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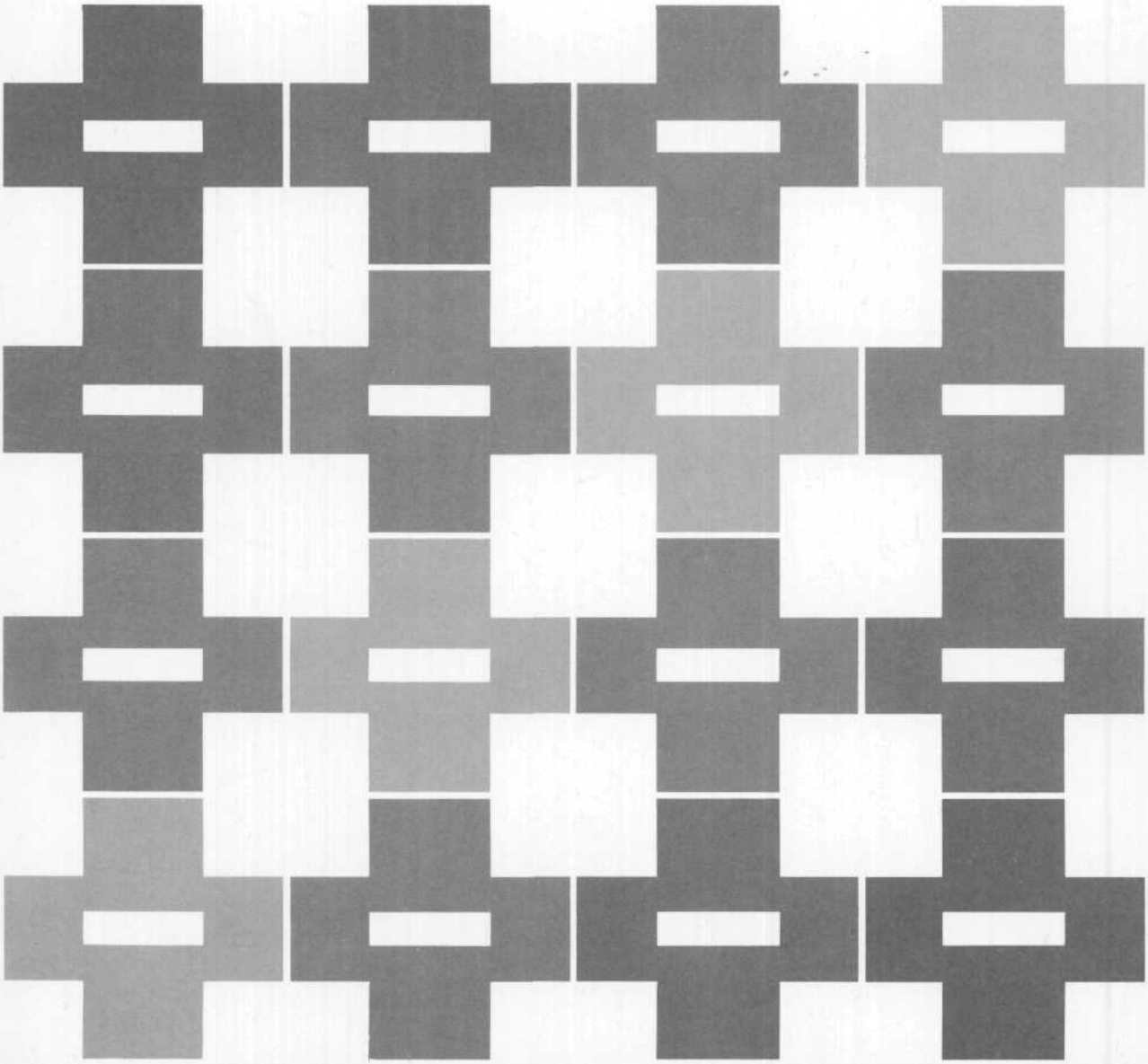
Federal Taxation of Tobacco, Alcoholic Beverages, and Motor Fuels



A CBO STUDY

CBO Publication
#519

S U M M A R Y

June 1990

CBO STUDY ON FEDERAL TAXATION OF TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS

The federal government draws only a small portion of its revenues from excise taxes on tobacco, alcoholic beverages, and motor fuels. Over the last 40 years, the share of these taxes in federal revenues has been declining. Some sentiment has been expressed for reconsidering the role of these taxes, partly to reduce the budget deficit but also because of the role that such excise taxes might play in federal health, safety, energy, and environmental programs.

The CBO study, *Federal Taxation of Tobacco, Alcoholic Beverages, and Motor Fuels*, analyzes some illustrative tax increases. It focuses on how the increases would affect family incomes, and to a lesser degree on whether they would serve other policy goals. The options in CBO's study are: doubling the cigarette tax from 16 cents to 32 cents per pack; equalizing the tax on all alcoholic beverages at $16.00 per proof-gallon ($0.25 per ounce of pure alcohol); and raising the gasoline tax from 9 cents to 21 cents per gallon and the tax on highway diesel fuel from 15 cents to 27 cents per gallon. Because excise taxes are thought to place a disproportionate burden on lower-income families, the report also analyzes measures that would reduce the burden for these families--through increases in the Food Stamp program and in the earned income tax credit.

The tax increases would burden lower-income families relatively more than other families, when the increases are measured relative to family incomes. Taking account of the effects of the tax increases on the price level and, as a result, on income taxes and transfer payments, would reduce but not eliminate the relatively greater burden on lower-income families. If the effects of the excise tax increases are measured relative to total annual family expenditures, which some people view as a better reflection of a family's economic circumstances than is its income for a single year, the net tax increases for lower-income families would be similar to those for other families.

Questions regarding the analysis should be directed to Frank Sammartino of CBO's Tax Analysis Division at (202) 226-2692. The Office of Intergovernmental Relations is CBO's Congressional liaison office and can be reached at 226-2600. For additional copies of the report, please call the CBO Publications Office at 226-2809.

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FEDERAL TAXATION OF TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS

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Congressional Budget Office

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PREFACE

In 1989, federal excise taxes on tobacco, alcoholic beverages, and motor fuels raised $24.4 billion in revenue--about 2.5 percent of total federal revenues. At the request of the Subcommittee on Human Resources of the House Committee on Ways and Means, this study examines current federal taxation of tobacco, alcoholic beverages, and motor fuels, and the likely effects of an illustrative set of increases in those taxes. In accordance with the mandate of the Congressional Budget Office (CBO) to provide objective and impartial analysis, the study contains no recommendations.

Frank Sammartino of CBO's Tax Analysis Division prepared the study under the direction of Rosemary Marcuss and Joseph Cordes. Len Burman, Maureen Griffin, and Eric Nicholson made important contributions to the report. Many people provided valuable comments on earlier drafts, including Robert Hartman, Richard Kasten, Stephen Long, David Montgomery, Rosemarie Nielsen, Kathleen O'Connell, Linda Radey, Frederick Ribe, Steven Sheingold, Frances Sussman, and Roberton Williams. Richard Kasten and Frank Sammartino developed the CBO tax simulation models used in the study. Eric Nicholson prepared the background tables contained in Appendix A.

Francis Pierce and Sherry Snyder edited the manuscript, Nancy H. Brooks provided editorial assistance, Denise Thomas typed the many tables, and Kathryn Quattrone prepared the paper for publication.

Robert D. Reischauer
Director

August 1990

CONTENTS

TABLES

FIGURES

SUMMARY AND INTRODUCTION

Excise taxes are taxes on the consumption of specific goods and services. Consumption taxes are not an important source of federal revenue, although they figure largely in the budgets of many states and localities. In 1989, excise taxes accounted for less than 3.5 percent of federal revenues.

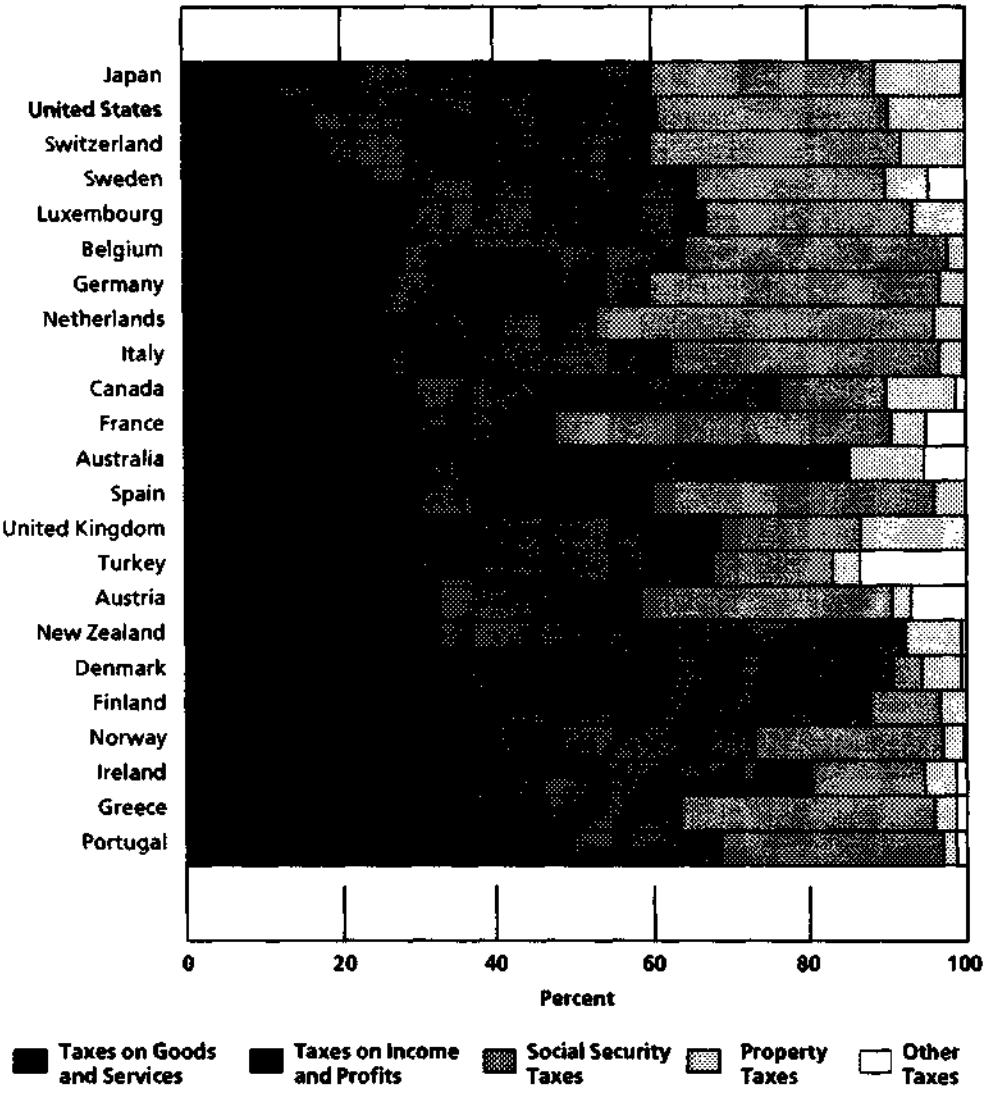
Most other industrialized countries depend more heavily on consumption taxes. Among member countries of the Organization for Economic Cooperation and Development (OECD), revenues from taxes on goods and services averaged about 34 percent of total tax revenues in 1987. In the United States, by contrast, such taxes were only 17 percent of combined federal, state, and local government revenues (see Summary Figure 1).

Concern over the federal budget deficit has prompted some interest in raising federal excise taxes on tobacco, alcoholic beverages, and motor fuels. This study examines the effect such taxes would have on consumers. Because some consumers would be affected more than others, the study examines measures that would reduce the burden for low-income families. The study also considers the possible effects of federal excise tax increases on the national economy, on different regions of the country, and on compliance with tax laws.

THE ROLE OF FEDERAL EXCISE TAXES

In 1989, federal excise taxes raised $34.1 billion in revenue. Excise taxes on tobacco, alcoholic beverages, and motor fuels accounted for more than two-thirds of this, or $24.4 billion. The other major sources of federal excise tax revenues were Airport and Airway Trust Fund taxes--primarily the airline ticket tax, which raised $3.7 billion--and the communications (telephone) excise tax, which raised $2.8 billion (see Summary Figure 2).

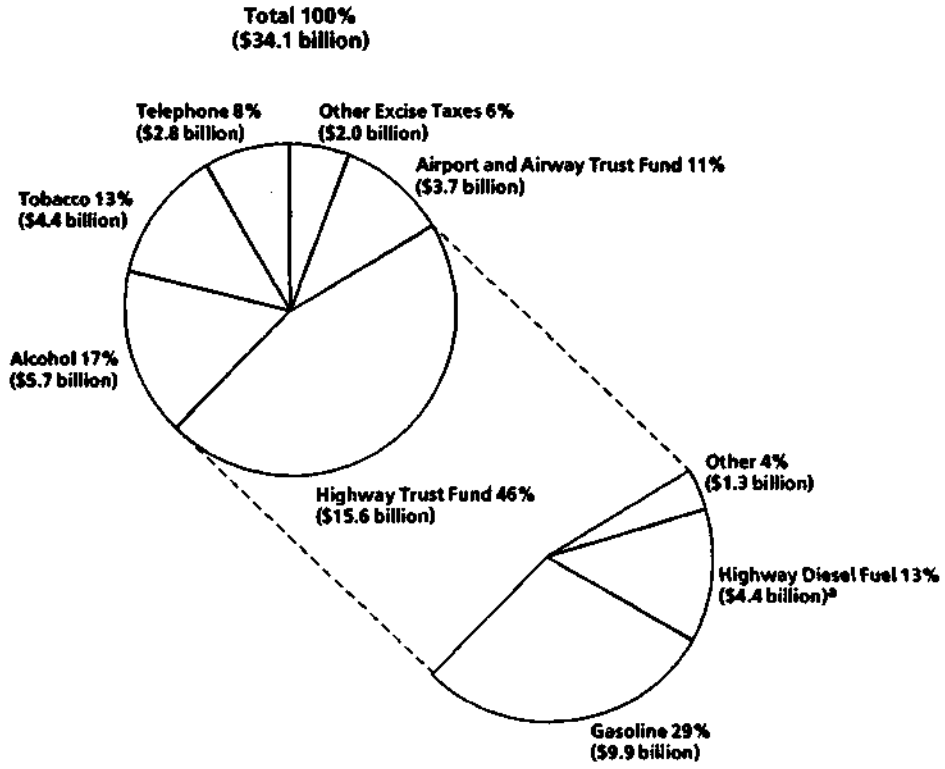
Summary Figure 1.
Share of Total Tax Revenues in OECD Countries by Tax Source, 1987



SOURCE: Congressional Budget Office using data from Organization for Economic Cooperation and Development, *Revenue Statistics of OECD Member Countries: 1965-1988* (Paris: OECD, 1989).

In the past, excise taxes were a more important source of federal revenues than they are today. They made up over 19 percent of revenues in 1950 (see Summary Figure 3). Federal taxes on tobacco and alcoholic beverages accounted for about 9 percent of total revenues in 1950, compared with about 1 percent today. Motor fuel taxes, which in the past were never a large component of federal revenues, contributing about 1 percent in 1950 and reaching a high of about 2.5 percent in the early 1960s, are today about 1.4 percent of total federal

Summary Figure 2.
Federal Excise Tax Revenues, Fiscal Year 1989



SOURCE: Congressional Budget Office using data from *Budget of the United States Government, Fiscal Year 1991.*

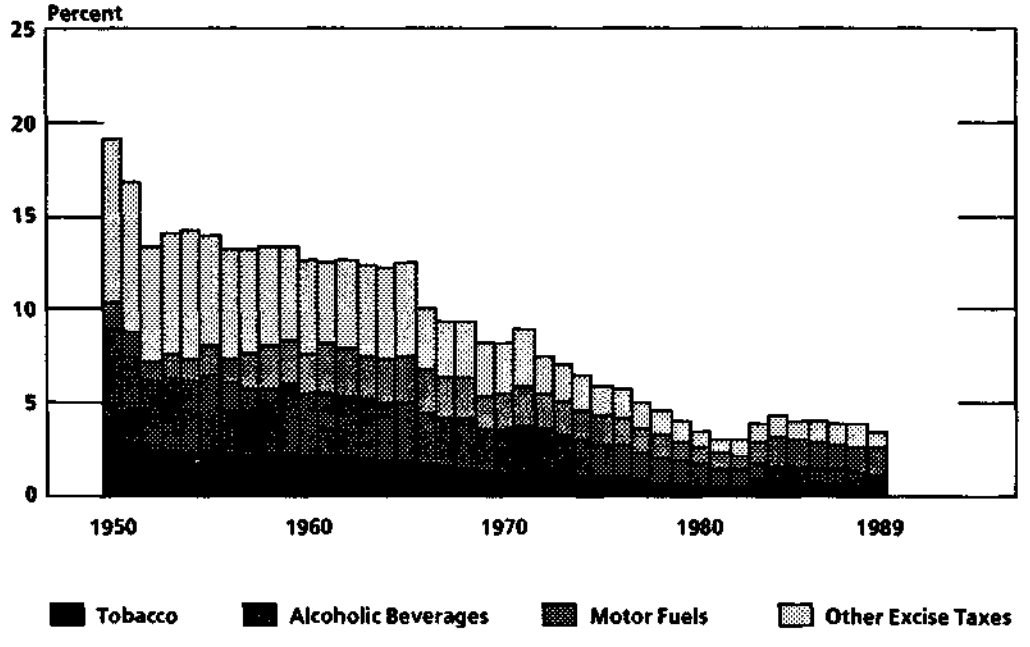
a. Highway diesel fuel tax revenues were unusually high in 1989. Both CBO and the Administration estimate that diesel fuel tax revenues will be about $3.2 billion in 1990.

revenues--more than the combined percentage of revenues from tobacco and alcoholic beverage taxes. At the state and local level, however, taxes on these and other goods and services are still an important source of revenue.

Excise taxes have not been favored as a source of federal revenue for several reasons:

- Excise taxes generally are a larger burden for lower-income families--relative to income--than for middle- and higher-income families.

Summary Figure 3.
Federal Excise Tax Revenues as a Percentage of Total Federal Tax Revenues, Fiscal Years 1950-1989



SOURCES: Congressional Budget Office using data from *Budget of the United States Government*, Fiscal Years 1952-1991; and Internal Revenue Service.

NOTE: Excise tax revenues in this figure do not include windfall profit tax revenues.

- Excise taxes have a varying impact on families with similar incomes. Because some families do not purchase the goods that are taxed, or purchase them in smaller quantities than other families, those with roughly the same incomes pay different amounts of excise taxes.

- Excise taxes interfere with the choices of consumers by raising the prices of taxed goods relative to untaxed goods. To the extent that consumers respond to these relative price changes by reducing their purchases of the taxed goods, resources are misallocated and society is made worse off.

- Keeping federal excise taxes low has left that source of revenue to states and localities.

In recent years, there has been a greater willingness to consider increasing some federal excise taxes, supported in part by the following reasons:

- Excise taxes may not burden lower-income families as much as they appear to. A family's expenditures may be a better indicator than its annual income of the family's true economic circumstances. Measured as a percentage of total family expenditures, excise taxes are more nearly the same for low-, middle-, and high-income families.

- Collecting different amounts of excise taxes from families with the same income may not be unfair if such taxes are related to benefits they receive from well-defined government services.

- Tax-induced price increases for some goods may actually improve the allocation of resources if the consumption of those goods imposes additional costs on society that are not reflected in prices. Further, if consumers are not fully aware of the harmful effects of certain types of consumption, such as smoking or drinking, they may benefit from price increases that discourage purchases of those goods.

- State tax revenues from taxes on tobacco, alcoholic beverages, and motor fuels are a declining source of total state revenues. Raising federal excise taxes on those items would not significantly limit the ability of state and local governments to raise revenues.

NOMINAL REVENUES AND REAL REVENUES

Although nominal federal revenues from tobacco and alcoholic beverage taxes are almost three times as high as they were 40 years ago, real revenues adjusted for inflation have fallen by more than one-third since 1950. In contrast, real revenues from motor fuel taxes have grown almost sixfold over the same period.

Because federal excise taxes on tobacco, alcoholic beverages, and motor fuels are levied on a per unit basis (that is, as cents per pack or per gallon), real revenues will fall over time as the price level rises unless statutory tax rates are increased or consumption grows rapidly.

Federal taxes on tobacco and alcoholic beverages have had few increases in the past 40 years. Taxes on cigarettes were doubled in 1983, but had not previously been increased since 1951. The federal tax on distilled spirits was not increased between 1951 and 1985, when it was raised by 19 percent. Taxes on beer and table wines have not changed since 1951. The federal tax on gasoline was more than doubled in 1983, after not being increased since the late 1950s.

WHO BUYS TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS?

Although higher-income families spend more on tobacco, alcoholic beverages and motor fuels than lower-income families, the latter spend a larger percentage of their income on all three items than do middle- and upper-income families.

Measured as a percentage of total expenditures, however, outlays on these goods tend to be more equal across family income classes. In

particular, expenditures on alcoholic beverages tend to rise as a percentage of total expenditures as family income increases, if adjustments are made for family size. Expenditures on tobacco are a smaller percentage of total expenditures as family income increases, while motor fuel expenditures are about the same percentage of total expenditures among all income groups except the highest, for whom they are a smaller share of the total family budget.

The older the head of the family, the smaller these expenditures become in relation to family income and total family expenditures. Families headed by someone under age 30, including single-person families, spend a much larger share of their income and a larger share of their total family budget on these goods than all other families.

Rural families spend a larger fraction of their income on motor fuels than other families, while families in the Northeast spend the smallest part of their income on motor fuels. Families in the West spend a smaller percentage of their income on tobacco than other families.

Not all families, of course, purchase tobacco, alcoholic beverages, and motor fuels. About 45 percent of families buy cigarettes or tobacco products, 70 percent buy alcoholic beverages, and nearly 95 percent buy motor fuels at some time during the year. Among those with the lowest incomes, fewer than half buy any tobacco products or alcoholic beverages, while about 80 percent buy motor fuels at some time during the year. Among families headed by a person age 75 or over, only 20 percent buy any cigarettes or tobacco, while fewer than half buy alcoholic beverages.

THE ECONOMIC COSTS OF SMOKING, DRINKING, AND DRIVING

Some of the costs of smoking, drinking, and driving are not paid by producers or consumers of those products but by other members of society. These costs include the presumptive effects of cigarette smoke on the health of nonsmokers, the lives and property lost in alcohol-

related accidents, and the environmental damage from automobile emissions.

If the market prices of tobacco, alcoholic beverages, and motor fuels do not fully reflect such "external costs," one way to adjust prices is to levy excise taxes on those goods. To the extent that the taxes raise prices and reduce demand, less of the taxed good or activity is produced, which in turn reduces external costs. Restricting such goods and activities can be beneficial to society if the external costs avoided exceed the value of the reduction in output caused by the tax. In this respect, excise taxes on goods that generate external costs differ from excise taxes on other goods. There is no benefit to society from restricting the output of a good whose consumption is not associated with external costs. In taxing the latter, scarce resources are allocated less efficiently, so the economy loses more than the government gains from the taxes.

There may be further benefits to restricting smoking and drinking if consumers underestimate the potential harm to themselves from such consumption, or if consumers are fully aware of the risks but are unable to reduce their consumption because of habit or addiction.

It is difficult to say whether raising current excise taxes on tobacco, alcoholic beverages, and motor fuels would lower external costs by enough to result in net gains to society. First, measuring external costs is uncertain because one must estimate the health damage caused by certain types of consumption and place a value on the additional illnesses and premature deaths caused by such consumption.

Second, external costs vary depending on how, where, and by whom a good is consumed. For example, a tax on gasoline levied in the interests of controlling pollution will be borne not only by drivers in densely populated urban regions where pollution is a serious problem, but also by drivers in sparsely settled regions where the environment can easily absorb automobile emissions. A tax on alcoholic beverages levied to reduce alcohol-related traffic accidents will tax not only those who drink and drive but also more conscientious drinkers.

Finally, an excise tax may not be the most efficient way to reduce a given external cost. Direct control of automobile emissions may be more effective than a gasoline tax in reducing pollution. Stricter enforcement of driving-while-intoxicated laws may do more to reduce alcohol-related fatalities than raising taxes on alcoholic beverages. Nevertheless, higher excise taxes may be desirable as part of an integrated policy to reduce the economic costs of smoking, drinking, and driving.

THE DISTRIBUTIONAL EFFECTS OF AN INCREASE IN TAXES

The Congressional Budget Office (CBO) has simulated the distributional effects of three separate excise tax increases:

- Doubling the cigarette tax from 16 cents to 32 cents per pack;
- Equalizing the tax on all alcoholic beverages at $16.00 per proof-gallon ($0.25 per ounce of pure alcohol), raising the tax on a 750-milliliter bottle of 80-proof spirits from $1.98 to $2.54, raising the tax on a six-pack of beer from 16 cents to about 81 cents, and raising the tax on a 750-milliliter bottle of table wine from 3 cents to about 76 cents;
- Raising the gasoline tax from 9 cents to 21 cents per gallon, and raising the tax on highway diesel fuel from 15 cents to 27 cents per gallon.

If effective on October 1, 1990, the cigarette tax increase would raise an additional $2.8 billion, the combined alcoholic beverage tax increases would raise an additional $7.2 billion, and the motor fuel tax increases would raise an additional $12.1 billion in fiscal year 1991.

These options are representative of those that have been suggested in recent debate. They are not necessarily the specific excise tax increases that would correct for the external costs of tobacco, alcoholic beverage, and motor fuel consumption.

