

# Economic Review



FEDERAL RESERVE BANK OF KANSAS CITY

September/October 1986

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Cash Cow or Pig in a Poke?

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Can They Be Explained?

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# The Value-Added Tax: Cash Cow Or Pig in a Poke

*By Glenn H. Miller, Jr.*

Earlier this year a conviction emerged that future federal budget deficits had been set on a downward path. That conviction stemmed from five-year budget projections made by the administration and by the Congressional Budget Office. Those projections reflected, among other things, expected lower interest costs and lower defense outlays, along with continued projections of strong economic growth. The conviction was reinforced by the adoption of the Gramm-Rudman-Hollings Act (GRH) and its first-year implementation.

Now, in the second half of 1986, attitudes about the prospects for deficit reduction are less sanguine. Estimates of expected budget deficits in the near term are ratcheting upward. Economic growth is slower than expected, the GRH sequestration procedure has been declared unconstitutional, and uncertainty about controlling budget deficits has increased.

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Most of the designs for deficit reduction, including GRH, emphasize restraints on spending growth. But decisions on what spending to slow or to cut are difficult, as priorities are hard to establish.

A possible role for revenue increases in reducing deficits is mentioned from time to time, but there has been a reluctance to push for such increases in the current environment. Inseparable from the question of the desirability of a revenue increase is the question of what revenue source might be tapped. Trial balloons were raised earlier this year for various revenue measures such as a tax on imported oil, a tax on gasoline, and a tax on all energy consumption. The current tax reform is intended to be revenue-neutral and makes no direct long-run contribution to deficit reduction. And with tax reform substantially changing the bases and rates of both personal and business income taxes, it seems unlikely that those revenue sources would be used for deficit reduction.

The value-added tax (VAT) is usually included in any list of potentially large revenue sources, and the possible adoption of a federal value-added

tax continues to be discussed.<sup>1</sup> This article does not espouse a revenue increase to help reduce the deficit. Nor does it support the value-added tax as an appropriate form of revenue enhancement. Rather, the article summarizes information about the VAT so the reader will be more informed about this somewhat novel tax.

The first part of the article describes and explains a value-added tax—what it is and how it works. Included are discussions of different types of a VAT, different methods of calculating a VAT, and estimates of the potential revenue a VAT might produce in the United States. The second part discusses a VAT in relation to the objectives of a good tax system—neutrality, fairness, and simplicity. Later sections deal briefly with other issues and concerns, including the relation of a VAT to inflation, to the size of government, to federal-state relations, and to international considerations. In the final section, a comparison is made between a VAT and a federal retail sales tax.<sup>2</sup>

### **What is the value-added tax and how much will it produce?**

In a modern economy, production generally occurs in several stages. As an item moves through the various stages of production and distribution, its value is increased as a result of each firm's activities in the process. For example, when a firm acquires materials, supplies, and components and processes them using capital goods, labor, and

management, it adds value to the product it sells. This addition to the value of the product is the firm's "value added," which is computed as the value of its output less the cost of inputs it purchases from other firms. Value added can also be computed by adding up the firm's payments to the factors that generate its addition to the value of the product—wages, interest, rent, and profit. A value-added tax is a tax levied on the amount of value added by a firm. Firms at every stage—

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*A value-added tax is usually included in any list of new revenue sources for budget deficit reduction.*

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raw materials producing, manufacturing, wholesaling, retailing—owe the government a tax assessed on the amount of their value added.

Proposals for a value-added tax trace back to the early 1920s in both Germany and the United States. Current use of the VAT traces primarily to the formation of the European Economic Community (EEC). Recognizing that establishment of a common market meant that the nations' tax systems could not be permitted to act as trade barriers, the EEC sought tax harmonization through the adoption of value-added taxes in all its countries. The necessary border tax adjustments could be readily made with a destination principle VAT that taxes a product where it is consumed. Taxes paid by a firm on exported products are refunded, and the tax is collected on imports. In this way,

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<sup>1</sup> For example, Ernest Conine, "Issue of Real Tax Reform Has Only Been Postponed by Current Versions," *The Kansas City Star*, July 10, 1986. "Congress will soon find itself having to deal with the question [of real tax reform] again. And when that time comes, it will not be surprising to find the so-called value-added tax, or VAT, being taken very seriously indeed."

<sup>2</sup> The article focuses on issues and concerns regarding the VAT as a means of increasing revenues to reduce the deficit—that is, as a supplement to existing taxes rather than as a substitute for an existing tax. But if increasing revenues were chosen as a means of reducing the deficit, a VAT is not the only tax that could be considered. Thus, in the sense that the effects of a VAT should

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be compared with the effects of raising the same revenue from other taxes, discussion of a VAT as a way of raising additional revenue is like discussing the substitution of a VAT for another tax. While the explicit discussion of such a substitution is beyond the scope of this article, such comparisons are available. For example, see Charles E. McLure, Jr., "The Tax on Value Added: Pros and Cons." Complete citations are found in the list of selected readings at the end of the article.

traded goods and domestic goods compete on an equal tax basis in the country where they are consumed.

Another important feature of the adoption of the VAT by many European countries in the 1960s and 1970s was its substitution in many instances for an inferior indirect tax, the cascade turnover tax. This tax was imposed on total sales of firms at every stage of production, not just on their value added. Ultimate tax liability depended, therefore, on the number of times a product "turned over" before final sale. Accurate border tax adjustments were not possible, products going through many stages of production and distribution were discriminated against, and vertical integration of production was rewarded.

### *Types of value-added tax*

An important question in implementing a VAT is how to treat capital goods purchases in determining tax liability. Answering this question gives rise to two types of value-added tax. One is the consumption type. This type allows firms to deduct all capital goods purchases, as well as other nonfactor input purchases, from the value of their output in determining their value added and hence their tax liability. For the economy as a whole, the tax base is total consumption, and the VAT is an indirect consumption tax. The other type of VAT is the income type. This type imposes a tax liability on net purchases of capital goods by allowing only the deduction of depreciation expenses rather than deduction of the capital goods' full price at time of purchase. Because this approach leaves net investment subject to tax, the tax base is equivalent to net national income.

The destination principle, consumption type of value-added tax is the form of VAT now used in Europe. As it is also the kind of value-added tax being discussed for possible adoption in the United States, this article focuses on that form of a value-added tax.

### *Methods of calculating a value-added tax*

A firm's value-added tax base is its contribution to the value of its output. That contribution can be determined either by subtracting from the value of its output the cost of inputs such as materials, supplies, and components purchased from other firms, or by summing its factor payments of wages, rent, interest, and profit. It follows, then, that there are two fundamental methods for calculating value-added tax liability—the subtraction method and the addition method. Tax liabilities are the same either way.

In the addition method, factor payments are summed and the appropriate tax rate is applied to the total, giving the firm's tax liability. The addition method is usually associated with the income type of VAT.<sup>3</sup> Because of the article's concentration on the consumption type of VAT, the addition method is not pursued further here.<sup>4</sup>

In the subtraction method, a firm subtracts the cost of its purchased inputs, including capital goods purchased during the period, from the value of its sales to get the tax base and computes its tax liability by applying the appropriate tax rate. This method is illustrated in the first part of Table 1, with a VAT rate of 10 percent. The table shows that a VAT is a sales tax collected partly at every stage of production. It also shows that the tax is levied not on total sales at a given stage but only on the value added in that stage.

The subtraction method of calculating a VAT shown in the first part of Table 1 is not the favored method of implementation, either in practice in European countries using the VAT or in discussion of a VAT to be adopted in the United States.

<sup>3</sup> According to McLure, the addition method is useful only with the income type VAT. "Economic Effects of Taxing Value Added," pp. 159-160.

<sup>4</sup> For more discussion of calculation methods, see *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," pp. 7-11.

**TABLE 1**  
**Calculation of value-added tax liability**  
**at a 10 percent rate**

	Stage of Production				Total
	Raw Materials Producer	Manufacturer	Wholesaler	Retailer	
<b>I. Subtraction Method</b>					
1. Sales	200	400	700	1,000	2,300
2. Purchased Inputs	0	200	400	700	1,300
3. Value Added (line 1 less line 2)	200	200	300	300	1,000
4. Value-Added Tax (10% of line 3)	20	20	30	30	100
<b>II. Credit Method</b>					
5. Sales	200	400	700	1,000	2,300
6. Tax on Sales (10% of line 5)	20	40	70	100	230
7. Purchases	0	200	400	700	1,300
8. Tax on Purchases (10% of line 7)	0	20	40	70	130
9. Value-Added Tax (line 6 less line 8)	20	20	30	30	100
<b>III. Addendum:</b>					
<b>Retail Sales Tax of 10%</b>					
10. Retail Sales Tax	0	0	0	100	100

The favored method is a variant of the subtraction approach called the credit (or invoice) method. In the credit method, illustrated in the second part of Table 1, a firm computes its VAT liability on its total sales at the 10 percent rate (line 6). It then deducts the VAT already paid on its purchases (line 8), an amount shown on the invoices provided by its suppliers. In this way, the firm is given a credit for taxes paid on its purchases. This credit reduces the tax liability computed on its total sales to an amount equal to the tax on its value-added base (line 9). Thus line 4 and line 9 are equal.

Some have suggested that the credit method makes administration of a VAT easier and encourages compliance, both because credits and payments can be readily checked and because taxpayers at every stage will insist on evidence that their suppliers have paid the VAT, since that is the source of their credit. Others believe, however, that this feature is overrated. They say it contributes little toward making the VAT a simple, self-enforcing tax.

The addendum to Table 1 illustrates a matter of importance in understanding the nature of a value-added tax. Line 10 shows that the same

revenue can be raised by levying a single-stage indirect consumption tax, the retail sales tax. The consumption type VAT, with capital purchases fully deducted and all the taxes levied at earlier stages shifted forward to the final consumer, is equivalent to a retail sales tax levied at the same rate.<sup>5</sup> Thus, it has been observed that "...the consumption-based VAT is best seen as merely an alternative means of collecting this more familiar tax."<sup>6</sup>

#### *How much revenue from a U.S. value-added tax?*

The value-added tax has some of the appearance of a cash cow for the revenue system. As a starting point for some notion of its revenue-producing power, suppose that the value-added tax were applied at a single rate to the consumption of all goods and services. The maximum tax base would be total personal consumption expenditures (PCE) in the national income and product accounts. In 1985, PCE amounted to nearly \$2.6 trillion. Thus each percentage point of a VAT levied on that total would have yielded about \$26 billion in revenue. At a 5 percent rate, the tax would have produced over \$125 billion.

It is unrealistic, however, to think that total PCE would be the base for a VAT. Because of ad-

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<sup>5</sup> While tax law determines where the legal liability for payment is placed (statutory incidence or impact), the actual burden of a tax may finally come to rest elsewhere. The place of final burden is called the point of economic incidence, and the process of transferring the burden from point of impact to point of economic incidence is called shifting. The point where a tax burden comes to rest may—and often does—differ from the point where it is imposed, as businesses and individuals act in response to the imposition of the tax. Both a consumption type VAT and a retail sales tax have their statutory incidence on businesses, which are required to remit taxes to government, but both are believed to be fully shifted forward to final consumers as the prices of goods and services rise by the amount of the tax. See Richard A. Musgrave and Peggy B. Musgrave, *Public Finance in Theory and Practice*, pp. 376-380, 441-444.

<sup>6</sup> Charles E. McLure, Jr., "Value Added Tax: Has the Time Come?" p. 203.

ministrative difficulties and reasons of public policy, considerable amounts of consumption would probably not be considered taxable under a value-added tax. It would be administratively difficult to tax the consumption of owner-occupied housing, for example, and inequitable to tax the consumption of housing by renters if homeowners were not taxed. Medical care services and food consumed at home are important examples of possible exclusions from the tax base for public policy reasons—the easing of the tax burden on lower income groups. Some estimates suggest that with limited exceptions, mainly for administrative reasons, a realistic value-added tax base might be 75 to 80 percent of total PCE. With more liberal exceptions, many for equity or other public policy reasons, a realistic VAT base might be only 45

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*Even with considerable amounts of consumption not taxable, a U.S. value-added tax could be a powerful revenue producer.*

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to 50 percent of total PCE. According to these estimates of the potential VAT base, each percentage point of a VAT levied in 1985 would have produced about \$20 billion of revenue in the limited exceptions case and about \$12 billion in the liberal exceptions case. On the basis of these assumptions of the size of the base, a 5 percent VAT rate would have yielded \$100 billion and \$60 billion in revenue, respectively.

