs. (See pp. 28-30.)

Maintaining U.S. Competitiveness

Exchange rate changes may compensate for increases in the prices of domestically produced goods and services induced by the value-added tax. Rather than assuming this will occur, many countries try to offset these potential problems through border tax adjustments (usually rebating the value-added tax on exports and imposing the tax on imports). In this way, a country's exports enter international markets free of the tax while its imports are subject to the same tax as its domestic products. Any foreign trade effects of the value-added tax are thus avoided. This approach is recognized and accepted under existing international trade agreements. (See pp. 31-33.)

The tax-credit method is well suited for border tax adjustments because it can easily accommodate a complete elimination of value-added taxes from exports. This is possible because the invoice system allows the precise tracking of transactions to make sure that untaxed goods were in fact exported. In principle, the subtraction method can also be used to deal with this issue. However, verification that untaxed goods were exported may be more difficult without the paper trail generated by the tax-credit method. (See pp. 33-35.)

Administration and Compliance Costs

To date, two studies have estimated the administrative costs of a value-added tax for the United States. Both studies were done by the Internal Revenue Service. The first, on the tax-credit method, was done for the Department of the Treasury. The other was on a variant of the subtraction method called the business transfer tax. Both studies focused on the costs of a single rate tax. There has been no study of the administrative cost of the simple subtraction method examined in this report. There are, therefore, no reliable cost estimates of a simple subtraction method value-added tax or of a multiple rate tax-credit value added tax. As a result, it is not possible to compare the administrative costs of these additional alternatives. (See pp. 35-38.)

Both studies found that, if all firms pay the value-added tax, the additional administrative costs would be about \$700 million a year. The Internal Revenue Service study gives measures of administrative cost-savings associated with exempting firms of different sizes. As small firms are exempted from the tax, the estimate of administrative costs falls. (See p. 37.)

There have been no comprehensive studies of the compliance costs U.S. taxpayers might experience under either method. Better information on administrative and compliance costs would be needed for policymakers to make informed decisions. (See pp. 37-38.)

Recommendations

GAO is not making any recommendations.

Agency Comments

The Internal Revenue Service emphasized that its subtraction method study was a staff study that had not been reviewed or approved by IRS or Treasury officials. IRS also said that neither of the cost studies discussed in this report is as relevant under current economic conditions as when they were prepared. IRS' comments and GAO's evaluation are included on pages 40 and 41.

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Abbreviations

BTT	Business Transfer Tax
GATT	General Agreements on Tariffs and Trade
IRS	Internal Revenue Service

Introduction

Between 1981 and 1987, the national debt of the United States grew from \$1 trillion to over \$2.4 trillion. During the same period, the gross national product increased from \$3 trillion annually to about \$4.5 trillion, and the average annual federal government deficit was a larger proportion of the gross national product than during any similar time period since World War II. In 1985, the prospect of sizeable annual deficits for the foreseeable future prompted the 99th Congress to enact legislation requiring the deficit to be eliminated by fiscal year 1991. Due to limited progress in reaching this goal, the 100th Congress extended the self-imposed deadline to 1993.

Expenditure freezes and economic growth alone are unlikely to solve the federal deficit problem. Additional revenues are probably an unavoidable part of any realistic strategy for reducing the deficit. These revenues could come from raising an existing tax or introducing a new tax.

The principal sources of federal general revenue are the individual and corporate income taxes. During World War II, to meet the need for more revenue, Congress increased income taxes. Through most of the postwar period, the combined effect of economic growth and inflation increased tax revenues at a rate sufficient to allow for periodic reductions in tax rates while the average annual budget deficit remained at about 1 percent of gross national product. Over the last 15 years, real economic growth has slowed, the individual income tax system has been indexed for inflation, and the rate structure has become less progressive. The result of these changes is an individual income tax system that is constrained in its ability to generate large revenue increases without a change in the rate structure.

In 1986, Congress responded to concerns about the perceived fairness of the income tax system by enacting wide-ranging and comprehensive tax reform legislation. The Tax Reform Act reduced income tax rates, broadened the tax base, lowered the proportion of individual income taxes, and raised the proportion of corporate income taxes in federal tax revenues. It was also designed to be revenue neutral, i.e., it provided no additional revenue to reduce the budget deficit or national debt. Because many members of Congress believe they made a tacit agreement with taxpayers to lower rates in return for broadening the base, it may be difficult to reach congressional consensus on future efforts to raise revenue through higher income tax rates. A broad-based consumption tax is one revenue-raising alternative.

Consumption Taxes Defined

If changes to the income tax system are excluded, a broad-based consumption tax is one of the few revenue initiatives likely to raise significant amounts of revenue. A consumption tax is levied on a taxpayer's expenditures for goods and services rather than on total income. The part of a taxpayer's income that is saved is not subject to current taxation from a consumption tax. Aside from the definition of the tax base, a consumption tax may differ from an income tax in who is responsible for collecting and remitting the tax, for example households or businesses. A consumption tax is commonly levied on individual transactions without regard for the taxpayer's total consumption, while under an income tax total income is taken into account.

There are various types of consumption taxes. The two most commonly used broad-based taxes are the retail sales tax and the value-added tax. Retail sales taxes are imposed at the point of final sale and are generally collected by the retailer directly from the consumer. Currently, 45 states and the District of Columbia use a retail sales tax.

A value-added tax is a multistage tax on goods and services. In principle, it is equivalent to a retail sales tax on goods sold to consumers, but it is calculated differently and collected at different stages of the production and distribution process. It is levied at each stage in the production and distribution chain on the difference between the value of goods and services that are sold and the value of goods and services that are purchased. This difference measures what value firms add to the goods and services they buy from their suppliers. Value-added taxes are collected at all levels of production and distribution and may or may not be passed on to the consumer. Value-added taxes are very common in Western Europe. Japan introduced a value-added tax this year. The government of Canada recently submitted a budget containing a value-added tax proposal to parliament.

The Congressional Budget Office estimates that a comprehensive value-added tax imposed at a rate of 5 percent could raise \$125 billion in 1992. Even if food, housing, and medical care were exempt, the tax would still yield \$72 billion annually. A retail sales tax with the same tax base would raise similar sums.

In 1986,¹ revenues to states from general sales and gross receipts taxes amounted to 32.2 percent of their total tax revenue. At all levels of government in the United States, consumption taxes accounted for 18.6 percent² of all tax revenues in 1986, while income taxes accounted for 45.1 percent.

At the federal government level, the United States collected 50.1 percent of its revenues from income taxes and 5.6 percent from consumption taxes. In contrast, Great Britain collected 38.9 percent of its revenues from income taxes and 30.4 percent from consumption taxes, including 15.8 percent in the form of value-added taxes. Among industrial countries, an average of 18 percent of tax revenues in 1986 was raised by consumption taxes and 37.4 percent by income taxes.

Objective, Scope, and Methodology

In 1986, we published an overview of consumption taxes and related issues.³ This study adds to our consumption tax work, focusing on methods for calculating a value-added tax. The objective of the study is to provide Congress with the information necessary to understand how choosing a method for calculating tax liability influences the ability of the tax to respond to various tax policy goals.

The two methods for calculating the tax we have analyzed are the subtraction method and the tax-credit method. In this study, we look at how effectively each method incorporates certain design features—such as (1) exempting small firms, (2) eliminating the value-added tax on exports, or (3) taxing different goods at different rates—to achieve the following policy objectives:

- reducing the regressivity of the tax,
- taxing exports and imports to maintain trade position,
- making the tax visible to the consumer,
- taxing goods or firms where it is difficult to measure value added, and
- keeping administrative and compliance costs to a minimum.

There are many other aspects of value-added taxation, such as the effect of a value-added tax on the savings rate, which would not be

¹Latest year for which complete international statistics are available.

²The figure for consumption taxes includes revenues from sales taxes, excise taxes, taxes on international trade, and other taxes on transactions.

³*Choosing Among Consumption Taxes* (GAO/GGD-86-91, Aug. 1986).

influenced by the choice of methods for calculating the tax. These other aspects of value-added taxation are not addressed in this study.

The information presented in this study was collected primarily from published sources, including economics and accounting textbooks, government reports, professional journals, and publications of accounting firms and trade associations. To get a wide range of opinions on the issues, we also spoke with academic experts and with knowledgeable officials of the Internal Revenue Service; the Canadian government; the state of Michigan; and several business associations, including the Michigan State Chamber of Commerce.