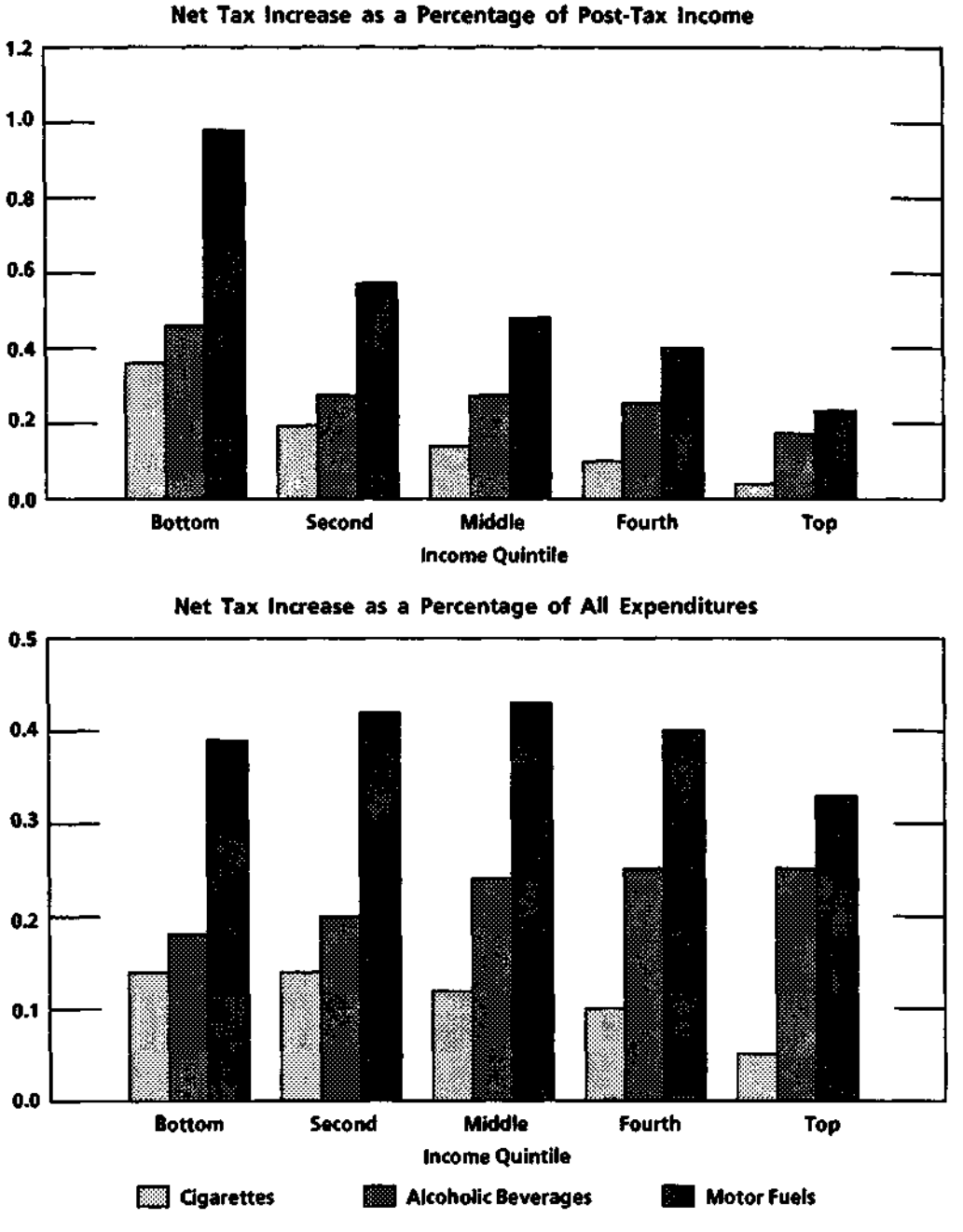
If prices rose by the full amount of a tax increase without additional markups, tax increases of these magnitudes could be expected to reduce consumption of cigarettes by 4 percent to 8 percent, consumption of beer by 5 percent to 13 percent, of wine by 17 percent to 25 percent, and of distilled spirits by 4 percent to 7 percent. The number of gallons of gasoline consumed would be reduced by about 2 percent.

Most of the tax increases would be paid by families who purchase tobacco, alcoholic beverages, and motor fuels. Some of the increases would eventually be offset by other changes in taxes and incomes. Higher excise taxes would lead to higher relative prices of the taxed goods and, in turn, to a higher consumer price level or lower returns to capital and labor, depending on the response of the Federal Reserve. If consumer prices rose, as assumed here, individual income tax liabilities would fall and transfer payments such as Social Security benefits would increase because of automatic indexing. These effects would reduce the burden of all three tax increases on lower-income families.

Even with these offsetting changes, the cigarette and motor fuel tax increases would be regressive with respect to post-tax family income. Although the dollar amount of the net tax increase would be smallest for lower-income families, their net tax increase would be a larger portion of their after-tax income than for middle- and upper-income families (see Summary Figure 4). After offsetting changes in income taxes and transfer payments had taken place, except for the lowest income families, the tax increase for alcoholic beverages would be nearly proportional as a percentage of post-tax family income.

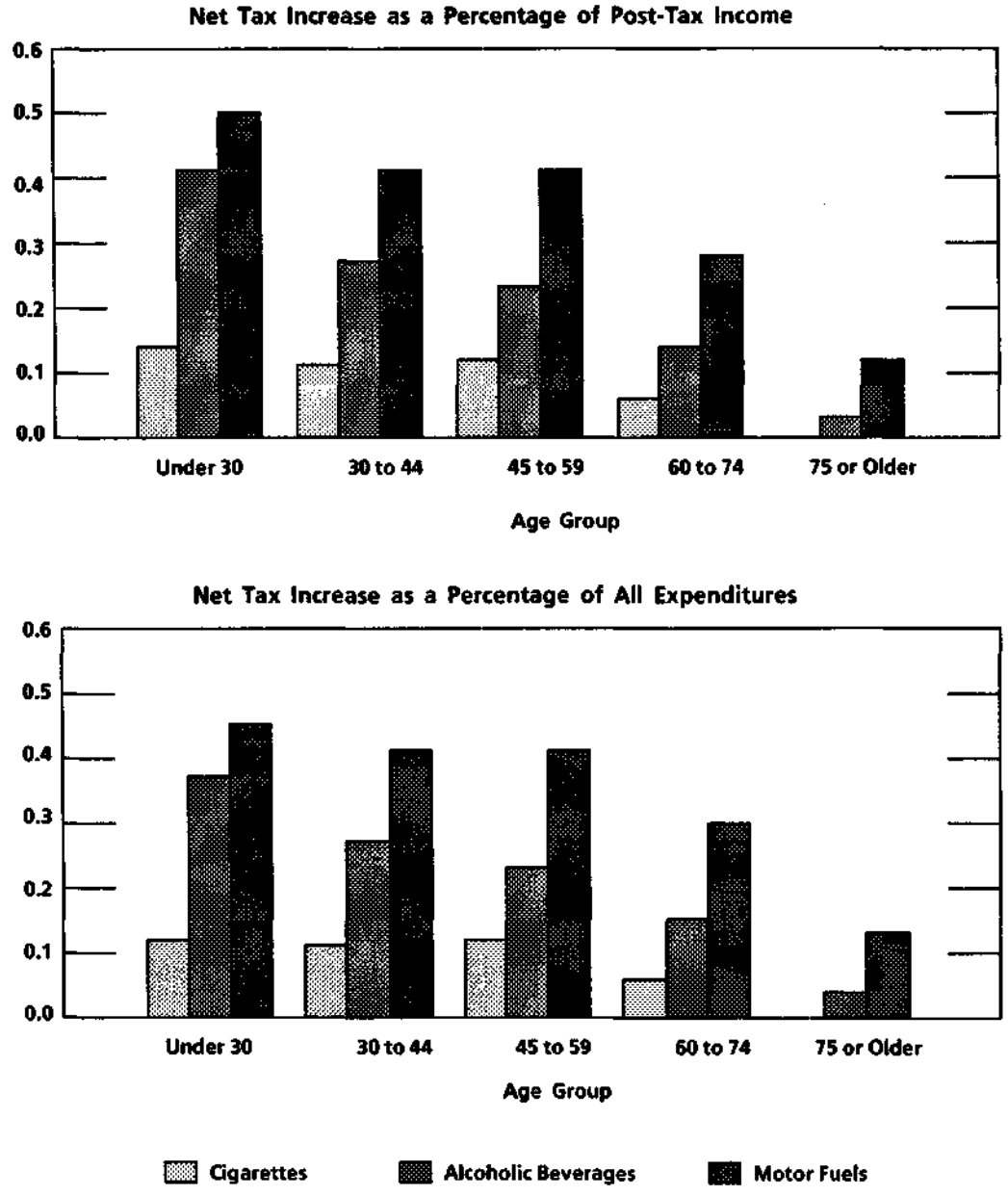
The tax increases would be less regressive relative to total family expenditures, which may be a better measure of a family's expected economic circumstances over a longer period of time. The cigarette and motor fuel tax increases would be about proportional to total expenditures--though both tax increases would be slightly smaller in proportion to the total expenditures of upper-income families than to those of lower- and middle-income families--while the alcoholic beverage tax increase would be slightly progressive--that is, it would take a larger proportion of the total expenditures of higher-income families. The progressivity of the alcoholic beverage tax increase may be overstated if expenditures on alcoholic beverages rise much faster with increasing income than do the actual quantities consumed.

Summary Figure 4.
Distributional Effects Among Families of Increasing Taxes on Cigarettes, Alcoholic Beverages, and Motor Fuels, 1990 (By income group)



SOURCE: Congressional Budget Office simulation models.

Summary Figure 5.
Distributional Effects Among Families of Increasing Taxes on Cigarettes, Alcoholic Beverages, and Motor Fuels, 1990
(By head-of-family age group)



SOURCE: Congressional Budget Office simulation models.

Elderly families would pay less additional tax under all three options than other families. When the net effects of offsetting changes in income taxes and transfer payments are included, elderly families would pay little or no additional net tax after the cigarette tax increase, and would pay a relatively small additional net tax after increases in alcoholic beverage or motor fuel taxes (see Summary Figure 5).

Policymakers might want to consider tax and transfer options that would compensate low-income families for the tax increase. CBO has examined three such options: an increase in food stamp payments; an increase in the earned income tax credit (EITC); and a combination of increases in both food stamps and the EITC. Each option would spend 15 percent of the net revenues raised by any of the tax increases. The increase in food stamps would provide the highest average benefit to lower-income families. The combined increase in food stamps and the EITC would reach the greatest number of lower-income families and still would provide average benefit increases that exceeded the average alcoholic beverage tax increase for those families, and that offset about 90 percent of the average motor fuel tax increase and about 60 percent of the average cigarette tax increase.

OTHER EFFECTS OF EXCISE TAX INCREASES

Excise tax increases would affect the economy at large mostly by helping to reduce the federal deficit.

Aside from their effects on the deficit, excise tax increases would raise the relative prices of the taxed goods, which could boost the overall price level if the nominal money supply was increased to accommodate the change. Such an increase in prices would be a one-time adjustment to a new price level. An increase in the relative prices of the taxed goods would in turn reduce demand for those goods. The impact would be greater in regions where production of the goods is concentrated. Demand and production in industries not subject to the higher taxes would respond to the change in relative prices, and investment and employment would be boosted in industries producing goods for

which demand had increased, so that in the long run there would be little or no effect on overall output.

An increase in the excise tax on motor fuels would have broader-reaching economic effects than the other tax increases in that motor fuels are used in production and distribution of other products. The effects would be muted to the extent that imported petroleum products would bear the brunt of the reduction in demand.

Consumption of tobacco, alcohol, and motor fuels would decline in response to higher federal excise taxes on these goods. Since many states also collect taxes on the same goods, a decline in consumption would reduce the amount of tax revenue collected for given tax rates.

Finally, an increase in excise tax rates would increase incentives to evade those taxes. Increases in the taxes on tobacco and alcoholic beverages on the order of those discussed in this study would be unlikely to have a major effect on compliance and tax collection. In the case of motor fuels, where compliance has been a serious problem in the past, recent changes in the laws governing collection procedures have not been in effect long enough to make it possible to predict what would happen.

CHAPTER I

THE ROLE OF FEDERAL EXCISE TAXES

Excise taxes, which are taxes on the sale of a particular commodity or service, are one type of consumption tax. Other types of consumption taxes include general sales taxes, which are taxes on the sale of all goods and services (usually with some exclusions), value-added taxes, which are taxes on the difference between the value of a firm's sales and purchases, and expenditure taxes, which are taxes on people's total consumption expenditures. Excise taxes are the only form of consumption tax levied at the federal level.

Although taxes on consumption are an important source of revenue in many European countries, as well as in many states and localities in the United States, they are a relatively minor source of federal revenue. The federal government instead relies on a mix of approximately 55 percent income taxes (individual and corporate) and 36 percent social insurance payroll taxes (primarily the Social Security payroll tax) for the bulk of revenues. Excise taxes make up just over 3 percent of total revenues, while estate and gift taxes, customs duties, earnings of the Federal Reserve, and miscellaneous receipts account for the remaining 5 percent.

Excise taxes are often criticized for being less equitable or fair than other taxes. Excise taxes are also thought to interfere with consumer choice and thus to reduce economic efficiency. In addition, federal excise taxes may compete with those of state and local governments for revenues. In the past, federal excise taxes have usually been introduced or increased as a means of raising revenues during wartime. There has been a greater willingness to reconsider the role of at least some excise taxes in the federal system in recent years, particularly taxes on tobacco, alcoholic beverages, and motor fuels. Part of this willingness stems from budget deficits, but part from the role that excise taxes can play in federal health, safety, environmental, and energy policies.

ARE EXCISE TAXES FAIR?

Excise taxes are often perceived to be inferior to income taxes with respect to equity or fairness among families, both because they are generally more of a burden relative to incomes for lower-income families, and because they are generally not the same burden for families with similar incomes.

Ability to Pay

Unlike a progressive income tax, excise taxes do not differentiate among taxpayers according to their ability to pay the taxes out of current income. Although per capita consumption of alcoholic beverages, tobacco, and motor fuels increases as incomes increase, consumption as a percentage of income declines. Excise taxes thus tend to be regressive, taxing a larger percentage of the income of lower-income families than of middle- and higher-income families. (A tax is progressive if the ratio of taxes to income rises as incomes rise; it is regressive if the ratio falls as incomes rise; and it is proportional if the ratio is the same at all income levels.)

The regressivity of excise taxes is overstated if annual income is not the best indicator of a household's ability to pay. Excise taxes depend on family expenditures, which probably are related to an expected long-term level of income rather than to income in a single year. Families whose income has fallen temporarily are likely to maintain their previous level of expenditures in the expectation that their annual income will return to more normal levels. Young families may well spend more than 100 percent of their current income because they expect their income to rise over time. Older families may also spend more than their current income once working members of the family have retired and the family has begun to draw on accumulated retirement savings. Excise taxes appear much less regressive when measured against total family expenditures, which may better reflect longer-term or permanent income.

Whether lifetime income is a more appropriate measure of ability to pay than annual income is a matter of debate. While a progressive income tax generates higher effective tax rates (tax liabilities as a per-

centage of family income) when a family's income is high, and lower effective tax rates when income falls, excise taxes work in the reverse direction. Excise taxes may be a fixed percentage of average family income over some longer period, but they are a larger percentage of family income when annual family income is low, and a smaller percentage of family income when annual family income is high. This may not pose a problem if families can easily borrow against the future when their incomes are low and repay such loans when incomes are high. But such loans are not possible for many families, and so their taxes essentially must be paid out of current income.

Horizontal Equity

Selective excise taxes discriminate against different families with the same income. Because not all families purchase the same amount of goods that are taxed, among families with generally equivalent incomes some pay more than others. The attribute of horizontal equity, meaning roughly equivalent taxes for families in similar economic circumstances, is an important feature of an equitable tax system.

The absence of discrimination among families with similar incomes is not always the appropriate criterion for judging fairness, however. Some government services are used by a well-defined portion of the population, and in some instances it may be appropriate to require those users to pay for their benefits. Excise taxes are one way of charging for some publicly provided goods and services. For example, taxes on gasoline and highway diesel fuel are allocated to the Highway Trust Fund to finance construction and maintenance of federal highways and bridges, and some capital expenditures for urban mass transit. The federal tax on airline tickets is allocated to the Airport and Airway Trust Fund to finance capital expenditures for the airway system, and also to finance some portion of Federal Aviation Administration operations. Tobacco and alcoholic beverage excise taxes might be considered indirect charges for benefits to the extent that they finance the increased use of publicly provided medical care and fire protection services caused by smokers, and the use of medical care and emergency services caused by some consumers of alcoholic beverages.

DO EXCISE TAXES INTERFERE WITH CONSUMER CHOICE?

In levying excise taxes, the government effectively raises the price paid by consumers relative to the price received by producers of the taxed good. To the extent that this price disparity results in less output of those goods, excise taxes cause an inefficient allocation of scarce resources. Resources that would have been used to produce those goods are used instead in some other, less desirable, way. Economists label this additional resource cost the excess burden of a tax. The more consumers change their consumption in response to an excise tax, the greater is the misallocation of resources and the larger is the excess burden from the tax. An economically efficient tax would have no excess burden, and the cost to taxpayers would be limited to the amount of revenues collected from the tax. Because the revenues would eventually be spent for someone's good, and possibly but not necessarily benefit the very same people who paid the tax, an economically efficient tax would represent only a transfer and not a loss of resources.

Excise taxes are not the only taxes that create an excess burden. By taxing earnings and the returns to saving, for example, an income tax tends to discourage both work and investment, although the size of the effects may not be large. While a tax with the smallest excess burden per dollar of revenue collected is generally preferable, the excess burden must be compared with the benefits from the additional revenues and with alternative methods of raising those revenues.

In some instances changing people's consumption is desirable because the market does not allocate resources in the best way. The production of certain products may generate additional costs that are not paid by the consumer but by society. Such indirect or "external" costs could include, for example, some of the medical costs associated with smoking, some of the costs of alcoholism and alcohol-related accidents, and some of the costs of pollution and congestion associated with the use of motor fuels. To the extent that these costs are not reflected in the prices of those goods, consumption of the goods is too high from the standpoint of economic efficiency. Using taxes to discourage such consumption is a way to reallocate resources more efficiently. The taxes serve to incorporate the external costs into the prices paid by consumers.

Even if consumers bear all relevant costs of their actions, consumption of some products may still be too high. Consumers may overestimate the value of the goods they consume, either by failing to appreciate their harmful effects or by failing to understand their potentially addictive nature. A direct way to address this problem is to provide better and more widely distributed information about the effects of consuming certain goods. But excise taxes can sometimes have a greater impact on consumption than more information. Using excise taxes to induce people to do what is best for themselves is an uncomfortable policy for a society that values consumer sovereignty highly. Yet, society employs much stronger inducements to discourage the consumption of certain products, for example, in prohibiting the sale of drugs and narcotics, and restraining certain activities such as gambling.

FEDERAL EXCISE TAXES AND STATE REVENUES

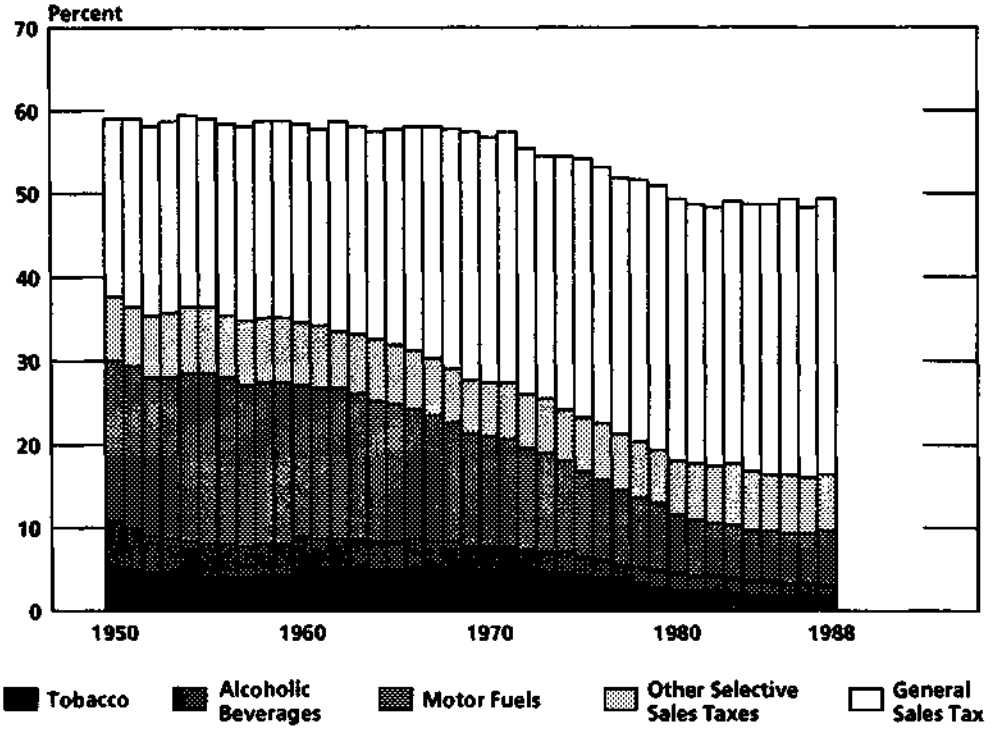
To the extent that federal excise taxes reduce demand for the taxed goods, the base for state and local taxes on those products is diminished. In 1988, revenues from combined taxes on tobacco, alcoholic beverages, and motor fuels were about 10 percent of total state tax revenues. Combined tobacco and alcoholic beverage taxes were 3.0 percent of state tax revenues, while motor fuel taxes were an additional 6.5 percent.

Though excise taxes are still an important source of revenues, the share of state tax revenues from taxes on tobacco, alcoholic beverages, and motor fuels has declined sharply in the past 40 years. Compared with the current 10 percent share, specific taxes on tobacco, alcoholic beverages, and motor fuels were about 30 percent of total state tax revenues in 1950 (see Figure 1). Revenues from motor fuels taxes alone were about 20 percent of state tax revenues in the 1950s.

Part of this decline reflects a shift by the states away from sales taxes on goods and services. The share of state tax revenues from all sales taxes, however, has not declined nearly as much as the share from excise taxes. In 1988, 49 percent of state tax revenues came from either general sales taxes or specific excise taxes, compared with a 59

percent share in 1950. In recent years, general sales taxes have become more important than specific excise taxes, contributing about 33 percent of total state tax revenues in 1988 compared with 21 percent in 1950.

Figure 1.
State Sales Tax Revenues as a Percentage of Total State Tax Revenues, 1950-1988



SOURCE: Congressional Budget Office calculations based on data from Department of Commerce, Bureau of the Census.

CHAPTER II

AN OVERVIEW OF FEDERAL TOBACCO, ALCOHOLIC BEVERAGE, AND MOTOR FUEL TAXATION

Revenues from tobacco and alcoholic beverage taxes have failed to keep up with overall economic growth in the last 40 years. Over this period, inflation has cut effective tax rates on tobacco and alcoholic beverages to a fraction of their previous values. The federal tax rate on cigarettes has declined by 50 percent in constant dollars since 1950. Over the same period, real federal tax rates on beer and wine have declined by about 75 percent while the real tax rate on distilled spirits has declined by nearly 70 percent. Although consumption of cigarettes and alcoholic beverages has grown over time, the increase has been insufficient to offset the decline in real tax rates. As a result, real revenues from these sources have fallen by more than a third. In contrast, measured in constant dollars, the federal tax rate on gasoline is about the same as it was 40 years ago, while the real tax rate on highway diesel fuel is nearly two-thirds higher than it was at that time. Over the same period, motor fuel usage has increased significantly, and as a result, real revenues from motor fuel taxes have increased almost six times since 1950.

In addition to federal excise taxes, all states and many local governments also levy taxes on tobacco, alcoholic beverages, and motor fuels. Despite the variety of taxes, consumption of all three items is taxed less heavily in the United States than in almost all other industrial countries.

TRENDS IN FEDERAL REVENUES AND RATES

Since 1950 the dollar amount of federal tobacco taxes has more than tripled, from $1.3 billion in 1950 to $4.4 billion in 1989. Over 98 percent of tobacco tax revenues come from the excise tax on cigarettes. Federal revenues from alcoholic beverage taxes have grown from $2.2 billion to $5.7 billion over the same period. In 1989, alcoholic beverage

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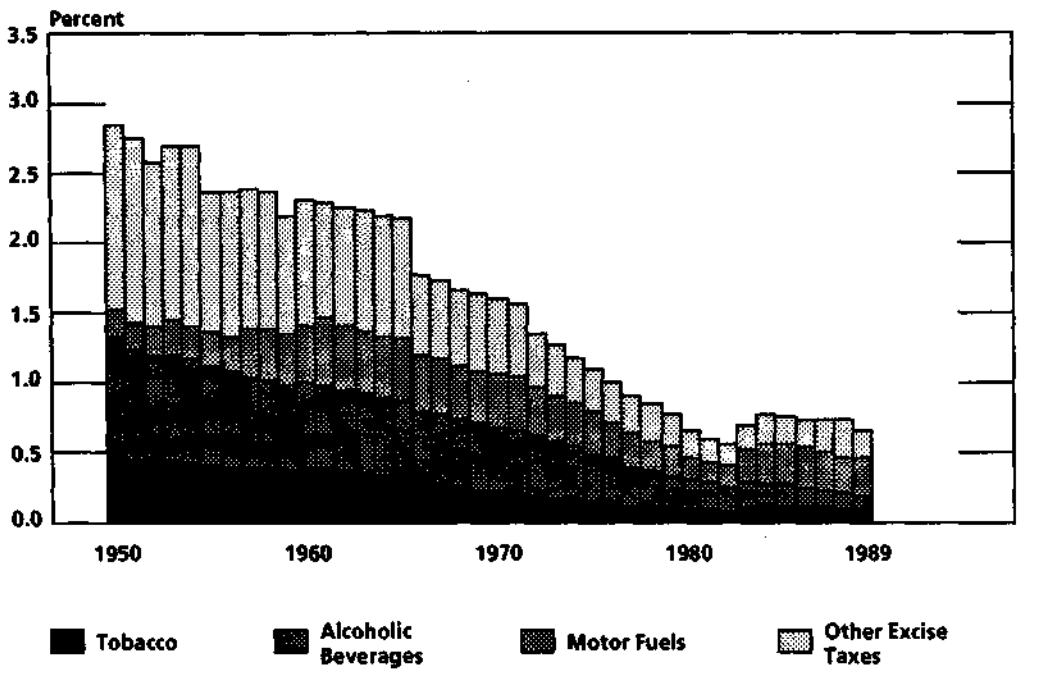
tax revenues comprised $1.7 billion from the excise tax on beer, $0.3 billion from excise taxes on wines, and $3.7 billion from the excise tax on distilled spirits.

Revenues from tobacco and alcoholic beverage taxes have not kept up with the growth in the economy. Tobacco tax revenues declined from 0.5 percent of gross national product in 1950 to less than 0.1 percent in 1982 (see Figure 2). The 1983 increase in the cigarette excise tax raised tobacco tax revenues, but by 1989 revenues were less than 0.1 percent of GNP. Revenues from the tax on alcoholic beverages

Figure 2.
Federal Excise Tax Revenues as a Percentage of Gross National Product, Fiscal Years 1950-1989



SOURCES: Congressional Budget Office using data from *Budget of the United States Government, Fiscal Years 1952-1991*; and Internal Revenue Service.

NOTE: Excise tax revenues in this figure do not include windfall profit tax revenues.

have declined steadily as a percentage of GNP from 0.8 percent in 1950 to 0.1 percent in 1989, despite an increase in the tax on distilled spirits in 1985.

Federal motor fuel tax revenues have grown much more rapidly than either tobacco or alcoholic beverage tax revenues. Motor fuel tax revenues rose from $0.5 billion in 1950 to $4.9 billion by 1982.

Following an increase in the tax on gasoline and diesel fuel in 1983, revenues reached $14.3 billion in 1989--$9.9 billion from the tax on gasoline and $4.4 billion from the tax on highway diesel fuel.[1] After growing from 0.2 percent to 0.5 percent of GNP between 1950 and 1960, motor fuel tax revenues fell to under 0.2 percent of GNP by 1982. Motor fuel taxes rose to 0.3 percent of GNP after the 1983 tax increase, but have not kept pace with the growth in GNP in the most recent years.

Nominal Tax Rates

Federal taxes on tobacco, alcoholic beverages and motor fuels are levied on a per unit or specific basis (for example, as cents per gallon or per number of cigarettes), rather than on an ad valorem basis (as a percentage of expenditures). Although per unit taxes often are preferable for administrative reasons, as the price level rises over time the effective tax rate falls. Real revenues decline unless consumption grows rapidly or tax rates are increased. While revenues from income and payroll taxes have generally matched or exceeded the growth in GNP, only excise revenues from motor fuel taxes have kept pace with the growth in the economy.