The Treasury Department, in making some forward-looking estimates of the yield of a VAT, projected total PCE of \$3.1 trillion in 1988. Based on a combination of administrative, social, and distributional considerations, the estimate of a realistic comprehensive value-added tax base for 1988 was 77 percent of PCE, or \$2.4 trillion. Further exclusion of expenditures for food consumed at home and household utilities reduced the

estimated VAT base to 55 percent of PCE, or about \$1.7 trillion. These projections and estimates suggest a 1988 yield for each percentage point of VAT amounting to about \$24 billion with limited exceptions and about \$17 billion with more liberal exceptions. A 5 percent VAT would produce about \$125 billion and \$85 billion, respectively, in revenue in 1988.<sup>7</sup>

While the value-added tax has the appearance of a potential cash cow for the revenue system, it may also have the characteristics of a pig in a poke. Adoption of a VAT without careful consideration could produce unexpected results. The rest of the article discusses the VAT in relation to the objectives of a good tax system and in relation to some other issues and concerns.

### **A value-added tax and the objectives of a good tax system**

A good tax system is expected to be fair, neutral, and simple. The burden of raising revenue should be distributed as fairly as possible, and ideally would be perceived to be so. Taxes should be as neutral as possible in terms of minimizing their influence on economic decisions and behavior. Tax administration and taxpayer compliance should be as simple and efficient as possible.<sup>8</sup>

#### **Neutrality**

The consumption type value-added tax levied at a uniform rate on all goods and services would not distort consumption choices, since it would be applied evenly to all consumption goods. Nor would it distort decisions among methods of pro-

duction or forms of business organization, since all producers would be covered. A VAT of the kind discussed here is also neutral between consumption now and consumption later—that is, between consumption and savings. Imposition of a value-added tax would not interfere with a person's decision to consume or to save, because the VAT does not affect the net rate of return on saving.<sup>9</sup> Like most taxes, however, a VAT would not be neutral between work and leisure.

As already noted, however, some goods and services—and perhaps some businesses—would not be taxed for administrative or public policy reasons. Furthermore, nearly all European countries using the VAT apply differential rather than uniform rates. Some commodities considered essentials are taxed at lower than standard rates, while other goods considered luxuries are taxed at higher than standard rates. Adoption of a VAT in the United States would require decisions between differential and uniform rates as well as decisions on what consumption to exclude from the tax base. A movement away from taxing all consumption at a uniform rate weakens the neutrality of the VAT, leading some consumption to be preferred for tax reasons.

#### **Fairness**

The idea of fairness in taxation generally embraces the notion that the tax burden should be distributed on the basis of ability to pay. The consensus in the United States still appears to be that the ability to pay criterion is best met by a progressive tax that requires those with higher

<sup>7</sup> *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," pp. 85-87. For detailed discussion of the difficulties involved in applying a VAT uniformly across the economy, see pp. 47-84.

<sup>8</sup> See Glenn H. Miller, Jr., "Alternatives to the Current Individual Income Tax," p. 4, and references cited.

<sup>9</sup> "[The consumption type VAT] does not distort the choice of whether to consume now or later because it applies at equal rates to consumption at either point in time (in the absence of statutory rate changes)." McLure, "Economic Effects of Taxing Value Added," p. 172. For a demonstration that a VAT is neutral with regard to the choice between consuming now or saving for future consumption, see *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," p. 19.

incomes to pay a larger share of their income in taxes. A major concern about the value-added tax is that it does not meet this criterion of fairness, or equity, in taxation.<sup>10</sup>

The consumption type value-added tax assessed at a uniform rate would be proportional with regard to consumption. Total consumption by households in all income classes would be taxed at the same rate. But because consumption becomes a smaller share of income as income rises, a VAT would be regressive with regard to income. Households in the lower income levels would pay a larger share of their incomes in taxes than households in the higher income levels.

As a result of the regressivity of a VAT in its pure form, it is often suggested that adoption of a value-added tax in the United States should be accompanied by some form of relief for low-income families. An often-discussed means of reducing the burden of a VAT on lower income groups is the exclusion from the VAT base of purchases of some basic consumption items, such as food, medical expenses, and household utilities. Housing is likely to be excluded for administrative reasons, as noted earlier. Lower tax rates on such items might be another means of low-income relief under a VAT. Such efforts to reduce the regressivity of the VAT are primarily responsible for the reduction in the VAT base to 45 to 50 percent of PCE used in the illustration of the revenue potential of a value-added tax.

<sup>10</sup> Discussion of progressivity or regressivity in taxation approaches the notion of fairness in terms of vertical equity. Vertical equity is concerned with seeing that those with different income situations are treated differently. Fairness in terms of horizontal equity is concerned with seeing that those in similar situations are treated similarly. If consumption is believed to be the appropriate tax base, then applying the same tax to two households with the same amount of consumption could be said to meet the criterion of horizontal equity. But if income is the best tax base, then treating two households with similar consumption similarly might not provide horizontal equity, because their income situations might be very different. For further discussion, see Musgrave and Musgrave, *Public Finance in Theory and Practice*, pp. 215-224, 331.

There are two problems with providing low-income relief by excluding basic consumption items from the VAT base or taxing them at lower rates. Both of these approaches would significantly lessen the neutrality of a VAT in its pure form by distorting consumption choices in favor of items with tax preferences. Some students of the tax structure suggest that equity under a VAT could be improved while preserving more of the tax's neutrality by means other than exclusion of necessities from the VAT base. For example, provision for refundable credits on the personal income tax—or a negative income tax—would be more neutral ways of providing low-income relief if a VAT were adopted, as would other direct income transfers.<sup>11</sup>

Both exclusion of certain items from the VAT base and the use of differential tax rates would make administration of the tax more difficult. European experience shows that such measures can make the VAT less regressive. But studies of the European experience also suggest that such gains in equity can be outweighed by complications in administration and compliance and by reductions in the neutrality of the VAT.<sup>12</sup>

Although many may still view progressivity as an important element of the tax structure, surveys taken in the early 1980s found that the existing federal personal income tax was viewed as the "least fair" tax by the largest share of respondents. A much smaller share believed that state sales taxes—the existing tax most like a VAT—were "least fair." These results might be construed as showing some public inclination in favor of a value-added tax, at least compared with the income tax. However, the tax reform legislation now in process may improve the public's perception of the fairness of the income tax. Criticisms

<sup>11</sup> See McLure, "The Tax on Value Added: Pros and Cons," pp. 37, 49-50.

<sup>12</sup> Henry J. Aaron, ed., *The Value-Added Tax: Lessons from Europe*, pp. 8-9 and elsewhere.

of the regressiveness of a VAT might be muted by the adoption of tax reform that closes many loopholes available to higher income groups and removes the income tax liability from several million families below the poverty level.

### *Simplicity*

The costs of administering a value-added tax and the costs of compliance by the taxpayers are important considerations in its adoption. For the ultimate consumer, compliance is simple and familiar since nearly all Americans have experience with the retail sales tax. Most retail firms would be familiar with collecting and transmitting a VAT for the same reason. Firms in the earlier stages of production would have less familiarity, and all firms would have to set up the record keeping necessary to pass on the VAT to customers and receive credit for VAT paid on purchases. Administration and compliance costs would likely depend on the extent of good written records and on small businesses' share in economic activity.

How large the administration and compliance costs of this new tax would be is hard to estimate, partly because the complexities involved would depend heavily on what products or firms were excluded from the VAT and by what method, and whether single or multiple tax rates applied. For example, applying the VAT to certain areas like farming, small business, some services, and non-profit organizations might be difficult or inadvisable.<sup>13</sup> Decisions to except some consumption items from the VAT base or to tax items differentially would also complicate administration of the tax. Compliance would be made more difficult because of the need to define sets of goods subject to different rates and determine where par-

ticular goods fit into the classifications. According to one analyst:

However simple the value-added tax may be in theory, European experience makes clear that it is not simple in practice. ...the point is that while the value-added tax... is simple and cheap to administer, it is not the simple, self-enforcing tax that some of its less sophisticated advocates have suggested.<sup>14</sup>

European adoption of a VAT was eased somewhat by its substitution in many cases for the turnover tax. While there are significant differences in the economic effects of the two taxes, the means of administration and compliance had some similarity. In the United States, a federal VAT would be a new tax, with no such model to follow.

Provisional plans have been developed for administering a consumption type, credit method VAT in the United States, with certain exclusions from the tax base. About 20 million tax filers are estimated to be covered by the tax. At least 18 months would be required between enactment of a VAT and the beginning of its administration. When fully phased in, administration of the VAT would require 20,000 additional government employees and cost \$700 million a year.<sup>15</sup>

### *Tradeoffs*

A value-added tax of the consumption type, calculated by the credit method and assessed on all consumption at a uniform rate, would be essentially neutral in its economic effects. It would also be regressive with regard to income, falling more heavily on low-income groups that spend larger

<sup>13</sup> Chapter 6 in *Tax Reform for Fairness, Simplicity, and Growth*, Vol. 3, "Value-Added Tax," discusses a number of such problem areas.

<sup>14</sup> Aaron, *The Value-Added Tax: Lessons from Europe*, p. 9. Special problems from the European experience are discussed on pp. 9-12.

<sup>15</sup> *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," pp. 113-128.

shares of their income on consumption than do higher income groups. Low-income relief could be provided under a VAT by excepting some consumption items from the tax base, such as food. Or regressivity could be lessened by taxing consumption of necessities at a lower than standard rate and consumption of luxuries at a higher rate. But either course of action would weaken the neutrality of the VAT and would increase the complexity and the cost of administration and compliance. Thus, adoption of a value-added tax forces choices among the three objectives of a good tax system—neutrality, fairness, and simplicity.<sup>16</sup>

## **Economic and political aspects of a value-added tax**

### *Saving and economic growth*

Many people favor a place for the VAT in the federal tax system because, in the form that allows deduction of capital purchases in calculating the tax base, consumption alone is taxed. Because a consumption tax does not reduce the net rate of return on saving as an income tax does, the essentially neutral VAT favors saving compared with a nonneutral income tax which discourages saving. If additional revenue is the aim, adopting a VAT instead of higher income taxes could be expected to have a positive effect on saving and investment and, therefore, on the rate of economic growth. How much of a positive effect is still an unsettled question.

### *Prices and inflation*

Some people fear that introduction of a value-added tax would necessarily be inflationary. Adoption of a VAT would likely bring a rise in con-

sumer prices related directly to the tax rate and the breadth of the tax base. For example, with a VAT base equal to half of consumption and a tax rate of 10 percent, consumer prices might be expected to rise by about 5 percent on average. This would be a one-time rise in the price level and not an increase in the rate of inflation. However, if wages or other payments were indexed to consumer prices, or if workers were able to bargain wages up following the price increase, there would be some potential for inflation.

Information about the effect on prices from the European experience following adoption of the VAT is not much help, because the VAT replaced a tax similar in coverage and revenue production. Later increases in VAT rates are reported to have been inflationary, however, perhaps because of a wage-price spiral.<sup>17</sup>

### *International considerations*

It is sometimes argued that adoption of a VAT would improve the competitiveness of U.S. industry in international trade. The General Agreement on Tariffs and Trade allows countries using the VAT to rebate it on exports and impose it on imports, while such adjustments cannot be made for direct taxes such as corporate and individual income taxes. But simply imposing a VAT is not equivalent to subsidizing exports and penalizing imports. Rather, adopting a destination principle VAT by rebating the tax on exports and collecting it on imports is just a border tax adjustment. The adjustment is needed so imports are not favored in competition with domestic products bearing the tax and for exports to compete with foreign goods not bearing the tax. Without such adjustments, imports would have a price advantage over domestic goods and exports would have a price disadvantage in foreign markets.

<sup>16</sup> For further development of the tradeoffs, see Aaron, *The Value-Added Tax: Lessons from Europe*, pp. 5-7.

<sup>17</sup> Aaron, *The Value-Added Tax: Lessons from Europe*, pp. 12-13.

...the export rebate and import tax allowed for the value-added tax are merely border tax adjustments required to put the value-added tax on a destination basis. The export rebate merely allows exports to enter world markets free of value-added tax, not at a subsidized price below the pre-tax price. Similarly, imposing a value-added tax on imports merely places imports on an equal footing with domestically produced goods; it does not penalize imports. ...the imposition of a value-added tax, with no offsetting change in any other taxes, would not directly improve the U.S. trade balance.<sup>18</sup>

Whether substituting a VAT for a direct tax like the corporation income tax would improve the U.S. trade balance depends on whether the direct tax is shifted forward into prices paid by consumers. Even then, with floating exchange rates, a resulting improvement in the U.S. trade balance could be expected to be restrained by an increase in the value of the dollar.