Mechanics of the Value-Added Tax

The two most frequently discussed methods of calculating a value-added tax are the subtraction method and the tax-credit method. These methods differ in the information used to calculate tax liability and in their ability to accommodate various design features including exemptions and the use of different rates for different goods. As a result, the two methods may differ in their ability to address tax policy issues, such as regressivity, administrative and compliance costs, and foreign trade.¹

Currently, almost all countries with a value-added tax use the tax-credit method. However, both Canada and Japan have considered a subtraction method tax as well as a tax-credit version. On April 1, 1989, Japan introduced a subtraction method value-added tax at a 3-percent rate. Both methods have been proposed for enactment in the United States at the federal level.

Concept of Value Added

In typical business operations, firms purchase goods and services from suppliers and produce goods or services by processing, manufacturing, distributing, or otherwise "adding value" to the purchases. Value is added to the purchased goods and services by using labor and capital equipment. For example, if a firm buys \$100 worth of materials from other firms and produces a product that sells for \$200, it is presumed to have added value of \$100. The value added consists of wages or salaries paid to employees plus any profit (or loss) made by the owners of the firm.² With a value-added tax rate of 10 percent, its tax liability would be \$10.

Value-added taxes can be imposed not only on goods but also on services, such as haircuts. For this reason the tax base (those items the tax is imposed upon) currently used by countries with a value-added tax is generally broader than the tax base of consumption taxes currently imposed in the United States, including state retail sales taxes and excise taxes. With a broader base, value-added taxes produce higher revenues with the same rate.

¹Taxes are regressive if low-income families pay a larger proportion of their income in taxes than do high-income families. Taxes are progressive if the result is reversed.

²Value added can also include interest and rent, but, as explained in chapter 3, the services of financial intermediaries and real estate are often exempted from the tax.

Methods of Calculating a Value- Added Tax

Both the subtraction and tax-credit methods of calculating a value-added tax are based on the premise that value added is equal to a firm's sales minus purchases. The methods differ in what information is used to calculate the tax.

The subtraction method calculates the tax once during the reporting period on the total business activity of the firm. It is simply the total value of sales minus the total value of purchases multiplied by the tax rate.

In contrast, the tax-credit method is calculated on the basis of individual transactions, i.e., on each sale and purchase. The individual calculations are then aggregated into the total taxes on sales and the total taxes on purchases. The difference is the tax liability of the firm.

In principle, the two methods should have very similar economic effects if both use a single rate over the same broad base. However, the methods differ in their ability to adopt various design features that can achieve various policy objectives. For example, if multiple rates are used, the subtraction method does not raise prices by the desired proportion. There is also some doubt as to whether the subtraction method is effective in eliminating the tax on exports. And the simplicity of the subtraction method becomes a liability when some transactions are treated differently from others.

Subtraction Method

With the subtraction method, a firm calculates its value-added tax liability by subtracting total purchases from total sales and applying the appropriate tax rate. The essential characteristic of the subtraction method is that a firm can calculate its value added from its normal books of account. No additional records, such as invoices, are required solely for tax purposes. The primary advantages of the subtraction method are its simplicity and use of readily available information.

For example, a tree farmer harvests ash trees and sells them to a bat maker. The bat maker makes baseball bats and sells them to a retailer. The retailer sells them to consumers. Table 2.1 shows the effects of a 10 percent value-added tax levied according to the subtraction method. This and all subsequent examples assume that the tax is passed along to the purchaser at each stage.³ Because the tax is calculated on the total

³For an example of the effects of the tax if it is passed backwards to wages and profits, see appendix I.

business activity of the taxpayer, it is included in the price along with the other costs of doing business. The tax is therefore likely to be invisible or at least not very visible to the consumer. This is similar to many existing federal excise taxes.

Table 2.1: Subtraction Method of Calculating a Value-Added Tax (10 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales	\$20	\$70	\$80	\$170
Purchases	0	20	70	90
Net Receipts	\$20	\$50	\$10	\$80
Value-Added Tax	\$2	\$5	\$1	\$8
Net Value Added	\$18	\$45	\$9	\$72

At each stage, the table shows sales, purchases, and the difference, which is the value-added tax base. The last column sums up the transactions of the three stages. Note that total value added, including the tax, for the three stages is equal to \$80 and retail sales, including the tax, also equals \$80. These two amounts measure the same thing.

The tax is not calculated for individual purchases or sales, and is not separated out on invoices. This form of the tax does not distinguish between a retailer who sells 4 bats at \$20, 20 bats at \$4, or 2 bats at \$20 and 10 bats at \$4. If the rate on all goods is the same, the composition is of no importance. However when different types of transactions are taxed at different rates, this inability to distinguish across categories can be a significant weakness. This issue is discussed later in this chapter.

Tax-Credit Method

Under the tax-credit method, a tax is calculated on every transaction. The tax rate is applied to the price the firm charges, the tax is calculated, and then printed on the sales or purchase invoice. At the end of the reporting period, the firm determines its tax liability by adding up the tax collected on its sales and subtracting from it the total tax paid on its purchases from other firms. Generally, the tax is included on every invoice. The tax can also be stated separately on a sales receipt and therefore can be made visible to the consumer. This aspect is similar to many state retail sales taxes. Table 2.2 illustrates the calculation of a tax-credit value-added tax.

Table 2.2: Tax-Credit Method for Calculating a Value-Added Tax (11.1 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales ^a	\$18	\$63	\$72	\$153
Tax on sales (1)	2	7	8	17
Purchases ^a	0	18	63	81
Tax on purchases (2)	0	2	7	9
Value Added ^a	\$18	\$45	\$9	\$72
Value-Added Tax (1 - 2)	\$2	\$5	\$1	\$8

^aSales, purchases, and value added do not include value-added tax

Because the tax is calculated for every transaction, a firm must be able to explicitly price every good or service for the tax-credit method to work. The retailer must have a record of all the bats that are sold, as well as the price charged and the tax collected on each item. If some transactions are taxed differently from others, there is a record of each type and distinctions can easily be made. This aspect of the tax-credit method allows great flexibility in the design and use of a value-added tax, enhancing its ability to respond to a variety of tax policy goals. To the extent this flexibility is used, however, the tax will be far more complex both in terms of administration and compliance.

In comparing tables 2.1 and 2.2, note that the tax rates used under the two methods are different. To generate the same revenue the subtraction rate is lower than the tax-credit rate. This is because the subtraction method uses a tax-inclusive rate while the tax-credit method uses a tax-exclusive rate. A tax-inclusive rate is applied to an amount of value added that already includes the tax. A tax-exclusive rate is applied to the value added without the tax. For example, a 10-percent tax on a good with a price of \$20, including the tax, is equivalent to a tax of 11.1 percent on the after-tax price of the good, in this case \$18. In both cases the price of the good including the tax is \$20, the price of the good excluding the tax is \$18, and the tax on each unit is \$2.

Unlike retail sales taxes, which are collected only at the point of final sale, collection of value-added taxes takes place at all stages of the production and distribution process from the production of raw materials to the retail sale of the product. Table 2.3 illustrates a retail sales tax applied to the same series of transactions as illustrated in table 2.2.

Table 2.3: Calculation of Retail Sales Taxes (11.1 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales	\$18	\$63	\$72	\$153
Tax on retail sales	0	0	8	8

As the tables illustrate, the same amount of tax is collected in each example, but the value-added tax has three collection points, including final sale, while the retail sales tax is collected only at the point of final sale.

Features of a Value-Added Tax

There are advantages in designing a value-added tax to be as simple as possible and in applying it to the broadest possible base. However, there may be overriding policy reasons, such as offsetting the regressivity of the tax or reducing the administrative cost of overseeing a tax system with many small businesses, for incorporating into the tax features, such as exemptions, multiple rates, or zero rating (a method of removing the tax from certain sales). The method chosen to calculate the tax will in certain cases determine whether or not the tax will achieve the policy goals established for it by tax policymakers. For example, if policymakers decide to alleviate the problem of regressivity by using multiple tax rates, the subtraction method will not function properly.

Exemption of Certain Firms or Sectors

Exemption is a method of removing firms or allowing firms the option to remove themselves from the value-added tax system. Exemptions can be used with both the tax-credit and subtraction methods. If a firm is exempt, it does not have to collect any tax or turn over any revenue to the government. The firm is "out" of the value-added tax system. Being "out" of the system is not necessarily beneficial to the company. While it is not faced with any costs of complying with the tax, an exempt firm gets no rebate on any value-added taxes paid on its purchases from other firms.