There have been few increases in federal tax rates on tobacco, alcoholic beverages, and motor fuels in the past 40 years. The current tax rate on cigarettes of $8.00 per 1,000 cigarettes, or $0.16 per pack of 20, took effect in 1983. After the Congress raised the federal excise tax on cigarettes from $0.07 to $0.08 per pack in 1951, the rate remained

1. Highway diesel fuel tax revenues were unusually high in 1989. Both CBO and the Administration expect that highway diesel fuel tax revenues will return to a more normal level of about $3.2 billion in 1990.

unchanged for more than 30 years. The Tax Equity and Fiscal Responsibility Act of 1982 temporarily raised the tax to the current rate of $0.16 per pack beginning January 1, 1983. After numerous extensions, that change was made permanent in 1986.

Federal excise taxes on beer and table wines have not changed since 1951, and taxes on champagne have not changed since 1955. The current rate on beer is $9.00 per 31-gallon barrel, or about $0.29 per gallon ($0.16 per six-pack of 12-ounce cans or bottles). The rate on wine varies by alcoholic content. The rate for wines of less than 14 percent alcohol (table wines) is $0.17 per gallon (about $0.03 on a 750-milliliter bottle). The rate for wines with between 14 percent and 21 percent alcohol (dessert wines) is $0.67 per gallon ($0.13 per 750-milliliter bottle), while the rate for champagne and other naturally carbonated wines is $3.40 per gallon (about $0.67 per 750-milliliter bottle).

The current rate on distilled spirits is $12.50 per proof-gallon (about $1.98 on a 750-milliliter bottle of 80-proof liquor).[2] The rate on distilled spirits was raised to $10.50 per proof-gallon in 1951 and remained at that level until 1985 when the Tax Reform Act of 1984 raised the tax to the current rate.

The current tax on motor fuels is $0.09 per gallon of gasoline and $0.15 per gallon of highway diesel fuel. Revenues from the tax are earmarked for the Highway Trust Fund. An additional tax of 0.1 cent per gallon is levied on both gasoline and highway diesel fuel, with revenues earmarked for the Leaking Underground Storage Tank Trust Fund. Two taxes are levied directly on domestic crude oil and on imported petroleum products. The proceeds from a tax of 9.7 cents per barrel are deposited in the Hazardous Substance Superfund, and the proceeds from a tax of 5 cents per barrel are deposited in the Oil Spill Liability Trust Fund.

Federal taxes on motor fuels predate the creation of the Highway Trust Fund. The Congress created the Trust Fund in 1956 to finance the construction and maintenance of the federal highway system and,

2. A proof-gallon is a gallon of 100 proof spirits (50 percent alcohol by volume). The tax on distilled spirits of lower or higher proof is $12.50 per gallon multiplied by the ratio of the proof to 100.

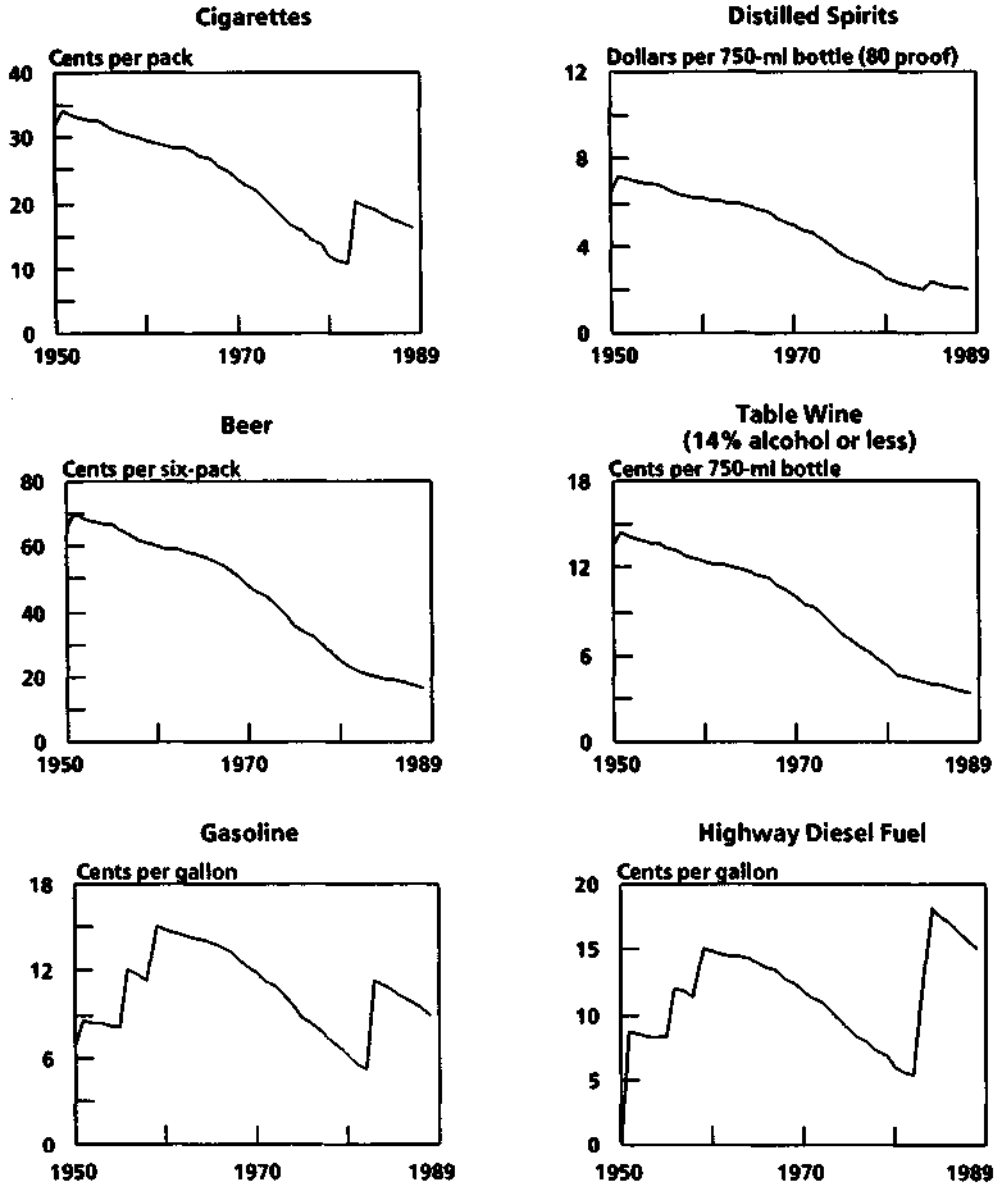
after raising the tax rate from $0.02 to $0.03 per gallon, it earmarked revenues from existing taxes on gasoline and highway diesel fuel to the fund. The tax rate was raised by an additional 1 cent per gallon beginning in October 1959. The Highway Revenue Act of 1982 increased the tax on gasoline from $0.04 to $0.09 per gallon, beginning in April 1983. The tax on highway diesel fuel was raised first to $0.09 per gallon in 1983 and then to $0.15 per gallon in the following year, but with a one-time credit for diesel-powered vehicles with gross weight of 10,000 pounds or less--intended as a repayment of the tax increase over the normal useful life of the vehicle. The Superfund Revenue Act of 1986 established the additional tax of 0.1 cent per gallon on gasoline and highway diesel fuel for purposes of cleanup and related costs involving leaking underground storage tanks.

Real Tax Rates

Because federal excise tax rates on cigarettes and alcoholic beverages have had few increases since 1950, taxes rates measured in constant dollars have declined sharply in the past 40 years (see Figure 3). By 1982 the real tax on cigarettes was about one-third of what it had been in 1950. The increase in the tax on cigarettes in 1983 was sufficient to adjust for about 10 previous years of inflation. The current rate is about the same in real terms as it was in 1977. Real rates on beer and wine are about one-fourth of the rate in 1950 and about one-half the real rate in 1977. The 1985 increase in the tax on distilled spirits compensated for about four previous years of inflation. Even with the 1985 increase, however, the real rate on distilled spirits is less than one-third of the rate in 1950 and only about 60 percent of the rate in 1977.

Real tax rates on gasoline are about the same as they were in 1951 and about 60 percent as high as when they reached their peak in 1960. The current rate on gasoline is about equal to the real rate in 1975. The real tax rate on highway diesel fuel was about twice as high in 1984 as it had been at its inception in 1951. Despite a decline in the latter part of the decade, the current rate is higher than the real rate at any time before 1984.

Figure 3.
Federal Excise Tax Rates as of December 31, 1950-1989 (In 1989 dollars)

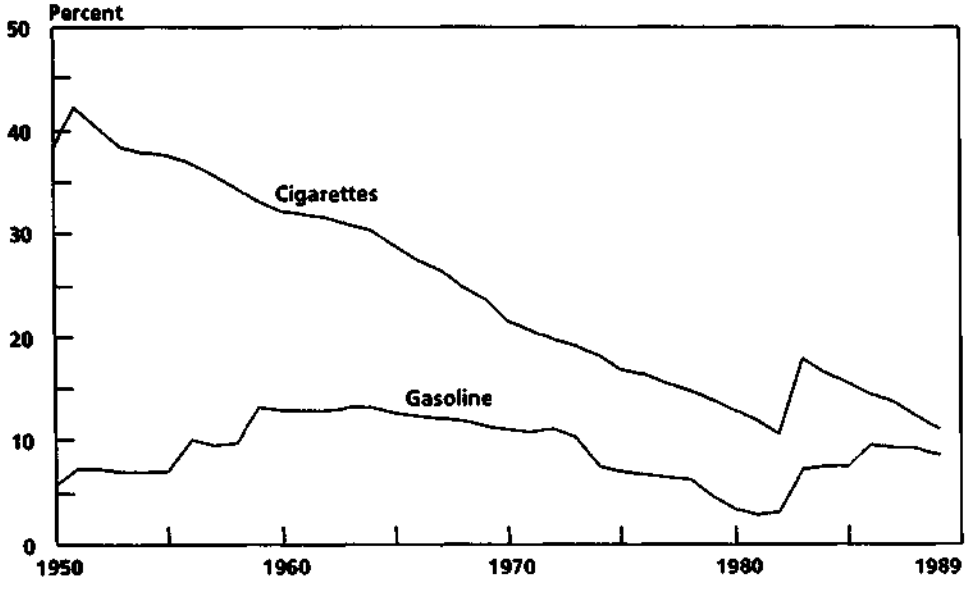


SOURCES: Congressional Budget Office calculations based on data from Congressional Research Service, *Federal Excise Taxes on Alcoholic Beverages* (January 30, 1989); Joint Committee on Taxation, *Schedule of Present Excise Taxes (as of January 1, 1990)* (February 2, 1990); Joint Committee on Taxation, *Background and Description of Present Federal Excise Taxes* (June 25, 1982); Department of Transportation, Federal Highway Administration, *Highway Statistics 1988* (1989); and *Economic Report of the President* (February 1990).

Federal Tax Rates in Relation to Product Prices

Another way to illustrate the decline in effective federal taxes on tobacco, alcoholic beverages, and motor fuels is to compare the taxes with the prices of those products over time. Because a consistent average price series is not available for beer, wine, and distilled spirits purchases, the comparison is made only for cigarettes and gasoline. In 1989, the federal tax on cigarettes was about 11 percent of the current average market price per pack, compared with 17 percent in 1975 and more than 30 percent in 1960 (see Figure 4). In general, cigarette prices have tended to keep pace with the rate of change in overall prices, so movements in the tax rate measured in constant dollars and the tax rate as a percentage of cigarette prices are quite similar. The federal tax on gasoline has varied as a percentage of price, falling

Figure 4.
Federal Excise Taxes as a Percentage of Price, 1950-1989

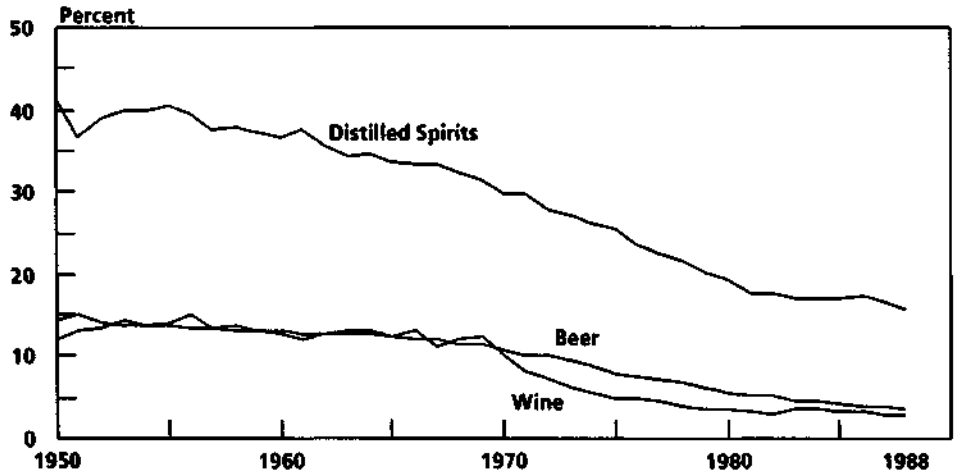


SOURCES: Congressional Budget Office calculations based on data from Department of Energy, Energy Information Agency, *Monthly Energy Review: December 1989* (March 21, 1990); Department of Energy, Energy Information Agency, *Annual Energy Review: 1988* (May 23, 1989); and Department of Agriculture, Economic Research Service.

significantly as gasoline prices rose in the mid-1970s and again in the 1979-1981 period. The 1989 rate of about 8.5 percent is still about two percentage points below the rate in 1973, prior to the oil embargo of 1973-1974.

An alternative way to measure federal taxes as a percentage of price is to compute federal tax revenues per dollar of taxable expenditures. The tax per dollar of expenditures (including taxes) on distilled spirits, beer, and wine declined almost as rapidly as real tax rates between 1950 and 1988 (see Figure 5). For products whose prices have been increasing faster than overall prices, such as wine, taxes as a percentage of price have declined more rapidly than tax rates measured in constant dollars. In 1950, taxes on wine were approximately 12 percent of price, while in 1988 they were about 3 percent. (The tax-price ratio for wine reflects revenues and expenditures on table, dessert, and carbonated wine. Almost half of federal tax revenues from wine come

Figure 5.
Federal Excise Tax Revenues as a Percentage of Expenditures on Distilled Spirits, Beer, and Wine, 1950-1988



SOURCES: Congressional Budget Office calculations based on data from *Budget of the United States Government*, Fiscal Years 1952-1991; Internal Revenue Service; Distilled Spirits Council of the United States, Inc.; and Department of Commerce, Bureau of Economic Analysis.

from the tax on champagne, which is taxed at a rate of about $0.67 per 750-milliliter bottle, and has a much higher tax-price ratio than table wine.) Federal taxes on beer were less than 4 percent of the price of beer in 1988, compared with close to 15 percent in 1950. Distilled spirits taxes were less than 16 percent of price in 1988, compared with more than twice that rate in the 1950s.

TRENDS IN TOBACCO, ALCOHOL, AND MOTOR FUEL CONSUMPTION

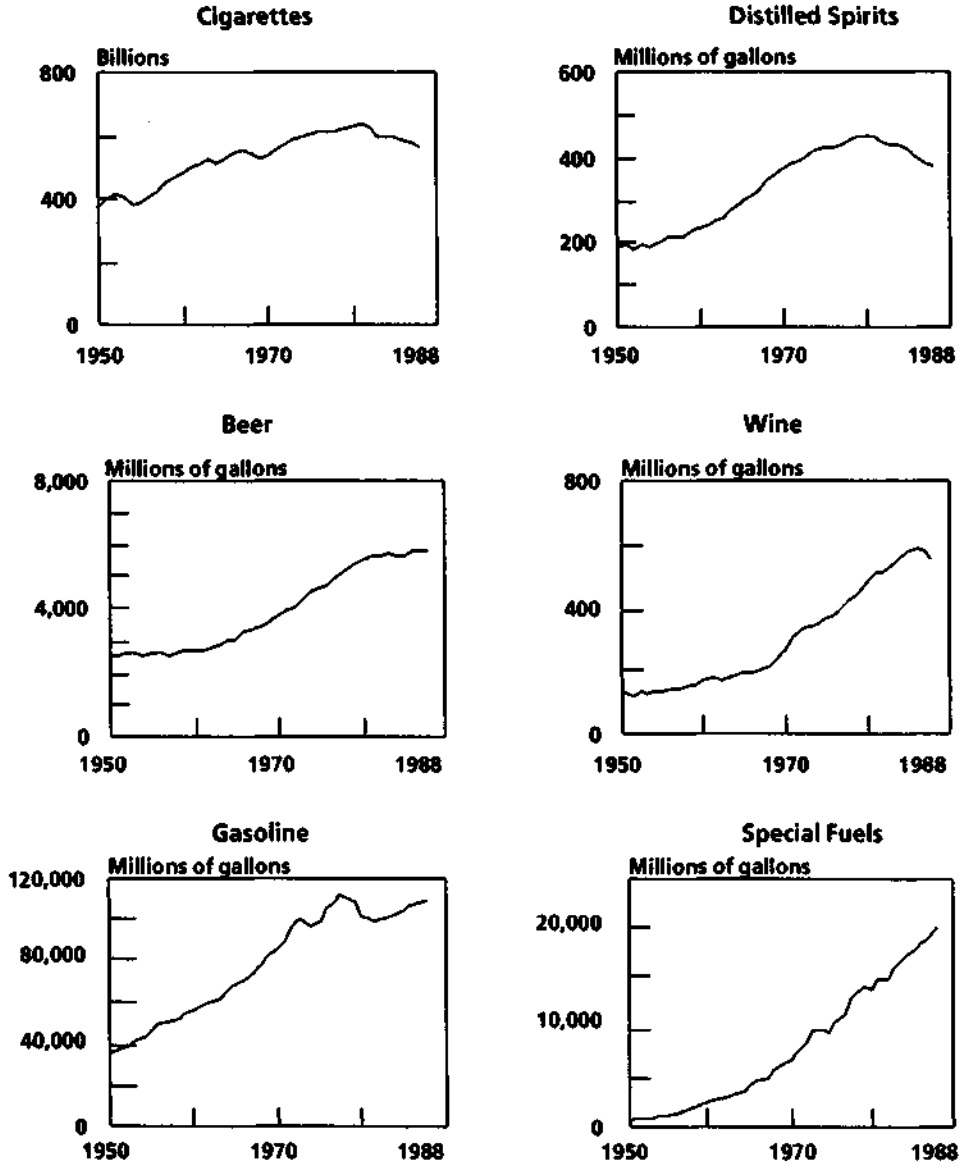
Excise tax revenues depend on the level of consumption as well as on statutory tax rates. After growing for most of the post-1950 period, total consumption of cigarettes and distilled spirits has fallen in the most recent years, while the growth in total beer consumption has almost stopped. Total consumption of gasoline grew rapidly from 1950 to 1973. After falling following the 1973-1974 and 1978-1979 oil embargoes, and the recessions of the early 1980s, total consumption of gasoline and other fuels has grown since 1982.

Tobacco

The relative decrease in federal revenues from tobacco taxes partly reflects slow growth in total cigarette consumption and, since 1981, an actual decline in total consumption (see Figure 6). Total consumption of cigarettes peaked in 1981 at about 640 billion cigarettes per year. By 1988, total consumption was down 12 percent from that peak to just over 563 billion cigarettes.

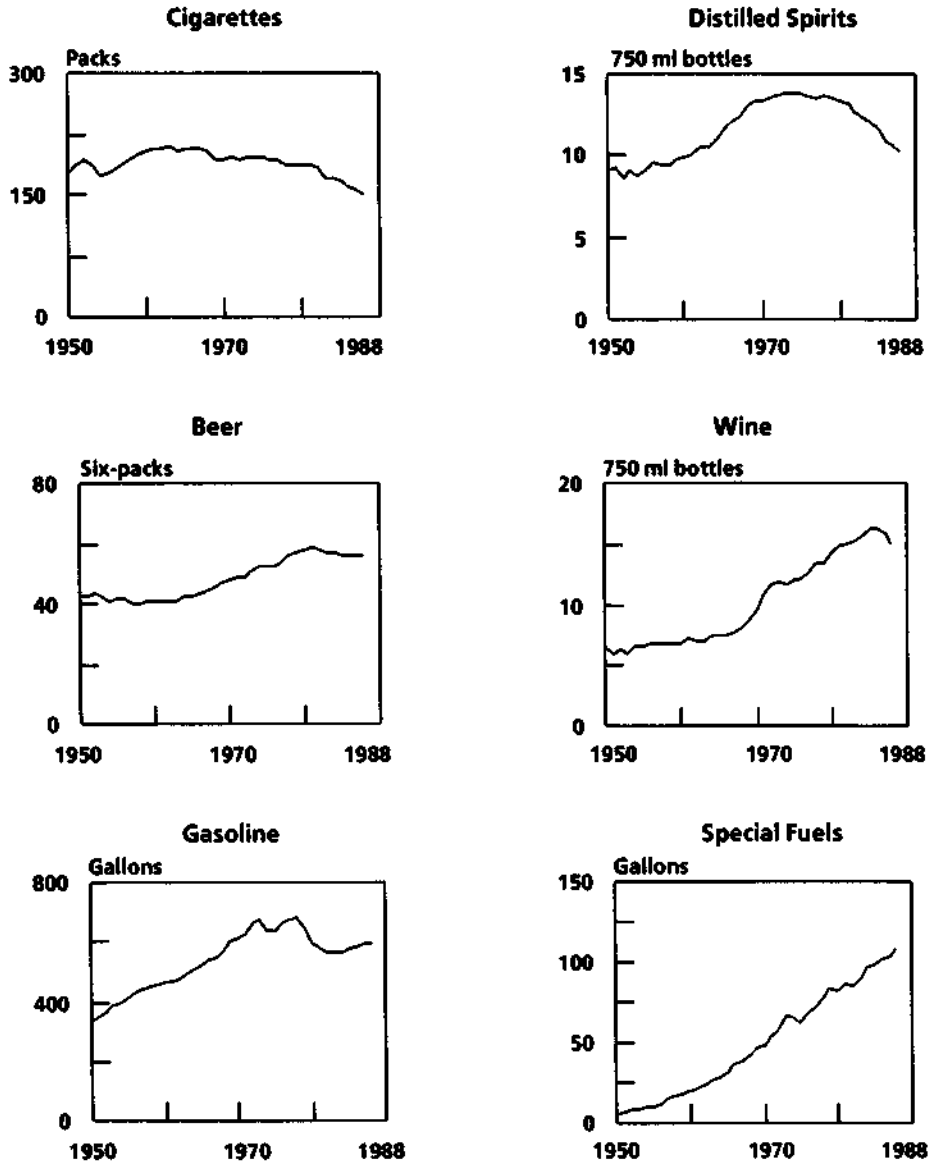
After rising during the early part of the post-1950 era, per capita consumption of cigarettes leveled off in the mid-1960s and then began a steady and increasingly rapid decline (see Figure 7). By 1963, per capita consumption by the U.S. resident population age 16 and over was more than 210 packs (4,200 cigarettes) per year. The first major downturn in per capita consumption came in 1964, coincident with the release of the Surgeon General's first report on smoking. After rising for a time after 1964, per capita consumption dipped again in 1968 and

Figure 6.
Total U.S. Consumption of Cigarettes, Alcoholic Beverages, and Motor Fuels, 1950-1988



SOURCES: Congressional Budget Office calculations based on data from The Beer Institute; Distilled Spirits Council of the United States, Inc.; Department of Agriculture, Economic Research Service, *Tobacco Situation and Outlook Report* (December 1989); Department of Transportation; Federal Highway Administration; and Wine Institute.

Figure 7.
Annual per Capita Consumption of Cigarettes, Alcoholic Beverages, and Motor Fuels by the U.S. Population Age 16 and Over, 1950-1988



SOURCES: Congressional Budget Office calculations based on data from The Beer Institute; Distilled Spirits Council of the United States, Inc.; Department of Agriculture, Economic Report Service, *Tobacco Situation and Outlook Report* (December 1989); Department of Transportation, Federal Highway Administration; Wine Institute; and *Economic Report of the President* (February 1990).

1969. Since 1974, per capita consumption has declined steadily, with an increase in the rate of decline beginning after 1981. Since 1981, per capita consumption of cigarettes has declined at a 2.5 percent annual rate. By 1988, per capita consumption had fallen nearly 30 percent from its peak in 1963 to about 151 packs per year, lower than at any time in the past 40 years.

Alcoholic Beverages

Changes in the total consumption of alcoholic beverages reflect different trends for beer, wine, and distilled spirits. Total consumption of beer and wine has continued to grow over the past 40 years, although the growth in beer consumption has almost ceased in the most recent years. Total consumption of distilled spirits peaked in 1980-1981 at about 450 million gallons per year. By 1988, consumption of distilled spirits had fallen 16 percent to about 378 million gallons per year.

Per capita consumption of distilled spirits peaked in 1974 at about fourteen 750-milliliter bottles per person a year. Per capita consumption has declined fairly steadily since then, and by 1988 was down to just over 10 bottles a year. Per capita consumption of beer has declined since 1981, when it peaked at over 58 six-packs (about 33 gallons) per person a year. By 1988, per capita consumption was down to over 55 six-packs (about 31 gallons) a year. Per capita consumption of wine has grown rapidly since the mid-1960s, reaching a high of about sixteen 750-milliliter bottles a year. While per capita consumption of wine has fallen in the past two years, it is too early to tell if that trend will continue.

Motor Fuels

Total gasoline consumption grew steadily until 1973, the time of the first oil embargo. After rebounding in the 1975-1978 period, total consumption of gasoline fell again in 1979 following the second oil embargo. Consumption has grown steadily since 1980, however, and by 1988 total consumption of gasoline was about 110 billion gallons per year, higher than at any time except in 1978.

Per capita consumption of gasoline also reached a peak in 1978 at about 686 gallons per person a year. By 1982, following the 1981-1982 recessions, per capita consumption had fallen by almost 18 percent from the 1978 level. By 1988, per capita consumption of gasoline had reached 589 gallons per year, higher than at any time since 1980 but lower than per capita consumption in any year from 1969 through 1980.

THE TOTAL TAX BURDEN ON TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS

The total tax burden on tobacco, alcoholic beverages, and motor fuels includes state and local taxes in addition to federal excise taxes. All 50 states and the District of Columbia tax tobacco, alcoholic beverages, and motor fuels. In a number of states, city and county governments levy additional taxes. Despite this combination of federal, state, and local taxes, tobacco, alcoholic beverages, and motor fuels are taxed less heavily in the United States than in most industrialized countries.

State and Local Taxes

In 1989, state excise tax rates on cigarettes ranged from 2 cents per pack in North Carolina to 40 cents per pack in Connecticut (see Appendix Table A-14). The median rate for all 50 states and the District of Columbia was 20 cents a pack. In addition to state excise taxes, over 400 local jurisdictions in 6 states also levy specific excise taxes on cigarettes. The bulk of local cigarette tax revenues are collected in New York City and in Cook County (Chicago). In most states, cigarettes are also subject to general state and local sales taxes at rates ranging from 3 percent to 8 percent of the retail sales price. Forty-five states and the District of Columbia have general sales taxes, Alaska, Delaware, Montana, New Hampshire, and Oregon being the five states that do not. Cigarettes are not subject to sales tax in Colorado, Maryland, New Jersey, Rhode Island, and Wyoming. Fifteen states raised cigarette tax rates in 1989, by an average of 8 cents a pack. Four states raised rates in 1988.