It is unlikely that adoption of a VAT would itself significantly improve the U.S. trade balance. Equating export subsidies and import penalties with export rebates and import levies under a VAT is not correct. Whether substitution of a VAT for direct taxes would improve the trade balance depends on several assumptions.<sup>19</sup>

### *Size and growth of government*

The very fact that a value-added tax is a powerful revenue producer raises suspicion among those who fear that the ability to tap a new revenue

source would lead to more spending and further growth in government rather than to deficit reduction. Others dispute this view that additional revenue simply encourages more spending.

Evidence on the relationship between a VAT and the growth of government is mixed. The Treasury Department study reports as follows:

Foreign experience indicates that those countries with value-added taxes tend to be high tax, and presumably high government spending countries ... While value-added tax countries appear to have high taxes, generally, the causal relation, if any, is less clear.<sup>20</sup>

However, a summary of a set of studies on the European experience with the VAT noted:

These statistics strongly suggest that the value-added tax was a handy instrument at a time when government expenditures were rising. The tax was introduced and its rates were increased as part of a process by which the role and scope of governmental activity increased.<sup>21</sup>

Another study examined the fiscal behavior of 24 countries with and without value-added taxes, seeking "evidence regarding the belief that there is a line of causation from a new revenue source and the level of government spending."<sup>22</sup> The author concluded that "The simple *prima facie* view that imposition of a value-added tax increases government spending, or the ratio of total taxation to total economic activity, is not supported." While noting that more complex analysis might modify these results he notes that the results

<sup>18</sup> *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," p. 22.

<sup>19</sup> For further development of this discussion, see McLure, "The Tax on Value Added: Pros and Cons," pp. 21-24, 44-47; Norman B. Ture, "Economics of the Value Added Tax," pp. 92-94; and McLure, "Value Added Tax: Has the Time Come?" pp. 197-198.

<sup>20</sup> *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," p. 23.

<sup>21</sup> Aaron, *The Value-Added Tax: Lessons from Europe*, p. 16.

<sup>22</sup> J. A. Stockfish, "Value-Added Taxes and the Size of Government: Some Evidence," p. 547.

should at least "call into question the unsophisticated claims that a major tax increase by means of a new revenue source will simply increase spending."<sup>23</sup>

### *Preemption of state-local tax domain*

Adoption of a federal VAT, an indirect consumption tax, may be viewed as a federal incursion into a tax domain traditionally reserved to state and local governments. More than 40 states and many local governments collect general sales taxes. These taxes provide more than a third of their total revenue. State and local officials fear that adoption of a federal VAT could impinge on their use of essentially the same revenue base. Use of a federal VAT might influence the public's acceptance of higher state and local sales taxes, with the VAT rate being the important factor in that influence.

One authority observed that "There is much truth to the general principle that the federal government, which has the greatest facility to tax any base, should be cautious about preempting revenue sources that are particularly suited to use by the states."<sup>24</sup> But while the federal government should be careful about the effect on state and local governments of its choice of a new tax base, experience shows that this need not prevent adoption of a VAT. Federal and state governments already share some very similar tax bases. More than 40 states impose corporate income taxes and individual income taxes.

### **The value-added tax and the retail sales tax**

Except for the difference in administration, a federal retail sales tax would be essentially the

same as a destination principle, consumption type VAT with the same coverage and the same rate. Both would collect the same amount of revenue (Table 1). They would be similar regarding neutrality and distribution of the tax burden. Adoption of either might be considered an infringement on state and local tax domains. Adoption of either would affect the price level. Thus, practically anything that can be said about the somewhat novel VAT can also be said about the more familiar retail sales tax.

Most of the differences between the two are in methods of administration, so that most reasons for preferring one over the other are found in those

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*There is little difference between a value-added tax and a federal retail sales tax.*

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differences. The greatest advantage of a VAT over a federal retail sales tax may be in the VAT's superior accounting for purchases of capital goods and of other goods for business use. As a fundamental step in its implementation, the consumption type VAT excludes from the tax base purchases of capital goods as well as other purchased materials inputs, so that only sales to final consumers are taxed. The means used to achieve the same goal in state retail sales taxes, such as registration of firms allowed to make tax-free purchases or exemption of purchased items to be used in production, have not been wholly successful. The VAT and the retail sales tax share the problem of seeing that purchases excluded for business use do not find their way into consumption use.<sup>25</sup>

The VAT appears more complicated than a retail sales tax, and compliance and administration might be more difficult. Part of this difference

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<sup>23</sup> Stockfisch, p. 549.

<sup>24</sup> McLure, "Value-Added Tax: Has the Time Come?" p. 199.

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<sup>25</sup> For further discussion, see *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," pp. 31-33.

probably lies in familiarity with the retail sales tax, both by consumers and by businesses collecting and remitting the tax. More firms would be involved with a VAT since it is collected at all stages of production. One estimate is that 10 percent fewer firms would be involved in a federal retail sales tax. The so-called self-enforcing feature of a VAT calculated by the credit method appears to be an advantage over the retail sales tax, but there is some question of how important that factor really is.

While adoption of either a VAT or a federal retail sales tax might be viewed by some as an intrusion into the revenue domain of state and local governments, a federal retail sales tax might be preferred over a VAT, if a choice had to be made between them. It would be far easier to piggyback state and local sales taxes on a federal retail sales tax base than on to a VAT base. Such piggybacking would introduce consistency in definitions of the sales tax base, while still allowing states and localities to set rates according to their fiscal needs.<sup>26</sup> Experience already exists with local sales taxes tied to state levies.

There seems to be no clear-cut reason for choosing either a consumption type VAT or a federal retail sales tax if a decision were made to seek additional revenue by means of an indirect consumption tax. The familiarity of the retail sales tax to consumers and most businesses may be the point most in its favor. The VAT's apparently better

treatment of purchases of capital and intermediate goods may be its most favorable point.<sup>27</sup>

## Summary

A value-added tax could well be a cash cow for the federal revenue system and need not be a pig in a poke. The form of VAT most likely to be considered for the United States is a destination principle, consumption type, credit method tax. Such a tax is generally neutral but regressive with regard to income. Efforts to make the tax less regressive would tend to make it less neutral. Such efforts would also lessen the simplicity of administration and compliance. But some form of low-income relief would be likely in a U.S. VAT, as has been true in European VAT's. Even with such a tradeoff between the goal of fairness and the goals of neutrality and simplicity—which would reduce the size of the tax base—the VAT's potential revenue yield would be large. Several other issues and concerns revolving around adoption of a VAT have been discussed in this article, and a body of literature exists that both covers these matters in more detail and addresses other issues and concerns. When and if a decision on a VAT is to be made, ample information exists so that neither policymakers nor the public need fear buying a pig in a poke.

<sup>26</sup> See *Tax Reform for Fairness, Simplicity, and Economic Growth*, Vol. 3, "Value-Added Tax," pp. 26-27.

<sup>27</sup> For a detailed discussion of the pros and cons, see John F. Due, "The Case for the Use of the Retail Form of Sales Tax in Preference to the Value-Added Tax," and Carl S. Shoup, "Factors Bearing on an Assumed Choice Between a Federal Retail-Sales Tax and a Federal Value-Added Tax."

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# U.S. Energy Policy In a Changing Market Environment

By *Tim R. Smith*

Recent dramatic changes in international crude oil markets, reflected in significantly lower and more volatile oil prices, have again brought energy policy issues to the fore. In response to these changes, several controversial policy responses have been proposed. Proposals range from taxes on oil imports to subsidies for the strained domestic energy industry. Given the diversity of proposed policy responses, the challenge for policymakers is to avoid quick-fix solutions by crafting policy responses aimed at a few predetermined objectives. Without clearly defined objectives to guide policy formation, energy policy initiatives are likely to be short-sighted and unable to adapt to an increasingly volatile market.<sup>1</sup>

This article identifies policy objectives that are deemed to be appropriate for the United States and considers whether current policy initiatives are consistent with these objectives. The first sec-

tion reviews the major turning points in the history of public policy toward oil. Other energy sources, such as natural gas and coal, have been important in the development of energy policy but oil has clearly been the most influential. The second section highlights the dramatic recent changes in the energy policy environment that have prompted a reexamination of current energy policies and have given rise to new policy proposals. The third section sets forth some long-run policy objectives that might be useful in guiding policy initiatives. The fourth section evaluates various energy policies in light of these objectives.

## **History of crude oil policies**

The United States has never codified a set of objectives for its energy policy. However, an examination of predominant turning points in crude oil policy helps identify the implicit objectives that have influenced policymaking.

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<sup>1</sup> This article reflects the state of world energy markets prior to the September 1, 1986, production agreement among OPEC members. This temporary agreement has not reduced uncertainty about the future of oil prices. Nor has it made the challenge for policymakers any less difficult.

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## 1900 to World War II

The basic problem for the oil industry in the early 1900s was overproduction and low prices. As a consequence, state governments tried to regulate oil production. Though Oklahoma and Texas tried to limit production, competition among oil producers in newly discovered oilfields led to soaring production and depressed prices. Competition to extract oil from common reservoirs also led to economic waste as underground pressure in the oilfields was dissipated.<sup>2</sup>

Quotas in oil-producing states did not prevent excess production from being shipped across state boundaries. In response, state governments sought help from the federal government in limiting state production. In 1935, the Interstate Transport of Petroleum Products Act established federal authority over oil production that exceeded what the states allowed. Federal control of production was not effective, however, and for the next 30 years an interstate agreement involving 20 states was used in policing production.

This early period, then, was characterized by concern over production of domestic oil. States attempted to conserve oil, a resource that was seen as limited in supply. The federal government had a minor role during the period. Federal energy policy did not become important until imported oil began influencing domestic crude oil prices.

## World War II to 1973

Though foreign sources of crude oil began developing in the 1930s, they did not become a major force in shaping energy policy until after World War II. Increasing U.S. imports of crude oil and refined products dominated the postwar

period up to 1973 (Chart 1). As part of an informal cartel of the world's largest oil companies, large U.S. oil firms sought to limit production from newly discovered foreign sources and to prevent a precipitous drop in world oil prices by fixing market shares.

Nevertheless, as the economic recovery built up after World War II, inexpensive foreign oil found its way into the United States, prompting opposition from some domestic producers. Imported oil gained an increasing share of the domestic market throughout the postwar period. By 1953, imported oil accounted for nearly an eighth of total U.S. supplies.

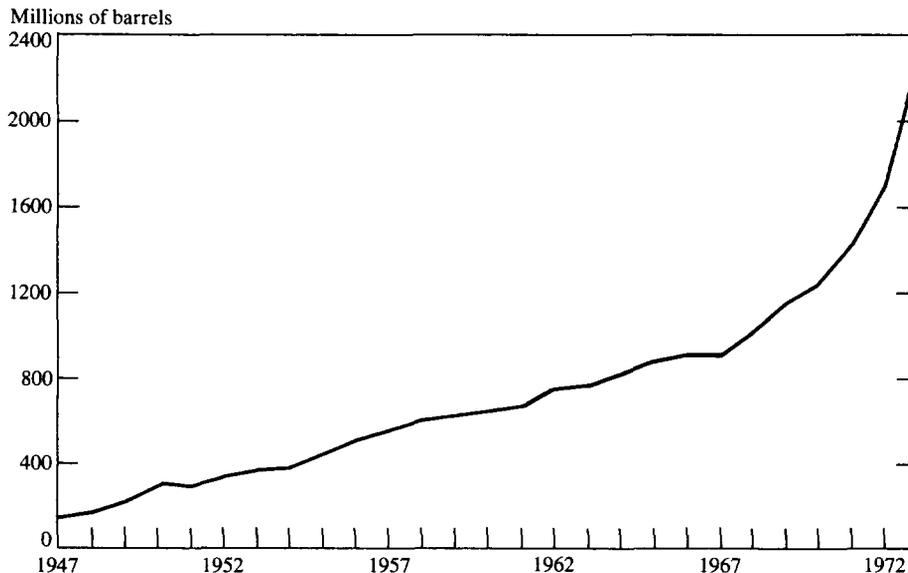
In response to growing pressure from domestic producers, President Eisenhower imposed mandatory oil-import quotas in 1959. The increase in oil imports and subsequent quotas imposed during the Eisenhower administration marked a major turning point in U.S. energy policy. The federal government was no longer a passive observer of state regulators but instead acted to stay the growth of imports. Under the quota system, the amount of foreign crude oil that domestic refiners could import was strictly regulated. As a result of this regulation, imports remained about an eighth of total supply between 1959 and 1973.