There are two reasons for exempting firms from the tax. Some firms are exempted because it is difficult for them to calculate their value added. Financial intermediaries are often exempted for this reason. In addition, small firms or industries composed primarily of small firms are exempt under many existing value-added tax systems. The cost to these small firms of complying with the accounting and reporting requirements of the value-added tax system is the reason cited for this exemption.

Since exemptions are based on the size or type of firm, an exempt firm can exist at any point in the production process. The effect of exemption, however, is different depending on where in the production process an exempt firm occurs and on which taxation method is used.

If the exemption is at the final or retail stage, the amount of tax revenue collected by the government will be lower since no tax is collected by or remitted to the government by the exempt firms. Taxes will, however, be paid on earlier stages in the production process. The lost revenue will be equal to the amount of value-added by the exempt firms times the tax rate. This is true under either the tax-credit or subtraction method. Alternatively, if the exemption takes place at an intermediate stage in the production process, the effect on the revenue collected depends upon whether the subtraction or tax-credit method is in force.

Table 2.4 shows how exemption works at the retail level under the tax-credit method. In this, and subsequent examples of the effect of exemptions, the tax paid by the exempt firm is assumed to be passed forward to the next stage.

Table 2.4: Exemption at the Retail Level Under the Tax-Credit Method (11.1 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales ^a	\$18	\$63	\$79 ^c	\$160
Tax on sales (1)	2	7	0	9
Purchases ^a	0	18	70 ^c	88
Tax on purchases (2)	0	2	0 ^c	2
Value Added ^a	\$18	\$45	\$9	\$72
Value-Added Tax (1 - 2)	\$2	\$5	\$0	\$7

^aSales, purchases, and value added do not include value-added tax unless stated

^bThe tax paid on purchases is included in the value of purchases and sales but the tax paid is not deductible.

The \$7 that the retailer pays in taxes on the purchase of bats is passed to the final buyers of the bats, raising the value of sales from \$72 to \$79. Total revenue collected by the tax is \$7, rather than the \$8 that would be collected in the absence of exemption.

The impact of exemption at an intermediate stage may vary with the method used to calculate the tax. The net effect of exempting firms in the "middle" of the production process under the tax-credit method is to increase the revenue generated by the tax. As shown in table 2.5, this occurs because the trail of taxes paid ends at the exempt level, in this

case the bat maker. The trail must start up again after the exempt level so that the pre-exemption value added is taxed twice.

Table 2.5: Exemption at the Intermediate Level Under the Tax-Credit Method (11.1 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales ^a	\$18	\$65 ^c	\$72	\$155
Tax on sales (1)	2	0	8.22	10.22
Purchases ^a	0	20 ^c	65	85
Tax on purchases (2)	0	0	0	0
Value Added ^a	\$18	\$45	\$9	\$72
Value-Added Tax (1 - 2)	\$2	\$0	\$8.22	\$10.22

^aSales, purchases, and value added do not include value-added tax

^cThe tax paid on purchases is included in the value of purchases and sales, but the tax paid is not deductible

Under the subtraction method it makes no difference to the firm whether particular purchases are from exempt firms or firms "in the system." The subtraction method allows firms to deduct from their sales all purchases and, correspondingly, any tax that is included in the price. Table 2.6 shows this.

Table 2.6: Exemption at the Intermediate Level Under the Subtraction Method (10 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales	\$20	\$65	\$75	\$160
Purchases	0	20	65	85
Net Receipts	\$20	\$45	\$10	\$75
Value-Added Tax	\$2	\$0	\$1	\$3
Net Value Added	\$18	\$45	\$9	\$72

Note that total tax collections by the government are lower by the amount of value added exempted times the tax rate. In the example there is \$50 of value added at the bat making stage.⁴ The government therefore receives \$5 less in revenue. Exemption of intermediate stages under the subtraction method does not lead to the double taxation of any value added. The value added by the exempt firm, which represents a "slice" of the total value of the product, is simply not taxed.

Zero Rating

Zero rating is a method used by all existing value-added tax systems to completely eliminate the tax from the price of a good or service. For the

⁴See table 2.1.

purpose of ensuring that a particular good is free of value-added tax, zero rating is better than exemption, since exemption does not remove the tax paid on an exempt firm's purchases. Zero rating is particularly useful for freeing exports from taxation. If policymakers decide to deal with the regressivity of the value-added tax by using more than one tax rate, certain necessities—such as food, medicine, health care, etc.—can be freed of the tax with zero rating. Zero rating is compatible with the tax-credit method, but problems arise with the subtraction method when some of a firm's goods are zero-rated and some are not.

Zero rating differs from exemption because zero rating keeps the firms producing zero-rated goods "in the system," that is, they are registered with the tax authority and must file a tax return. For zero-rated goods and services, no taxes are collected on sales, but taxes paid on inputs used in their production can be claimed as a credit against any value-added tax owed by the firm on goods sold that are not zero-rated. If the credits are greater than the tax owed on taxable sales, the firm receives a rebate for the difference from the government. As a result, zero-rated goods and services that are sold to consumers or that are exported do not bear any tax. The price that is charged in the marketplace will reflect this tax-free status.

Table 2.7: Zero Rating of Goods at the Retail Level Under the Tax-Credit Method (11.1 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Sales ^a	\$18	\$63	\$72	\$153
Tax on sales (1)	2	7	0	9
Purchases ^a	0	18	63	81
Tax on purchases (2)	0	2	7	9
Value Added ^a	\$18	\$45	\$9	\$72
Value-Added Tax (1 - 2)	\$2	\$5	(\$7)	\$0

^aSales, purchases, and value added do not include value-added tax.

Table 2.7 illustrates how zero rating works under the tax-credit method. In this example, the net tax revenue collected is zero, since the \$7 collected on the first two stages is rebated at the third stage. The sales value of \$72 reflects the tax-free status of the sector.

If the firm accurately reports its zero-rated and taxable sales, the subtraction method achieves a similar result. Receipts from the sales of zero-rated goods are not taxed, yet the firm is allowed to deduct all purchases whether they are used to produce zero-rated goods or goods that are taxed at the standard rate. If the value of taxable sales is less

than the total value of purchases, a rebate is paid similar to that paid under the credit method.

Table 2.8: Zero Rating at the Retail Level Under the Subtraction Method (10 Percent Tax Rate)

	Lumber Yard	Bat Maker	Retail Outlet	Total
Taxable Sales	\$20	\$70	\$0 ^a	\$90 ^a
Purchases	0	20	70	90
Net Taxable Receipts	\$20	\$50	(\$70)^a	\$0^a
Value-Added Tax	\$2	\$5	(\$7)	\$0
Net Value Added	\$18	\$45	\$9	\$72

^aActual sales at the retail stage are \$72. Net receipts are actually \$2. This along with the \$7 rebate gives firms at the retail level \$9 in value added.

In the above example the actual value of sales is \$72, as it is in table 2.7. Since none are taxable, the amount of sales in the tax base is \$0.

If all of a firm's sales are zero-rated, there is no difficulty with the subtraction method. Problems could arise under either method when some transactions are zero-rated and some are not, since there are incentives to overstate the value of sales that are zero-rated. Without invoices or some device for tracing transactions, there may not be enough information available under the subtraction method for the taxing authority to determine what percentage of sales should be tax-free.

Zero rating intermediate goods under either method provides no guarantee that the final user will not be taxed. All revenue collected up to the zero-rated stage is rebated, and the good—at that point—is free of tax. Then the tax picks up at the next stage with the total value added up to and including that of the next stage being subject to the tax. Thus the total tax paid by the consumer of the good is the same as without zero rating. By the same token, exports would also include the tax if zero rating was done at an intermediate stage rather than at the final stage. A value-added tax that zero-rated all stages but the retail stage would be identical to a retail sales tax.

There are problems that can arise in a system that allows both exemptions and zero rating. If an export firm is exempt, it will not be able to claim a rebate for the taxes paid on purchases used in the production of zero-rated goods. It will not be possible to eliminate the tax from exports produced by exempt firms. As a result, smaller firms that expect to export significant amounts of their output would likely choose to be "in the system," if the option is available. This issue arises under either method.

If the exemptions occur at stages of production before the exporting stage, the method of calculating the tax is very important. Under the tax-credit method the only case in which exemption at an early stage causes a problem is if the exempt stage is directly before the exporting stage. In this case there will be no tax paid on the purchase invoice and no rebate allowed for whatever tax is included in the purchase price. If the exempt stage is followed by a taxed stage, the tax will have been included on the purchase invoice and will be fully rebatable at the export stage.