Thirty-two states and the District of Columbia levy taxes on licensed sales of distilled spirits. In 1989, rates in these states ranged from $1.50 to $6.50 per proof-gallon (about $0.24 to $1.03 per 750 milliliter bottle of 80-proof spirits--see Appendix Table A-14). In the remaining 18 states, the sale of distilled spirits is controlled through a state monopoly on the distribution of distilled spirits at the wholesale level. In 12 of the 18 control states, distilled spirits are sold at the retail level for off-premise consumption only through state-controlled establishments. State revenues from the sale of alcoholic beverages in control states come from retail markups in addition to state excise, sales, and other taxes.

All 50 states and the District of Columbia levy taxes on beer and wine. In 1989, rates on bottled and canned beer ranged from 3.33 cents per gallon in New Jersey to 89 cents per gallon in Hawaii (about $0.02 to $0.50 per six-pack of 12-ounce cans or bottles--see Appendix Table A-14). The median rate for all states was 18 cents per gallon (about $0.10 per six-pack). Rates on table wine ranged from 1 cent per gallon in California to $2.25 per gallon in Florida. Most control states also assess a markup on the retail price of wines in addition to a specific excise tax. In most license and control states, distilled spirits, beer, and wine are also subject to general sales taxes.

State tax rates on gasoline ranged from 4 cents per gallon in Florida to 22 cents per gallon in Nebraska in 1989 (see Appendix Table A-14). The median rate for all 50 states and the District of Columbia was 16 cents per gallon. In about a dozen states, gasoline was also subject to general sales taxes.

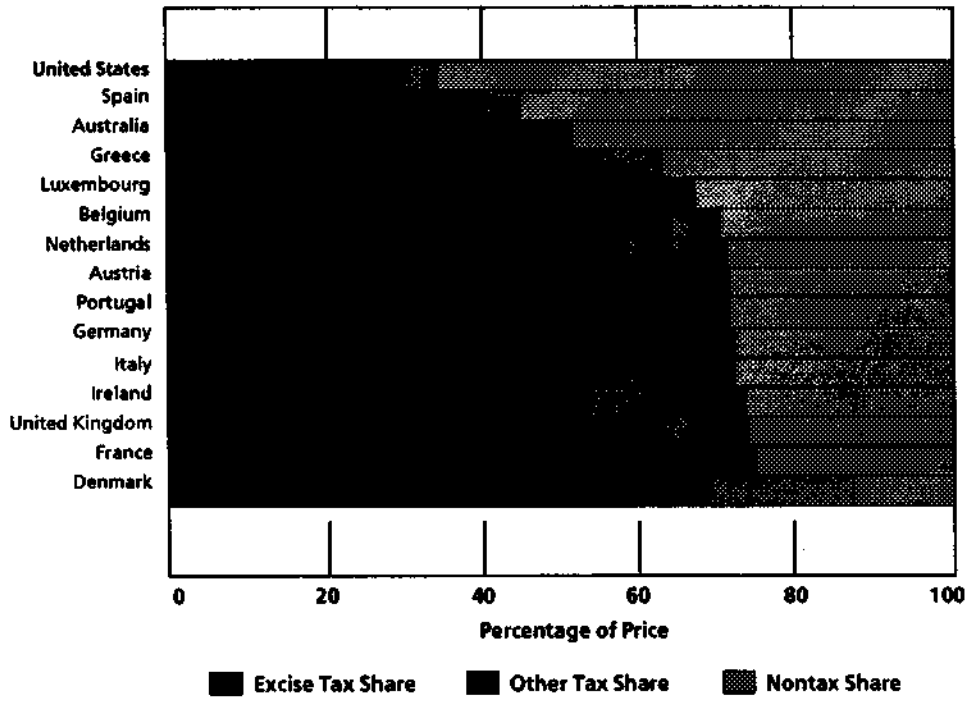
Tax Rates in Other Industrialized Countries

The average combined tax on cigarettes in the United States was about 40.1 cents a pack in 1987, or about 34.2 percent of the average retail price of a pack of cigarettes. Most of the tax came from the combination of federal and state excise taxes (about 35 cents or 29 percent of the average retail price). The total tax on cigarettes in the United States was the lowest among all member countries of the Organization for Economic Cooperation and Development (OECD). For the 14 other

OECD countries for which data were available, the combined sales tax on cigarettes (including value-added taxes) ranged from 45 percent to 87 percent of the retail sales price, with a median of about 72 percent of the retail price (see Figure 8).

Combined taxes on beer, wine, and distilled spirits in the United States also are among the lowest in all OECD countries. In 1988, the combined tax on beer in the United States was 15 percent of the average retail price, while the tax on distilled spirits was 45 percent of

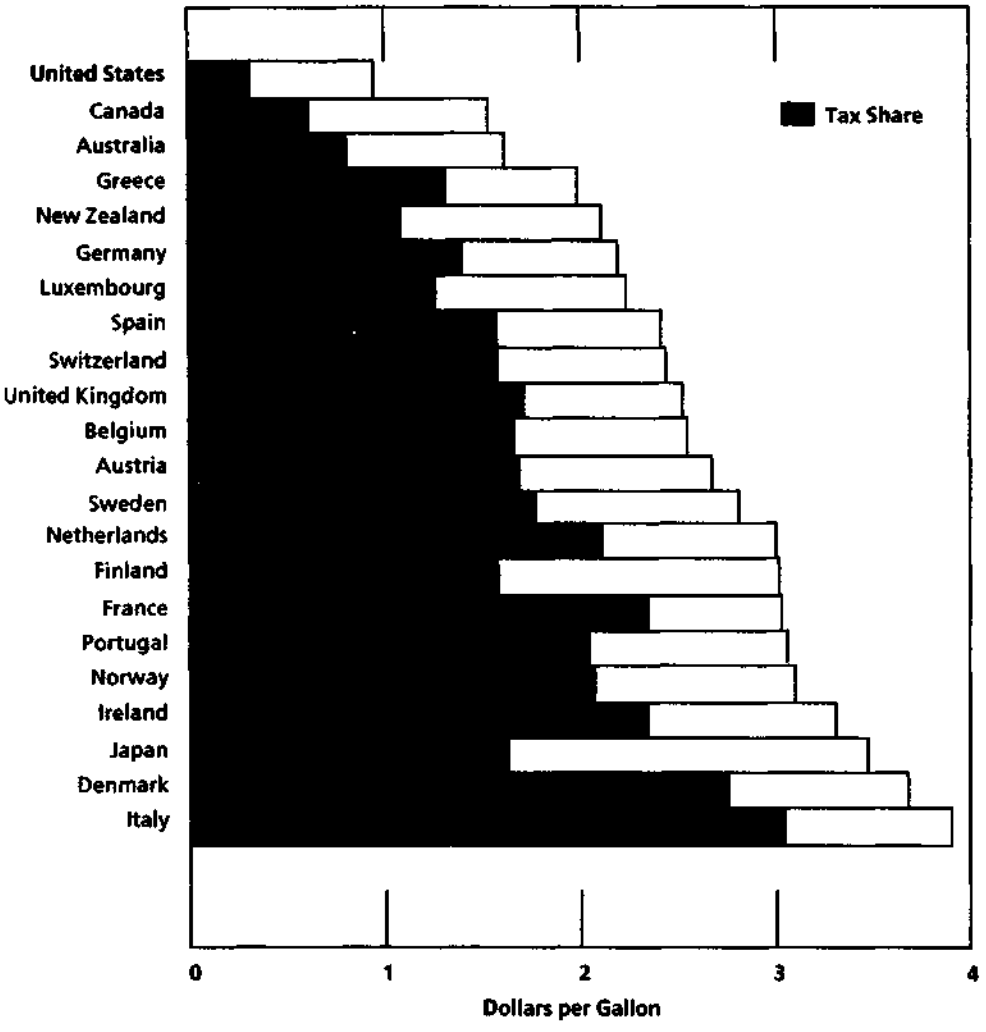
Figure 8.
Share of Sales Taxes in Cigarette Prices in OECD Countries, 1987



SOURCES: Organization for Economic Cooperation and Development, *Taxing Consumption* (Paris: OECD, 1988); and Congressional Budget Office calculations based on data from The Tobacco Institute, *The Tax Burden on Tobacco*, vol. 22 (1987); and Department of Agriculture, Economic Research Service.

NOTE: The U.S. tax shares are based on Congressional Budget Office calculations from Tobacco Institute and USDA data on taxes and prices.

Figure 9.
Share of Sales Taxes in Gasoline Prices in OECD Countries, Fourth Quarter 1988



SOURCE: Congressional Budget Office calculations based on data from Organization for Economic Cooperation and Development, International Energy Agency, *Energy Prices and Taxes: Fourth Quarter 1988* (Paris: OECD, 1989).

the price. For the 21 OECD countries, including the United States, for which data were available, the average tax on beer ranged from 14 percent to 64 percent of the retail price, with a median tax of 31 percent, while taxes for distilled spirits were 8 percent to 91 percent of price, with a median of 51 percent (see Appendix Table A-17).

Combined federal and state tax rates on gasoline were 32 percent of the average retail price of gasoline at the end of 1988, lower than in any of the other 21 OECD countries for which data were available, and less than half the median tax of 65 percent of the average retail price (see Figure 9 on page 22). In Canada, a country much like the United States, gasoline taxes were 41 percent of the average retail price of gasoline.

CHAPTER III

WHO BUYS TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS?

Purchases of tobacco, alcoholic beverages, and motor fuels vary among families. To the extent that excise taxes are reflected in higher prices for those goods, tax increases will affect families in proportion to their spending.

Although average expenditures on tobacco, alcoholic beverages, and motor fuels are higher for families with higher incomes, lower-income families spend a higher percentage of their income on all three items than middle- and upper-income families. Expenditures on tobacco, alcoholic beverages, and motor fuels are the smallest percentage of income for families with the highest incomes.

When compared as percentages of total expenditures, however, tobacco, alcoholic beverages, and motor fuels expenditures are all more equal among family income classes. In particular, expenditures on alcoholic beverages tend to rise as a percentage of total expenditures as family income increases, if adjustments are made for family size. Expenditures on tobacco are a smaller percentage of total expenditures as family income increases, while motor fuel expenditures are about the same percentage of total expenditures among all income groups except the highest 20 percent.

AVERAGE FAMILY EXPENDITURES

For purposes of this study, the Congressional Budget Office has estimated the distribution of family expenditures on tobacco, alcoholic beverages, and motor fuels in 1990. The results are reported by adjusted post-tax family income, by age of the family head, and by region of residence. CBO took the expenditure and income data from the 1984-1985 Consumer Expenditure Survey (CES) Interview Survey, the 1986 Current Population Survey (CPS), and the 1985 Statistics of

Income. Expenditure (but not income) data were adjusted to personal consumption expenditures from the National Income and Product Accounts (NIPA). The data were projected from 1985 to 1988 using actual growth rates for different components of income and expenditures, and from 1988 to 1990 using the CBO August 1989 economic forecast. A complete discussion of the data and the simulation methods is contained in Appendix B.

Adjusting for Family Size

Comparing expenditures among families with different incomes can present a misleading picture unless some adjustment is made for different family sizes. For example, a single person with income of $40,000 has a much higher standard of living than a family of four with the same income. One alternative is to measure income on a per capita basis. This approach removes all differences based on family size, including economies of scale from living together. Another alternative is to adjust family income based on some equivalence scale. This study employs one such equivalence scale: the family size adjustment used in determining the poverty thresholds (see Table 1). This scale assumes, for example, that a family of four needs about twice the income of a single person to maintain the same standard of living. The incomes of families of different sizes are made comparable by dividing each family's income by its poverty threshold. Under this approach, a four-person family with an income of about $40,000 in 1990--or three times the poverty threshold for a family of four--is on a par with a three-person family with an income of about $31,000, which is three times the poverty threshold for a three person-family. Single people living alone are treated as one-person families.

Expenditures in Relation to Family Income

Average incomes and expenditures in 1990 are shown in Table 2 by adjusted post-tax family income, age of the family head, and region of residence. Because the CES does not report region of residence for rural families, those families are classified separately. Results for the four census regions pertain only to nonrural families in those regions.

The figures in the table show that families in the lowest income group spend almost as much on tobacco as families in the highest income group, but spend less than half as much on motor fuels and one-fourth as much on alcoholic beverages as families in the highest income group. A somewhat different picture emerges when these expenditures are shown as percentages of income and total expenditures (see Table 3). For example, families in the lowest income quintile (fifth) spend 4 percent of their post-tax income on tobacco while families in the highest quintile spend 0.5 percent of their post-tax income on tobacco. Families in the lowest income quintile spend 3.7 percent of their post-tax income on alcoholic beverages, while families in the middle income quintile spend 2.2 percent and families in the highest quintile spend 1.6 percent. The distribution for motor fuels shows a greater range of spending among income classes. Families in the lowest income quintile spend 6.9 percent of their income on motor fuels, while families in the middle quintile spend 3.5 percent and families in the highest quintile spend 1.5 percent.

TABLE 1. PROJECTED WEIGHTED-AVERAGE POVERTY THRESHOLDS IN 1990, BY SIZE OF FAMILY

Family Size (Persons)	Projected Poverty Threshold in 1990 (Dollars)	Equivalent Value (One person = 1)
1	6,569	1.00
2	8,401	1.28
3	10,288	1.57
4	13,186	2.01
5	15,599	2.37
6	17,610	2.68
7	19,898	3.03
8	22,113	3.37
9 or More	26,316	4.01

SOURCE: Congressional Budget Office projections based on official weighted-average poverty thresholds in 1988. Department of Commerce, Bureau of the Census, *Money Income and Poverty Status in the United States: 1988 (Advance Data from the 1989 Current Population Survey)*, Current Population Reports, Series P-60, No. 166, 1989.

Younger families spend a higher percentage of their incomes on tobacco, alcoholic beverages, and motor fuels than families in any other age category. Expenditures as a percentage of income for all three items generally decline with increasing age of the family head. Tobacco expenditures in particular drop significantly for families with a head of family age 60 and over, while alcoholic beverage and motor fuel expenditures drop for families with a head age 75 and over.

TABLE 2. AVERAGE FAMILY INCOME AND EXPENDITURES, BY ADJUSTED POST-TAX INCOME QUINTILES, AGE OF FAMILY HEAD, AND REGION, 1990

	Number of Families (Millions)	Average Income (Dollars)		Average Expenditures (Dollars)			
		Pre-tax	Post-Tax	All Items	Tobacco	Alcoholic Beverages	Motor Fuels
All Families[a]	94.4	41,416	34,463	34,248	390	698	925
Post-Tax Family Income[b]							
Bottom quintile[c]	17.4	8,581	8,228	20,719	327	308	570
Second quintile	18.0	20,179	18,101	24,634	380	409	765
Middle quintile	18.2	31,525	27,314	30,741	426	606	952
Fourth quintile	19.1	44,626	37,581	37,777	427	811	1,099
Top quintile	20.5	97,198	77,622	52,446	383	1,210	1,185
Age of Head of Family							
Under 30	13.6	29,670	24,717	27,200	358	747	845
30 to 44	33.0	45,777	37,540	37,602	440	793	1,031
45 to 59	21.3	51,028	41,730	41,633	528	801	1,155
60 to 74	18.1	38,502	32,987	30,865	291	573	785
75 and over	8.4	25,364	23,024	21,157	112	252	367
Census Region[d]							
Northeast	18.4	46,376	38,467	36,221	410	747	803
Midwest	19.2	40,083	33,406	33,671	440	733	908
South	25.2	41,152	34,179	33,641	384	649	951
West	17.1	46,423	38,256	39,143	325	817	949
Rural	14.4	31,399	26,768	27,770	386	533	1,032

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

d. Data for the four census regions exclude rural families, which are shown separately.

Noticeable differences among regions in expenditures on tobacco, alcoholic beverages, and motor fuels are few. Families in the South spend a slightly higher than average percentage of post-tax income on motor fuels. Families in the West spend a smaller percentage of post-

TABLE 3. EXPENDITURES ON TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS AS PERCENTAGES OF POST-TAX FAMILY INCOME AND TOTAL EXPENDITURES, BY ADJUSTED POST-TAX INCOME QUINTILES, AGE OF FAMILY HEAD, AND REGION, 1990

	Percentage of Post-Tax Income			Percentage of All Expenditures		
	Tobacco	Alcoholic Beverages	Motor Fuels	Tobacco	Alcoholic Beverages	Motor Fuels
All Families[a]	1.1	2.0	2.7	1.1	2.0	2.7
Post-Tax Family Income[b]						
Bottom quintile[c]	4.0	3.7	6.9	1.6	1.5	2.8
Second quintile	2.1	2.3	4.2	1.5	1.7	3.1
Middle quintile	1.6	2.2	3.5	1.4	2.0	3.1
Fourth quintile	1.1	2.2	2.9	1.1	2.2	2.9
Top quintile	0.5	1.6	1.5	0.7	2.3	2.3
Age of Head of Family						
Under 30	1.5	3.0	3.4	1.3	2.8	3.1
30 to 44	1.2	2.1	2.8	1.2	2.1	2.7
45 to 59	1.3	1.9	2.8	1.3	1.9	2.8
60 to 74	0.9	1.7	2.4	0.9	1.9	2.5
75 and over	0.5	1.1	1.6	0.5	1.2	1.7
Census Region[d]						
Northeast	1.1	1.9	2.1	1.1	2.1	2.2
Midwest	1.3	2.2	2.7	1.3	2.2	2.7
South	1.1	1.9	2.8	1.1	1.9	2.8
West	0.9	2.1	2.5	0.8	2.1	2.4
Rural	1.4	2.0	3.9	1.4	1.9	3.7

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

d. Data for the four census regions exclude rural families, which are shown separately.

tax income on tobacco than families in any other region. Families in the Northeast spend a smaller percentage of their income on motor fuels than families in other regions, while rural families spend a much larger fraction of their income on motor fuels than other families, and a slightly higher percentage on tobacco.

Expenditures in Relation to Total Family Expenditures

It is also useful to compare expenditures on tobacco, alcoholic beverages, and motor fuels with total family expenditures on all items. Annual income may fluctuate, while total family expenditures may reflect a family's longer-run expectations. When this comparison is made, expenditures on tobacco, alcoholic beverages, and motor fuels show less variation among income classes. The budget share of tobacco ranges downward from 1.6 percent for families with the lowest incomes to 0.7 for families with the highest incomes. The budget share for alcoholic beverages actually rises with adjusted family income: families in the lowest income quintile spend 1.5 percent of their budget on alcoholic beverages, while families in the middle income quintile spend 2.0 percent and families in the highest quintile spend 2.3 percent. The budget share for motor fuels varies little among the first four income quintiles, hovering at about 3.0 percent. For families in the highest quintile, however, the budget share is only 2.3 percent.

These results suggest that, to the extent that annual family expenditures rather than annual family income better reflect lifetime income, expenditures on tobacco are slightly regressive over the income classes (that is, they tend to be a slightly greater percentage of total expenditures at lower income levels), while expenditures on alcoholic beverages are progressive, and expenditures on motor fuels are about proportional except for families in the highest income quintile.

The results for alcoholic beverages are the most striking. Part of the pattern results from the adjustment for family size. The adjustment moves smaller families higher up in the income distribution, and

TABLE 4. EXPENDITURES ON DISTILLED SPIRITS, BEER, AND WINE AS A PERCENTAGE OF POST-TAX FAMILY INCOME AND OF TOTAL EXPENDITURES, BY ADJUSTED POST-TAX INCOME QUINTILES, 1990

	Percentage of Post-Tax Income			Percentage of All Expenditures		
	Distilled Spirits	Beer	Wine	Distilled Spirits	Beer	Wine
All Families[a]	0.8	0.8	0.5	0.8	0.8	0.5
Post-Tax Family Income[b]						
Bottom quintile[c]	1.3	1.7	0.7	0.5	0.7	0.3
Second quintile	0.8	1.0	0.4	0.6	0.8	0.3
Middle quintile	0.8	1.0	0.5	0.7	0.9	0.4
Fourth quintile	0.8	0.9	0.5	0.8	0.9	0.5
Top quintile	0.6	0.5	0.4	0.9	0.8	0.6

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

moves larger families farther down. Thus, families with many children, who presumably do not drink, are counted as having lower income when the family size adjustment is made. If that adjustment is not made, the distribution of average alcoholic beverage expenditures as a percentage of total expenditures is almost proportional among family income quintiles, except for families in the lowest quintile who spend a slightly lower percentage of their budget on alcohol than other families.

Spending patterns for distilled spirits, beer, and wine differ significantly (see Table 4).[1] Expenditures on distilled spirits and beer both fall as a percentage of income from the lowest to the highest family income quintiles. Expenditures on wine, however, are nearly

1. The Interview portion of the Consumer Expenditure Survey reports combined expenditures on beer and wine consumed at home, and combined expenditures for all alcoholic beverages consumed away from home. The CES Diary survey, in which families record their purchases over a two-week period, reports separate expenditures on beer, wine, and distilled spirits consumed at home and away from home. Factors from the Diary survey were used to allocate combined alcoholic beverage expenditures into separate expenditures on distilled spirits, beer, and wine.

proportional to family income except in the lowest quintile. Expenditures on distilled spirits and wine rise as a percentage of total expenditures among adjusted family income quintiles. Expenditures on beer are roughly proportional to total expenditures.

Expenditures on tobacco, alcoholic beverages, and motor fuels are a smaller percentage of total expenditures the older the head of the family (see Table 3). Families with a head age 30 or under spend more than the average percentage of their total budget on tobacco, alcoholic beverages, and motor fuels. Families with a family head age 60 or more spend less than the average percentage of their budget on all three items.

Expenditure Shares

Expenditure shares for different groups can be compared with their share of income. For example, the lowest income group has 4.4 percent of total income, but its share of expenditures on alcoholic beverages is 8.1 percent (see Table 5). The shares of expenditures on tobacco, alcoholic beverages, and motor fuels rise with rising income (except for the share of tobacco expenditures for families in the highest income quintile). The share of all three types of expenditures equals or exceeds the share of post-tax income for families in the four lower quintiles. Only in the highest income quintile is the share of expenditures on tobacco, alcoholic beverages, and motor fuels less than the share of income. Higher-income families buy more tobacco, alcoholic beverages, and motor fuels on average than lower-income families, but buy less relative to their income.

Families with a head age 44 or under have a larger share of tobacco, alcoholic beverage, and motor fuels expenditures than their share of post-tax income. Families with heads age 60 and older have a smaller share of those expenditures than their share of post-tax income.

Families in the South devote a higher share of expenditures on motor fuels than their share of income. Families in the West, although spending a significant amount on motor fuels, have a smaller share of expenditures than their share of income.

TABLE 5. SHARE OF FAMILY INCOME AND EXPENDITURES BY ADJUSTED POST-TAX INCOME QUINTILES, AGE OF FAMILY HEAD, AND REGION, 1990

	Percentage of Families	Share of Income (Percent)		Share of Expenditures (Percent)			
		Pre-tax	Post-Tax	All Items	Tobacco	Alcoholic Beverages	Motor Fuels
All Families[a]	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Post-Tax Family Income[b]							
Bottom quintile[c]	18.4	3.8	4.4	11.1	15.4	8.1	11.3
Second quintile	19.1	9.3	10.0	13.7	18.6	11.2	15.8
Middle quintile	19.3	14.7	15.3	17.3	21.0	16.7	19.8
Fourth quintile	20.2	21.8	22.1	22.3	22.1	23.5	24.0
Top quintile	21.7	50.9	48.9	33.2	21.3	37.6	27.8
Age of Head of Family							
Under 30	14.4	10.3	10.4	11.5	13.2	15.5	13.2
30 to 44	34.9	38.6	38.1	38.4	39.4	39.7	38.9
45 to 59	22.5	27.8	27.3	27.4	30.5	25.9	28.1
60 to 74	19.1	17.8	18.3	17.2	14.3	15.7	16.2
75 and over	9.0	5.5	6.0	5.5	2.6	3.2	3.6
Census Region[d]							
Northeast	19.5	21.9	21.8	20.7	20.5	20.9	16.9
Midwest	20.4	19.7	19.7	20.0	23.0	21.4	20.0
South	26.7	26.6	26.5	26.3	26.3	24.9	27.5
West	18.1	20.3	20.1	20.7	15.1	21.2	18.5
Rural	15.3	11.6	11.9	12.4	15.1	11.7	17.0

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

d. Data for the four census regions exclude rural families, which are shown separately.

FAMILIES WITH TOBACCO, ALCOHOLIC BEVERAGE, AND MOTOR FUEL EXPENDITURES

Part of the difference in average expenditures among families classified by income, age, and region results from differences in the percentages of families who buy tobacco, alcoholic beverages, and motor fuels. The following section compares expenditures among only those families who have expenditures on the items in question.

Percentages of Families Who Have Taxable Expenditures

Not all families in a particular income class have taxable expenditures, and the percentage with expenditures varies by family income (see Table 6). Over 90 percent of families in all but the lowest income quintile have expenditures on gasoline. Over two-fifths of families in

TABLE 6. EXPENDITURES ON TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS FOR FAMILIES WITH EXPENDITURES, BY ADJUSTED POST-TAX INCOME QUINTILES, AGE OF FAMILY HEAD, AND REGION, 1990

	Percentage of Families with Expenditures			Average Expenditures for Families with Expenditures (Dollars)		
	Tobacco	Alcoholic Beverages	Motor Fuels	Tobacco	Alcoholic Beverages	Motor Fuels
All Families[a]	45.9	71.4	93.5	850	978	990
Post-Tax Family Income[b]						
Bottom quintile[c]	46.5	48.8	80.4	704	631	709
Second quintile	47.0	63.4	91.3	809	645	838
Middle quintile	48.1	71.0	95.9	886	854	993
Fourth quintile	46.4	79.9	98.5	919	1,014	1,116
Top quintile	41.9	89.2	99.6	913	1,356	1,189
Age of Head of Family						
Under 30	46.7	80.9	92.9	766	924	909
30 to 44	51.7	78.7	96.9	852	1,008	1,064
45 to 59	54.3	71.7	95.5	972	1,117	1,210
60 to 74	37.1	62.8	91.8	784	912	855
75 and over	20.1	44.7	80.1	559	564	459
Census Region[d]						
Northeast	44.3	75.8	88.4	925	985	909
Midwest	49.3	76.7	95.1	893	956	955
South	48.7	65.0	93.0	789	999	1,023
West	41.4	78.9	96.1	787	1,035	987
Rural	44.2	60.8	95.8	873	877	1,078

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

d. Data for the four census regions exclude rural families, which are shown separately.

all income quintiles buy tobacco products. Although about 70 percent of all families purchase alcoholic beverages, the percentage rises with incomes from less than 50 percent in the lowest quintile to just under 90 percent in the highest.

The percentage of families with expenditures on tobacco increases with the age of the head of the family up to age 60, and declines sharply thereafter. The percentage of families with alcoholic beverage expenditures declines with increasing age of the family head. The percentage of families with gasoline expenditures is fairly constant through age 60. This might appear to suggest that the people who live longest are those who refrain from smoking, drinking, and driving. It is not possible from these data, however, to separate the effects of higher survival rates from differences in behavior as people grow older, differences in behavior among those born at different times, or differences in behavior among sexes (for example, single women account for a large fraction of older families).