Another turning point in energy policy came when consumers reacted to the high domestic oil prices that resulted from the quotas. Consumer pressure led to new policies under the Nixon administration. With only limited access to inexpensive imported crude oil, growing U.S. demand put enough pressure on supplies to raise U.S. oil prices significantly above foreign prices. By the early 1970s, U.S. oil prices were 60 percent higher than foreign oil prices. Rather than remove the quotas, President Nixon exempted oil from Canada and Venezuela. Heating oil also was exempted in an effort to quell consumer criticism of the quotas. These concessions were minor, however, and did not allow supplies to rise fast

<sup>2</sup> The history of U.S. energy policy is discussed in more detail in Crawford D. Goodwin, ed., *Energy Policy in Perspective*, The Brookings Institution, Washington, D.C., 1977, and *Energy Policy*, Congressional Quarterly, Inc., 1981.

## CHART 1

### Growth in U.S. imports of petroleum and refined products



Source: American Petroleum Institute

enough. Under the quota system, demand continued to grow and domestic prices continued to rise. Serious shortages of crude oil and refined products occurred in the summer of 1971, when President Nixon imposed a freeze on wages and prices. This was the first in a series of price controls that would keep domestic oil prices below market-clearing levels throughout the decade. In response to shortages, all import quotas were lifted in 1973 and replaced with fees on imported crude oil and refined products.

During the period between World War II and 1973, therefore, the growing importance of foreign oil production was clearly a driving force behind energy policy. Policymakers were first motivated by concern for the domestic oil industry when the attempted cooperation among large companies failed to prevent the growth in imports and the subsequent slide in prices. Policy was later

influenced by consumers' objecting to the high domestic prices resulting from import quotas.

#### 1973 to 1982

Energy policy shifted again in response to the severe supply disruptions that began in 1973 and continued throughout the rest of the 1970s. First, the Arab oil embargo sharply reduced supplies and increased prices, and then the Organization of Petroleum Exporting Countries (OPEC) sought to exert its market power by imposing further constraints on supplies and seeking higher prices.

Saudi Arabia cut off oil shipments to the United States in October 1973, and thereby opened a decade of turmoil for the world's energy users and producers. Policies aimed at increasing domestic petroleum supplies and curbing the nation's appetite for energy were sought to ensure

national security. Policymakers were also influenced by concern for consumers objecting not only to high energy costs but also to the transfer of wealth to oil producers.

At the time of the embargo, controls on domestic oil prices were imposed by the President under authority of the Economic Stabilization Act of 1970. Under this two-tiered system, price controls were retained for existing production but removed for "new oil," meaning oil from wells drilled after 1973. The spread between the prices of old and new oil widened during the embargo, stimulating an increase in the share of supplies comprised of new oil. Price controls in the oil market continued under the Emergency Petroleum Allocation Act (EPAA) signed into law in 1973.

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*The world's crude oil supply can be characterized by a large number of major suppliers, each with a significant share of world production and some market power.*

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The Arab oil embargo ended in 1974 but OPEC clearly emerged as a formidable market force. As OPEC's official prices rose, the price of new oil in the United States also increased. Domestic price increases were seen as a windfall to oil companies, contributing to a general anti-oil industry sentiment. Two alternative methods arose for dealing with high-priced new oil. One would extend price controls to include new oil. The other would decontrol all oil but impose a tax on oil-producing companies to avoid the transfer of wealth from consumers to producers.

With the United States under inflationary pressures in the mid-1970s, the issue of oil decontrol was especially sensitive. Decontrol of old oil would substantially raise nominal prices of domestic oil, since old oil accounted for about 60 percent of all domestic oil produced in 1975.

At the time, domestic prices averaged about half of world prices. While the President and Congress struggled over the decontrol issue, price controls remained on old oil through numerous extensions of the EPAA. Just as the EPAA controls expired near the end of 1975, Congress passed the Energy Policy and Conservation Act providing for the phased decontrol of oil prices. Price controls would finally end on September 30, 1981.

As oil price controls were gradually ended in the late 1970s, the Crude Oil Windfall Profits Tax was imposed on the increased profits of producers. The tax, passed in 1980, followed OPEC's move in 1979 to increase its official price by the largest amount since the embargo in 1973. The tax was applied to the difference between the actual sales price and a certain base price. The base price and the tax rate varied for different categories of oil. For example, stripper wells—wells producing fewer than ten barrels a day—were given a higher base price and a lower tax rate than most other categories of domestic oil.

During the 1973-82 period, therefore, changes in energy markets motivated policymakers. Energy policies formulated during the 1970s were aimed at coping with serious supply disruptions. Concern for national security and consumers troubled by high energy costs and general price inflation appears to have shaped these policies.

### **Recent changes in the policy environment**

Now, as in the 1970s, dramatic and far-reaching changes in the policy environment are drawing the attention of policymakers. Not the least of these changes has been the precipitous drop in the price of oil, by more than 50 percent during the first half of 1986. The drop in oil prices and other events reflect fundamental changes in international crude oil markets that need to be understood before objectives are defined and policy initiatives are assessed.

TABLE 1

**Average crude oil production of major petroleum producing countries**  
(thousands of barrels per day)

<u>Year</u>	<u>Saudi Arabia</u>	<u>Total OPEC*</u>	<u>Canada</u>	<u>Mexico</u>	<u>United Kingdom</u>	<u>United States</u>	<u>China</u>	<u>USSR</u>
1977	9,245	31,298	1,320	981	768	8,245	1,874	10,682
1978	8,301	29,805	1,313	1,209	1,082	8,707	2,082	11,185
1979	9,532	30,928	1,496	1,461	1,568	8,552	2,122	11,460
1980	9,900	26,891	1,435	1,936	1,622	8,597	2,114	11,773
1981	9,815	22,646	1,285	2,313	1,811	8,572	2,012	11,907
1982	6,483	18,868	1,271	2,748	2,065	8,649	2,045	11,967
1983	5,086	17,583	1,356	2,689	2,291	8,688	2,120	12,027
1984	4,663	17,576	1,436	2,750	2,495	8,879	2,269	11,878
1985	3,388	16,028	1,460	2,740	2,559	8,920	2,428	11,795

Source: U.S. Department of Energy  
\*OPEC total includes production in Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, United Arab Emirates, Indonesia, Iran, Nigeria, Venezuela, Ecuador, and Gabon.

### Changing markets

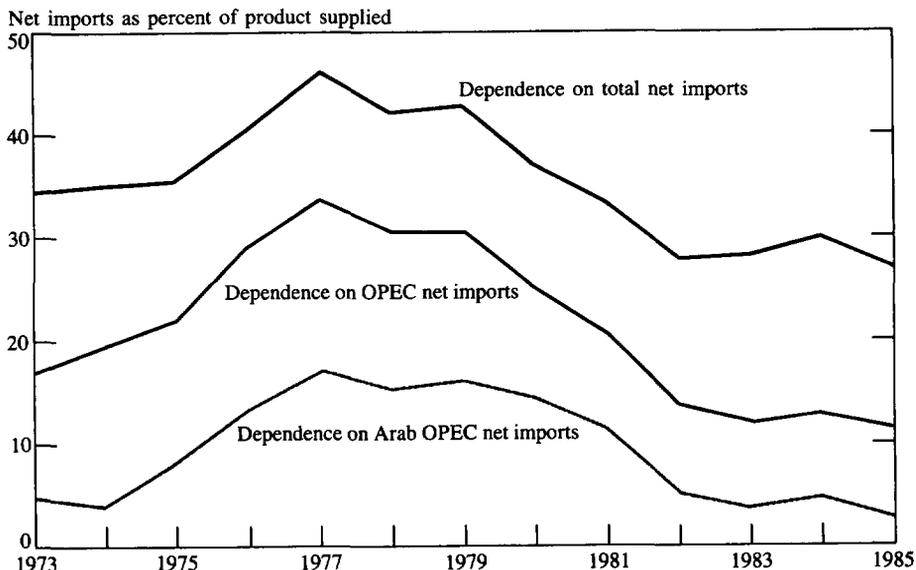
*Production.* World crude oil supplies have changed dramatically. High prices in the late 1970s stimulated enough production outside OPEC to eventually undermine the cartel. Now, the world's crude oil supply can be characterized by a large number of major suppliers, each with a significant share of world production and some degree of market power (Table 1). Any large producer can influence world crude oil prices for awhile by significantly increasing or decreasing production. That influence is short-lived, however, because other producers quickly respond to market fluctuations. The flow of crude oil from foreign sources also is heavily influenced by political considerations and the need to generate revenue for economic development in exporting countries. These characteristics of world petroleum markets suggest that oil prices will be more volatile in the future.

In the United States, dependence on petroleum

imports has declined significantly since the late 1970s (Chart 2). The United States imported 32 percent of its oil supplies in 1985, as against 48 percent in 1977. Meanwhile, the sources of U.S. crude oil imports also have changed. More and more oil comes from non-OPEC sources, such as Mexico and Canada (Table 2). In 1985, Mexico was the leading source of crude oil imports to the United States, with Canada ranking second. The United States imported an average of 815,000 barrels a day from Mexico that year and 768,000 barrels a day from Canada. As a result, the share of imports coming from OPEC countries has declined from 70 percent in 1977 to 36 percent in 1985.

In 1986, however, OPEC's waning importance has begun to reverse itself. Total OPEC supplies have increased since the cartel abandoned its quotas in favor of a policy of aggressively regaining market share. Substantially lower prices for imported crude oil will undoubtedly increase U.S. imports as oil from foreign sources becomes

**CHART 2**  
**U.S. dependence on petroleum net imports**



Source: U.S. Department of Energy

relatively less expensive than domestic oil. Production declined in the United States in 1985, and lower oil prices are expected to bring even lower production levels in 1986. In addition, U.S. reserves will grow more slowly as oil companies cut back on their exploration and development activities.

*Consumption.* As world supplies of crude oil have increased, oil consumption by the industrial world has declined (Table 3). The high relative prices of energy in the 1970s stimulated the development of energy-saving technology for both residential and industrial application. Many of these cost-reducing enhancements to the capital stock are just now being fully implemented. Moreover, lower prices are expected to encourage consumption far less than they would have a decade ago because of increased uncertainty about future price movements.

Technology-based energy conservation has allowed the U.S. economy to expand with less than proportionate increases in energy consumption. Chart 3 shows the steady decline in energy consumption per constant dollar of gross national product. Reduced oil and natural gas consumption has been largely responsible for the decline.

*New pricing mechanisms.* Underscoring these general trends in production and consumption have been changes in the nature of transactions in oil and natural gas markets. More of the world supply of crude oil is being sold in the spot market. While most oil is still sold under long-term contracts, the growth in spot market transactions has made prices much more volatile than previously.