Under the subtraction method, however, exemptions at earlier stages imply that the tax included in the purchase price at the export stage is less than the statutory rate. For example, in table 2.6, purchases at the retail stage amount to \$65, and the tax included in that price is only \$2. The value of taxable sales for export is zero. Allowing a full deduction for purchases means that the tax rebate would be \$6.50, though the tax paid was only \$2. The subtraction method will lead to export subsidies to the extent that exports use intermediate goods purchased from exempt firms.

Multiple Rates

The purpose of using different tax rates for different goods, i.e., multiple rates, is to offset the regressivity of the value-added tax. Goods and services that make up a large part of the budgets of low-income households can be taxed at rates that are below the standard rate. Many of the countries that have value-added taxes also apply tax rates that are above the standard rate to goods that are primarily consumed by higher income households. For the purpose of multiple rates to be achieved, the prices of goods taxed at above average rates should rise by more than the average price increase, and the prices of goods that are taxed at below average rates should rise by less than the average price increase.

However, a single rate value-added tax is generally considered to be the best form of value-added tax from an administrative and compliance standpoint, and, according to some economists, from an efficiency standpoint. If tax policymakers choose to offset regressivity by using multiple rates, the tax-credit method has substantial advantages over the subtraction method. The tax-credit method achieves the effect by applying the higher or lower rate to the retail stage. As will be seen below, this has the desired effect on prices regardless of the tax rate on inputs purchased by the firm. Using multiple rates under the subtraction method is unlikely to result in the desired price effects, and, in addition, will give firms incentives to move value added from high tax rate stages to low

tax rate stages. The result will be resources allocated on the basis of tax considerations rather than economic considerations.

To show how multiple rates are supposed to work we will begin with the tax-credit method and apply an above standard rate at the retail stage. Suppose that baseball bats are considered a luxury good that should be subject to a higher than standard tax rate. In table 2.9, a 25 percent tax rate is applied to the value of retail sales. All other stages are taxed at the standard rate of 11.1 percent. This is because before they reach the point of final sale to the consumer, it is often difficult to identify which inputs will be used to produce goods taxed at the standard rate and which inputs will be used to produce goods taxed at rates above or below the standard rate. The credit method does not require such an identification before the retail stage since it calculates the correct tax regardless of the rate that applied at earlier stages. In the example, the higher rate raises the price of the goods and the value of sales, including the tax, to \$90.

Table 2.9: Multiple Rating of Goods at the Retail Level Under the Tax-Credit Method (25 Percent Tax Rate)

	(11.1 percent)		(25 percent)	Total
	Lumber Yard	Bat Maker	Retail Outlet	
Sales ^a	\$18	\$63	\$72	\$153
Tax on sales (1)	2	7	18	27
Purchases ^a	0	18	63	81
Tax on purchases (2)	0	2	7	9
Value Added ^a	\$18	\$45	\$9	\$72
Value-Added Tax (1 - 2)	\$2	\$5	\$11	\$18

^aSales, purchases, and value added do not include value-added tax

The total value-added tax imposed on a good under the tax-credit method depends solely on the tax rate at the retail stage. This is not the case with the subtraction method. The tax-credit method applies the rate at the retail level to the entire value added, up to and including that stage. It then allows a credit for the tax paid up to the retail stage. The tax liability is the difference between taxes on sales and taxes on purchases. If the lumber yard and the batmaker were both taxed at 25 percent, the tax on purchases by the retailer would have been \$15.75 (25 percent of \$63) and the value-added tax at the retail stage \$2.25 (\$18 - \$15.75). The tax on the product to the consumer (\$18) would be the same. Under the tax-credit method, the tax collected at the retail stage is always the amount necessary to ensure that the total value-added tax imposed on a good does not depend on the amount of value added at the retail stage, or the tax rates at earlier stages.

The subtraction method applies the relevant tax rate to the difference between total company sales, including the tax, and purchases, including the tax. Therefore, the subtraction method only applies the nonstandard tax rate to the value added calculated at the relevant stage, in this case the retail stage. If the rate that applies at the retail stage is higher than the standard rate and there is little value added at the retail stage, then there will be little additional tax collected from a higher than standard tax rate. Since the higher tax rate did not apply to all value added contained in the good, the price of the good will not increase by the same percentage as the tax rate. A tax rate that is higher than the standard rate will only affect all value added and will only raise the price by the same percentage as the tax rate if all value added occurs at the retail level. For an example, see table 2.10.

Table 2.10: Multiple Rating of Goods at the Retail Level Under the Subtraction Method (20 Percent Tax Rate)^a

	(10 percent)		(20 percent)	Total
	Lumber Yard	Bat Maker	Retail Outlet	
Sales	\$20	\$70	\$81.25	\$171.25
Purchases	0	20	70.00	90.00
Net Receipts	\$20	\$50	\$11.25	\$81.25
Value Added Tax	\$2	\$5	\$2.25	\$9.25
Net Value Added	\$18	\$45	\$9.00	\$72.00

^aA 20 percent tax-inclusive rate is consistent with the 25 percent tax-exclusive rate used in table 2.9

In this case the tax collected at the retail stage is 20 percent of the difference between sales and purchases. Value added at the retail stage is still \$9 after taxes and the total tax collected is \$9.25, which is less than the tax collected by the equivalent tax-credit method. To impose the same tax under the subtraction method as that imposed under the credit method in table 2.9, we would have had to apply a tax rate of 55 percent at the retail level. In that case sales would have been \$90 and net receipts \$20. The tax would be \$11 and value added after taxes would again be \$9.

This means that to achieve any particular tax rate on final sales under the subtraction method, the rate structure must take into account how much value added takes place at the final stage. The more value added at the retail stage the lower the tax rate necessary to achieve a particular above standard price change. Since the amount of value added that takes place at any stage may be different for different firms producing the same good and can change over time, a subtraction method that attempted this would involve an enormously complicated system of tax rates. These complications would not exist under the credit method. The

system of tax rates, under the subtraction method, would also generate incentives to move value added from high tax rate stages to low tax rate stages. Decisions on how to produce goods would be based on tax considerations rather than economic calculations. Under the tax credit method these problems do not exist.

In table 2.10, if all value added takes place at the retail stage, a tax rate of 20 percent will give the same result as the credit method. A tax rate of 20 percent on the final good can also be achieved by taxing all value added at 20 percent. The problem is that before the good reaches later stages, it is not clear whether it will become part of a higher than standard rate good, a standard rate good, or a lower than standard rate good. As a result, it is not possible to tax goods that will be inputs into high tax rate goods at those high rates, nor is it possible to tax at low rates goods that will become inputs into low tax rate goods. At the lumber yard stage, it is often not clear whether the wood that sold will end up in a luxury good or a necessity.

Since the purpose of multiple rates is to affect the prices that consumers pay, it makes no sense to use multiple rates at intermediate stages under the tax-credit method. As tables 2.7 and 2.9 show, the rate applied at the retail level determines the amount of the tax collected on the entire value added of the good and the effect of the tax on the price paid by the consumer. Since the amount of tax paid by consumers is not affected by the use of multiple rates at intermediate stages of production, such rates would have no effect on the regressivity of the tax. The one rationale that exists for multiple rates would not apply. Using multiple rates at intermediate stages under the subtraction method would lead to a completely arbitrary set of taxes depending on the structure of rates and the pattern of value added.

Visibility

The tax-credit method is a much more visible method than the subtraction method. Special measures need to be taken to make the subtraction method visible since it is generally included in the price and not stated separately.

A tax is considered visible if it is stated on a receipt or purchase invoice or if it is stated on a tax return or pay stub; a tax is considered hidden if it is not so stated. Visibility is important to the extent that it makes the taxpayer aware of the taxes that are being paid. With a hidden tax, consumers may not know whether a price increase results from a tax

increase or from a cost increase. It is often assumed that hidden taxes are easier to impose and to increase.

The tax-credit method is visible because the amount of the tax charged on each transaction must appear on the purchase or sale invoice. In this way firms know the amount of tax paid on purchases and know the amount to credit against their own tax due on sales. From a tax administration standpoint, there is no need for consumers to know the tax that they pay, since they need not file a return nor are they allowed any credits. However, if higher visibility is thought desirable from a tax policy perspective, it can be extended to the retail level by requiring that the value-added tax be calculated at the time of sale to the consumer and added to the price, as is common practice with retail sales taxes.

Under the subtraction method the tax is included in the price of goods and services sold. It is not separately stated on invoices. For this reason the tax is more likely to be a hidden tax. If firms are required by law to state the tax on sales to consumers, they could do so accurately only if the tax was a single rate applied to all stages of the production process, i.e., with no exemptions.