Average expenditures on tobacco, alcoholic beverages, and motor fuels for families with expenditures show a somewhat different pattern than those averages for all families. Average expenditures on alcoholic beverages for families with expenditures vary less among income groups than the averages for all families, reflecting the increasing proportion of families in the higher income quintiles with expenditures. To a lesser degree, the same is true for motor fuels expenditures. In other words, higher-income families as a group have higher average expenditures on alcoholic beverages and motor fuels because more of these families buy at least some of those products.

Because average alcoholic beverage expenditures differ less among income quintiles for families with expenditures, the distribution of expenditures as a percentage of income is more regressive for families with expenditures than for all families (see Table 7 and Table 4). Alcoholic beverage expenditures represent nearly the same percentage of total expenditures among income quintiles for families with alcoholic beverage expenditures (see Table 7).

TABLE 7. EXPENDITURES ON TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS AS A PERCENTAGE OF POST-TAX FAMILY INCOME AND OF TOTAL EXPENDITURES FOR FAMILIES WITH EXPENDITURES, BY ADJUSTED POST-TAX INCOME QUINTILES, 1990

	Percentage of Post-Tax Income			Percentage of All Expenditures		
	Tobacco	Alcoholic Beverages	Motor Fuels	Tobacco	Alcoholic Beverages	Motor Fuels
All Families[a]	2.5	2.5	2.8	2.4	2.5	2.8
Post-Tax Family Income[b]						
Bottom quintile[c]	8.2	7.3	8.2	3.1	2.4	3.1
Second quintile	4.3	3.4	4.5	3.1	2.4	3.3
Middle quintile	3.1	3.1	3.6	2.8	2.6	3.2
Fourth quintile	2.4	2.7	3.0	2.3	2.6	2.9
Top quintile	1.2	1.7	1.5	1.7	2.5	2.3

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

Variation in Expenditures

The amounts spent vary a great deal even among families with expenditures (see Table 8). The 10 percent of families who spend the most on tobacco account for 44 percent of all tobacco expenditures. The same is true with regard to alcoholic beverage expenditures. In contrast, the 10 percent of families who spend the most on motor fuels make only 26 percent of all motor fuel purchases.

There is considerable variation in expenditures within each income quintile and age category, particularly for alcoholic beverages. For families in the lowest income quintile (including families with no expenditures on alcoholic beverages), the 20 percent of families who spend the most on alcoholic beverages make over 80 percent of all alcoholic beverage purchases, while among middle-income families the 20 percent of families who spend the most make between 60 percent and 75 percent of all alcoholic beverage purchases.

Among older families, most of the spending on tobacco and alcoholic beverages is also done by relatively few families. The 20 percent of families headed by someone age 60 to 74 who spend the most on tobacco and alcoholic beverages make about 75 percent of all tobacco and alcoholic beverage purchases by families in that age group.

TABLE 8. DISTRIBUTION OF EXPENDITURES ON TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS, BY ADJUSTED POST-TAX INCOME QUINTILES, AGE OF FAMILY HEAD, AND REGION, 1990

	Percentage of Expenditures Made by the 10 Percent of Families with the Highest Expenditures			Percentage of Expenditures Made by the 20 Percent of Families with the Highest Expenditures		
	Tobacco	Alcoholic Beverages	Motor Fuels	Tobacco	Alcoholic Beverages	Motor Fuels
All Families[a]	43.9	44.4	26.3	69.3	66.7	43.5
Post-Tax Family Income[b]						
Bottom quintile[c]	42.3	59.4	31.2	68.7	82.8	50.9
Second quintile	42.4	52.3	27.1	67.8	74.6	44.7
Middle quintile	42.3	45.4	25.2	66.9	67.5	42.1
Fourth quintile	42.6	38.6	23.8	68.0	59.3	40.1
Top quintile	48.6	34.7	23.9	75.0	54.3	40.0
Age of Head of Family						
Under 30	41.1	38.4	24.3	66.6	59.7	40.6
30 to 44	39.8	40.1	23.6	65.0	61.7	39.7
45 to 59	40.0	43.8	24.5	63.0	66.1	41.0
60 to 74	48.7	50.8	29.7	77.5	74.4	47.3
75 and over	75.7	69.8	31.8	100.0	88.9	51.5

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

CHAPTER IV

THE ECONOMIC COSTS OF SMOKING, DRINKING, AND DRIVING

The prices consumers pay for most products generally reflect the marginal or incremental costs of resources used in producing and selling those goods. Producing and consuming some goods, however, generates additional costs that are not reflected in their prices. These additional or external costs are not paid by producers or consumers of those goods but by other members of society. Possible examples of resource costs that are generally not reflected in product prices are the presumptive effects of cigarette smoke on the health of nonsmokers, the lives and property lost in alcohol-related accidents, and the environmental damage from automobile exhaust emissions.

If market prices do not fully reflect such "external costs," one way to adjust for them is to levy excise taxes on goods that generate those costs. To the extent that the taxes raise prices and reduce demand, less of the taxed good or activity is produced, which reduces external costs. Restricting such goods and activities can be beneficial to society if the external costs avoided exceed the value of the reduction in output caused by the tax. In this respect, excise taxes on goods that generate external costs differ from excise taxes on other goods. There is no benefit from restricting output of goods whose consumption is not associated with external costs. In taxing the latter, scarce resources are allocated less efficiently, and the total losses to firms and consumers exceed the revenue raised from the taxes. This so-called excess burden is a real cost of collecting taxes, in addition to the administrative costs involved.

It is difficult to say whether raising current taxes on tobacco, alcoholic beverages, and motor fuels would lower external costs by enough to result in net gains to society. First, measuring external costs is uncertain because it involves evaluating imprecise estimates of the health damage caused by certain types of consumption, and

33-148 0 - 90 - 3 QL 3

assigning costs to the additional illnesses and premature deaths caused by such consumption.

Second, external costs vary depending on how, where, and by whom a good is consumed. For example, a tax on gasoline levied in the interests of controlling pollution will be borne not only by drivers in densely populated urban areas where pollution is a serious problem, but also by drivers in sparsely settled regions where the environment can easily absorb automobile emissions. A tax on alcoholic beverages levied to reduce alcohol-related accidents will tax not only those who drink and drive but also more conscientious drinkers.

Finally, an excise tax may not be the most efficient way to reduce a given external cost. Direct control of automobile emissions may be more effective than a gasoline tax in reducing pollution. Stricter enforcement of driving-while-intoxicated laws may do more to reduce alcohol-related fatalities than raising taxes on alcoholic beverages. Nevertheless, higher taxes may be desirable as part of an integrated policy to reduce the economic costs of smoking, drinking, and driving.

TOBACCO AND ALCOHOL

Smoking and drinking can create additional costs that are generally not reflected in the prices of tobacco and alcoholic beverages. Smokers and drinkers themselves bear some of the economic costs of smoking and drinking in the form of higher medical bills, lost workdays that are not covered by paid sick leave, and premature death. The rest of society bears other costs--for example, through higher health insurance costs, and the damage done to nonsmokers and nondrinkers.

If the rest of society bears some or all of the economic costs of smoking and drinking, and if these external costs of smoking and drinking exceed current taxes on tobacco and alcohol, then raising taxes, to the extent that this reduces consumption, would improve society's use of resources.

Health and Safety Risks

The 1989 Surgeon General's report on reducing the health consequences of smoking summarized current medical findings concerning the link between smoking and disease. The report cited cigarette smoking as a major cause or a contributing factor of cancer and cardiovascular and respiratory disease, and a probable cause of unsuccessful pregnancies and low-birth-weight babies.[1] Total deaths attributable to smoking were estimated to be 390,000 in 1985. A total of 337,000 deaths were attributable to the 10 leading smoking-related diseases, representing 22 percent of all deaths among men and 11 percent of deaths among women.

The 1986 Surgeon General's report concluded that passive smoking is a cause of disease, including lung cancer, among healthy nonsmokers.[2]

Smoking contributes to fire-related injury and property damage. According to the National Fire Protection Association, smoking-related fires in 1986--the leading single cause of civilian deaths from fires--caused 1,506 civilian deaths, 3,559 civilian injuries, and $402 million in property damage.[3]

An estimated 105,000 deaths in 1987 were the result of alcohol-related causes.[4] Chronic alcohol consumption is associated not only with liver disease, the leading cause of alcohol-related deaths from diseases, but also with a variety of other diseases and illnesses such as

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1. Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*, DHHS Publication No. (CDC) 89-8411, (prepublication version, January 11, 1989), pp. 98-99. Specifically, the report found that cigarette smoking is the major cause of lung and laryngeal cancer, chronic bronchitis, and emphysema; a major cause of oral and esophageal cancer, coronary heart disease, and cerebrovascular disease (stroke); and a contributing factor to bladder, pancreatic, and renal cancer.

2. Department of Health and Human Services, *The Health Consequences of Involuntary Smoking. A Report of the Surgeon General*, DHHS Publication No. (CDC) 87-8398 (1986).

3. John R. Hall, Jr., and Alison L. Norton, "The U.S. Smoking-Material Fire Problem Through 1986" (National Fire Protection Association, Fire Analysis Research Division, September 1988).

4. J.M. Shultz, D.P. Rice, and D.L. Parker, "Alcohol-Related Mortality and Years of Potential Life Lost--United States, 1987," reported in *Morbidity and Mortality Weekly Report*, 39(11):173-178 (March 23, 1990).

cancer, mental disorders, and cardiovascular and respiratory diseases. About half of all alcohol-related deaths in 1987 were attributable to alcohol-related diseases and illnesses. The rest resulted from accidents associated with alcohol use.

Alcohol abuse is a major factor in motor vehicle accidents. According to the National Highway Traffic Safety Administration, 40 percent of all traffic fatalities in 1987 involved a legally intoxicated participant (accidents in which either a driver, pedestrian, or bicyclist had a blood alcohol content in excess of 0.1 percent, the legal level of intoxication in most jurisdictions). About 10 percent of all police-reported motor vehicle crashes were alcohol-related, with approximately 534,000 people suffering injuries in nonfatal alcohol-related crashes.[5]

Drinkers who cause traffic accidents injure many besides themselves. Of the 18,500 traffic fatalities in 1987 involving a legally intoxicated participant, about 37 percent of those who died were passengers of vehicles, other drivers, and pedestrians who were not drunk.[6]

Measuring Economic Costs

A method commonly used to measure the economic costs of smoking and abusive alcohol consumption is to multiply the total costs of certain diseases and accidents by the attributable risk of tobacco and alcohol consumption. The attributable risk is the fraction of occurrences of a particular disease or accident associated with smoking or drinking. The total costs associated with a particular disease or accident are usually divided into direct and indirect costs. Direct costs reflect the expenses of medical treatment for smoking and alcohol-related illnesses, for property loss from accidents and fires, and for special programs--such as highway safety programs or programs for victims of

5. Department of Transportation, National Highway Traffic Safety Administration, *Fatal Accident Reporting System (1987)* (December 1988) and Department of Transportation, National Highway Traffic Safety Administration, "Drunk Driving Facts" (National Center for Statistics and Analysis, August 1988).

6. Department of Transportation, National Highway Traffic Safety Administration, "1987 Fatality Facts" (National Center for Statistics and Analysis, October 1988).

fetal alcohol syndrome. Indirect costs measure the value of production lost because of attributable illnesses and premature death.

Two recent studies provide roughly similar estimates of the economic costs of smoking. Considering only the economic costs of cancer and cardiovascular and respiratory diseases attributable to smoking, the Office of Technology Assessment (OTA) estimated total costs of smoking at between $38 billion and $95 billion in 1985, with a middle estimate of $65 billion, while Rice and others estimated total costs at $53.7 billion in 1984.[7] Based on estimated total annual consumption of cigarettes in the United States of about 30 billion packs in 1984 and 1985, the OTA middle estimate and the estimate by Rice suggest total costs of between $1.79 and $2.17 per pack.

In both studies, indirect costs were larger than direct costs. Based on the estimate of $65 billion in total costs, the OTA study estimated direct health care costs of $22 billion in 1985, of which $4.2 billion represented costs to the federal government. Indirect costs from lost production were estimated to be $43 billion--66 percent of the total. The study by Rice estimated direct medical costs of $23.3 billion and indirect costs of $30.4 billion, 57 percent of total costs.

A 1984 study by the Research Triangle Institute (RTI) estimated that the economic costs of alcohol abuse were $89.5 billion in 1980. Projecting this result forward, the study estimated that the costs were $116.7 billion in 1983.[8] Based on estimated consumption of approximately 502 million gallons of pure alcohol in 1983, this estimate sug-

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7. Office of Technology Assessment, "Smoking-Related Deaths and Financial Costs" (OTA Staff Memorandum, Health Program, U.S. Congress, 1985); Dorothy P. Rice, Thomas A. Hodgson, Peter Sinsheimer, Warren Browner, and Andrea N. Kopstein, "The Economic Costs of the Health Effects of Smoking, 1984," *Milbank Quarterly* 64(4):489-547 (1986). A recent report by the Department of Health and Human Services estimated total costs of smoking of $52.3 billion in 1985. See Department of Health and Human Services, *Smoking and Health, A National Status Report, 2nd Edition*, DHHS Publication No. (CDC) 87-8396 (Revised February 1990).

8. Henrick J. Harwood, Diane M. Napolitano, Patricia L. Kristiansen, and James J. Collins, "Economic Costs to Society of Alcohol and Drug Abuse and Mental Illness: 1980" (PHS Contract No. ADM 283-830002), Research Triangle Institute, Research Triangle Park, N.C., 1984.

gests total economic costs of about $1.82 per ounce of alcohol consumed.[9]

Like the studies of costs of smoking described above, the RTI study separated the total cost into direct and indirect costs. Indirect costs were about 80 percent of total economic costs in 1983--$92.8 billion. The largest components of indirect costs were the value of lost production and employment because of illness, and the value of lost lives. Costs of reduced production alone equaled $65.6 billion. The RTI study estimated that the direct costs of alcohol abuse in 1983 were $23.9 billion.

Although these were careful studies, measures of the economic cost of smoking and drinking can vary a great deal. Estimated economic costs are likely to be too low because it is difficult to quantify all the attributable risks. The studies by OTA and Rice considered only the specific disease-related costs of smoking. They did not include other costs, such as those associated with fires started by smoking. The attributable risks of abusive alcohol consumption may be understated if many alcohol-related deaths are not recorded as such. The inability to quantify all attributable risks and the underreporting of measured risks results in an underestimate of economic costs.

Estimates of the economic costs of smoking and drinking may be too high for other reasons. The studies measure gross rather than net economic costs. If morbidity and mortality from smoking and alcohol were reduced, people would incur other illnesses and would die from other causes, which would have their own costs. These costs could be as high as, or even higher than, the medical costs of treating smokers and heavy drinkers. The studies also assign all of the difference in mortality to the attributable risk of smoking and drinking. If smokers and drinkers differ from nonsmokers and nondrinkers in other health

9. According to industry sources, an estimated 5,666 million gallons of beer, 528 million gallons of wine, and 431 million gallons of distilled spirits were consumed in 1983. The cost per ounce of alcohol is based on an average alcoholic content of 4.5 percent for beer, 12.9 percent for wines, and 41.4 percent for distilled spirits. The latter factors are from Sharon D. Brooks, Gerald D. Williams, Fredrick S. Stinson, and John Noble, *Surveillance Report #13: Apparent Per Capita Alcohol Consumption: National, State, and Regional Trends, 1977-1987* (Rockville, Md.: National Institute on Alcohol Abuse and Alcoholism, Division of Biometry and Epidemiology, Alcohol Epidemiologic Data System, September 1989).

care habits and genetic and economic characteristics that may contribute to illnesses, then the attributable risks assigned to smoking and drinking will be overstated and so will the economic costs of those activities.

Finally, estimates will be imprecise because indirect costs, which are a large portion of total economic costs, are very difficult to measure. There is no agreement on the value to assign to the losses from illness and premature death. The previously cited studies value those losses at the rate of forgone earnings, estimated for both workers and nonworkers. Another way of evaluating the loss is to estimate the amount that people are willing to pay to avoid illness or premature death. Willingness to pay is a broader measure, encompassing the value people place on good health beyond just the loss of production, but it is more difficult to estimate than forgone earnings. Measurements of indirect costs also are imprecise because most indirect costs will be incurred in the future, so it is necessary to assume a discount rate for estimating the present value of these costs. A change in the discount rate assigned to future indirect costs can significantly change the estimate of total costs.

Internal and External Costs

An important question is the extent to which the economic costs are paid by smokers and drinkers themselves (internal costs), or by the rest of society (external costs). The distinction between internal and external costs matters because, if consumers pay for the economic costs of their consumption, they bear all the economic consequences of their decisions. From the standpoint of economic efficiency, observed tobacco and alcoholic consumption is neither too high nor too low, and no misallocation of resources takes place. From that standpoint, there would be no case for raising or lowering excise taxes to change consumption.

Smokers or drinkers pay some portion of the health costs stemming from smoking and drinking through higher out-of-pocket medical costs or higher health insurance premiums. (Differential rates based on health care habits are not typical of health insurance policies, par-

ticularly group insurance plans, although such rates are common in life insurance policies.) The rest of society pays other health costs to the extent that a group health insurance policy or Medicare or Medicaid pays for medical care.

Lost wages from illness or premature death represent a loss of resources, but whether they are an external or internal cost is a matter of some dispute. One view is that they are a cost borne mainly by the consumer to the extent that wages are not replaced by paid sick leave or disability payments. Society, in turn, loses the value of forgone tax payments on those earnings. Ironically, this view suggests that some external costs may be negative if, for example, users of tobacco and alcoholic beverages die prematurely before they are able to collect Social Security and pension retirement benefits.[10]

A recent study by Manning and others divided the economic costs of smoking and abusive alcohol consumption into internal and external costs.[11] The estimated external costs of smoking included the discounted values of medical care for smoking-related illnesses paid by group health plans or federal programs, covered sick leave for additional workdays lost by smokers, and the lives of nonsmokers and the property lost from fires associated with cigarette smoking. These costs were offset by the discounted value of reduced pension and nursing home payments that smokers fail to receive because of premature death, but the costs were increased by the value of lost taxes. The external costs of abusive alcohol consumption included the discounted values of the lives of nondrinkers lost and property damage from alcohol-related traffic accidents and fires, alcohol-related costs for the criminal justice system, and the cost of alcohol treatment programs, in addition to medical, sick leave, and pension costs. (Abusive consumption of alcohol was defined in the Manning study as consumption in

10. See John B. Shoven, Jeffrey O. Sundberg, and John P. Bunker, "The Social Security Cost of Smoking" (National Bureau of Economic Research, Working Paper No. 2234, Cambridge, Mass., May 1987); and Virginia Baxter Wright, "Will Quitting Smoking Help Medicare Solve Its Financial Problems?" *Inquiry*, 23:76-82 (Spring 1986).

11. Willard G. Manning, Emmett B. Keeler, Joseph P. Newhouse, Elizabeth M. Sloss, and Jeffrey Wasserman, "The Taxes of Sin. Do Smokers and Drinkers Pay Their Way?" *Journal of the American Medical Association*, 261(11):1604-1609 (March 17, 1989).

excess of two drinks per day, estimated to be 40 percent of total consumption.)

The estimated external cost of smoking in 1986 dollars ($0.15 per pack) was considerably lower than the average combined federal and state tax ($0.37 per pack). The estimated external cost of drinking ($1.19 per ounce of excess consumption or $0.48 per ounce of total alcohol consumed) was much higher than the average combined tax ($0.23 per ounce).

The estimated costs depend on assumptions concerning the medical costs associated with smoking and drinking, the rate at which future costs are discounted, and estimates of the dollar value of life, things about which even experts will disagree. Most of the direct external costs of smoking were attributable to medical expenditures. Net total costs were less than gross costs because of offsets from reduced future pension and nursing home payments, reflecting the shorter lives of smokers.

Medical costs were a small portion of the direct external costs of alcohol consumption. The majority of the costs were attributable to the lost lives of nondrinking passengers and bystanders in alcohol-related traffic accidents, and other costs associated with traffic accidents such as costs to the criminal justice system and property damage. Because heavy drinkers are more likely to retire and receive pension and disability benefits early, and because these costs exceed the reduced pension payments from the shorter lives of heavy drinkers, total net external costs of alcohol consumption--unlike those of smoking--were estimated to exceed direct costs.

These estimates suggest that raising taxes on drinking would increase economic efficiency, but that the external costs of smoking are already covered by existing taxes. Particularly for smoking, however, these conclusions depend on which costs are considered to be real external costs.

For example, though the study by Manning treated costs imposed by smokers and heavy drinkers on other family members as internal costs, it recognized that a different classification would have raised

estimated total external costs. If the costs imposed by passive smoking on other family members (about $0.14 per pack), and the costs of deaths and injuries to family members from smoking-related fires (about $0.09 per pack), had been treated as external rather than internal, the external cost of smoking would have risen to about $0.38 per pack, about equal to the combined federal and state taxes on cigarettes.

The study by Manning included effects of smoking that represent transfers of income between smokers and nonsmokers in its measure of net external costs. Such transfers do not reflect a misallocation of society's resources that could be addressed by reducing the amount of smoking. For example, if smokers receive lower Social Security payments, other citizens may appear to enjoy an external "benefit" to the extent that they pay lower Social Security taxes or are able to receive higher benefits themselves. These benefits, however, are obtained at the expense of smokers: what may appear to be an external "benefit" to nonsmokers is also an internal cost to smokers. Similarly, lower taxes paid by smokers are not an external resource cost of smoking. Lower taxes paid by smokers are simply the way in which part of the internal cost of lower production and earnings is transferred from the smoker to the rest of the population. Removing indirect pension costs net of reduced tax payments from the calculation of net external costs would have increased total estimated external costs by $0.13 per pack.

Abusive Consumption

While excise taxes on tobacco and alcoholic beverages are levied on all consumption, it may not be true that all consumption of tobacco and alcohol generates external costs. The distinction between harmful and harmless use may be more important in the case of alcohol consumption. The health effects of smoking appear even at low consumption levels. Light smoking (1 to 9 cigarettes per day) is linked with increased risks of smoking-related diseases. By comparison, some evidence suggests that moderate consumption of some alcoholic beverages

is not injurious to health, and may in fact be beneficial.[12] Although moderate drinking does appear to increase the risk of traffic accidents, the risk rises substantially with increased consumption.[13]

Because it is generally not possible to levy taxes only on alcohol consumption that generates external costs, the gains from a reduction in external costs must be balanced against the losses to nonabusive drinkers.[14] These losses include not only the additional tax payments made by nonabusive consumers, but also the loss in their welfare if higher taxes cause these consumers to drink less.

The sensitivity of abusive and nonabusive consumption to price changes is an important factor in determining the appropriate rate at which to tax. If abusive consumption is sensitive to prices (and if changes in taxes are reflected in prices), then higher taxes could be effective in reducing external costs. If abusive consumption is not sensitive to prices, however, higher taxes would not effectively reduce external costs and would only penalize all drinkers. If abusive consumption is more sensitive to prices than nonabusive consumption, then higher taxes would reduce external costs and would not seriously penalize nonabusers by causing them to significantly reduce their consumption of alcohol (although the disposable incomes of all drinkers would be reduced by the amount of the additional tax).

Ever since the apparent failure of the "great experiment" of Prohibition during the 1920s, many people have held that any governmental effort to discourage harmful drinking is bound to fail, and that

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12. Though a matter of controversy, research suggests a positive relationship between moderate alcohol consumption and a lower risk of coronary artery disease. This issue is discussed in Department of Health and Human Services, *Seventh Special Report to the U.S. Congress on Alcohol and Health* (Public Health Service, National Institute on Alcohol Abuse and Alcoholism, preprint copy, 1990).

13. Youths (ages 16 to 21) with a blood-alcohol concentration (BAC) between 0.01 and 0.05 corresponding to one to two drinks over a several-hour period, face twice the risk of being in a fatal automobile accident relative to nondrinking youths. Youths with a BAC of over 0.10, corresponding to six or more drinks over a several-hour period, face 100 times the risk of being in a fatal automobile accident relative to nondrinking youths. See Charles E. Phelps, "Death and Taxes: An Opportunity for Substitution," *Journal of Health Economics*, 7:1-24 (1988).

14. This issue is discussed in more detail in Thomas F. Pogue and Larry G. Sgontz, "Taxing to Control Social Costs: The Case of Alcohol," *American Economic Review*, 79(1):235-243 (March 1989).

such an effort will only hurt more conscientious drinkers.[15] Yet evidence suggests that abusive alcohol consumption is sensitive to price, and that heavy use declines more than infrequent use under a price increase.[16] Cirrhosis of the liver, which is positively related to heavy alcohol consumption, has been found to be negatively related to state alcohol tax rates. In a study of 30 states, those that raised liquor taxes had either smaller increases or greater reductions in cirrhosis mortality rates.[17]

Relating the appropriate mix of tax rates among different alcoholic beverages to external costs is difficult. Although the medical consequences of pure ethyl alcohol consumption are the same for all beverages, current federal excise tax rates per ounce of pure alcohol vary by type of beverage. The tax on distilled spirits is equal to about $0.20 per ounce of pure alcohol, while the tax on beer is about $0.05 per ounce of alcohol and the tax on table wine is about $0.01 per ounce of alcohol. A 12-ounce can of beer, a 1.4-ounce shot of 80-proof distilled spirits, and a 5-ounce glass of table wine all contain about 0.55 ounces of ethyl alcohol.

Some external costs of drinking vary not only with the quantity of alcohol consumed, but also with the type of beverage, the consumer, and the setting in which the beverage is consumed. Beer may in some respects have higher external costs than wine or distilled spirits because it is the alcoholic beverage of choice among teenagers and young adults, who are responsible for a disproportionate share of traffic fatalities. In 1987 licensed drivers age 16 to 19--6.2 percent of all licensed drivers--accounted for 12.7 percent of drivers involved in fatal traffic accidents and 9.6 percent of legally intoxicated drivers involved in fatal traffic accidents. Licensed drivers age 20 to 24--10.9

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15. Recent attempts to restrict consumption of alcoholic beverages in the Soviet Union have had limited success. See "Russia's Anti-Drink Campaign," *The Economist* (December 23, 1989), pp. 50-54.

16. Michael Grossman, "Health Benefits of Increases in Alcohol and Cigarette Taxes," National Bureau of Economic Research, (Working Paper No. 3082, Cambridge, Mass., August 1989).

17. Philip J. Cook, "The Effect of Liquor Taxes on Drinking, Cirrhosis, and Auto Accidents," in Mark H. Moore and Dean R. Gerstein, eds., *Alcohol and Public Policy: Beyond the Shadow of Prohibition* (Washington, D.C.: National Academy Press, 1981); and Philip J. Cook and George Tauchen, "The Effect of Liquor Taxes on Heavy Drinking," *Bell Journal of Economics*, 13(2), pp. 379-390 (Autumn 1982).

percent of all licensed drivers--accounted for 17.8 percent of drivers involved in fatal traffic accidents and 23.5 percent of legally intoxicated drivers involved in fatal traffic accidents.[18] Even here it is difficult to determine an appropriate tax rate. A higher tax on beer-alcohol could cause youths to consume more wine- or spirits-alcohol.

The external costs of drinking depend on how and by whom the beverage is consumed. The concentration of alcohol in the body, and hence the degree of intoxication, varies according to the weight and sex of the consumer, whether or not alcohol is consumed with food, and the extent to which the alcohol is diluted in other liquids.