Even long-term contracts have become more responsive to market conditions. So-called "net-back" agreements, which tie the price of crude

**TABLE 2**

**Sources of U.S. imports of crude oil and petroleum products**  
(thousands of barrels per day)

Year	Canada	Mexico	United Kingdom	Caribbean Basin Countries*	Other Non-OPEC	Total Non-OPEC	Total Arab OPEC	Total OPEC	Total Imports
1977	517	179	126	1,242	550	2,614	3,185	6,193	8,807
1978	467	318	180	1,165	484	2,613	2,963	5,751	8,363
1979	538	439	202	1,091	548	2,819	3,056	5,637	8,456
1980	455	533	176	955	491	2,609	2,551	4,300	6,909
1981	447	522	375	793	534	2,672	1,848	3,323	5,996
1982	482	685	456	718	627	2,968	854	2,146	5,113
1983	547	826	382	732	701	3,189	632	1,862	5,051
1984	630	748	402	706	902	3,388	819	2,049	5,437
1985	768	815	314	458	866	3,221	475	1,825	5,045

Source: U.S. Department of Energy  
\*Includes Bahamas, Netherlands Antilles, Trinidad and Tobago, Puerto Rico, and Virgin Islands

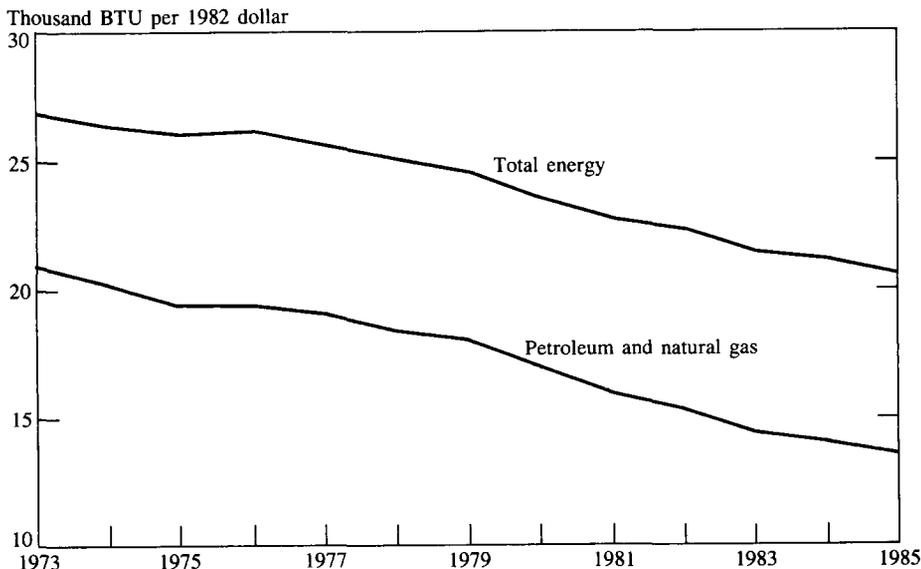
**TABLE 3**

**Average petroleum consumption of major noncommunist industrial countries**  
(thousands of barrels per day)

Year	Canada	France	Italy	Japan	United Kingdom	United States	West Germany
1977	1,661	1,973	1,476	5,015	1,655	18,431	2,478
1978	1,701	2,077	1,551	5,115	1,683	18,847	2,596
1979	1,766	2,107	1,607	5,173	1,690	18,513	2,664
1980	1,730	1,965	1,602	4,680	1,420	17,056	2,360
1981	1,615	1,745	1,705	4,445	1,325	16,058	2,120
1982	1,450	1,645	1,614	4,196	1,337	15,296	2,045
1983	1,345	1,600	1,590	4,185	1,290	15,231	2,005
1984	1,338	1,523	1,520	4,338	1,595	15,726	2,057
1985	1,489	1,489	1,491	4,090	1,410	15,666	2,018

Source: U.S. Department of Energy

**CHART 3**  
**Energy consumption per dollar of GNP**  
Seasonally adjusted



Source: U.S. Department of Energy

petroleum to product prices, have become increasingly popular. Nearly all Saudi Arabian crude oil is now sold under netback contracts with refiners. These contracts place all of the risk of fluctuations in refined product prices with the crude oil producer, making crude prices more responsive to conditions in the product markets.

Futures markets have recently become an important tool for oil market participants. Producers, refiners, and traders can use the futures markets to hedge against future price movements. Trading on petroleum futures markets still represents a relatively small proportion of all crude oil transactions, but the steady growth in trading volume nevertheless signals the beginning of a time when oil is traded as a commodity much like wheat, coffee, and soybeans. As more and more oil is traded on futures markets, oil prices will react more quickly to market factors.

Decontrol has been largely responsible for the change in contractual arrangements for the sale of natural gas. Long-term contracts, which for decades guaranteed steady supplies at predictable prices, have been largely replaced by direct spot market transactions between producers and utilities. Pipeline companies serve increasingly as common carriers that simply transport gas between producers and end-users or distributors.

### *Policy participants*

Energy policy has always been influenced by special interests. Until 1973, energy policy was heavily influenced by oil-producing companies. During the remainder of the 1970s, consumer interests played an expanded role. Special interests associated with energy issues have become well organized over the years, and they will almost

certainly continue to affect policy formulation.

Recent changes in energy markets have affected the financial condition of many energy policy participants. While consumers have benefited generally from the recent decline in crude oil prices, financial hardship has resulted for most oil and gas producers in the United States. As a result, any new energy policies developed currently will be formulated in an environment where the domestic oil and gas industry is financially quite weak.

The oil and gas industry has been adversely affected by weak world demand, large supplies, and soft prices. The downward slide in crude oil prices and the persistent surplus of natural gas have led to sharp cutbacks in exploration, development, and production. Overcapacity in drilling and associated declines in the value of oilfield equipment have resulted. Though this decline in equipment value has meant lower drilling costs, it has also meant increased financial pressures on contract drillers and energy lenders. Even integrated oil companies—those with refining operations that benefit from lower priced crude oil—have significantly cut outlays for exploration and development.

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*The oil and gas industry has been adversely affected by weak world demand, large supplies, and soft prices.*

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The economic health of the energy sector, therefore, is likely to greatly influence the formulation of new energy policy. Current weakened conditions may provoke sympathetic responses from policymakers. Such sympathy has already been seen in the protectionist proposals for an oil import tax. Short-term efforts to protect the domestic energy industry, while bringing relief to troubled energy-producing regions in the country, might impair longer run adjustments to fun-

damental changes being made in the world's energy markets. Despite the influence of special interests, energy policy needs to be forward looking and sensitive to a new market environment.

### **Policy objectives**

Identifying policy objectives is a critical step toward developing consistent and effective energy policies. Policymakers have never before clearly defined objectives to guide their choices. As a result, policy measures have been largely short-term responses to changes in the policy environment. This section brings forward some broad objectives by which existing and proposed energy policies can be evaluated.

Though never explicitly delineated, three main concerns appear to underlie past energy policies. First, energy supply disruptions could jeopardize national security. Second, energy resources could be extracted too rapidly or too slowly, leading to additional costs ultimately being borne by consumers or producers. And third, energy price shocks could be destabilizing to the national economy. These three concerns point to three corresponding long-run objectives that are desirable guides for evaluating current and proposed energy policies. In brief, energy policies should be consistent with the objectives of maintaining national security, assuring efficient energy resource extraction, and achieving economic stability.

The first two of these objectives stem from markets that do not always work perfectly. Energy markets may not always provide a reliable supply of energy. And they may not always extract energy resources at the rate society wants. That is, market prices do not always reflect all social costs and benefits of private production and consumption decisions. When prices do not reflect all the costs and benefits, there is a role for energy policy. For example, policies might be designed to increase secure energy supplies when the market is providing a large amount from sources

that may be deemed politically unreliable. Or, policies might be aimed at delaying extraction of energy resources to make more energy available for future generations. However, policymakers should intervene in energy markets only when they have more information or better incentives than market participants.<sup>3</sup>

The third objective, economic stability, arises from a recognition that political instability in world energy markets has clearly contributed to economic instability in the United States. In the 1970s, energy markets plainly had sharp effects on the domestic U.S. economy. Thus, well-designed energy policies can augment monetary and fiscal policy in providing for sustained economic growth without inflation.

These three objectives do not make an exhaustive list. Nor do they necessarily require policy responses. Taken together, however, they do provide an essential guide for developing and evaluating energy policy.

### *National security*

National security is provided by the federal government because, as a public good, it is not provided by private market participants. Individuals cannot capture the benefits from providing national security because those who do not pay cannot be excluded from enjoying the benefits. Instead, the government taxes individuals and provides national security.

Dependence on imported oil is a national security concern. As significant amounts of imported oil are subject to political considerations, such as an embargo, reducing the potential damage to national security is a legitimate policy objective.<sup>4</sup> Market forces alone will not address the national security concern. Market prices do

not differentiate the value of supplies that have a low probability of embargo from supplies that have a high probability of being disrupted.

National security could be affected by potential disruptions in foreign energy supplies. Foreign sources might not be available in time of war and domestic supplies might not be expanded enough to satisfy wartime energy requirements. Supplies of oil from politically unstable sources can be subject to embargo, as they were in 1973. Thus, an embargo would place national security in jeopardy to the extent that the United States depends on embargo-prone supplies to defend its borders. While Chart 2 suggests that dependence on Arab OPEC supplies has been significantly reduced in recent years, there is widespread concern that the dramatic increase in availability of oil from the Middle East and the associated decline in world oil prices since 1985 have begun to reverse this trend. Such a reversal would no doubt increase the potential national security costs of a Middle Eastern embargo.

Energy policies have been motivated in the past by concern for national security. The mandatory import quotas imposed in 1959, conservation measures taken in the 1970s, and the Strategic Petroleum Reserve are examples of policy responses directed, at least partly, at the national security problem. As in the past, national security will be an important consideration in evaluating future energy policies.

### *Efficient energy resource extraction*

Primary energy resources—oil, natural gas, and coal—need to be extracted at a rate that maximizes

<sup>3</sup> The economic rationale for energy policy is discussed in James M. Griffin and Henry B. Steele, *Energy Economics and Policy*, Academic Press, New York, 1980.

<sup>4</sup> Though some might argue that economic instability resulting from an embargo is a national security concern, it is treated in this article as a separate policy objective. National security problems associated with energy supply disruptions are more narrowly defined in this article to include only situations where the ability of the United States to power its armed forces and defend its borders is impaired.

the benefits of the resource to society. While determination of this “efficient” rate of extraction is very difficult in practice, it is a desirable goal for energy policy. Most energy policies affect the rate at which energy resources are extracted. For example, a subsidy to energy producers accelerates production while an excise tax delays production. Policymakers should be sensitive, therefore, to the effects of policies on extraction. When private markets come close to extracting energy resources at an efficient rate, they should be left alone. Intervention by policymakers could, in these cases, reduce the social benefits from extracting the resources.

In some cases, policy actions can improve the allocation of energy resources over time. Since the interest rate reflects the market’s valuation of future consumption relative to current consumption, it governs the rate at which energy resources are used. But the rate at which market participants discount future consumption may differ from the rate at which society discounts future consumption. One reason for this difference is that energy use by future generations is a public good. Private market participants may value the wellbeing of future generations but have no incentive to conserve energy resources for the future. Policies that delay extraction provide this public good that collectively benefits market participants but is not provided in a private market setting.

Though nearly all past energy policies have affected the rate at which energy resources are used, little attention has been given to the net effect of these policies on the pace of extraction. For example, favorable provisions in the tax law have the effect of stepping up production of oil and natural gas but this effect has been offset to some extent by the Windfall Profits Tax. Clearly, these two policies have different results with respect to the objective of efficient extraction of energy resources. Since the effects of one policy might offset the effects of another policy, it is important to understand these effects and to evaluate

future policies in light of the objective of extracting resources efficiently.

### *Economic stability*

Economic stability is another desirable goal for energy policy. Energy policy should be consistent with macroeconomic policy objectives. Though the objectives of macroeconomic policy are beyond the scope of this article, the general objective of economic stability spills over into the energy policy arena.

Disruptions in energy markets can destabilize the U.S. economy. Changes in energy prices affect inflation and real economic activity. For example, the 1973 Arab oil embargo produced a price shock that fueled inflationary pressures and slowed real economic growth in the United States.

Although many past energy policies, such as those formed during the 1970s, were aimed at coping with destabilizing supply disruptions, economic stability should be an explicit objective for new policies. The recent Saudi Arabian production increase sent oil prices plummeting, resulting in another shock to the U.S. economy. Developments discussed earlier in this article suggest that world oil prices are likely to become increasingly volatile. Thus, energy policy needs to be sensitive to the potential for price shocks, to increased price volatility, and to the objectives of macroeconomic policy.

### **Policy directions**

The policy objectives discussed above help define the overall role of policy in energy markets. Moreover, they can be used as a means of evaluating existing and proposed energy policies. When policy formulation is guided by a coherent set of objectives, transitions to new market conditions are likely to be smoother over the long run.

In this section, current and proposed energy

policies are evaluated in light of the policy objectives discussed. Though it is essential that each policy be examined relative to the objectives, the process is made more difficult by the interrelationships between different policies. Policies directed at one objective can be closely related to policies directed at other objectives. As a result, policies must be matched with objectives, with awareness of the effects one policy response may have on the results expected of other policies.

### *The Strategic Petroleum Reserve*

Now that the world is awash in oil, many policymakers have advocated slowing or stopping additions to the Strategic Petroleum Reserve. The reserve was authorized by the Energy Security Act of 1980 as protection against future supply disruptions. If the policy of stockpiling oil has merit when measured against energy policy objectives, then curtailing additions to the reserve when oil is relatively inexpensive could be a mistake.

The Strategic Petroleum Reserve provides a cushion against another embargo, allowing time for domestic production to be increased. Adding to oil stocks makes sense when oil can be purchased and stored at costs lower than the adjustment costs that would attend an embargo. The drop in world oil prices in 1986 makes it more likely that the costs of adjusting to an embargo will exceed the costs of strategic stockpiling of oil.