Summary

If a single rate is to apply to all value added then, in principle, the tax-credit and the subtraction method will achieve similar effects. The subtraction method is the simpler of the two and should be easier for firms to calculate.

Exemptions can be used under either method, though the effects will differ. Exemption under the subtraction method simply cuts a piece of value added out of the system. Some revenue is lost, but there are no effects on other stages of production. This is also true for the tax-credit method if the exemption is at the retail level. However for goods sold to other producers, that is, if the exemption occurs at an intermediate stage, the paper trail is interrupted and the tax already paid must be paid again at later stages.

Zero rating for exports or for certain necessities will work under both systems as long as retailers report the amount of zero-rated sales accurately and as long as purchases from exempt firms are not a very important part of export production. The absence of a paper trail under the subtraction method makes the tax-credit method appear preferable from an administrative standpoint. To insist that the subtraction method employ an invoice system similar to the credit method would make the

subtraction method indistinguishable from the credit method. If purchases from exempt firms are important to the production of exports, the subtraction method will lead, in effect, to export subsidies.

Multiple rates only make sense at the retail stage and only have the desired effect on prices under the tax credit method. Using multiple rates under the subtraction method will make consumer prices depend not just on the tax, but also on the pattern of value added in the production process.

Visibility of the tax can be seen as an advantage or a disadvantage. It is much easier to achieve visibility with the tax-credit method than with the subtraction method. The subtraction method can be made visible only if there is a single rate applied to all transactions.

Questions and Answers About the Value-Added Tax

A set of key policy issues usually emerges in discussions surrounding the introduction and operation of a value-added tax. Some issues imply difficulties no matter which method is chosen to calculate the tax. Some issues raise concerns only under the tax-credit method, some only under the subtraction method. These issues include how to deal with the tax's regressivity, the effect of the tax on inflation, the impact of the tax on a country's international trade position, the breadth of the tax base, and the administrative and compliance costs of the tax. In this chapter we address these issues through a series of questions and answers.

Some of these issues are less controversial than others. The regressivity issue is probably the most contentious. Less controversial is how a value-added tax should treat goods that enter international trade. This difference reflects the fact that there is more consensus, at least among economists, on questions of efficiency than there is on questions of equity. There is also a set of questions for which the answers are uncertain because sufficient research has not been done in the area; administrative and compliance costs fit into this category.

Will a Value-Added Tax on Consumption Impose a Relatively Larger Tax Burden on Low-Income People Than on High-Income People?

There is little doubt that a broad-based value-added tax with a single tax rate is a regressive tax. Controversy exists, however, over the degree of regressivity and the best method of compensating for it. The degree to which a value-added tax is regressive depends crucially on the time period over which the regressivity is measured. The value-added tax always appears more regressive when taxes on annual consumption are compared with annual income. On the other hand, if we compare taxes on lifetime consumption with lifetime income, the degree of regressivity is reduced.

One standard method of assessing the regressivity of the value-added tax is to examine the pattern of income and consumption in a given year. In this case we find lower income people consuming substantially higher portions of their income than higher income people. Lower income people would therefore pay a significantly higher percentage of their income as tax under a consumption value-added tax, and the tax would be considered highly regressive.

However, when people's consumption patterns are examined over time periods longer than 1 year, particularly when lifetime patterns of consumption are examined, the differences between low income and high income groups are reduced. This is because some people who are measured as poor in a particular year may only be poor temporarily. The

temporary poor, on average, consume more than the permanent poor from the same income. One source of this higher consumption is past savings. As a result, any measure of the proportion of income consumed by the poor that includes the consumption behavior of the temporary poor overstates the proportion relevant for the long-term poor.

An additional consideration is that some part of saving is to finance consumption in the future. If all income is eventually consumed by the household that earns the income, the value-added tax, from a household perspective and over a long time horizon, is basically proportional to lifetime income. To the extent that saving is not eventually consumed but is passed on as an estate by high income households, the value-added tax will be regressive even in the long run.¹

The value-added tax is a regressive tax, though not as regressive when judged on the basis of lifetime income as when judged on the basis of annual income. Since any policy to offset regressivity will be based on average consumption behavior, the consistently poor provide a better measure of the consumption patterns of low-income families than do the occasionally poor. While the amount of tax rebate or other offset should be based on the consumption pattern of the consistently poor, the rebate can be paid to anyone who qualifies, even if they are only poor temporarily.

Which Method of Calculating the Tax Is Better Suited to Dealing With the Problem of Regressivity?

The answer to this question depends upon how policymakers choose to offset the regressivity of the tax. If refundable tax credits or increases in government outlays (including transfer payments such as Aid to Families with Dependent Children, or Supplemental Security Income) targeted to those most affected by the value-added tax are used, then the method chosen for calculating the tax is not important. However, if multiple rates are used, the tax credit method is the preferred option.

Refundable Tax Credits

One way to offset the regressivity of the value-added tax is through the use of a refundable income tax credit. The amount of the credit can be

¹ Those who left a sizable estate would pay a proportionately lower tax on their lifetime income; however, those who were left estates would pay a greater proportion of their lifetime income on value-added tax, assuming they consumed some part of their inherited wealth. For a discussion of these issues, see Musgrave and Musgrave, *Public Finance in Theory and Practice*, Fourth edition, 1984, McGraw-Hill, pp. 446-448.

set at the average amount of value-added tax paid by a low income individual or household. Taxpayers will be able to offset this credit against any income tax liability. Those who pay less income tax than the amount of the credit, including those whose income is so low that they do not currently file a tax return, would receive a refund from the government. To increase the degree of progressivity and to reduce the amount of revenue lost, the credit could decline as income increases and disappear at a designated level of taxable income.

Any system that attempts to deal with regressivity will be forced to deal with a set of complicated issues. The most important is: how do we define low income families? The higher the defined level of income, the surer we are of including the neediest, but the more expensive the system of rebates becomes. In addition, there is the problem of allowing for family size, special medical circumstances, regional cost of living differences, and the frequency of payment. These issues will be difficult to deal with under the refundable tax credit, but impossible to deal with through multiple rates.

An additional problem is that a system of refundable tax credits would give rise to an increase in the number of people who must file tax returns to claim the credit. In particular it would mean including a large number of very needy people who rarely, if ever, file income tax returns.² Since the refundable tax credit would be administered as part of the personal income tax system, it does not depend upon which of the two methods, tax-credit or subtraction, is chosen.

Multiple Rates

A second approach for dealing with the regressivity issue is to use multiple tax rates. This method is used by all of the members of the European Economic Community, except Denmark.³ Items that are considered necessities—such as housing, medical care, and many food items—are taxed at rates below the standard rate, and occasionally at a zero rate. In addition, to further offset the regressivity of the tax, items consumed in relatively greater proportions by high income people are taxed at tax rates that are above the standard rate. It is important to note that high income households also spend a significant portion of their budgets on

²It would also require an extensive public relations campaign to make sure that everyone who was eligible was made aware of the refund.

³Denmark, along with Norway and Sweden (who are not members of the European Economic Community), employs a flat rate value-added tax. Denmark does zero rate newspapers. These countries deal with regressivity through expenditure and transfer programs.

the low tax rate goods. One of the drawbacks of using multiple rates is that the offset to regressivity is not well targeted, since the tax break is provided to anyone who consumes a good taxed at a low rate whether they are rich or poor.⁴ Multiple rates only serve to offset regressivity if the prices of goods that are an important part of the budgets of low income households do not rise as much as the average price of goods consumed by the average household. The discussion of multiple rates in chapter 2 showed that the only way to insure that a below-standard tax rate gets translated into a price change that is proportionately below the average is to use the tax credit method. Using multiple rates under a subtraction method causes price changes that depend, not only on tax rates, but also on the proportion of value added that occurs at the retail level. As a result the burden of tax payments could be very different from what is intended. In addition incentives would be established to alter production methods so as to have more value added occur at stages that have lower value-added tax rates.

Is the Tax-Credit or Subtraction Method of Calculating the Value-Added Tax Likely to Be More Inflationary?

A value-added tax under either method may lead to a one-time increase in the price level, but it will not in and of itself lead to an ongoing increase in the rate at which prices are rising. The value-added tax will therefore not increase the rate of inflation.

The tax introduces a “wedge” between the price that consumers pay for a good and what is available to the seller to pay for wages, interest, raw materials and other productive inputs as well as any profit. The “wedge” is the value-added tax on the good. There are two ways for the tax to have its effect. The tax can be passed forward to consumers in the form of higher prices, or, at the other extreme, prices to consumers could remain the same and the tax could force down wages and profits. The second case is discussed in more detail in appendix I.