Information, Habit, and Addiction

Even if smokers and drinkers bear all the relevant costs of their actions, consumption of cigarettes and alcoholic beverages could still be too high if users underestimate the potential harm to themselves from consumption. If users are fully aware of the risks but are unable to reduce their consumption because of habit or addiction, there may be further justification for government intervention. In such cases, the principle of consumer sovereignty might be questioned because two of its tenets--full information and rational choice--no longer apply.

There is evidence that smokers and drinkers do not correctly perceive the health risks associated with smoking and drinking. Substantial percentages of current smokers do not know or do not believe that smoking is causally related to several diseases, including lung cancer (9 percent), heart disease (18 percent), chronic bronchitis (20 percent), emphysema (17 percent), or cancer of the mouth and throat (15 percent).[19] In addition, although light smoking (1 to 9 cigarettes per day) is linked with increased risk of smoking-related diseases, 20 percent of smokers, 13 percent of former smokers, and 11 percent of those who have never smoked were found to believe that only heavy smoking has

18. Department of Transportation, Federal Highway Administration, *Highway Statistics, 1987*; and Department of Transportation, National Highway Traffic Safety Administration, *Fatal Accident Reporting System, 1987.*

19. Charlotte A. Schoenborn and Gayle M. Boyd, "Smoking and Other Tobacco Use: United States, 1987" (National Center for Health Statistics, *Vital Health Statistics*, 10(169), September 1989).

adverse health effects.[20] Some evidence suggests that young adults greatly underestimate the risks of drinking and driving.[21]

Even if smokers and drinkers correctly perceive the internal costs of alcohol and tobacco consumption, they may be unable to reduce their consumption. The addictive nature of alcohol for some portion of the population is widely accepted. Nicotine in tobacco has been identified as the agent that causes cigarette consumption to be addictive.[22] Seventy percent of all current smokers in 1985-1986 reported a least one serious attempt to quit at some time during their lives.[23] Teenagers in particular may not appreciate the addictive nature of alcohol or nicotine, and by the time they become aware they may be unable to reduce their consumption.

If smokers and drinkers do not correctly perceive the relative risks of their behavior, or if they understand the risks but are unable to limit their consumption, there may be benefits to society in taxing addictive consumption apart from internalizing external costs. These benefits could be substantial in the case of cigarettes, since the value of lives lost by smokers is substantial--much higher than any of the measured external costs. For example, results from the study by Manning suggest that the total cost of lost lives of smokers runs as high as $5.00 per pack, while the cost of lost lives of heavy drinkers is over $1.00 per ounce of alcohol consumed.

Alternatives to Taxation

Raising excise taxes on alcohol and tobacco is not the only way to reduce the economic costs of smoking and alcohol abuse. Other effective policies might include stricter enforcement of laws against driving

20. Department of Health and Human Services, Office on Smoking and Health, *Tobacco Use in 1986: Methods and Basic Tabulations from Adult Use of Tobacco Survey* (1989).

21. Charles E. Phelps, "Risk and Perceived Risk of Drunk Driving Among Young Drivers, *Journal of Policy Analysis and Management*, 6(4):708-713 (Summer 1987).

22. Department of Health and Human Services, *The Health Consequences of Smoking: Nicotine Addiction*, DHHS Publication No. (CDC) 88-8406 (1988).

23. Department of Health and Human Services, *Reducing the Health Consequences of Smoking.*

while intoxicated, control of the distribution and advertising of alcohol and tobacco products, and educational and advertising campaigns.

Limiting Smoking. Current federal efforts to limit consumption of tobacco focus primarily on providing information on the adverse health effects of tobacco use, requiring health warnings on cigarette products and advertisements, banning tobacco advertisements in the broadcast media, and restricting tobacco use on government worksites and on domestic flights of U.S. airlines.

Federal law requiring health warnings on cigarette packages and advertisements began in 1966, shortly after the publication in 1964 of the first Surgeon General's report on smoking and health. Federal restrictions on cigarette advertising began in July 1967, when the Federal Communications Commission began to apply the Fairness Doctrine, requiring broadcasters of smoking advertisements to allot time for antismoking messages. In 1971, under the Public Health Cigarette Smoking Act of 1969, the Fairness Doctrine was replaced by the current ban on cigarette advertising on television and radio.

Cigarette advertising and promotion are still extensive. According to the 1989 Surgeon General's report on reducing the health consequences of smoking, $2.4 billion was spent on the advertisement and promotion of cigarettes in 1986. Cigarette advertisements ranked first among advertisements in billboards, second in magazines, and third in newspapers. While some advertising and promotion may be targeted only at the brand selections of current smokers, it may also increase both the prevalence of smoking and the per capita consumption of cigarettes. A number of bills to reduce advertising and promotion of tobacco products were introduced in the 100th and 101st Congresses.[24]

Per capita consumption of cigarettes by people age 16 and over has declined dramatically since the release of the first Surgeon General's report in 1964: from an average of 210 packs per year in 1963 to 150 packs per year in 1988. The change is even more dramatic given that cigarette consumption trends were rising before 1964. It is estimated

24. Bruce K. Mulock, "Cigarettes and Other Tobacco Products: Should Congress Ban All Advertising and Promotion?" Congressional Research Service, Issue Brief No. 86105 (updated January 27, 1989).

that, had it not been for the antismoking campaign over the last 25 years, per capita consumption today would be 79 percent to 89 percent higher.[25]

The effects of specific federal policies designed to reduce cigarette consumption, and in particular the effects of federal restrictions on cigarette advertising and promotion, are not as clear. While the application of the Fairness Doctrine probably reduced consumption, replacing the doctrine with the existing ban on broadcast advertisements may have led to increased consumption. According to the 1989 Surgeon General's report on reducing the health consequences of smoking, per capita consumption increased by 2.0 percent during the three years preceding the Fairness Doctrine, fell 6.9 percent during the three years the doctrine was in force, and increased by 4.1 percent during the three years after it was discontinued.

Whether further restrictions on cigarette advertising would reduce smoking is also uncertain. If current cigarette advertising recruits new smokers and encourages others to smoke more, a total ban on cigarette advertising might reduce consumption. If the advertising is only a struggle for shares of the current market, a total ban might reduce advertising costs and result in lower prices of cigarettes. Lower prices might in turn lead to higher per capita consumption and to a wider prevalence of smoking, particularly among price-sensitive teenagers.

No federal law sets a minimum age for purchasing tobacco, although 44 states and the District of Columbia restricted sales of tobacco to minors. The minimum age for legal purchases varies from 15 years to 19 years, with 18 years the most common. The 1989 Surgeon General's report concludes that current restrictions are not, in practice, very effective.

Limiting Alcohol Abuse. Much of recent federal policy directed at abusive alcohol consumption focuses on drinking and driving, and on alcohol consumption among teenagers. To establish a standard drink-

25. Kenneth E. Warner, "Effects of the Antismoking Campaign: An Update," *American Journal of Public Health*, 79(2):144-151 (February 1989).

ing age among all states, the Federal Uniform Drinking Age Act of 1984 provided that the Congress would withhold federal highway funds from states with minimum legal drinking ages (MLDA) below 21 years. Currently, all 50 states and the District of Columbia use 21 years as the MLDA.

Most research indicates that the MLDA is inversely related to traffic fatalities involving alcohol.[26] When 29 states lowered the MLDA between 1970 and 1975, involvement of young drivers in fatal motor vehicle accidents increased, and conversely, when states raised the MLDA in the late 1970s and early 1980s, involvement of young drivers in fatal motor vehicle accidents fell.[27] The National Highway Traffic Safety Administration estimates that minimum drinking age laws have reduced traffic fatalities involving drivers in affected age groups by 13 percent--saving 1,071 lives in 1987 and a cumulative total of 8,142 lives between 1975 and 1987.[28]

As required by the Alcohol Beverage Label Act of 1988, all cans and bottles of domestic and imported beer, wine, and distilled spirits must now carry a health warning label. The current label includes a caution against consuming alcoholic beverages and driving a car or operating machinery. It is too early to tell whether this will have much effect.

In 1989, based on recommendations from a workshop on drunk driving, the Surgeon General proposed a number of options designed to reduce the costs of drinking and driving. These options include automatic confiscation of drivers' licenses for driving while intoxicated, a

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26. General Accounting Office, *Drinking Age Laws: An Evaluation Synthesis of Their Impact on Highway Safety*, GAO/PEMO-87-10 (March 1987).

27. Henry Saffer and Michael Grossman, "Beer Taxes, the Legal Drinking Age, and Youth Motor Vehicle Fatalities," *The Journal of Legal Studies*, 16(2):351-374 (June 1987); William DuMouchel, Allan F. Williams, and Paul Zador, "Raising the Alcohol Purchase Age: Its Effects on Fatal Motor Vehicle Crashes in Twenty-six States," *The Journal of Legal Studies*, 16(1):249-266 (January 1987); Philip J. Cook and George Tauchen, "The Effect of Minimum Drinking Age Legislation on Youthful Auto Fatalities, 1970-1977," *The Journal of Legal Studies*, 13(1):169-190 (January 1984); Allan F. Williams, Paul L. Zador, Sandra S. Harris, and Ronald S. Karpf, "The Effect of Raising the Legal Minimum Drinking Age on Involvement in Fatal Crashes," *The Journal of Legal Studies*, 12(1):169-179 (January 1983).

28. Department of Transportation, National Highway Traffic and Safety Administration, "1987 Fatality Facts" (National Center for Statistics and Analysis, October 1988).

reduction in the legal blood alcohol concentration limit for drivers from 0.10 percent to 0.04 percent by the year 2000, restriction of certain advertising of alcoholic beverages, and expanded use of sobriety checkpoints.[29]

MOTOR FUELS

Drivers of motor vehicles, like smokers and drinkers, impose costs on others that are not included in the private cost of driving. These costs include wear and tear on highways, congestion costs imposed on other motorists, and emissions of air pollutants that are injurious to property and health. Reductions in gasoline consumption resulting from a gasoline tax would reduce some, but not all, of these external costs. On close examination, it appears that an increase in the federal gasoline tax would contribute little to more efficient use of highways in terms of either reduced wear and tear or less congestion. Higher federal gasoline taxes could be a cost-effective means of reducing air pollution, at least in heavily polluted areas, but that result could be achieved more directly by other emission-related taxes, or increases in state gasoline taxes. Gasoline consumption also contributes to dependence on oil imports that may keep world oil prices high and entail reliance on oil supplies from insecure sources. By reducing gasoline consumption, higher gasoline taxes would reduce the need to rely on imported oil.

How Are Motor Fuel Taxes Used?

Receipts from the federal gasoline and diesel fuel tax are now deposited, along with other earmarked excise taxes, into the Highway Trust Fund (HTF). The HTF is essentially an accounting mechanism that records revenues from the taxes earmarked for the fund, spending from the fund on designated highway and mass transit programs, and interest that accrues on the fund's cash balances. The HTF maintains separate highway and mass transit accounts. In addition to federal excise taxes on gasoline and diesel fuels, three other HTF taxes are

29. Department of Health and Human Services, *Proceedings of the Surgeon General's Workshop on Drunk Driving* (Public Health Service, Office of the Surgeon General, Washington D.C.: December 14-16, 1988).

currently assessed on highway use. These taxes include a 12 percent sales tax on heavy trucks and trailers, a heavy-vehicle use tax (varying by weight) on vehicles weighing in excess of 55,000 pounds, and a tax on heavy tires for highway vehicles. In 1989, the HTF collected $15.6 billion in total revenues--$14.3 billion from taxes on motor fuels and $2.2 billion from taxes on trucks and trailers, heavy vehicles, and tires, less about $0.8 billion in refunds..

Since 1980, HTF highway account receipts and spending have been roughly in balance. During the 1970s an unexpended balance accumulated and has hovered around $10 billion for the last decade, primarily attributable to the natural lag between commitments and outlays for federal highway programs. During the 1980s, outlays have exceeded tax revenues credited to the fund and have been roughly equal to total fund receipts, which include interest in addition to tax revenues.

Because of the long lead times that can exist in highway programs, funds may be committed from the Highway Trust Fund long before they are actually spent. The Byrd amendment allows unpaid commitments against the fund to exceed the cash balance by as much as two years of future receipts (including interest). As a result, unpaid commitments at the beginning of fiscal year 1990 totaled about $32 billion, compared with the unexpended balance of $10.6 billion. The Congressional Budget Office expects receipts in 1991 and 1992 to exceed the unfunded authorizations at the end of the current year by about $8 billion. This amount indicates the approximate level of additional spending that could be sustained by the highway account without violating the Byrd amendment.

This balance ignores spending on highway programs out of general fund revenues. While the HTF currently finances most federal highway spending, the government's general fund has provided over $3 billion for highway spending since 1957. If these expenditures had been paid from HTF taxes, the unexpended balance in the HTF would now be under $1 billion.

Combined spending on highways by all levels of government exceeds revenue collected directly from users. In 1988, federal, state, and

local government collections from motor fuel taxes, vehicle taxes, and tolls ($41.6 billion) were only 61 percent of total highway disbursements ($68.6 billion).[30] Highway collections from motor fuel taxes, vehicle taxes, and tolls were 60 percent of total receipts in 1988--down from a high of 73 percent in 1964 and up from a low of 55 percent in 1982.[31] According to FHWA, the share of state highway collections from user-related taxes and tolls declined from 95 percent of total receipts in 1965 to 86 percent in 1988. Although combined highway spending exceeds combined highway taxes, it may be appropriate that nonusers bear some burden of government highway programs if they benefit indirectly from these programs.

Controversy is likely to arise over whether any increase in motor fuel taxes should go into the HTF and be used to fund increases in federal spending on highways and related projects or go into the general fund. One position is that all motor fuel tax receipts belong to the HTF, and that the government has a compact with those who pay the taxes to use them exclusively for highways. Others hold that taxes on fuels should be designed to provide incentives for their efficient use, and that levels of spending on highways should be determined independently of receipts. A motor fuel tax increase designed to provide incentives to reduce external costs of driving could yield revenues much greater than the amount that could be spent profitably on highway projects as compared with other programs.

What Would Be the Benefits of Higher Motor Fuel Taxes?

Higher motor fuel taxes would directly cause reductions in gasoline consumption. These reductions could come about through reduced driving, through actions that would improve the fuel efficiency of vehicles that are now in use, and through long-run changes in the fuel efficiency of new vehicles.

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30. Department of Transportation, Federal Highway Administration, *Highway Statistics, 1988*, Publication No. FHWA-PL-89-003, HPM-40 (October 1989), p. 38.

31. Department of Transportation, Federal Highway Administration, *The Status of the Nation's Highways and Bridges: Conditions and Performance*, Report of the Secretary of Transportation to the U.S. Congress, Committee on Public Works and Transportation, Committee Print 101-2 (June 1989), p. 35.

In the short term, reductions in fuel use would come about almost exclusively as a result of reductions in discretionary driving. Discretionary driving does not appear to include work-related transportation, as was apparent during the oil supply disruptions in the 1970s. Other reductions in fuel use, as through improvements in average vehicle efficiency or changes in people's decisions about where they live or how they get to work, would not be affected by relatively small changes in the cost of gasoline. (Greater vehicle efficiency might mean smaller cars, lighter cars, changes in engine design, or some combination of all three.)

Fuel costs are an increasingly small component of the total cost of vehicle ownership, and hence play an increasingly small role in consumers' choice of new vehicles. Though the higher gasoline prices of the 1970s prompted consumers to pay more attention to fuel efficiency when purchasing motor vehicles, improvements in fuel efficiency have been strongly influenced by the corporate average fuel economy (CAFE) standards established by the Energy Policy and Conservation Act of 1975. These standards are generally regarded as mandating greater improvements in fuel efficiency than would be chosen by consumers on the basis of current prices, and, to the extent that the current standards affect consumer choice, a small change in fuel costs is not likely to prompt consumers to push average efficiencies of new cars beyond the regulated standards.

Over the longer term, however, greater reductions in fuel consumption would be possible if consumers opted increasingly for more efficient gasoline-powered vehicles or if vehicles powered by other fuels became economically viable.

Some commonly cited ways in which drivers impose costs on the rest of society are wear and tear on highways, congestion, the emission of air pollution, and increased dependence on imported oil. These costs are related to consumption of motor fuels, but the relationship is not direct. As a result, changes in the consumption of motor fuels will be more effective in reducing some external costs of driving and less effective in reducing others.

Motor Fuel Taxes and the Efficient Use of Highways

Drivers of automobiles and light trucks probably pay more in gasoline and related highway taxes than the cost of the wear and tear they cause on highways. Heavy trucks, on the other hand, pay less in highway taxes than the wear and tear they impose. A recent study found that highway wear increases disproportionately with vehicle weight.[32] As weight per axle increases, the costs of highway wear increase more quickly than the revenues per mile traveled (although revenues increase because of increased fuel consumption per mile). Consequently, collections from fuel taxes exceed the costs of highway use imposed by lighter vehicles, while collections fall short of the costs of heavier vehicles. Higher motor fuel taxes in themselves would not correct the disproportionate burden of the tax, nor, more important, would they give heavy truckers an incentive to take actions that reduce pavement damage (such as reducing axle-loadings). This relationship has led some to suggest that a tax on trucks based on weight and distance traveled would be more equitable.

Even for automobiles, the correlation between taxes paid and costs of highway use is weak. Older cars that get fewer miles per gallon of gasoline pay a higher tax per mile traveled than do newer, more fuel-efficient vehicles. Other inequities stem from reduced tax rates on ethanol/methanol, gasohol, and other special fuels, as well as tax exemptions for state and local governments, nonprofit educational institutions, and local and school buses. Although these differences may serve to promote important policies, they weaken the effectiveness of the gasoline tax as a charge for using the highways.

Congestion is another external cost imposed by motorists. Congestion is specific to particular locations and times of day. Urban roadways are congested during rush hours. Other locations may be congested because of bottlenecks or, often, temporary problems. To be effective, a fee would have to be specific to the time and place of congestion (as in rush-hour tolls on bridges). Increased federal motor fuel taxes are thus unlikely to have a role to play in making the use of roads

32. Department of Transportation, Federal Highway Administration, *The Feasibility of a National Weight Distance Tax*, Report of the Secretary of Transportation to the U.S. Congress (December 1988).

and highways more efficient. Increasing taxes within particular states and localities that have severe problems of overuse might reduce the use of local roads, with beneficial effects. Nationwide, on the whole, highways are used to only 20 percent of their capacity. The uniform reductions in driving that might be caused by an increase in federal taxes on motor fuels would lead to further underuse of a highway system that, on average, already has ample capacity.

Motor Fuel Taxes and Air Pollution

Automobiles and trucks contribute to air pollution by emitting sulfur dioxide, nitrous oxides, and carbon monoxide. Motor vehicles are also a major source of volatile organic compounds (VOCs) that produce ozone when combined with nitrous oxides in the presence of sunlight. Ozone is a component of smog that causes serious respiratory problems such as breathing difficulty, asthma, and reduced resistance to infection. Ozone is also associated with damage to crops and trees and organic materials, such as fabrics, rubber, dyes, and paints.

Higher motor fuel taxes would lower these emissions by reducing driving. It is difficult, however, to estimate the size of the health and other benefits that would be obtained per gallon of reduced motor fuel consumption. One study suggests that the damages from motor vehicle emissions are on the order of 3.5 cents to 11 cents per gallon consumed.[33] These estimates are average values; the benefits from reducing emissions in highly polluted areas could be much higher. Further, the study evaluated only the traditional cost of illness--the cost of medical treatment plus lost earnings. Other approaches that take into account benefits other than costs of illness could yield estimates of health effects that are three to four times higher.[34]

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33. Mark W. French, "Efficiency and Equity of a Gasoline Tax Increase," Finance and Economics Discussion Series, #33, Federal Reserve Board, Washington, D.C. (July 1988). Estimate based on Environmental Protection Agency, *Costs and Benefits of Reducing Lead in Gasoline*, Chapter 6: "Benefits of Reducing Pollutants Other Than Lead," EPA-230-05-85-006 (February 1985); and Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors*, vol. 2: Mobile Sources, 4th ed., AP-42 (September 1985).

34. Maureen L. Cropper and Wallace Oates, "Environmental Economics: A Survey" (Resources for the Future, Discussion Paper QE90-12, Washington, D.C.).

The range of uncertainty surrounding estimates of the environmental benefits of less air pollution--in health and other benefits--can be illustrated by the example of ozone levels. Estimates from a recent study of the benefits that would be obtained from bringing all areas nationwide up to the federal ozone standard range from $51 million to $4.7 billion--two different orders of magnitude.[35] The wide range of estimates reflect both variation in epidemiological and clinical estimates of the health benefits of lower ozone levels, and variation in the values placed on those benefits.

What Could a Motor Fuel Tax Increase Contribute to Air Pollution Control?

Emissions of pollutants per unit of gasoline consumed are forecast to decline over the next 20 years, reflecting changes in fleet composition, in fuel efficiency, and in efficiency on the road. Further reductions in fuel use from an increased tax on motor fuels would probably make some small contribution to further emissions reductions. It is not possible, however, to estimate reductions of emissions just on the basis of changes in motor fuel use alone.

Most pollution related to vehicles has local characteristics, although with national consequences. Factors relevant to local air pollution problems (from sulfur dioxide, nitrous oxides, carbon monoxide, and volatile organic compounds) include the age composition of the automobile fleet, fuel standards (including vapor pressure), and highway congestion. Direct vehicle emissions are also affected by temperature and elevation. Moreover, the degree to which a given level of emissions contributes to pollution depends on local conditions such as days of sunshine and the number of trees.

Taxes levied more directly on emissions might provide better incentives for reducing emissions. Such taxes could be levied on new cars, based on their estimated emissions, and on old vehicles in con-

35. Allen J. Krupnick, "Economics and the Ambient Ozone Standard," *Resources* (Summer 1988), Resources for the Future, Washington, D.C., pp. 9-12.

junction with an inspection program that measured emissions and recorded annual mileage.[36] Such an emissions tax could also vary according to the jurisdiction in which a vehicle was located, adjusting the incentive to the severity of local problems.

As a practical matter, however, higher motor fuel taxes should be compared with the pollution control measures that have actually been proposed. These include inspection and maintenance programs for nonattainment areas, stage II vapor recovery--a type of control used to reduce emissions when filling a vehicle's gasoline tank--and methanol-powered vehicles. Given the costs and limitations of these measures, higher gasoline and diesel fuel taxes may be a reasonably cost-effective means of achieving some modest improvement in air quality.

Motor Fuel Taxes, Oil Imports, and Energy Security

Any reduction in the demand for petroleum-based motor fuels as a consequence of higher fuel costs would translate into reduced petroleum imports. For this reason, taxes on gasoline and diesel fuel have been mentioned as one of several policies that would provide greater protection from an interruption in vital imports of oil and from the damaging economic effects of any consequent increase in world oil prices.[37]

At present, U.S. energy security policy is to build and maintain a Strategic Petroleum Reserve, to support the oil-sharing agreements of the International Energy Agency, to foster the development of more secure supplies of petroleum and other strategic goods (both at home and abroad), and to support conservation measures. This policy includes assistance to the U.S. petroleum industry to help sustain current production and to retain the infrastructure that would help the industry to rebound if oil prices were to rise sharply in the future.

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36. For an analysis of this option, see Congressional Budget Office, *Reducing the Deficit: Spending and Revenue Options* (February 1990).

37. See, for example, Mark W. French, "Efficiency and Equity of a Gasoline Tax Increase"; Knut A. Mork, "Taxation as a Protection Against the Effects of Price Fluctuations: The Case of Oil," *The Energy Journal*, Special Tax Issue: 73-87 (1985); and Harry G. Broadman and William W. Hogan, "Oil Tariff Policy in an Uncertain Market" (John F. Kennedy School of Government Discussion Paper, E-86-11, Harvard University, 1986).

Higher motor fuel taxes might add to U.S. energy security by reducing both the magnitude and the likelihood of potential disruptions of oil supply. First, higher fuel excise taxes would directly reduce imports of foreign oil. Second, the reduced U.S. demand for foreign oil would lower world oil prices. As long as other oil-consuming countries did not significantly increase their consumption as a result of the oil price decline, oil production in insecure regions of the world might fall.

A tax increase of 12 cents per gallon would have a beneficial but fairly small effect on oil imports, and a small effect on world oil prices. CBO has estimated that increases of 12 cents per gallon in gasoline and diesel excise taxes effective in 1986 would have reduced oil import dependence by about 100,000 barrels per day in 1987--1 percent to 2 percent of projected imports in that year. The Department of Energy concluded that increasing fuel excise taxes would have a very small moderating effect on world oil prices and oil price volatility. A 10-cent-per-gallon increase in motor fuel taxes effective January 1, 1988, was estimated to reduce oil imports by 100,000 to 180,000 barrels per day and to lower the world oil price by $0.21 to $0.37 per barrel in 1990.[38]

These energy security benefits, however, are uncertain and may be small. In today's global oil market, the United States will be more secure only if its major trading partners are more secure as well. Whether the United States would ultimately benefit from a motor fuel tax increase would also depend on which oil-exporting countries produced less as result of lower U.S. demand. So long as the OPEC oil-producing countries act to restrict oil production and support oil prices, the large Persian Gulf producers will continue to be the marginal source of the world's oil supply.

38. Congressional Budget Office, *Budgetary and Economic Effects of Oil Taxes* (September 1987); Department of Energy, *Energy Security* (March 1987).

CHAPTER V

THE DISTRIBUTIONAL EFFECTS OF INCREASES IN FEDERAL TAXES ON TOBACCO, ALCOHOLIC BEVERAGES, AND MOTOR FUELS

The Congressional Budget Office has simulated the distribution of federal excise tax increases among families for the following three options:

- Doubling the cigarette tax from 16 cents to 32 cents per pack;
- Equalizing the tax on all alcoholic beverages at $16.00 per proof-gallon ($0.25 per ounce of pure alcohol) by increasing the tax on a 750-milliliter bottle of 80-proof liquor from $1.98 to $2.54, increasing the tax on a 750-milliliter bottle of wine from 3 cents to about 76 cents, and increasing the tax on a six-pack of beer from 16 cents to about 81 cents; and
- Raising the gasoline tax from 9 cents to 21 cents per gallon and the diesel fuel tax from 15 cents to 27 cents per gallon.

If effective on October 1, 1990, the cigarette tax increase would raise an additional $2.8 billion, the combined alcoholic beverage tax increases would raise an additional $7.2 billion, and the motor fuels tax increase would raise an additional $12.1 billion in fiscal year 1991.[1]

These options were examined because they typify those that have been suggested in recent debate. They are not necessarily the specific excise tax increases appropriate to correct the external costs of tobacco, alcoholic beverage, and motor fuel consumption.

If prices rose by the full amount of the tax increases without additional markups, doubling the current federal excise tax on cigarettes would increase the price of cigarettes by about 11 percent. Equalizing the tax on all alcoholic beverages at $16.00 per proof-gallon ($0.25 per

1. Congressional Budget Office, *Reducing the Deficit: Spending and Revenue Options* (February 1990).

ounce of alcohol) would increase the price of beer by about 18 percent, the price of table wine by about 25 percent, and the price of distilled spirits by about 7 percent. Raising the tax on gasoline by $0.12 per gallon would raise the price of gasoline by about 11 percent.

Estimates vary as to how sensitive consumption is to changes in price, but price changes of these magnitudes could be expected to reduce consumption of cigarettes by 4 percent to 8 percent, and to reduce consumption of beer by 5 percent to 13 percent, of wine by 17 percent to 25 percent, and of distilled spirits by 4 percent to 7 percent. The number of gallons of gasoline consumed could be expected to fall by about 2 percent in the short term.