The Strategic Petroleum Reserve provides secure supplies of oil with minimal distortion of energy markets. Market prices guide the decision-making of producers and consumers with respect to the production and use of energy resources over time. The Reagan administration has maintained a posture of allowing markets to work when they can. Unlike taxes and subsidies, stockpiling of oil entails little distortion of private incentives regarding the rate of energy resource extraction.

Since oil supply disruptions lead to fluctuations in domestic economic activity, the Strategic Oil Reserve can help smooth out those fluctuations. This feature of the reserve should come into play only when supply disruptions are contrived and do not reflect underlying supply and demand conditions. For example, high oil prices associated with an embargo could be mitigated by releasing oil from the reserve. However, if increases in demand for gasoline put upward pressure on domestic crude oil prices, the government should not interfere with the price signal. To do so would ignore the objective of efficiency in energy resource extraction.

In principle, the Strategic Petroleum Reserve is consistent with all three major energy policy objectives. It provides some protection against risks to national security and economic stability while not interfering with market allocation of energy resources. The extent to which energy markets would be affected, of course, varies with the rate at which oil would be added to the stockpile or released from it.

Timing also affects the cost of a stockpiling policy. The Strategic Petroleum Reserve can contribute to national security at lower cost if oil is added to the reserve when it can be purchased at low prices. Just as oil might be released from the reserve when oil prices are high, oil should be added when prices are low.

### *A tax on imported oil*

An oil import tax has been proposed as a means of protecting the domestic energy industry and raising revenues to help reduce the federal budget deficit. A tax on oil imports would raise domestic oil prices and accelerate production. Only short-term national security concerns are addressed by an oil import tax and the effects on the efficiency of energy resource extraction and overall economic stability are uncertain.

A tax that would reduce imports and raise

domestic oil prices likely would not have the long-run benefit of enhancing the ability of the United States to protect itself. The degree to which the national security objective is met depends on the effects of higher domestic prices on capacity. If reserves are depleted without significant increases in domestic capacity to produce oil, then future national security could be jeopardized.

Using an oil import tax to relieve short-term vulnerability to supply disruptions entails additional costs. A policy that stimulates domestic production is not the only way to secure energy supplies. There are foreign supplies with little risk of embargo available at lower cost than many domestic supplies. Denying consumers these low-cost supplies while giving an artificial signal to domestic producers is not consistent with an objective of extracting energy resources at an efficient rate.

The effect of an oil import tax on economic stability is uncertain. Depriving energy users of low-cost energy would slow domestic real economic growth. Friendly trading partners, such

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*While subsidizing domestic production might reduce dependence on imported energy, it would entail substantial costs.*

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as Mexico and Venezuela, would lose a major market for their oil that might eliminate a major source of their foreign exchange. Demand for U.S. products in these countries would no doubt be reduced. Financial institutions with large loan exposure to these countries might face problems as the quality of their loan portfolios deteriorated.

One kind of tax that is theoretically appropriate for securing energy supplies is a “risk-based” oil import tax. Since oil from some sources is more likely to be embargoed, this “risky” oil could be taxed to reflect its potential for jeopardizing national security. Thus, less oil from risky

sources would be imported because of the signal coming from the higher price.

While theoretically appealing, a risk-based oil import tax entails several practical problems. The amount of the tax—the penalty paid for importing oil from risky sources—is impossible to determine because the value and optimal amount of national security are impossible to determine. Moreover, because oil is a fungible commodity, enforcement of the tax would be complicated by efforts to disguise risky oil by shipping it through countries not subject to the tax or by shipping refined products.

### *Energy subsidies*

Some policymakers have recently favored subsidizing the domestic oil and gas industry to prevent further deterioration in economic activity in energy producing regions of the United States. For instance, support is growing for legislation to protect operators of stripper wells. Though subsidies would be a stabilizing influence on regional economic conditions, they would place additional strain on the federal budget and shut friendly trading partners out of U.S. markets. Such a policy is not a stabilizing influence on the whole U.S. economy.

While subsidizing domestic production might reduce dependence on imported energy, it would entail substantial costs. Subsidies benefit producers and allow consumers to get high-cost domestically produced energy at lower prices. However, if too much oil is extracted now, too little may be available for the future. The price paid for national security today would be expensive energy and potential national security problems in the future.

This “drain the United States first” strategy distorts market price signals by discouraging production from the lowest cost reserves. This strategy is, therefore, inconsistent with the objective of efficient extraction. Instead of obtain-

ing low-cost oil from the Middle East, subsidies would misdirect production to high-cost domestic sources.

Favorable income tax treatment for oil and gas producers with the percentage depletion allowances and the immediate expensing of intangible drilling costs are other forms of subsidies that encourage energy production.<sup>5</sup> Recent changes in the tax law regarding the treatment of ordinary investments in plant and equipment have reduced the relative size of these subsidies. While oil and gas producers will no doubt object to losing these advantages, they have much less to lose than they once did.<sup>6</sup>

In the current environment of tax reform, tax treatment of the oil and gas industry compared with other industries is certain to be reevaluated. Taken together, the three important policy objectives considered in this article do not appear to warrant either a different tax treatment of the energy industry or subsidies in general.

### *The crude oil windfall profits tax*

Policy debates have recently focused on another tax affecting oil and gas producers—the crude oil windfall profits tax. This tax was enacted in 1980 in connection with the decontrol of crude oil prices. The tax is not directly levied on profits. Instead it is an excise tax applied to the difference between the actual sales price and a certain base price for different categories of oil. The tax

<sup>5</sup> The percentage depletion allowance was designed in 1926 to account for the depreciation of oil or gas wells as the wells were depleted. The depletion allowance was set then at 27.5 percent of gross income, with a limit on the deduction equal to 50 percent of taxable income. The allowance was reduced to 22 percent in 1969 and now applies only to independent producers, that can deduct 15 percent of gross income for the first 1,000 barrels of oil production and the first 6 million cubic feet of gas production.

<sup>6</sup> See James W. Wetzler, "Taxation of Energy Producers and Consumers," in S. Fred Singer, ed., *Free Market Energy*, Universe Books, New York, 1984.

discourages production to the extent that it lowers the price producers receive net of the tax.

When oil prices fall below the base prices, the windfall profits tax has no direct effect on current production and generates no revenue. This has been the case so far in 1986. The tax remains an issue, however, for two reasons. It will affect production directly if prices rise again above base levels, and it indirectly influences production through its effect on producers' expectations about future profits.

The national security objective is not served by the crude oil windfall profits tax. In fact, a policy that encourages domestic production or purchases of oil from safe foreign sources might be needed to offset the negative effects of the tax on national security when oil prices are high. Given the problems with policies of this kind, such efforts to offset the windfall profits tax would likely lead to a complex and costly set of policies.

Like other tax policies, the windfall profits tax distorts market incentives. Taken alone, an excise tax results in excessive conservation when prices are high. This result is not likely to be consistent with an efficient rate of energy resource extraction. A policy that discourages production is appropriate only when resources are being used up too fast.

It is difficult to build a case that favors the windfall profits tax on grounds that it contributes to economic stability. The tax exaggerates cyclical swings in oil prices by dampening the response of domestic supplies to rising oil prices. Prices tend to be higher than they might be otherwise. Moreover, revenues generated from the tax are sensitive to energy market conditions. When oil prices are above base levels, windfall profits tax receipts vary directly with changes in oil prices. When prices fall below the base levels, tax receipts drop to zero.

The crude oil windfall profits tax was enacted originally to make decontrol of oil prices politically acceptable. Though the tax is fairly in-

nocuous in the current market environment, it is not consistent with the longer run objectives of energy policy.

## **Summary**

Current and proposed energy policies may not be able to respond adequately to the dramatic changes going on in global energy markets. A basic problem is the past and present failure of policymakers to identify and target certain key policy objectives. These objectives provide a common frame of reference against which existing and proposed policies can be viewed. Approached in this way, energy policies could be more consistent and effective. Three objectives form a desirable guide to energy policy formation: national security, efficient extraction of energy resources, and economic stability. This

list is not exhaustive, but it provides a starting point for evaluating energy policies.

Policymakers should intervene in energy markets only when they can improve the allocation of resources with respect to these objectives. Since it is unlikely that policymakers have more information or better incentives than market participants, little room is left for public policies directed at energy markets. As a general policy, therefore, the deemphasis of energy regulation by the Reagan administration seems appropriate. But a number of specific energy policies remain in effect, and more have been proposed. These should be evaluated in light of a common set of objectives. Though only a few might be appropriate, policies formulated in this way are likely to provide larger benefits at lower costs while improving adjustment over time to new market conditions.

# High Real Interest Rates: Can They Be Explained?

*By Stephen G. Cecchetti*

There is a common perception that real interest rates have been high in the 1980s because nominal interest rates have been high, while inflation has been low. Examination of the data for the post-World War II period certainly gives that impression. Nominal interest rates less actual inflation have averaged over 3 percent in the 1980s, consistently higher than any time since 1950. Since real interest rates are crucial to investment and saving decisions and to overall business activity, it is important to determine whether they actually have been high and, if so, what has been the cause.

This article provides evidence on real interest rates in the 1980s and develops a simple framework for analyzing possible causes of the high interest rates. Various causes are examined, in-

cluding restrictive monetary policy, changes in total savings brought about by a reduced saving rate and high budget deficits, and increases in the profitability of investment possibly due to changes in the tax law. The impacts of these factors are distinguished by looking at their effects on the term structure of real interest rates and on stock prices. Evidence presented in the article suggests that the rise in real interest rates in the 1980s has not been the result of a single cause. At different times, monetary policy actions, changes in investment incentives, and changes in savings decisions appear to have contributed to the rise in real rates.

The article is divided into four parts. The first section defines real interest rates, discusses appropriate measures of real interest rates, and compares estimates of real interest rates in the 1980s with earlier years. The second section discusses the term structure of real interest rates and the real yield curve. The third section describes a simple framework for distinguishing possible explanations for the rise in real interest rates by looking at the behavior of the real yield curve and stock prices. The final section examines whether proposed explanations for the rise in real rates

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during the 1980s are consistent with the empirical evidence.<sup>1</sup>

## Real interest rates in the 1980s

### *The importance of the real rate of interest*

Real interest rates must be distinguished from the more familiar nominal interest rates quoted by banks and reported in the financial press. Because nominal interest rates include the effects of inflation, they are poor measures of the true costs of borrowing or returns to lending. For example, a lender receiving a 10 percent nominal return on his investment will find the purchasing power of this return reduced by increases in inflation. By contrast, real interest rates remove the effects of inflation from nominal rates and provide a more accurate measure of borrowing costs and returns to lending.

Unlike nominal interest rates, real interest rates are not directly observable and so must be calculated. Real interest rates can be obtained using the "Fisher equation,"

$$(1) r^e = i - p^e$$

where  $r^e$  is the expected or ex ante real interest rate,  $i$  is the nominal interest rate, and  $p^e$  is expected inflation. The expected real interest rate can be calculated by subtracting a measure of expected inflation from the observed nominal interest rate.

In the same way that relative prices provide information for the flow of resources to the production of different goods at a point in time, real interest rates influence saving and investment decisions and determine the allocation of

resources over time. Changes in the expected real rate of interest lead to changes in the levels of investment and saving and translate into changes in aggregate expenditure and the level of economic activity. In general, high real interest rates depress investment, by making new capital purchases less profitable, and encourage private saving, by making current consumption more costly.<sup>2</sup> Both lower investment and higher savings reduce aggregate expenditure and lower the equilibrium level of output in the economy below what it otherwise would be.

### *The behavior of real interest rates*

In examining the behavior of real interest rates in the 1980s, it is important to distinguish between the expected or ex ante concept of the real rate and a realized or ex post concept. Ex post real rates of interest are nominal interest rates less actual inflation. For a three-month security, for example, the ex post real rate of interest can be computed by taking the current nominal rate of interest and subtracting actual inflation over the three-month maturity of the security. In contrast, calculating the ex ante real rate of interest requires an estimate of expected inflation. Since inflation is not perfectly anticipated, the ex post and ex ante real rates of interest differ by the amount of unexpected inflation.

It is the ex ante real rate of interest rather than the ex post real rate that is important for economic decisions. When a firm is making an investment decision or an individual is making a saving decision, they must consider the expected real return. People do not have the benefit of knowing future

<sup>1</sup> For a more technical discussion of the issues raised in this article, see Stephen G. Cecchetti and Robert E. Cumby, "The Real Yield Curve," New York University, Graduate School of Business, mimeo, 1986.