A standard assumption in discussions of the value-added tax is that monetary policy will be sufficiently expansive to allow a one-time increase in the price level equal to the tax rate. Only under some very special conditions concerning wage and price setting behavior and an expansive monetary policy is the rate of inflation likely to increase after the tax is fully integrated into the economy.

⁴Multiple rates, in addition to being imprecise devices for dealing with inequity, also interfere with the neutrality of the value-added tax system. Goods with tax rates below the standard become more attractive to consumers and goods with above standard rates less attractive. This could result in a less efficient allocation of resources.

The basic conclusion of the value-added tax literature on the issue of inflation is that a value-added tax which is introduced as an additional tax, and accompanied by a modest monetary expansion, is likely to lead to a proportional increase in the general level of prices equal to the average value-added tax rate. Once this proportional increase has occurred, the tax should not lead to any further increases unless the tax rate is increased. The method of calculating the tax should have no differential effect on the price level.

If the Value-Added Tax Increases the Prices of Goods Produced in the United States, Will That Not Affect Our Ability to Compete in World Markets?

Imposition of a value-added tax could affect the nation's ability to compete in world markets if price increases resulting from monetary accommodation of the tax are not offset by changes in the exchange rate or border tax adjustments. Either of these options could compensate for the effect of a higher domestic price level on our competitive position. The issue of exchange rate adjustments following the imposition of a value-added tax is more complicated however, since the use of the tax revenues would also affect exchange rates. The final effect of introducing a value-added tax on both the international trade position and the exchange rate will depend on whether the tax revenues are used to replace an existing tax, finance new outlays, or reduce the budget deficit.

If the value-added tax leads to a one-time increase in the prices of domestically produced goods and services, and nothing else changes, this will place them at a competitive disadvantage compared to goods and services produced abroad. Thus, one would expect fewer exports and more imports. The resulting increase in the trade deficit, however, should lead to a change in the exchange rate. Specifically, the dollar should depreciate in terms of the currencies of our trading partners. This depreciation, in turn, will offset the tax-induced price increase by raising the prices of goods produced abroad, measured in dollars (it will lower the prices of goods produced at home measured in terms of the foreign currency). This change in prices should reduce or eliminate the deterioration of the trade balance caused by the imposition of the tax.

The effect of a currency devaluation in improving the trade balance usually takes some time to occur, and the effects are subject to many uncertainties. Among these are the effect of a change in the exchange rate on expectations about future exchange rates, and the effect of the level or rate of change of exchange rates on capital flows. Rather than assuming that exchange rate changes will solve any trade problems resulting from

the introduction of a value-added tax, many countries attempt to forestall these problems by employing border tax adjustments.

What Are Border Tax Adjustments and How Are They Implemented?

Border tax adjustments are attempts by countries using a consumption based value-added tax to remove the tax from goods that are exported and apply the tax to imported goods. In order to maintain incentives for domestic producers to sell abroad, exports are not taxed. Imports are subject to a value-added tax that is equivalent to that imposed on similar domestically produced goods.

Under a value-added tax, there are two ways of handling goods and services which cross national borders—according to the origin principle or the destination principle. The origin principle would apply the value-added tax only to domestic production, i.e., tax goods at the point of origin regardless of where they are consumed. Thus exports would be subject to the value-added tax because they are produced domestically, while imports would enter the country free of domestic tax. Only the value added to imports by domestic firms subsequent to importation would be subject to the tax. This implies that there are no border tax adjustments under the origin principle.

The destination principle implies that a country taxes only domestically consumed goods and services, whether produced at home or abroad, i.e., production is taxed at the destination of consumption. Thus exports, because they are destined for foreign consumption, would not be subject to the domestic value-added tax. This implies that exports should not only be free of taxation at the production stage at which exportation takes place, but also should be free of all value-added taxes paid on previous stages. This can be done through zero-rating. Imports, because they are consumed domestically, are subject to the domestic tax upon entering the country.

The most practical reason for using the destination principle is that all countries that currently use the value-added tax also use the destination principle. If the United States were to use the origin principle while many of our trading partners use the destination principle, all U.S. exports to these countries would be subject to both the domestic value-added tax and the value-added tax of the importing country. Goods which were imported by the United States would not be subject to taxation in either jurisdiction. Exchange rate movements should offset the resulting trade imbalances to some extent. However, to the extent that exchange rates do not fully adjust or that the adjustment takes too long,

there could be resource allocation effects from the double taxation of exports and lack of taxation of imports. In particular there would be an incentive to produce abroad whether for domestic or foreign consumption.

Another reason for using the destination principle is that under the General Agreement on Tariffs and Trade (GATT) indirect taxes on exports, such as value-added taxes, can be refunded to exporters. The basis for this rule is the assumption that such taxes increase the prices of exports and therefore make them less competitive in world markets.⁵ GATT therefore treats any value-added tax system as if it was in accord with the destination principle.

Are Border Tax Adjustments Easier Under the Tax-Credit or the Subtraction Method?

Both methods should be able to handle the necessary border tax adjustments if (1) companies accurately distinguish between their exports and their production for domestic consumption and (2) goods purchased from exempt firms are not important in the production of exports. However, incentives exist to overstate the amount that is exported so that the tax-credit method, with its more detailed record keeping, will make it easier to determine if reported exports and actual exports coincide. In addition, if goods purchased from exempt firms are important in the production of exports, the subtraction method may lead to exports being, in effect, subsidized.

Under the tax-credit method border tax adjustments are straightforward. Since the tax-credit method explicitly adds the tax to the price of the good or service, an export is easily freed from the tax by taxing it at a zero rate, i.e., a tax of zero dollars is added to the price. With respect to the value-added tax paid on the inputs purchased by exporters, they can claim a credit on their tax returns for the amount of the tax specified on their purchase invoices and receive a refund for that amount. This method not only frees the export stage of production from the tax; but also frees exports of the tax on previous stages which is assumed to have been passed forward and therefore must be rebated. This eliminates any disincentive to export that might result from the imposition of a value-added tax.

⁵Direct taxes, such as corporate and personal taxes, cannot be refunded on exports under GATT. This is based on the assumption that these taxes do not increase the prices of exports, but only decrease wages and profits.

There are two problems that may arise. The first is with exempt firms that export, since they would not be eligible for a rebate of taxes paid. These firms are likely to opt for being in the system if exports are an important part of their output. The second problem is with export firms that purchase directly from exempt firms, since they would not be allowed any rebate of taxes that were not shown on an invoice. As a result, export firms would have strong incentives not to purchase from exempt firms if there is some tax included in the exempt firm's price.

If there is a single rate of value-added tax that applies to all goods and services, and if firms accurately report the amount exported, the subtraction method can be used to zero-rate exports. Zero rating, in the context of the subtraction method, implies excluding exports from the sales to which the tax is applied. However, it also implies including all purchases, whether used to produce exports or goods for domestic consumption. This results in an effective rebate of all taxes paid on inputs used in the production of exports.

Zero rating, however, could present incentives to overstate the value of zero-rated goods. If firms can sell goods domestically that are effectively zero-rated, they can undercut competitors whose sales are accurately reported, raise their own profits, or some combination of the two. If they sell goods at the same price as competitors but pay less tax, their profits should be higher. If the tax rate is large enough, they could charge a lower price than competitors and still earn a larger profit.

These incentives exist under both methods. With its more detailed record-keeping apparatus, the tax-credit method should be more amenable to ensuring that goods that are recorded as exports do in fact leave the country. The difference is that the tax-credit method requires firms to keep track of transactions, while the subtraction method relies on sales and purchase information at a more aggregated level.

Exempt firms that export under the subtraction method will not be able to claim rebates for taxes paid. As with the credit method, the result is likely to be firms choosing to be "in the system" rather than exempt if exports are significant for them. A second problem arises with the subtraction method that is more difficult to resolve. Firms will be allowed to deduct from their tax base the full value of their purchases as if all purchases had been fully taxed throughout all stages of the production process. If some stage was exempt, the amount of tax included in the purchase price will be less than the tax rate multiplied by the value of

purchases. Allowing the full deduction will act as a subsidy for export sales.

Would the Level of Administrative Costs Be Lower Under the Tax-Credit or the Subtraction Method?

There have been only two studies of the costs of administering a value-added tax in the United States—one for each method. The comparable cases in each study assumed that a single rate would be applied to all taxable transactions.