All three tax increases would be regressive with respect to post-tax family income--that is, they would be larger relative to the incomes of lower-income families than of higher-income families. Elderly families would pay less additional tax under all three options than other families.

Some of the tax increase would be offset by changes in other taxes and changes in income. Higher excise taxes would initially raise the relative price of tobacco, alcoholic beverages, and motor fuels. This increase in relative prices would be reflected in higher overall consumer prices and lower real incomes of families, or in an unchanged overall price level and lower nominal returns to labor and capital, depending upon whether or not the nominal money supply was increased enough to accommodate the change in prices. If prices rose, as assumed here, individual income taxes would fall and transfer payments such as Social Security benefits would increase because of indexing. The net tax increases after the effects of indexing would be less regressive for all three taxes.

Measured against total family expenditures, which may be a better indicator of a family's expected economic circumstances over a longer period of time, the tax increases would be less regressive. The cigarette and motor fuel tax increases would be about proportional to total expenditures, although the motor fuel increase would be a slightly lower percentage of total expenditures for upper-income families, while the alcoholic beverage tax increase would be slightly progres-

sive--that is, an increasing percentage of total expenditures as family income increases.

Concerns about the regressivity of an excise tax increase might lead policymakers to consider options that would compensate low-income families for the tax increase. CBO has examined three such changes: an increase in food stamp payments, an increase in the earned income tax credit (EITC), and a combination of increases in food stamps and the EITC. Each option would spend 15 percent of the net revenues from an increase in cigarette, alcoholic beverage, or motor fuel taxes. The increase in food stamps would provide the highest average benefit to families in the lowest income quintile of the three options. The combined increase in food stamps and the EITC would reach the greatest number of families in the lowest income quintile and would provide average benefit increases that would more than offset the average alcoholic beverage tax increase for low-income families, and that would offset about 90 percent of the average motor fuel tax increase and about 60 percent of the average cigarette tax increase for those families.

EXCISE TAXES, PRICES, AND CONSUMPTION

The effect of federal excise tax increases on the consumption of tobacco, alcoholic beverages, and motor fuels depends on the extent to which the increased taxes are reflected in the prices of those items relative to the prices of other goods, and on how consumers respond to changes in price.

Although excise tax revenues are collected from producers, manufacturers, or importers, the economic burden of an excise tax ultimately passes on to families. The distribution of the burden depends on how consumers adjust their purchases to changes in prices. Most studies of excise taxes commonly assume that these burdens are distributed among families in proportion to their purchases of the taxed goods.

How consumer demand responds to price changes is measured by the price elasticity of demand, which is the ratio of the percentage

change in the quantity demanded to the percentage change in the price. Thus, a price elasticity of demand of -0.5 implies that a 10 percent increase in price will result in a 5 percent decrease in the quantity demanded.

Taxes and Prices

Higher excise taxes on tobacco, alcoholic beverages, and motor fuels will initially prompt producers of those goods to raise the prices they charge consumers. If consumers do not respond to the price changes, there will be little or no change in the consumption of cigarettes, alcoholic beverages, and motor fuels, and the relative prices of these goods will rise by the full amount of the higher excise taxes.

If consumers of these goods are responsive to price changes, however, higher prices will reduce demand for the taxed goods and increase demands for other goods. The shift in demand will also lower the demand for labor and capital employed in the production of cigarettes, alcoholic beverages, and motor fuels while increasing the demand for these factors elsewhere in the economy. How the longer-run adjustments affect the relative prices of tobacco, alcohol, and motor fuels depends on the ease with which resources employed in the production of the taxed goods can be shifted to other uses.

If resources released from the production of the taxed goods cannot be easily shifted to other uses, the relative prices of taxed and untaxed goods will not rise by the full amount of the tax, and part of the adjustment to the tax will be reflected in lower relative prices of labor and capital. In that case, the burden of the tax will be distributed not only in proportion to purchases of taxed and untaxed goods but also in proportion to the income received from various sources. Most economists generally assume that, at least over time, the resources released from the production of the taxed goods would be readily employable elsewhere in the economy. If this is the case, an excise tax would raise the relative prices of the taxed goods by the full amount of the tax, while also reducing the amount of such goods consumed and produced.

In the short run, a tax increase could cause retail prices to rise by more than the amount of the increase if producers, wholesalers, or retailers added additional markups to the tax. In the long run, however, competitive pressures should prevent such markups from continuing.

A number of studies have looked at the effect of excise tax increases on retail cigarette prices. Because there has been only one change in the federal tax on cigarettes in the past 40 years, much of this research concerns the effects of changes in state excise tax rates on cigarette prices over time. Most studies found that when state excise tax rates were raised, cigarette prices increased by slightly more than the amount of the tax increase. This result was attributed variously to a possible change in cigarette quality, to sellers using the occasion of a tax increase to adjust their prices for past inflation, or to price markups.[2]

The possibility that cigarette producers use the opportunity of a tax increase to raise prices by more than the amount of the tax increase is consistent with the experience just before and after the 1983 increase in the federal excise tax on cigarettes, when cigarette prices rose by 37 percent in excess of a dollar-for-dollar passthrough of the tax increase.[3] Between 1981 and 1985, retail cigarette prices rose by 54 percent (30 percent in real terms), although the federal excise tax increase, combined with small increases in state taxes that occurred over the period, was only 16 percent of the 1981 average retail price.

Prices of alcoholic beverages are likely to rise by at least the full amount of a tax increase. Prices could rise by more than the amount of a tax if producers, wholesalers, or retailers added additional markups

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2. See Yoram Barzel, "An Alternative Approach to the Analysis of Taxation," *Journal of Political Economy*, 84(6):1177-1197 (December 1976); Terry R. Johnson, "Additional Evidence on the Effect of Alternative Taxes on Cigarette Prices," *Journal of Political Economy*, 86(2):325-328 (April 1978); Daniel A. Sumner, "Measurement of Monopoly Behavior: An Application to the Cigarette Industry," *Journal of Political Economy*, 89(5):1010-1019 (October 1981); and Daniel Sullivan, "Testing Hypotheses About Firm Behavior in the Cigarette Industry," *Journal of Political Economy*, 93(3):586-598 (1985). Some research has found that cigarette prices rise by less than dollar-for-dollar with increases in state excise taxes. This could be the result of interstate competition. See Michael T. Sumner and Robert Ward, "Tax Changes and Cigarette Prices," *Journal of Political Economy*, 89(6):1261-1265 (1981).

3. For a detailed and perceptive analysis of the 1983 tax increase, see Jeffrey E. Harris, "The 1983 Increase in the Federal Cigarette Excise Tax," in Lawrence H. Summers, ed., *Tax Policy and the Economy*, vol. 1 (Cambridge, Mass.: National Bureau of Economic Research, 1987).

to the tax increase. While some estimates of markups on alcoholic beverages are as high as 100 percent, significant price markups are unlikely to be maintained over a long period because of competitive pressures within the industry. Estimates of the effects of tax increases on alcoholic beverage prices are few.[4]

Motor fuel prices would be likely to rise by the full amount of a tax increase, at least in the short run. As consumers responded to the price increase by reducing their demand for gasoline and diesel fuel, producers might be forced to reduce their prices, and thus absorb some of the tax, if they wished to maintain production at pretax levels. Producers could maintain prices by accepting a slight decline in production levels. Whichever happened would depend largely on the response of the OPEC oil-producing countries. Most studies of the effect of an increase in motor fuel taxes assume that world oil prices would fall by less than $0.01 per gallon in response to a $0.10 per gallon increase in U.S. taxes on gasoline, and that most of the tax increase would be reflected in higher gasoline prices.[5]

Prices and Consumption

Although people generally assume that consumer demand for tobacco, alcoholic beverages, and motor fuels (at least in the short term) does not change a great deal in response to changes in prices, substantial evidence indicates that price increases cause some reduction in consumer demand for all three products.

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4. Philip Cook used an estimated markup of 20 percent in his study of the effects of liquor taxes. See Philip J. Cook, "The Effect of Liquor Taxes on Drinking, Cirrhosis, and Auto Accidents," in Mark H. Moore and Dean R. Gerstein, eds., *Alcohol and Public Policy: Beyond the Shadow of Prohibition* (Washington, D.C.: National Academy Press, 1981).

5. See Mark W. French, "Economic Analysis of Gasoline Tax Increases," in House Committee on Public Works and Transportation, *Proposals to Increase the Federal Gasoline and Diesel Taxes for Deficit Reduction Purposes*, 100:1 (July 1, 1987); Department of Energy, Energy Information Agency, *Cost and Benefit Analysis of a Motor Fuels Tax*, SR/EAFD/87-02 (March 1987); Department of Energy, *Energy Security* (March 1987); Bernard A. Gelb and Salvatore Lazzari, "Gasoline Excise Tax: Economic Impacts of an Increase" (Congressional Research Service Issue Brief 87078, March 13, 1989); and Congressional Budget Office, *Budgetary and Economic Effects of Oil Taxes* (April 1986).

Tobacco. Most estimates of the demand for tobacco are based on aggregate data that measure changes in total cigarette consumption over time, or differences in consumption among states at a particular point in time, in relation to cigarette prices, incomes, demographic characteristics of the population, and other factors such as cigarette advertising or public knowledge concerning the health consequences of smoking. These studies have found that the demand for cigarettes is generally inelastic, but the range of estimated elasticities is large.[6] Estimates from most studies suggest a price elasticity of between -0.4 and -0.7, or a decline of between 4 percent and 7 percent in cigarette consumption in response to a 10 percent increase in price.

Other studies using data from surveys of consumers have found that young smokers respond far more to changes in price than older smokers. Among those age 12 to 17, a 10 percent increase in price was estimated to result in a 14 percent reduction in cigarette purchases. Among smokers age 20 to 74, a 10 percent increase in price was estimated to produce only a 4.2 percent decrease in purchases.[7]

Most of the estimated response to higher prices among young smokers was the result of a decline in smoking participation rather than a reduction in the average number of cigarettes smoked. Among teenagers, participation elasticities are almost five times as large as quantity elasticities. The elasticity of smoking participation was -1.20 for those 12 to 17, compared with an elasticity of -0.25 with respect to the quantity of cigarettes consumed by the average smoker. Thus, among smokers age 12 to 17, a 10 percent increase in the price of cigarettes would be estimated to reduce the number of smokers by 12

6. See Eric J. Toder, "Issues in the Taxation of Cigarettes," in *The Cigarette Excise Tax*, Smoking Behavior and Policy Conference Series, Harvard University Institute for the Study of Smoking Behavior and Policy (April 17, 1985); Jeffrey E. Harris, "The 1983 Increase in the Federal Cigarette Excise Tax," in Lawrence H. Summers, ed., *Tax Policy and the Economy*, vol. 1 (Cambridge, Mass.: National Bureau of Economic Research, 1987); and Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress*, A Report of the Surgeon General, DHHS Publication No. (CDC) 89-8411 (prepublication version, January 11, 1989), pp. 98-99.

7. See Eugene M. Lewit, Douglas Coate, and Michael Grossman, "The Effects of Government Regulation on Teenage Smoking," *Journal of Law and Economics*, 24(3) (December 1981); Eugene M. Lewit and Douglas Coate, "The Potential for Using Excise Taxes to Reduce Smoking," *Journal of Health Economics*, 1(2) (August 1982); and Michael Grossman, "Health Benefits of Increases in Alcohol and Cigarette Taxes" (Working Paper No. 3082, National Bureau of Economic Research, Cambridge, Mass., August 1989).

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percent, and the average number of cigarettes smoked by teenagers who continue to smoke by 2.5 percent. Effects on teenage smoking participation are an important factor in determining total smoking, since about 85 percent of smokers begin before the age of 20.

Even among adults, more of the response to an increase in cigarette prices is a reduction in the number of smokers rather than in the average number of cigarettes smoked. For smokers 20 to 74 years old, the estimated participation elasticity was -0.26, compared with a quantity elasticity of -0.10. This result is consistent with models of addictive behavior that predict an all-or-nothing response by smokers to changes in the price of cigarettes.

If prices were to rise by the full amount of a $0.16 per pack tax increase, the average price of a pack of cigarettes in 1990 would rise by about 11 percent, assuming full passthrough of the tax increase with no additional markup, and an average price of $1.50 per pack. This rise could be expected to reduce overall smoking by 4 percent to 8 percent, with much larger changes among teenagers.

Alcoholic Beverages. Existing studies suggest that among alcoholic beverages, beer consumption responds less to price changes than consumption of distilled spirits and possibly of wine. Estimates of the price elasticity of demand for beer range between -0.3 and -0.7, while estimates for distilled spirits are generally between -0.6 and -1.0. Only a few studies have estimated price elasticities for wine, and these suggest that the elasticity for wine could be larger (in absolute value) than for either beer or distilled spirits, possibly -1.0 or more.[8]

An important question is whether abusive consumption of alcoholic beverages responds to price changes even if average alcoholic beverage consumption falls when prices rise. One hypothesis is that abusive consumption moves in tandem with average consumption, and

8. Stanley I. Ornstein and David Levy, "Price and Income Elasticities of Demand for Alcoholic Beverages," in Marc Galanter, ed., *Recent Developments in Alcoholism*, vol. 1 (New York: Plenum Publishing, 1983); Stanley I. Ornstein and Dominique M. Hanssens, "Alcohol Control Laws and the Consumption of Distilled Spirits and Beer," *Journal of Consumer Research*, 12 (September 1985); Jon P. Nelson, "Effects of Regulation on Alcoholic Beverage Consumption: Regression Diagnostics and Influential Data" (unpublished paper, Pennsylvania State University, Institute for Policy Research and Evaluation, January 1988).

that all consumption is reduced when prices increase. An alternative theory is that abusive consumption is attributable to those who are unable to control the amount they drink no matter what the price of beverages. Any reduction in alcoholic beverage consumption in response to a price increase would then be attributable only to nonabusive drinkers.

Research indicates that abusive consumption is sensitive to price. Cirrhosis of the liver, which is positively related to abusive alcohol consumption, was found to be negatively related to state alcohol tax rates. In a study of 30 states, those that raised liquor taxes had either smaller increases or greater reductions in cirrhosis mortality rates than states in which the tax remained unchanged. A $1.00 per proof-gallon increase in a state liquor tax was estimated to reduce the state's cirrhosis mortality rate by 1.9 percent in the short run.[9]

Research also shows that alcohol-related motor vehicle fatalities, another aspect of abusive consumption, are sensitive to higher taxes on alcoholic beverages.[10] Finally, there is some evidence that heavy drinking among teenagers is more responsive to the price of beer than more moderate drinking. An increase in the tax on beer was found to reduce the percentages of teenagers who drank beer frequently (four to seven times per week) and fairly frequently (one to three times per week) by proportionately more than the percentage of those who drank infrequently.[11]

An equalized tax of $16.00 per proof-gallon ($0.25 per ounce of alcohol) would raise the price of beer by 18 percent, the price of table wine by 25 percent, and the price of distilled spirits by 7 percent, assuming full passthrough of the tax with no additional markup, based on estimated 1990 prices of $3.64 per a typical six-pack of beer, $2.89

9. Cook, "The Effect of Liquor Taxes on Drinking, Cirrhosis, and Auto Fatalities;" and Philip J. Cook and George Tauchen, "The Effect of Liquor Taxes on Heavy Drinking," *Bell Journal of Economics*, 13(2) (Autumn 1982).

10. See Cook, "The Effect of Liquor Taxes on Drinking, Cirrhosis, and Auto Fatalities;" and Henry Saffer and Michael Grossman, "Beer Taxes, the Legal Drinking Age, and Youth Motor Vehicle Fatalities," *Journal of Legal Studies*, 16(2): 351-374 (June 1987).

11. Douglas Coate and Michael Grossman, "Effects of Alcohol Beverage Prices and Legal Drinking Ages on Youth Alcohol Use," *Journal of Law and Economics*, 31(1) (April 1988).

per 750-ml bottle of table wine, and $8.05 per 750-ml bottle of 80-proof distilled spirits.[12]

These increases could be expected to reduce beer consumption by 5 percent to 13 percent and distilled spirits consumption by 4 percent to 7 percent. The effect on wine consumption is uncertain, but the reduction could be 17 percent to 25 percent.

One issue is whether a disproportionate tax increase on one type of beverage will lead to substituting consumption of beer, wine, or distilled spirits rather than reducing overall alcohol consumption. Most research has found little evidence that the consumption of one type of beverage is responsive to changes in the prices of other beverages. A recent study found that increases in taxes on beer and distilled spirits are likely to reduce total consumption of alcohol, but that wine taxes would not have a significant effect on total alcohol consumption. That is, although a tax increase on beer could increase consumption of wine and distilled spirits, the increase would not be large enough to offset the reduction in beer consumption. Likewise, a tax increase on distilled spirits could increase consumption of beer and wine, but not enough to offset the reduction in spirits consumption. This result is consistent with limited substitution between beer and distilled spirits consumption.[13]

Motor Fuels. There is more unanimity regarding estimates of the price elasticity of demand for motor fuels than in the case of either cigarettes or alcoholic beverages. Generally, most studies have estimated a short-term elasticity of about -0.2 and a long-term elasticity of between -0.7 and -1.0.[14] In the short term, the entire response to higher prices

12. Prices reflect estimates by the Distilled Spirits Council of the United States (DISCUS) of the 1989 price of a six-pack of Budweiser, a 750-ml bottle of Gallo Chablis Blanc, and a 750-ml bottle of Smirnoff 80-proof vodka. Prices were inflated to 1990 using CBO's projected change in overall consumer prices.

13. See Henry Saffer, "Alcohol Consumption and Tax Differentials Between Beer, Wine and Spirits" (Working Paper No. 3200, National Bureau of Economic Research, Cambridge, Mass., December 1989).

14. See Douglas R. Bohi, *Analyzing Demand Behavior* (Baltimore, Md.: The Johns Hopkins University Press, 1981); Douglas R. Bohi and Mary Beth Zimmerman, "An Update on Econometric Studies of Energy Demand Behavior," *Annual Review of Energy*, vol. 9 (Palo Alto: Annual Reviews, Inc., 1984); and Carol A. Dahl, "Gasoline Demand Survey," *The Energy Journal*, 7(1): 67-82 (January 1986).

is by reducing miles driven. In the long term, the response is split between a reduction in average miles driven and an increase in the average fuel economy of automobiles.

A tax increase of $0.12 per gallon would raise 1990 gasoline prices by about 11 percent, assuming full passthrough of the tax increase and an average price of $1.10 per gallon. This rise could be expected to reduce gasoline consumption by a little over 2 percent in the short run.

In the current environment, a tax increase is unlikely to lead to major changes in the fuel efficiency of vehicles. About half of the vehicle stock on the road today was built between 1980 and 1985, when nominal gasoline prices were higher than in 1989. Even with a tax increase of $0.12 per gallon, gasoline prices in 1990 would still be lower in nominal terms than in 1981 and 1982. Moreover, improvements in fuel efficiency have been strongly influenced by the corporate average fuel economy (CAFE) standards established by the Energy Policy Conservation Act of 1975. These standards are generally regarded as mandating greater improvements in fuel efficiency than would be chosen by consumers on the basis of current prices. Thus, the tax would not create additional incentives for producing vehicles with greater fuel efficiency.

THE DISTRIBUTION OF EXCISE TAX INCREASES AMONG FAMILIES

In simulating the distribution of federal excise tax increases among families for 1990, CBO used data from the Consumer Expenditure Survey (CES), the Current Population Survey (CPS), and the Statistics of Income (SOI). (The data and simulation methods are described in Appendix B.) The CES reports family expenditures on cigarettes and other tobacco products, alcoholic beverages, and gasoline and highway diesel fuel rather than the quantities consumed. For purposes of the simulations, the distribution of quantities consumed was assumed to be proportional to the distribution of expenditures. This method implies that prices of the taxed commodities are constant among income classes, which is probably reasonable for motor fuels, cigarettes, and beer, but suspect for distilled spirits and especially for wine. For simulations in which excise taxes are allocated according to taxable expenditures, this method will be likely to overstate the tax on alco-

holic beverages paid by upper-income families, making the tax appear less regressive than it actually may be.

The distribution of taxable expenditures does not give a complete picture of the distribution of excise tax increases. First, not all taxable expenditures are made by consumers. A certain amount of taxable expenditures are used as intermediate goods or are purchased for use by business. The purchase of other final goods reflects the tax on that portion of taxable expenditures. For the simulations, CBO assumed that business made 20 percent of alcoholic beverage purchases and 40 percent of motor fuel purchases, and allocated that portion of the tax increase in proportion to expenditures on all items.[15]

Second, some of the tax increase is offset by changes in income and changes in other taxes. Excise tax increases will lead either to higher prices or to lower returns to capital and labor (lower factor incomes), depending on whether or not the nominal money supply increases in response to an increase in relative prices. Most revenue estimates for Congressional legislation make the standard assumption that nominal gross national product is fixed, and the tax increase leads to a reduction in factor incomes. The reduction in nominal factor incomes leads, in turn, to a decline in both income and payroll taxes. The revenue yield is usually assumed to be only 75 percent of the gross tax increase.

This study assumes that prices rise but that real GNP and nominal factor incomes remain fixed. With an increase in the price level and no change in nominal incomes, individual income taxes fall under an indexed tax system. Further, as indexed transfer payments, such as Social Security benefits and Supplemental Security Income (SSI) payments, rise, only factor incomes are affected. These changes will offset some of the increase in excise taxes. The net increases in excise taxes are measured before and after the offsetting effects of indexing.

15. The business share of alcoholic beverage expenditures is based on a 1985 estimate by the Distilled Spirits Council of the United States, Inc. The business share of motor fuel expenditures is a weighted average of an estimated 25 percent business share for gasoline and a 90 percent business share for diesel fuel (estimates based on Federal Highway Administration projections of fuel consumption by sector).

The distributional effects of the tax increases were simulated by allocating the estimated total revenues among families, thus assuming that the price elasticities of demand are constant among income and age categories. (A price elasticity of -0.40 was used for cigarettes, -0.30 for beer, -0.70 for wine, -0.70 for distilled spirits, and -0.20 for motor fuels.) The simulations assume that the increase in each tax is fully passed through to consumers without additional markups, and allow for changes in taxes and incomes, primarily Social Security benefits and SSI payments, that result from the higher price level. The tax increase was assumed to be in effect for the entire year.

Tax Increases in Relation to Family Income

The average tax increases, and the tax increases as percentages of after-tax income for the three separate excise tax options before and after offsetting changes in taxes and transfer payments, are shown in Table 9. All three tax increases are regressive with respect to post-tax family income. The regressivity of all three tax increases is reduced when the effects of indexing are taken into account, with the net alcoholic beverage tax increase becoming mostly proportional to income except for families in the lowest income quintile. The tax increases are all fairly small relative to family incomes. With the effects of indexing included, the three tax increases are all 0.4 percent or less of post-tax family income on average. For families in the lowest income quintile, the cigarette and the alcoholic beverage net tax increases are between $30 and $40, or 0.4 percent to 0.5 percent of post-tax income. The tax increase on motor fuels for families in the lowest quintile is about $80, or 1.0 percent of income. Elderly families are hurt less than other families, especially after their benefit levels are adjusted for the effects of higher prices. The effect of the tax increases among regions varies little, except that rural families pay slightly more than other families--relative to their incomes--with a motor fuel tax increase.

TABLE 9. EFFECTS OF INCREASING CIGARETTE, ALCOHOLIC BEVERAGE, AND MOTOR FUEL TAXES, BY ADJUSTED POST-TAX INCOME QUINTILES, AGE OF FAMILY HEAD, AND REGION, 1990

	Cigarette Tax Increase		Alcoholic Beverage Tax Increase		Motor Fuel Tax Increase	
	Before Indexing	After Indexing	Before Indexing	After Indexing	Before Indexing	After Indexing
Net Tax Increase (Dollars)						
All Families[a]	41	33	101	81	162	131
Post-Tax Family Income[b]						
Bottom quintile[c]	35	30	50	38	99	81
Second quintile	40	34	64	49	127	103
Middle quintile	45	38	91	74	158	132
Fourth quintile	45	36	117	95	187	152
Top quintile	41	28	163	133	223	175
Age of Head of Family						
Under 30	38	34	111	100	140	123
30 to 44	47	40	118	102	180	155
45 to 59	56	49	114	96	200	171
60 to 74	31	19	76	46	141	93
75 and over	12	0	38	8	77	28
Census Region[d]						
Northeast	43	35	107	86	151	118
Midwest	47	39	104	86	159	129
South	41	33	95	76	164	133
West	34	26	118	98	173	141
Rural	41	33	78	59	164	135
Net Tax Increase as a Percentage of Post-Tax Family Income						
All Families[a]	0.1	0.1	0.3	0.2	0.5	0.4
Post-Tax Family Income[b]						
Bottom quintile[c]	0.4	0.4	0.6	0.5	1.2	1.0
Second quintile	0.2	0.2	0.4	0.3	0.7	0.6
Middle quintile	0.2	0.1	0.3	0.3	0.6	0.5
Fourth quintile	0.1	0.1	0.3	0.3	0.5	0.4
Top quintile	0.1	e	0.2	0.2	0.3	0.2
Age of Head of Family						
Under 30	0.2	0.1	0.5	0.4	0.6	0.5
30 to 44	0.1	0.1	0.3	0.3	0.5	0.4
45 to 59	0.1	0.1	0.3	0.2	0.5	0.4
60 to 74	0.1	0.1	0.2	0.1	0.4	0.3
75 and over	0.1	e	0.2	e	0.3	0.1
Census Region[d]						
Northeast	0.1	0.1	0.3	0.2	0.4	0.3
Midwest	0.1	0.1	0.3	0.3	0.5	0.4
South	0.1	0.1	0.3	0.2	0.5	0.4
West	0.1	0.1	0.3	0.3	0.5	0.4
Rural	0.2	0.1	0.3	0.2	0.6	0.5

SOURCE: Congressional Budget Office simulation models.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

(Continued)

TABLE 9. Continued

	Cigarette Tax Increase		Alcoholic Beverage Tax Increase		Motor Fuel Tax Increase	
	Before Indexing	After Indexing	Before Indexing	After Indexing	Before Indexing	After Indexing
Net Tax Increase as a Percentage of All Expenditures						
All Families[a]	0.1	0.1	0.3	0.2	0.5	0.4
Post-Tax Family Income[b]						
Bottom quintile[c]	0.2	0.1	0.2	0.2	0.5	0.4
Second quintile	0.2	0.1	0.3	0.2	0.5	0.4
Middle quintile	0.2	0.1	0.3	0.2	0.5	0.4
Fourth quintile	0.1	0.1	0.3	0.3	0.5	0.4
Top quintile	0.1	0.1	0.3	0.3	0.4	0.3
Age of Head of Family						
Under 30	0.1	0.1	0.4	0.4	0.5	0.5
30 to 44	0.1	0.1	0.3	0.3	0.5	0.4
45 to 59	0.1	0.1	0.3	0.2	0.5	0.4
60 to 74	0.1	0.1	0.2	0.2	0.5	0.3
75 and over	0.1	e	0.2	e	0.4	0.1
Census Region[d]						
Northest	0.1	0.1	0.3	0.2	0.4	0.3
Midwest	0.1	0.1	0.3	0.2	0.5	0.4
South	0.1	0.1	0.3	0.2	0.5	0.4
West	0.1	0.1	0.3	0.2	0.4	0.4
Rural	0.2	0.1	0.3	0.2	0.6	0.5
Share of the Net Tax Increase (Percent)						
All Families[a]	100.0	100.0	100.0	100.0	100.0	100.0
Post-Tax Family Income[b]						
Bottom quintile[c]	15.4	16.4	9.1	8.6	11.3	11.3
Second quintile	18.6	19.4	12.2	11.5	15.0	14.9
Middle quintile	21.0	22.0	17.3	17.5	18.8	19.4
Fourth quintile	22.1	21.9	23.5	23.7	23.4	23.5
Top quintile	21.3	18.3	35.1	35.4	29.9	28.9
Age of Head of Family						
Under 30	13.2	14.5	15.9	17.8	12.5	13.6
30 to 44	39.4	42.2	40.8	43.9	38.8	41.4
45 to 59	30.5	32.8	25.6	26.7	27.9	29.5
60 to 74	14.3	10.7	14.4	10.8	16.6	13.6
75 and over	2.6	-0.1	3.4	0.9	4.2	1.9
Census Region[d]						
Northest	20.5	20.4	20.7	20.7	18.2	17.6
Midwest	23.0	23.7	21.1	21.4	20.0	20.0
South	26.3	26.3	25.2	25.0	27.0	27.2
West	15.1	14.2	21.2	21.8	19.3	19.4
Rural	15.1	15.3	11.8	11.2	15.5	15.7

c. Excludes families with zero or negative incomes.

d. Data for the four census regions excludes rural families, which are shown separately.

e. Less than 0.05 percent.