<sup>2</sup> This is true only when all other relevant economic variables are held fixed. If the real rate of interest rises because of an unexpected increase in the profitability of new investment, investment would be observed to rise. If the real interest rate were then to fall for some other reason, investment would go up even further.

inflation with certainty. While examination of the ex post real rate of interest is interesting, it is incorrect to claim that high realized real rates of interest influence aggregate expenditure.

The ex ante real interest rate can be estimated by using a statistical procedure that accounts for the fact that expected inflation at any point in time is based only on information available at that time.<sup>3</sup> The implication of this procedure is that when a nominal interest rate is determined in financial markets, the real interest rate embodied in it can depend only on currently observable economic variables, such as past inflation or economic growth. An estimate of the expected real interest rate can be obtained from a regression of the realized real interest rate on these variables.

This procedure was used in obtaining monthly estimates of the ex ante real rate of interest on U.S. government securities of three-month, two-year, and five-year maturities.<sup>4</sup> The results for the 1950-85 period are plotted in Chart 1.

The estimates reported in Chart 1 establish conclusively that real interest rates have been very high since late 1979. Moreover, all maturities examined have been high, including the three-month rate and the two-year and five-year rates. In prior years, real interest rates rarely exceeded 3 percent. In the past seven years, levels above 5 percent have not been unusual.

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<sup>3</sup> The procedure described is due to Frederic S. Mishkin, "The Real Interest Rate: An Empirical Investigation," *The Costs and Consequences of Inflation*, K. Brunner and A. Meltzer, eds., Carnegie-Rochester Conference Series on Public Policy, vol. 15, 1981, pp. 151-200.

<sup>4</sup> These estimates were obtained from a regression of the ex post real rates of interest on a set of variables consisting of the nominal interest rate, lagged inflation, lagged growth in industrial production, and lagged growth in M2. The fitted values from this regression are estimates of the ex ante real rate. While it would be interesting to look at securities with maturities beyond five years, the estimation technique used produces estimates that are too unreliable.

## The term structure of interest rates

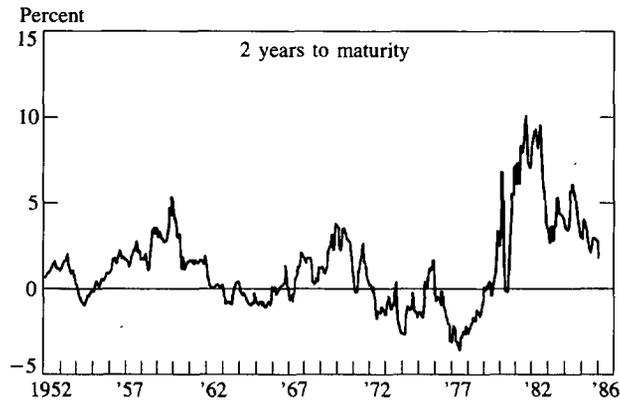
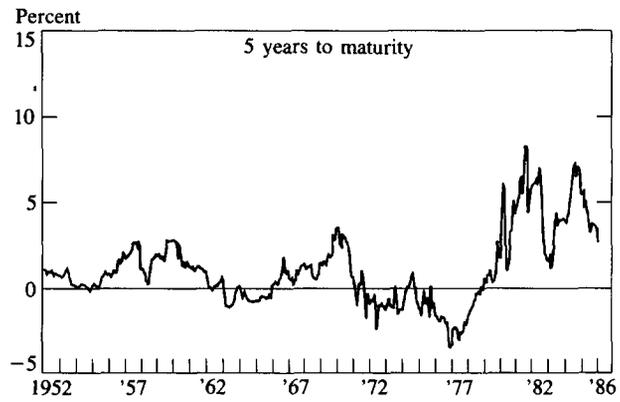
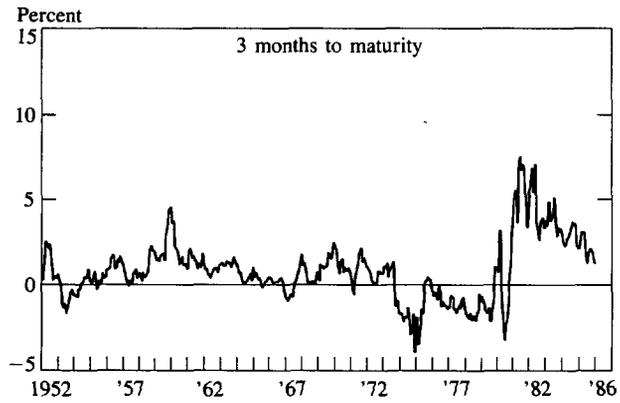
A casual glance at the financial page of any newspaper shows that there are many interest rates. Restricting the discussion to securities issued by the U.S. government, there are still many types that differ by the date on which they are redeemed—their maturity date. There are Treasury bills, usually maturing in either three or six months, and Treasury bonds, which may not come due for up to 30 years. Together, these short-term and long-term securities form the term structure of interest rates, or yield curve.

Examining the yield curve helps in understanding how policy changes and other spending decisions affect economic activity. Since investment and saving decisions are normally made with a fairly long time horizon in mind, the relevant interest rate is a long-term rate. Purchasers of capital equipment, for example, are concerned with returns over the next three, five, or ten years. At the same time, macroeconomic policy actions and private spending changes have their immediate effects on short-term real interest rates. The connection between short-term and long-term real interest rates is important in understanding how these decisions affect the economy.

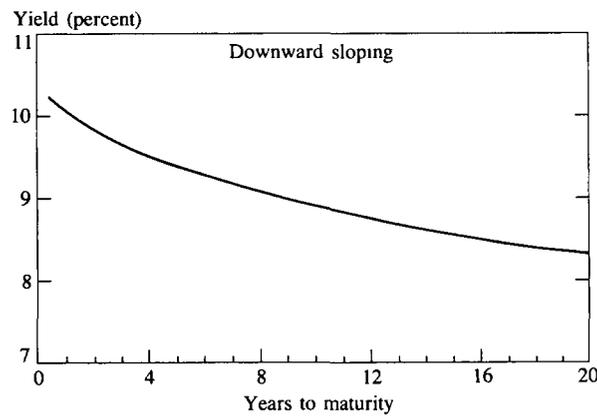
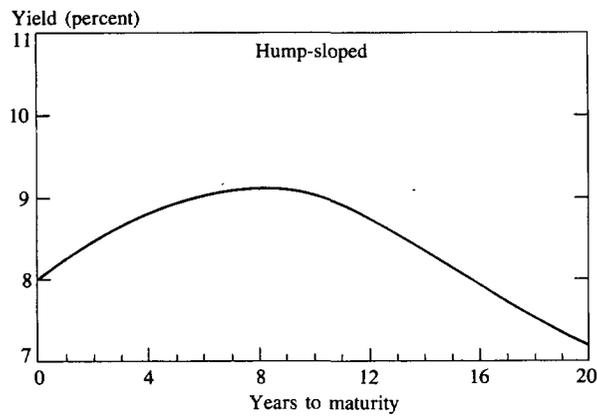
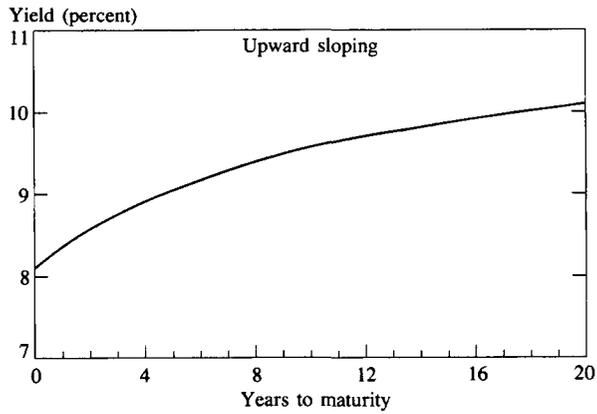
A plot of the yields to maturity of securities against their time to maturity can take on many different shapes. Possible yield curves are drawn in Chart 2. In the first panel, the yield curve slopes upward, indicating that long-term interest rates exceed short-term rates. The yield curve can also be hump-shaped, as shown in the second panel of the chart, or downward sloping, as shown in the third panel.

The causes of the different shapes of the yield curve can be explained by the "expectations theory" of the term structure of interest rates. According to this theory, the yield to maturity of a long-term security is the sum of expected future short-term interest rates. If short-term interest rates are expected to rise, then the long-

**CHART 1**  
**Ex ante real interest rates on Treasury securities**



**CHART 2**  
**Nominal yield curve**



term interest rate would be higher than the short-term rate, causing the yield curve to slope upward. If short-term interest rates are expected to fall, the yield curve will slope downward. Similarly, if short-term rates are expected to first rise and then fall, the yield curve will be hump-shaped.

According to this theory, when expectations of the level of future short-term interest rates change, for whatever reason, long-term interest rates adjust. Though a current policy that is expected to have a short-lived impact will affect the short-term interest rate, the long-term interest rate will change significantly only if the policy is expected to lead to further changes in the short-term interest rate at some time in the future.

Examination of the entire term structure of interest rates provides information on the way policy changes have both current and prospective influences on economic activity. Conversely, by developing a theory for how policies move the yield curve, it is possible to work backward and infer the policy from its influences and, thereby, determine why interest rates have changed.

### **Alternative explanations for high real interest rates**

A number of competing explanations have been offered for the rise in real interest rates in the 1980s.<sup>5</sup> Some have argued that the Federal Reserve's anti-inflation policy in the early 1980s contributed to a rise in real rates. Others have focused on such possible causes as the effects of tax law changes on investment incentives, the impact of large federal budget deficits, and a declining savings rate.

<sup>5</sup> A more complete discussion of the issues presented here can be found in Olivier J. Blanchard and Lawrence H. Summers, "Perspectives on High World Real Interest Rates," *Brookings Papers on Economic Activity*, 1984:2, pp. 273-334.

This section shows that these explanations can be distinguished from one another by looking at the behavior of the real yield curve supplemented by information on stock prices. That is, if monetary factors contributed to the rise in real rates in a given period, a particular pattern should be observed in the behavior of the real yield curve and stock prices. In contrast, if a change in investment incentives or savings decisions was the principal cause of higher real rates, different patterns should be seen in the real yield curve and stock prices.

### ***Monetary policy and the real yield curve***

Monetary policy actions have only temporary effects on real interest rates. For example, in the short run, a restrictive monetary policy will tend to raise short-term real interest rates as the quantity of money supplied by the Federal Reserve falls short of the amount demanded by the public. Over the longer run, however, the principal effect of a reduced quantity of money is to lower the price level in the economy.<sup>6</sup> As prices fall, the level of the real money supply increases and the real interest rate falls back to its original level.

Because the effects of monetary policy on real interest rates are only temporary, these actions lead to a particular shape of the real yield curve. Specifically, a restrictive monetary policy causes the real yield curve to slope downward, with short-term interest rates exceeding long-term rates. This shape of the yield curve results from both the temporary nature of the monetary effect on interest rates and the expectations theory of the term structure. Following the reduction in the money stock, both current and expected future

<sup>6</sup> In the current environment, changes in the growth rate of the money stock translate after a few years into changes in the inflation rate.

short-term rates rise. Long-term rates also rise since long-term rates are the sum of the expected future short-term rates. However, long-term rates do not rise by as much as short-term rates because the temporary nature of the monetary policy action means that expected future short-term rates rise by less than current short-term interest rates. As a result, a restrictive monetary policy causes the real yield curve to slope downward.

It is important to realize that this downward slope may not be apparent over the entire maturity structure because monetary policy has lagged effects, taking a few years to reach its full force. Following a monetary contraction, it will take time before the rise in short-term interest rates reduces interest-sensitive areas of spending. Once future spending is reduced, however, short-term rates will begin to fall. As a result, the real yield curve will slope downward only for securities that mature beyond the time when monetary policy affects aggregate spending. In practice, then, a restrictive monetary policy can result in a real yield curve that is hump-shaped with a slight upward slope for shorter maturities and a downward slope as the maturity structure lengthens.

### *Investment spending and the real yield curve*

In addition to monetary policy actions, changes in aggregate expenditure patterns may also affect real interest rates. Recently, considerable attention has been given to the strength of investment spending in the early stages of the current economic recovery, the contribution of tax law changes to investment spending, and the possible impact of this spending on real interest rates.