Staff at the Internal Revenue Service (IRS) did a study of the Business Transfer Tax (BTT), which is a subtraction method value-added tax.⁶ This study was not reviewed and approved by IRS or Treasury officials, so the views, opinions, and conclusions presented do not necessarily represent official positions. The Treasury Department studied the tax-credit method in its proposal for tax reform. The chapter in the Treasury volume dealing with administrative costs of the tax-credit method was also prepared by the IRS.⁷

Both reports developed annual staffing and cost estimates for a single rate value-added tax with 20 million business taxpayers. Neither study incorporates the cost of the Customs Service, which would be a necessary component in dealing with border-tax adjustments. The IRS report assumed quarterly payments and annual filing, while the Treasury report assumed monthly or semimonthly payments and quarterly filing. There are a number of other areas in which the assumptions of the two studies differ, and IRS cautions against a direct comparison of the two estimates.⁸ However, both studies arrive at an annual cost of administering a value-added tax of approximately \$700 million. The IRS budget for 1987 was about \$4.4 billion, and the revenue generated approximately \$890 billion.

The level of administrative costs that is associated with the value-added tax, as well as the costs associated with each method, depend crucially on the features that are included in the package, as well as the economic

⁶Internal Revenue Service, Implementation and Administration of the Business Transfer Tax (Feb. 1986).

⁷U.S. Department of the Treasury, Tax Reform for Fairness, Simplicity, and Economic Growth: The Treasury Department Report to the President Volume III, Value-Added Tax (Washington D.C., Government Printing Office, 1984).

⁸There are differences in how computer costs were estimated: the Treasury report assumed equipment needed to be procured, while the IRS study assumed that much of it already had been. The Treasury report used fiscal year 1987 figures for estimating staff costs while the IRS study, completed 2 years later, used fiscal year 1989 figures.

conditions and tax environment that prevailed at the time. If the value-added tax that is enacted differs substantially from what was assumed in the studies, they will have little to tell us of the administrative costs involved. In addition, economic conditions have changed since the studies were completed, and the passage of the Tax Reform Act of 1986 may have altered the cost and timeframe for introducing and administering a value-added tax.

Aside from the difficulties of comparing the two studies, there are additional problems in relying on the estimates for a realistic measure of the cost of introducing either type of value-added tax. The study on the tax-credit method appears to assume that a new infrastructure must be created to administer the tax, while the other study suggests that the subtraction method could be, at least in part, combined with the existing administration of the income tax system. The need for a new infrastructure should depend at least in part on the number of taxpayers that are to be covered by the value-added tax system. Neither study has sufficient detail to determine the basis for the estimates nor to allow a comprehensive examination of how different assumptions affect the conclusions.

One of the supposed advantages of the subtraction method is that it is much simpler and easier to administer. The fact that the IRS BTT study finds the cost of administering the subtraction method is about the same as that of the tax-credit method is therefore surprising, and reflects the importance of the number of taxpayers in driving the IRS cost estimates.

The IRS BTT study did attempt to examine the effect of exempting an increasing number of firms on the administrative cost of the system. The study found that exempting firms whose gross receipts were under \$50 thousand a year would lower the number of firms required to file from 20 to 5 million, and the cost from \$700 million to closer to \$200 million. At the same time, this increase in the exemption level would eliminate about 2 percent of the gross receipts subject to tax under the lower exemption level. Further increases in the exemption level would continue to decrease the cost of administration without reducing the amount of revenue in as great a proportion. Eventually, at high enough thresholds, revenue will begin to fall faster than administration costs.

It is most likely the case that similar effects would result under the tax-credit method. Tax revenue would not fall as much under the credit method since some double taxation would result. The double taxation in

turn might lead to a less efficient pattern of production, as firms move value added around to reduce taxes.

While exemptions generally serve to simplify administration and reduce the costs of applying the tax, in one minor sense they make administration more difficult. Since firms will generally be exempted because of some characteristic such as sales volume, it will be necessary to pay particular attention to firms near the borderline. For example, if the cutoff for exempting a firm is sales volume of \$1 million, firms with sales close to that amount would have to be watched very closely.

Firms would have incentives to split into smaller pieces to avoid dealing with the tax system. Deciding what constitutes an entity of sufficient size for tax purposes then becomes an issue. In addition, transition rules would be necessary for firms whose sales cross the line during the year whether from above or below.

Other design features can have the effect of making the tax more complicated and therefore more costly to administer. Multiple rates would make the tax-credit system much more complicated and would raise administrative as well as compliance costs. If the rates are different, firms that produce classes of goods subject to different rates must make decisions about classifying those goods according to rate categories, and tax administrators must resolve interpretive questions concerning those different categories. Multiple rates will not have the proper effect on prices under the subtraction method.

Zero rating will not add much in the way of administrative costs to the tax-credit method. If there is a single rate and there are no exemptions, zero rating under the subtraction method will present administrative problems to the extent that it is more difficult to trace whether or not goods leave the country when firms are not required to maintain invoices. If firms are required to maintain those invoices, there is little difference between the subtraction and the credit method. However, the presence of exemptions will definitely increase the difficulty in calculating the proper rebate on zero-rated goods.

The fact is that a thorough study of the administrative costs of the simple form of subtraction value-added tax has not been done. If it can be administered along with the income tax, as its proponents claim, the simple subtraction method may cost less to administer than the BTT, but how much less we do not know. Neither is much useful information available on the cost of administering a more complicated, tax-credit

value-added tax, for example, one with multiple rates. Such a tax should be more costly to administer, but again we do not know how much more costly. A much more serious investigation of these questions needs to be done if informed decisions are to be made on a subtraction versus a tax-credit value-added tax.

Is the Tax-Credit or the Subtraction Method Better at Ensuring a Broad Tax Base?

Both taxes can be applied to a very large proportion of economic activity if it is thought desirable. There are two categories of transactions, the services of financial intermediaries and used goods, in which the subtraction method has an advantage over the tax-credit method. Neither method would be able to deal effectively with the problem of owner-occupied housing.

There are two important advantages to a very broad value-added tax base. The first is that a broad base allows the government to raise a given amount of revenue with a lower tax rate, or, conversely, a narrow base implies that the tax rate on those transactions subject to tax must be that much higher. The second is that taxing some transactions and not taxing others sets up incentives for consumers to shift purchases away from taxed goods and toward non-taxed goods. High tax rates on transactions that involve discretionary choice will induce consumers and businesses to undertake transactions as much for tax purposes as for economic purposes. These behavioral changes can generate costs in efficiency. Whether the base is to be narrowed for equity or for administrative reasons, the burden of proof should generally be placed on those wishing to narrow the tax base.

Financial Intermediaries

Financial intermediaries present a problem for the tax-credit method, but less of a problem for the subtraction method. Bank fees for checking account services, processing and handling of loans, and for acting as an intermediary—borrowing short term and lending long term—are the basis for a bank's value added. These fees are usually included in the spread between the interest rate earned on loans and the interest rate paid to depositors. The fees are rarely expressed explicitly and are therefore difficult to tax using the credit method. The interest rate itself should not be taxed, only the spread between borrowing and lending rates.

Insurance companies have expenses for pooling assets to cover risks and these are usually included as part of the premium. However, most of the premium is simply a payment now for a future benefit to the individual

or a beneficiary. The fact that the benefit is in the future is especially important for life insurance, and the savings element of life insurance should not enter the value-added tax base. However, property casualty insurance has a very small savings component and, therefore, is more amenable to value-added taxation.

The value added of banks can be calculated as the difference between the interest that is earned on assets and interest paid on deposits. The value added of insurance companies can be calculated as the difference between premium income received and the present value of insurance claims to be paid out (reserves). The subtraction method can be used to measure these amounts. If interest receipts or insurance premiums received are treated as "sales" and interest payments or insurance claims paid are treated as "purchases," the difference between the two minus the purchase of other inputs constitutes value added. The tax rate can then be applied to that amount.

The credit method works best when prices and quantities can be easily identified. For many services a unit of service and a fee for service can be identified. This is, however, not possible for financial intermediaries, because the value of the service is imbedded in the price of the overall transaction. As a result the countries that use the tax-credit method exempt most financial services from the tax. This causes a break in the chain of credits and some double taxation.

Used Goods

In principle the value added to used goods should be taxed in the same way as the value added to newly produced goods. Taxation of used goods poses no problem under either method as long as the transactions are between registered businesses, i.e., firms that file value-added tax returns. The problem with used goods arises from transactions between consumers and registered businesses such as used car dealers, pawn brokers, art dealers, scrap dealers, antique dealers, jewelers, etc.

When a registered business purchases a good from a household and then resells the good, there is value added. For the tax-credit method such a transaction would require applying a tax to the resale, and offsetting that tax with a credit for the tax paid on the purchase from the household. This would require households to file a value-added tax form and increase the administrative and compliance costs of the tax. If, instead, these transactions were treated as if they were between an exempt sector—households—and a taxable sector—used-good dealers—then there would be double taxation at the level of the dealer. Instead, dealers in

used goods are usually exempted from the tax, and the value added is not included in the tax base.

Under the subtraction method the dealer would subtract the value of used goods purchased from the value of used goods resold and apply the tax rate to the difference. The tax base would be the value added by the "middle man." As in the case of exemption under the subtraction method, any tax included in the purchase price would be part of deductible purchases. There is no double taxation of used goods under the subtraction method.

Housing

Rental housing presents no real problem for either value-added tax system. Owner-occupied housing presents a problem for both. A house occupied by its owner is an asset that generates, aside from any change in market value, a nonmonetary return. The return is approximated by the rent that would have been paid for an equivalent dwelling. This can be very difficult to measure, and even harder to administer.

Under most existing value-added tax systems, a tax is imposed on the sale of a newly constructed house. Any improvements or additions to the house are also subject to a value-added tax. There are a number of countries that impose a low or zero rate on newly purchased homes, and a few that exempt these purchases from the value-added tax. However, the purchase of a previously constructed house does not constitute a taxable transaction under most existing value-added tax systems.

Agency Comments

In its comments, the Internal Revenue Service made the following five points about the two studies discussed in this report:

- The IRS study on the subtraction method was a staff level study that was never approved or released by the agency.
- The administrative section of the Treasury report on the tax-credit method was done by IRS.
- Many aspects of the economy, especially inflation factors and the number of business entities in various gross receipts categories, have changed since the reports were done.
- Administrative costs and assumptions associated with both reports have changed significantly.
- Both studies have limitations that may affect their usefulness as a basis for estimating future costs of administering a value-added tax.

They went on to make the following three additional points:

- Multiple rates, including zero rates, introduce complexity and add to the administrative burden.
- Any study needs to include administrative and compliance problems in dealing with imports and exports.
- Any study of a value-added tax in the United States needs to include the costs of taxpayer compliance.

We basically agree with the points made by the IRS and have incorporated them into our report.

Analysis of Valued-Added Tax Under Alternative Assumptions About Pass-Through

In chapter 2, we discussed the effects of the tax-credit and subtraction method under the assumption that the value-added tax was passed completely on to consumers. While it is generally felt that this is the most likely case, alternative scenarios are possible. If monetary policy is not sufficiently expansive, it is also possible that some or all of the tax could be passed back to the wages and to the profits paid to the factors of production. In this appendix, we will demonstrate that if the tax is an across-the-board tax and is passed back to the factors of production rather than forward to consumer prices, the difference is one of price levels and not of relative prices. In both cases the prices of consumption goods rise relative to investment goods. For the case described in the text, the prices of consumer goods rise and the prices of investment goods remain the same. In the case described in this appendix, the prices of consumer goods remain the same and the prices of investment goods fall. As a result, the effects on the allocation of resources are the same under the two sets of assumptions.

In table I.1 we provide an illustration of the subtraction method and the tax-credit method under the new assumption. The top portion of the table describes the subtraction method. As in chapter 2, we use a tax-inclusive rate, since the tax base includes the tax itself. For example, the bat maker purchases lumber worth \$18 from the lumber yard and sells bats worth \$63 to the retailer. The value-added of the bat maker, including the tax, is equal to \$45. The tax is one-tenth of that, or \$4.50. As a result, the net value added—what is left over to the bat maker for wages, rents, and profits—is equal to \$40.50. Notice that all values in table I.1, including the totals, are exactly nine-tenths of the values in table 2.1, which describes the case of passing the tax forward. Thus, everyone's purchasing power is the same in the two cases, but the levels of all variables are lower.

Using the tax credit method leads to similar results. In this case there is a tax-exclusive rate of 11.11 percent charged on purchases and on sales. For the case of the bat maker described above, this implies that the value of sales without the tax will be \$56.70. The tax on this value will be \$6.30. The value of lumber purchases is \$18, but \$1.80 of this is the value-added tax on the \$16.20 in net purchases. The tax that the bat maker must remit is the tax on sales (\$6.30) minus the tax on purchases (\$1.80) which is equal to \$4.50.

Appendix I
 Analysis of Valued-Added Tax Under
 Alternative Assumptions About Pass-Through

Table I.1: Subtraction and Tax-Credit
 Methods for Calculating a Value-Added
 Tax If the Tax Is Passed Backward

	Lumber yard	Bat maker	Retailer	Total
Subtraction method (10-percent tax inclusive rate)				
Sales ^a	\$18	\$63	\$72	\$153
Purchases ^a	0	18	63	81
Net receipts	\$18	\$45	\$9	\$72
Value-added tax	\$1.80	\$4.50	\$0.90	\$7.20
Value added (Net)	\$16.20	\$40.50	\$8.10	\$64.80
Tax-credit method (11.11-percent tax exclusive rate)				
Sales ^b	\$16.20	\$56.70	\$64.80	\$137.70
Tax on sales (1)	1.80	6.30	7.20	15.30
Purchases ^b	0	\$16.20	\$56.70	\$72.90
Tax on purchases (2)	0	1.80	6.30	8.10
Value-added tax	\$1.80	\$4.50	\$0.90	\$7.20
Value added ^b	\$16.20	\$40.50	\$8.10	\$64.80

^aIncluding tax.

^bExcluding tax.

Source: Adapted from Choosing Among Consumption Taxes (GAO/GGD-86-91, Aug. 1986) pp. 13-14.

Similar effects would occur under any of the special features discussed in chapter 2—i.e. exemption, zero-rating, or multiple rates. One difference between this case and the case of full pass-through to consumers lies in the area of border-tax adjustments. Even with the destination principle there is no real need for border-tax adjustments since prices of goods to consumers or other buyers do not rise if the tax is not passed forward. As a result, there is no loss of international competitiveness as there could be in the case of pass forward and no border-tax adjustments.¹ Without the need for border tax adjustments, one of the advantages of the tax-credit becomes unimportant.

¹ It is because direct taxes, in particular income taxes, are assumed to be borne by factors of production rather than passed forward to consumers that they are not rebatable under GATT. If the value-added tax is not passed forward, it should also not be rebatable.

Comments From the Internal Revenue Service



COMMISSIONER

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON D C 20224

Mr. Richard L. Fogel
Assistant Comptroller General
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Fogel:

Thank you for the opportunity to comment on your draft report concerning the tax-credit and subtraction methods of calculating a value-added tax. Our comments are limited to the section of the report relating to the IRS studies on administration of both VAT methods.

First, we want to emphasize that the IRS study on the subtraction method VAT was a staff level study on the costs of administering a subtraction-method VAT that was never approved or released by the agency. Also, the administrative section of the Treasury report on the credit method VAT was conducted by IRS, not Treasury.

Second, we would point out that the Country's economy has changed substantially since these reports were conducted, and the assumptions and costs in the report, such as inflation factors and the number of business entities categorized by gross receipts, do not necessarily reflect current economic factors.

Third, administrative costs and assumptions associated with both reports have changed significantly since the reports were issued. For example, timeframes for installing major computer systems are somewhat longer today than several years ago.

Fourth, both studies have limitations that may affect their usefulness in estimating the cost of administering a VAT in the future. For example, the credit method study did not take inflation into account for the implementation years. Also, as noted in the report, the costs included were only IRS costs, and did not reflect the cost to the Treasury of paying financial institutions to handle FTDs. Neither study included an estimate for the costs that would be incurred by Customs, which will no doubt, be substantial. The subtraction-method study, while attempting to estimate the number of taxpayers given various filing thresholds based on gross receipts, used 1982 and 1983 data to project those thresholds beginning in 1987. More recent data should be used to accurately estimate the universe of taxpayers in subsequent years.

Appendix II
Comments From the Internal Revenue Service

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Our experience with these two studies, however, as well as from a reading of literature in this area confirm certain basic points. First, it is clear that multiple rates, including the zero rating of any products, introduce significant complexity into a VAT and increases the difficulty of monitoring compliance. Second, any discussion of the administrative burdens and costs must consider the administrative and compliance problems in connection with imports and exports in a United States VAT. Third, any study of the impact of a VAT should include the costs and burdens that would be imposed on taxpayers. We know of no data on this subject.

We hope you find these comments are useful.

With best wishes.

Sincerely,

A handwritten signature in black ink, appearing to read "J. J. [unclear]", written in a cursive style.

Acting Commissioner

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