Investment spending changes affect real interest rates and the real yield curve in a manner similar to the effects of monetary policy. Like monetary policy, investment spending changes tend to have temporary effects on real interest rates. As a result, a stimulus to investment spending leads to a downward-sloping yield curve.

To see the effects of investment spending on the real yield curve, consider the impact of a tax law change, such as an investment tax credit or more liberal depreciation allowances. These policy actions increase the profitability of new capital equipment and cause an increase in investment expenditures. Increased spending leads to increased income in the economy, resulting in a higher transactions demand for money and higher short-term real interest rates. The rise in short-term interest rates is only temporary, however, because additions to the capital stock result in diminished profitability. Under the new tax structure, businesses eventually find that further additions to the capital stock are unprofitable and new investment spending ceases.<sup>7</sup> The expected fall in investment spending causes a corresponding decline in expected future short-term interest rates. Although the investment stimulus tends to raise interest rates at all maturities, short-term rates rise by more than long-term rates and, hence, the yield curve is downward sloping.

### *Saving, budget deficits, and the real yield curve*

A third explanation sometimes offered for the rise in real interest rates in the 1980s relies on changes in aggregate saving behavior. Some analysts have emphasized the effect of an apparent decline in the saving rate and the associated stimulus to consumer spending. Others have focused on the impact of public sector dissaving in the form of large government budget deficits.<sup>8</sup>

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<sup>7</sup> This result can be easily derived from an equilibrium growth model. An increase in the marginal product of capital increases the size of the steady state capital stock. Along the transition path to the new steady state growth path, the marginal product of investment is falling, implying a falling real rate of return.

<sup>8</sup> The term "budget deficits" refers to what is sometimes called the "public sector borrowing requirement," the sum of federal, state, and local deficits.

Changes in public or private saving behavior have a different effect on real interest rates than either monetary policy or investment spending changes. Reduced saving or increased consumption raises the level of aggregate expenditures in the economy and puts upward pressure on short-term interest rates. If people believe that this change is permanent—that the saving rate will be permanently lower or budget deficits will persist into the future—expected real interest rates will also be high in the future. This means that interest rates will rise over the entire maturity spectrum. However, long-term rates will rise by more than short-term rates because short-term rates are seen as increasing into the future. Thus, a reduction in saving that is believed to be permanent will result in an upward-sloping real yield curve.

### *Distinguishing the causes*

It is now possible to see how evidence on the slope of the real yield curve can be used to determine the cause of high real interest rates. All the potential sources—restrictive monetary policy, increases in the profitability of investment, and reduced current and future saving—lead to high real interest rates in the short run. Monetary policy and investment incentives can be differentiated from savings changes, however, by looking at the real yield curve. The former explanations cause the real yield curve to slope downward, while the latter explanation leads the yield curve to slope upward. Thus, evidence of an upward-sloping real yield curve is consistent with a savings explanation of high real rates, while evidence of a downward-sloping real yield curve is consistent with a monetary or investment story.

Although the monetary policy and investment stories lead to the same behavior of real interest rates, they can be distinguished because they have opposite implications for the stock market value of the capital stock. Changes in tax laws that increase the profitability of existing capital or future

additions to the capital stock will be reflected in higher stock prices. By contrast, a contraction in the money stock that lowers output and decreases profits will reduce the value of capital as measured by the stock market. If high short-term real interest rates are accompanied by a downward slope in the real yield curve, then it is possible to discriminate between the two possible causes by examining movements in a comprehensive measure of the value of the capital stock, such as a broad stock market index. When the index shows a fall, the real interest rate increase can be ascribed to stringent monetary policy. Alternatively, when the stock market index shows an increase, the real interest rate increase can be ascribed to higher investment spending.

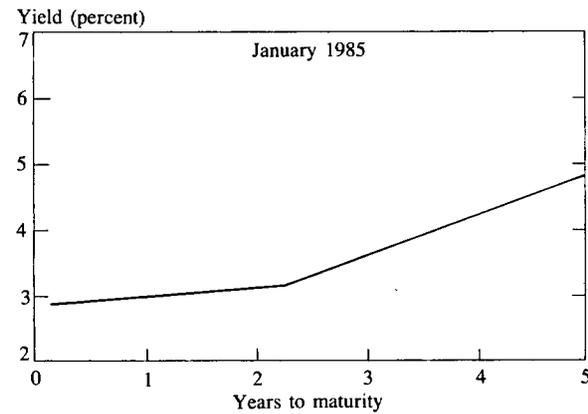
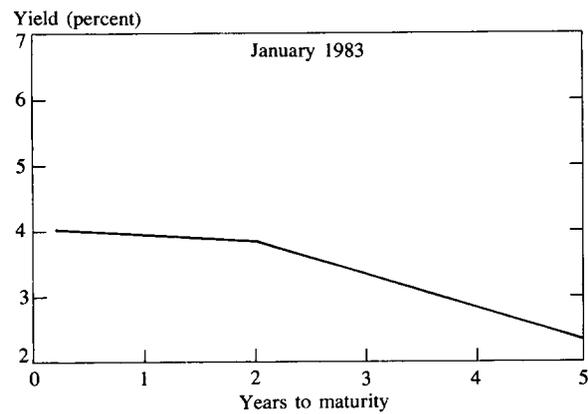
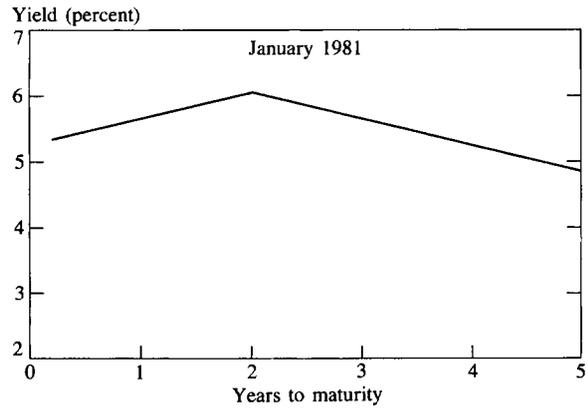
The three potential sources of high real interest rates considered here can be differentiated, then, by reviewing three pieces of information. Examination of both the relationship of the short-run and long-run real interest rates as well as the movements in the value of the stock market will shed light on the reasons for the observed movements in ex ante real interest rates.

### **Causes of high real interest rates: the evidence**

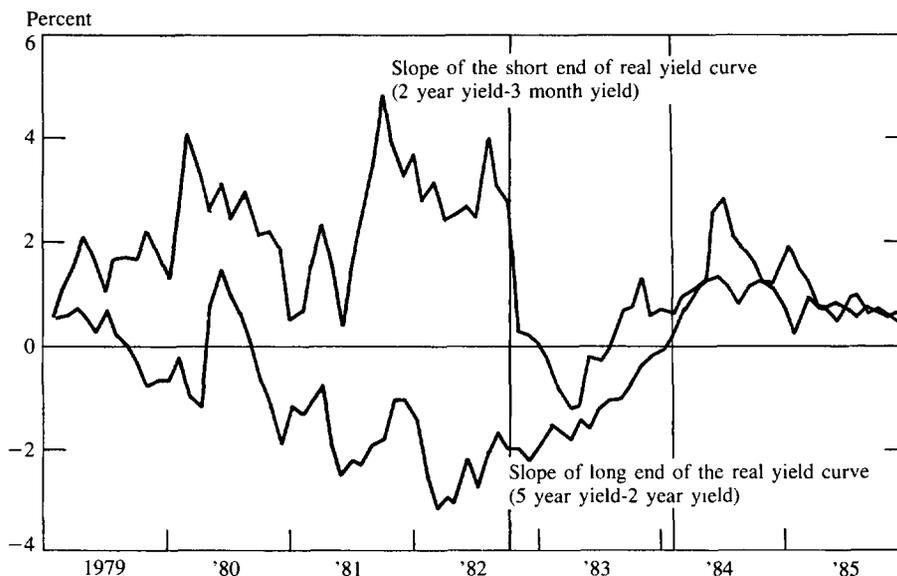
What were the causes of high real interest rates in the 1980s? The framework presented in the previous section suggests that information on the slope of the real yield curve supplemented with data on stock price movements can be used to discriminate monetary, investment, and saving explanations of the rise.

Estimates of the slope of the real yield curve are presented in Charts 3 and 4 using estimates of the ex ante real interest rate discussed earlier and presented in Chart 1. Chart 3 provides information about the real yield curve at a specific point in time, while Chart 4 provides a time series of the slope of the real yield curve over the 1979-85 period.

**CHART 3**  
**Real yield curve**



**CHART 4**  
**Real yield curve slope**



In Chart 3, the estimates from Chart 1 are used to plot yield curves for three specific months, January 1981, January 1983, and January 1985. Chart 4 presents a summary of information needed to infer the slope of the yield curve over the entire period from the beginning of 1979 to the end of 1985. Included in Chart 4 are plots of the difference between the real rates at two years and three months, the slope at the short end of the term structure, and the difference between the real rate at five years and that at two years, which measures the slope at the long end of the maturity structure. In Chart 4, a point above the horizontal line at zero signifies that the yield curve slopes upward and a point below zero indicates that the yield curve slopes downward.

To help in reading these two charts, consider January 1981 as an example. The top panel of Chart 3 shows that in January 1981 the real two-year interest rate exceeded both the three-month,

rate and the five-year rate. The yield curve was hump-shaped. In Chart 4, this shape is depicted as a point on the solid line above zero, indicating an upward slope at the short end of the yield curve, and a point on the dashed line below zero implying a downward slope at the long end.

A number of interesting observations can be made from this evidence. The past six years, 1979 to 1985, can be divided into three distinct periods delineated by the vertical lines in Chart 4. The first period covers the time of the first change in Federal Reserve operating policy, October 1979 to October 1982, when monetary policy moved from targeting interest rates to targeting nonborrowed reserves. This period began with very high inflation. Depending on the measure used, prices were increasing at annual rates of as much as 15 percent. The stated objective of the Federal Reserve was to lower inflation through lower money growth.

The 1979-82 period of tight money shows up clearly in the estimates. Chart 1 shows that real interest rates were then very high. Furthermore, the top panel of Chart 3, together with Chart 4, indicates that the expected real return to holding two-year securities exceeded the expected return on securities of either three months or five years. Thus, during this period the real yield curve was hump-shaped. The upward slope at shorter maturities is the consequence of lags in the effect of monetary policy. Meanwhile, the value of the in-place capital stock as measured by the New York Stock Exchange Composite Index first fell during the brief recession in the first half of 1980, rose during the second half of that year, and then fell gradually throughout 1981 and the first seven months of 1982. This pattern is inconsistent with high investment having caused high real interest rates and further bolsters the case for ascribing the high rates to tight money.

The second distinct period runs from the fall of 1982 through the end of 1983. Again, real interest rates were high at all maturities. But this time both the plot of January 1983 in Chart 3 and the series in Chart 4 indicate that the real interest rate at three months exceeded that at two years, which in turn was higher than the real return at five years. The real yield curve sloped downward throughout. Meanwhile, stock market indexes showed a sharp upward movement. It is likely that this was a period of an investment boom brought on by the tax policy changes included in the revisions of the federal tax code enacted in the summer of 1981. Increases in the investment tax credit and changes in capital depreciation schedules both spurred investment demand, which led to high real interest rates and a downward-sloping real yield curve.

Charts 3 and 4 indicate that the yield curve sloped upward over the entire range examined during the most recent period, running from January 1984 to December 1985. From the previous discussion, it is clear that an upward-sloped yield curve is the predicted pattern when there is a reduction in both current and anticipated future saving. This pattern is inconsistent with both tight money and increases in the profitability of investment. Decreases in saving signal an increase in consumption and higher levels of aggregate expenditure. The most recent high real interest rates could well be the consequence of the pattern of anticipated future government budget deficits. It is important to realize that current deficits are not sufficient to produce this pattern in the data. People must believe that there will be continued reductions in saving fairly far into the future.

## Conclusion

This article has provided evidence supporting the contention that real interest rates have been high in the 1980s. Three possible causes of the height of ex ante real interest rates were examined and each was found to bear primary responsibility for the rise at some time over the past six years. From the fall of 1979 through the fall of 1982, the evidence points to tight money as the primary cause of high real interest rates. From late 1982 through the end of 1983, an increase in the profitability of investment, due possibly to changes in tax policy, bears primary responsibility for real interest rates of nearly 5 percent. Finally, for 1984 and 1985, changes in saving patterns, due perhaps to changes in fiscal policy, appear to be primarily responsible for high real interest rates.

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