Tax Increases in Relation to Total Family Expenditures

The tax increases are much less regressive relative to expenditures than they are to annual income (see Table 9). Indeed, after taking account of offsetting changes in taxes and transfers, measured against expenditures, the net tax increases for cigarettes and motor fuels are mostly proportional to total expenditures, while the tax increase for alcoholic beverages is slightly progressive. The progressivity of the alcoholic beverage tax increases may be overstated if expenditures on alcoholic beverages rise much faster with increasing income than do actual quantities consumed.

Shares of the Tax Increases

Reflecting the general pattern of expenditures on tobacco, alcoholic beverages, and motor fuels, families in the highest quintile pay the largest share of the increase in alcoholic beverage and motor fuel taxes (see Table 9). Families in the middle and fourth quintile pay the highest share of the cigarette tax increase. Families headed by persons age 60 to 74 pay about 11 percent of the net cigarette or alcoholic beverage tax increases, and about 14 percent of the net motor fuel tax increase.

OPTIONS THAT WOULD OFFSET THE REGRESSIVITY OF AN EXCISE TAX INCREASE

The potential regressivity of an increase in federal excise taxes should be considered in the context of the entire federal tax system. An increase in a regressive tax may have little effect if that tax is small relative to total tax payments. Federal excise taxes on tobacco, alcoholic beverages, and motor fuels are a small portion of total federal taxes--less than 3.5 percent in 1989. For lower-income families, however, excise taxes can be a relatively large share of their total federal tax payments. Many of these families have income that is below the tax threshold for income taxes, while some, particularly elderly families, receive no income from earnings and hence do not pay payroll taxes. CBO has estimated that for families in the lowest income quintile,

federal excise taxes will be about 25 percent of their total federal tax liabilities in 1990.

Concerns about the regressivity of an excise tax increase may cause policymakers to consider tax and transfer options that would compensate low-income families for the tax increase. CBO has examined three such changes: an increase in food stamp payments, an increase in the earned income tax credit (EITC), and a combination of increases in both food stamps and the EITC. Each option would spend 15 percent of the net revenues from the excise tax increases. Any of the options could be redesigned to provide either more or less assistance to low-income families. Only simple changes in existing programs were considered, to avoid any new administrative costs. Options not considered here, such as new tax credits or gasoline stamps, could be more effective in reaching those low-income families that would be paying the increased excise taxes, but might be costly to administer.

An Increase in the Earned Income Tax Credit (EITC)

The EITC is available to working families with children. Under current law, the credit is calculated as 14 percent of earnings up to a maximum amount. The credit is reduced by 10 percent of adjusted gross income (AGI) in excess of a minimum amount. For 1990, the earnings maximum for the credit is $6,810, yielding a maximum EITC of $953. The minimum AGI above which the credit is reduced is $10,730 so the credit is completely phased out when AGI reaches $20,264. Because the EITC is refundable, it can be used to provide assistance to families whose incomes are too low to owe federal individual income taxes. A disadvantage of the credit as an offset to an excise tax increase is that childless couples and single individuals are not eligible, and that families have to file income tax returns to get the EITC.

Separate increases in the EITC were simulated to offset 15 percent of the net tax increase from raising cigarette, alcoholic beverage, or motor fuel taxes. An approximate 10 percent increase in the EITC was simulated to offset the added net cigarette tax, about a 20 percent increase was simulated to offset the combined alcoholic beverage net tax

increases, and about a 30 percent increase was simulated to offset the net increase in the motor fuel tax.

An Increase in Food Stamp Benefits

Food stamps are federal benefits available to households that meet eligibility limits for monthly income and assets, as long as certain household members fulfill requirements to register for work and for employment and training programs. Recipients of cash benefits from the Aid to Families With Dependent Children (AFDC) program or the Supplement Security Income (SSI) program are generally eligible for food stamps.

Food stamp benefits are a function of household size, monthly income after deductions, and the maximum monthly benefit. The maximum monthly benefit is tied to the Department of Agriculture's Thrifty Food Plan, which measures the cost of purchasing a nutritionally adequate low-cost diet. Food stamp benefits are reduced by 30 cents for every dollar of monthly income after deductions. For fiscal year 1990, average monthly benefits are projected to be about $59 per person.

With some exceptions, food stamps can be used only to purchase food items for home preparation and consumption. They cannot be used to purchase tobacco and alcohol. Food stamps generally are received by families whose income is low enough to place them outside the federal tax system. However, because food stamp eligibility is determined on a monthly basis, some families with relatively high annual income can receive food stamps if their income is low in one or more months and if they do not have many countable assets in those months. A disadvantage of food stamps as an offset to an excise tax increase is the relatively low participation rates in the program. CBO has estimated that only about one-half to two-thirds of eligible people participated in the program in August 1984.[16] Many of those who did

16. Congressional Budget Office, "The Food Stamp Program: Eligibility and Participation" (Staff Working Paper, November 1988).

not participate, however, were eligible for very low benefits because they had relatively high monthly incomes after deductions.

Separate increases in food stamps were simulated to offset 15 percent of each of the three net tax increases. An increase of about 5 percent in food stamps was simulated to offset the net cigarette tax increase, an increase of about 10 percent was simulated to offset the net alcoholic beverage tax increase, and a food stamp increase of about 15 percent was used to offset the net motor fuel tax increase.

An Increase in Food Stamp Benefits and in the EITC

One can receive both food stamps and the EITC. If the refundable portion of the EITC is received as a single lump-sum payment, it is counted as an asset in the month it is received for purposes of determining food stamp eligibility, but advance EITC payments are no longer counted as monthly income by the food stamp program.

An increase in food stamps, the EITC, or a combination of the two would provide the largest assistance to families in the lowest income quintile (see Table 10). The increase in food stamps would more than offset the average net alcoholic beverage and motor fuel excise tax increases and offset about 75 percent of the average net cigarette tax increase for families in the lowest income quintile. The increase in the EITC would likewise offset most of the average net increase in alcoholic beverage taxes, but less than one-half of the net increase in the cigarette tax, for families in the lowest income quintile.

Under any of these options, but particularly for increases in the EITC, some of the benefit of the credits would go to high-income families. For the EITC this is because low-income people would be entitled to the credits even if they lived with high-income relatives. The EITC provides a large percentage of its benefits to nonelderly families. As an offset to excise tax increases, this greater share may not be a problem because low-income elderly families receive much of their income from indexed transfer payments.

The average benefits mask the fact that not all families are eligible for either food stamps or the EITC. Just over 50 percent of families in the lowest quintile receive food stamps, while about 28 percent of families receive an EITC (and about 17 percent of families receive both).

TABLE 10. AVERAGE NET TAX INCREASE AND AVERAGE BENEFIT INCREASE FROM FOOD STAMP AND EITC OPTIONS, BY ADJUSTED POST-TAX INCOME QUINTILES, 1990 (In dollars)

	Net Tax Increase	Average Benefit Increase From		
		Increased Food Stamps	Expanded EITC	Combined Options
Cigarettes				
All Families[a]	33	5	5	5
Post-Tax Family Income[b]				
Bottom quintile[c]	30	23	14	18
Second quintile	34	2	8	5
Middle quintile	38	d	2	1
Fourth quintile	36	d	1	1
Top quintile	28	d	d	d
Alcoholic Beverages				
All Families[a]	81	12	12	12
Post-Tax Family Income[b]				
Bottom quintile[c]	38	55	33	44
Second quintile	49	4	19	12
Middle quintile	74	1	5	3
Fourth quintile	95	d	2	1
Top quintile	133	d	1	d
Motor Fuels				
All Families[a]	131	19	19	19
Post-Tax Family Income[b]				
Bottom quintile[c]	81	89	53	71
Second quintile	103	7	31	19
Middle quintile	132	1	9	5
Fourth quintile	152	1	4	2
Top quintile	175	d	1	1

SOURCE: Congressional Budget Office simulation models.

NOTE: EITC = earned income tax credit.

a. Includes families with zero or negative incomes not shown separately.

b. Quintiles contain equal numbers of people.

c. Excludes families with zero or negative incomes.

d. Less than $0.50.

Many of the families in the lowest income quintile that do not receive either food stamps or an EITC are elderly families. The net tax increase for any of the three options, however, would be very different for elderly low-income families than for other low-income families (see Table 11). Elderly low-income families would have a smaller tax increase after accounting for the effects of a higher price level on indexed transfer payments and individual income tax payments. The average net tax increase for families headed by someone age 60 or over would be about $8 for the cigarette and alcoholic beverage tax increases and about $41 for the motor fuel tax increase. Elderly low-income families would pay lower net additional taxes than other families both because they have low expenditures on tobacco, alcoholic beverages, and motor fuels and hence would have a small tax increase to begin with, and because they receive much of their income from indexed transfer payments.

For nonelderly low-income families, the net effects of any of the three tax increases would be very different for families receiving food stamps or an EITC and families not receiving any of those benefits (see Table 12). About 60 percent of nonelderly low-income families receive food stamps, about 42 percent receive EITC, and 77 percent receive either food stamps or an EITC or both. The average increase in food

TABLE 11. AVERAGE NET TAX INCREASE FOR FAMILIES IN THE LOWEST INCOME QUINTILE, BY AGE OF HEAD OF FAMILY, 1990

	Percentage of Low-Income Families	Average Net Tax Increase (Dollars)		
		Cigarettes	Alcoholic Beverages	Motor Fuels
All Families	100	30	38	81
Age of Head of Family				
Under 60	66	41	53	100
60 and over	34	8	8	41

SOURCE: Congressional Budget Office simulation models.

stamp benefits would more than offset any of the three average tax increases for nonelderly low-income food stamp families as would the average increase in the EITC for nonelderly low-income families receiving an EITC. The average increase in combined benefits would be sufficient to offset the average alcoholic beverage and motor fuel tax but not the average cigarette tax increase for nonelderly low-income families receiving either food stamps or an EITC or both.

Nonelderly low-income families who do not receive food stamps or an EITC would face higher taxes under any of the three tax increases. If both food stamps and the EITC were increased, about 23 percent of nonelderly low-income families would fall into this category. The average increase in taxes faced by these families would be about $38 per year for the cigarette tax, about $67 per year for the alcoholic beverage tax, and about $100 per year for the motor fuel tax.

TABLE 12. AVERAGE NET TAX INCREASE AND AVERAGE BENEFIT INCREASE FROM FOOD STAMP AND EARNED INCOME TAX CREDIT OPTIONS FOR FAMILIES IN THE LOWEST INCOME QUINTILE WITH AGE OF FAMILY HEAD UNDER 60, 1990 (In dollars)

	Families Receiving Benefits			Families Not Receiving Benefits	
	Percentage of Families	Average Net Tax Increase	Average Benefit Increase	Percentage of Families	Average Tax Increase
Food Stamp Option					
Cigarettes	60	40	51	40	42
Alcoholic Beverages	60	46	125	40	63
Motor Fuels	60	93	201	40	112
Earned Income Tax Credit Option					
Cigarettes	42	45	48	58	38
Alcoholic Beverages	42	52	116	58	53
Motor Fuels	42	117	188	58	88
Combined Food Stamp and Earned Income Tax Credit Option					
Cigarettes	77	42	33	23	38
Alcoholic Beverages	77	49	80	23	67
Motor Fuels	77	100	129	23	100

SOURCE: Congressional Budget Office simulation models.

CHAPTER VI

OTHER EFFECTS OF EXCISE TAX INCREASES

Increases in the excise taxes on tobacco products, alcoholic beverages, and motor fuels would affect the economy at large principally by reducing the federal deficit. In the context of recent discussions of deficit reduction options, the tax increases discussed in Chapter V are modest from an economywide perspective. These options would raise revenues by about $3 billion annually in the case of tobacco products, about $7 billion annually in the case of alcoholic beverages, and about $12 billion annually in the case of motor fuels. The economic effects of deficit reduction summarized below would be common to each of these tax increases. In each case, the economic effects would be more significant the greater the deficit reduction.

An increase in the excise tax on motor fuels would have broader-reaching economic effects than an increase in taxes on tobacco products or alcoholic beverages generating the same amount of revenue, because motor fuels are intermediate inputs in production and distribution while tobacco products and alcoholic beverages are not. The effects of the motor fuel tax increase would be muted, however since net imports account for a large portion--approximately 40 percent in 1989--of U.S. petroleum products and are likely to bear the brunt of the reduction in demand resulting from any excise tax increase. In the tobacco product and alcoholic beverage markets, imports play a smaller role. In 1989, taxes on imports generated less than 1 percent of total tobacco tax revenues, and about 14 percent of alcoholic beverage tax revenues.

Aside from its effects on the deficit, an excise tax increase would raise the relative prices of the taxed goods, which could boost the overall level of consumer prices if the nominal money supply increased to accommodate the change. Any increase in the price level would be a one-time adjustment. An increase in the relative prices of the taxed goods would reduce demand for those goods. The impact would be

greater in regions where production of the goods is concentrated. Demand and production in industries not subject to the higher taxes would respond to the change in relative prices, and investment and employment would be boosted in industries producing goods for which demand had increased, so that, in the long run, there would be little or no effect on overall output.

Finally, an increase in excise tax rates would increase incentives for noncompliance. Tax increases on tobacco and alcoholic beverages on the order of those discussed in Chapter V would be unlikely to reduce compliance significantly. The consequences of a motor fuels tax increase are less certain. Procedures for collecting payment of the motor fuels excise tax were tightened in 1987 in response to concerns about widespread evasion. The efficacy of these efforts is unclear.

EFFECTS ON THE ECONOMY OF AN INCREASE IN EXCISE TAXES ON MOTOR FUELS

Increasing the excise tax on gasoline from 9 cents to 21 cents per gallon, and the excise tax on diesel fuels from 15 cents to 27 cents per gallon, would raise about $12 billion annually in additional taxes. A tax increase of this magnitude would have discernible, though modest, effects on national income, the general price level, and the balance of trade.

Like virtually any other reduction in the federal budget deficit, it would temporarily slow the growth of the gross national product. It would also increase consumer prices, unlike some other reductions in the deficit. Higher taxes on sales of motor fuels to households would lower private disposable income, while higher taxes on fuels used by businesses would increase costs. These increased costs would be ultimately shifted forward to consumers through higher prices, thereby reducing disposable income. At first, however, businesses would bear some share of the increased costs in the form of lower profits. Either effect would weaken private demand, and hence reduce GNP. To the extent that the positive effects of reduced motor fuel consumption on, for example, pollution levels, would not be captured in the national

income statistics, these GNP effects would overstate the costs of the higher tax rates.

These temporary effects would be relatively modest in the case of a 12 cent per gallon increase in motor fuels taxes. Several recent studies of the effects of increasing the tax on gasoline found that, relative to a base case of no tax increase, a 10 cent per gallon increase in motor fuel taxes would reduce real output by between 0.2 percent and 0.3 percent--estimates that CBO judges to be on the high side--while causing a one-time increase in the consumer price index of approximately 0.3 percent to 0.4 percent.[1]

The initial effect of higher taxes on motor fuels would be to increase the relative prices of motor fuels, and of goods using motor fuels as intermediate inputs. In the near term, this increase in relative prices would probably be reflected in a higher overall price level. The effect on output of the one-time increase would depend on the response of the Federal Reserve. If the nominal money supply was not increased enough to compensate for the increase in prices, the real money supply would be reduced. This reduction in turn would boost interest rates, adding to the contractionary effects of higher prices in reducing spendable incomes and profits. However, such additional declines in real output would not occur if the Federal Reserve increased the nominal money supply enough to offset the initial rise in the general price level.

The contractionary effects of higher motor fuel taxes would eventually, however, be offset by the effects of a smaller federal deficit on interest rates, investment, and the balance of trade via reduction in the trade deficit. Reducing the federal deficit would be likely to result in a reduction in interest rates, and this reduction in rates would stimulate increases in spending on housing, consumer durables, and

1. For analyses of the effects of motor fuel tax increases, see Mark W. French, "Economic Analysis of Gasoline Tax Increases," in House Committee on Public Works and Transportation, *Proposals to Increase the Federal Gasoline and Diesel Taxes for Deficit Reduction Purposes*, 100:1 (July 1, 1987); Department of Energy, Energy Information Agency, *Cost and Benefit Analysis of a Motor Fuels Tax*, SR/EAFD/87-02, Washington, D.C. (March 1987); Department of Energy, *Energy Security. Appendix E: Analysis of the Effects of a Gasoline Tax*, DOE/S-0057 (March 1987); and Joyce Yanchar, "Closing the Deficit: An Income Tax Surcharge Versus Energy Taxes," *Data Resources U.S. Review*, pp. 17-23 (November 1987).

perhaps business investment, which would eventually offset at least some of the initial contractionary effects of the tax increase.

The contractionary effects of higher motor fuels taxes would also be offset eventually by an increase in net exports--the difference between sales of American goods abroad and American purchases of foreign goods. A country with a trade deficit can be described as "overspending its income" in the sense that its total expenditure on, or absorption of, goods and services (including imports) exceeds its domestic production (including exports). Higher motor fuels taxes not matched by corresponding increases in government spending would reduce domestic spending, thereby lowering absorption, reducing imports, and freeing domestic resources to go into production of exports.

The increase in net exports would be helped along by a depreciation of the dollar that would result if U.S. interest rates were reduced. With lower interest rates, inflows of foreign capital would decline, lowering the demand for dollars and thereby lowering the rate at which dollars can be exchanged for other currencies. As a result, imports would become more expensive in this country, U.S. exports would become cheaper, and net exports would increase.

Higher taxes on motor fuels would also directly reduce oil imports. Higher taxes would lower consumption of motor fuels, but--because this would not affect the wellhead price of oil--domestic production and reserves would not be harmed. With domestic supply of oil unchanged, the effect of lower domestic demand for oil would be to reduce oil imports. CBO has estimated that raising motor fuel taxes by 12 cents per gallon in 1986 would have lowered the country's net oil import requirements by between 1 percent and 2 percent in 1987.[2]

Over time, lower U.S. demand for imported oil would put some downward pressure on world oil prices. The effect would be small, given a small estimated drop in U.S. demand for oil. Domestic wellhead prices are likely to track world oil prices, which might lower domestic supply, though the effect would be small in light of the small change in world oil prices.

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2. Congressional Budget Office, *The Budgetary and Economic Effects of Oil Taxes* (April 1986).

Over the long term, firms and households would adjust their spending patterns to reflect the increase in the relative prices of motor fuels and goods using motor fuels as inputs. In addition to decreasing the demand for these goods, these adjustments would lead to increased demand for goods whose relative prices fell. The ultimate result would be a reallocation of factors of production from motor-fuel-producing and motor-fuel-using sectors of the economy to other sectors.

REGIONAL EFFECTS

Regions differ in how much they depend on automobile and truck transport, while the use of tobacco products and alcoholic beverages also varies among regions. As has been noted above, because of higher than average consumption of motor fuels, households and businesses in rural regions would bear a somewhat disproportionate share of the burden of higher motor fuel taxes.

Different regions would also be affected differently by reductions in the demand for tobacco, alcoholic beverages, and motor fuels. Regions whose economic base depends heavily on oil refining would be affected by the motor fuel tax increase. Because any reduction in the demand for motor fuels resulting from higher prices would eventually translate almost entirely into reduced petroleum imports, domestic refiners and marketers, not producers, would be those principally affected. In 1988, almost 40 percent of total U.S. refinery production of motor gasoline came from the Texas and Louisiana Gulf coast region.[3] Domestic producers could be affected if a reduction in U.S. demand stemming from a tax increase lowered world oil prices, but this effect would probably be very small.

Production of tobacco products and alcoholic beverages is also concentrated in a few states. Although 21 states have establishments authorized to manufacture tobacco products, North Carolina and Kentucky accounted for 70 percent of taxable cigarette output in 1989. Distilled spirits production is spread over about two dozen states,

3. Department of Energy, Energy Information Administration, *Petroleum Supply Annual, 1988*, vol. 1, DOE/EIA-0340(88)/1 (May 1989).

although California and Kentucky were responsible for over 40 percent of domestic taxable output in 1989. California produces about 80 percent of the domestic wine consumed in this country, with most of the remaining production in New York. Beer production is more diffuse. Five states were responsible for over 50 percent of the total taxable output in 1989, but none of these five (California, Colorado, New York, Texas, and Wisconsin) produced as much as 13 percent of the total.[4]

Reducing the consumption of tobacco, alcoholic beverages, and motor fuels would affect state government finances. Virtually all states tax tobacco and motor fuels on a per unit basis (in cents per pack or per gallon). A reduction in consumption of tobacco and motor fuels resulting from the federal excise tax increase would, therefore, lead to a proportional reduction in state tax revenues from these sources.

The effect on state alcoholic beverage tax revenues would be less clear. A number of states tax alcoholic beverages on an ad valorem basis (as a percentage of final sales price inclusive of excise taxes). In these cases, the change in state revenues would be proportional to the change in total expenditures rather than to the change in unit consumption. Because higher federal taxes would raise prices but reduce consumption, total expenditures on alcoholic beverages could either increase or decrease following an increase in federal tax rates. Because the percentage changes in the quantities of beer and distilled spirits purchased in response to a price change are estimated to be smaller than the percentage changes in the prices of the goods (that is, the elasticity of demand is estimated to be less than one), alcoholic beverage revenues in ad valorem states would be likely to increase with an increase in the federal excise tax rate on these goods.

Some states tax tobacco products, alcoholic beverages, and motor fuels under ad valorem general sales taxes as well as under selective excise taxes. Because the estimated elasticities of demand for cigarettes and motor fuels (in the short run) are also estimated to be less than one, general sales tax revenues from these three sources would be

4. Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms, unpublished data, May 1990.

likely to increase with an increase in federal excise tax rates on these goods.

The magnitude of the effects of higher federal excise taxes on overall state and local finances would depend on the shares of state tax revenues provided by taxes on tobacco, alcoholic beverages, and motor fuels. These shares are relatively small on average, for tobacco and alcoholic beverages. In 1988, tobacco taxes were 1.8 percent of state tax revenues, while alcoholic beverage taxes were 1.2 percent. Some states rely more heavily on these taxes than others. New Hampshire received more than 5 percent of its total revenues from taxes on tobacco, while Florida received 4 percent of its revenues from taxes on alcoholic beverages. Motor fuel taxes are a larger percentage of state tax revenues--6.5 percent in 1988. The share of state tax revenues provided by motor fuel taxes varies considerably, however. In 1988, the share ranged from a low of under 3 percent in Alaska, Hawaii, and New York (1.3 percent in the District of Columbia) to a high of over 14 percent in Montana and New Hampshire.

TAX COLLECTION AND COMPLIANCE

Higher tax rates increase the incentive for noncompliance. At current rates, compliance is generally considered problematic only for gasoline and diesel tax collections. Changes in collection procedures put in place by the Tax Reform Act of 1986 (TRA) address the perceived abuses of previous collection procedures. Current compliance with federal excise taxes on alcoholic beverages and tobacco products is generally considered to be acceptable. The major compliance problems are those of state governments, arising from bootlegging across state lines and from the exemption from state taxes for purchases on Indian reservations and military bases.

Gasoline

The federal excise tax on gasoline is levied on the sale or removal of gasoline from the refinery or terminal. For imported gasoline, the tax is imposed on removal from customs custody. After removal, the gaso-

line is delivered to a wholesale distributor who delivers the gasoline either directly to the user or to a retailer, who then sells the gasoline to the final user. Several users of gasoline are tax-exempt, including state and local governments, nonprofit educational organizations, and commercial ships and aircraft. Sales for export are also tax-exempt.[5]

Up to the point of taxation, gasoline may be transferred tax-free among registered producers. The Internal Revenue Service (IRS) approves and registers producers, who include importers, refiners, terminal operators, throughputters, and traders.[6] The IRS may require an applicant to secure a bond before approving a registration application. Once registered, a producer may purchase and sell gasoline tax-free to any other registered producer as long as the gasoline is not removed from a terminal. About 2,300 registered producers exist. The IRS investigates each six months after the initial approval of registration and again at regular intervals of at least every two years.

These registration and auditing procedures were established under TRA. Widespread noncompliance and organized crime involvement were alleged to have occurred under the previous collection process. Estimates of forgone revenues varied widely. In 1986, the Treasury Department estimated forgone federal revenue at $100 million to $200 million annually, while Roderick G. W. Chu, the New York State Commissioner of Taxation and Finance, estimated it at $1 billion.[7] Estimates of noncompliance are further complicated by discrepancies between the gasoline gallonage reported by the IRS and that reported by the Federal Highway Administration.

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5. Effective October 1, 1988, tax-exempt users are permitted to purchase gasoline tax exempt from a wholesale distributor and the wholesale distributor may claim a refund. Under prior law, a tax-exempt user, purchasing gasoline at a price that included the gasoline excise tax, could claim a credit or refund against his or her income tax liability. If a refund exceeded $1,000 in any of the first three calendar quarters, a refund claim could be filed in that quarter.

6. Throughputters receive transfers of gasoline from refiners, importers, terminal operators, other throughputters, or traders, and then store the gasoline in a terminal; they own the gasoline or hold the inventory position to the gasoline at the time of removal or sale from a terminal. Traders buy and sell gasoline in a pipeline or terminal. Traders do not normally take physical possession or store the product.

7. Statements by O. Donaldson Chapoton, Deputy Assistant Secretary, Department of the Treasury, and Roderick G. W. Chu, Commissioner, New York State Department of Taxation and Finance, before the Subcommittee on Oversight of the Committee on Ways and Means, U.S. House of Representatives Hearing on Compliance with Federal Gasoline Excise Tax Provisions, Washington, D.C., July 15, 1986.

Noncompliance typically takes one of four forms: bootlegging, "daisy chain operations," dilution, or exaggerated gas loss. Bootlegging is importing foreign oil without paying the tax, or retaining domestic gasoline for domestic use while classifying it as tax-exempt oil for export. A daisy chain operation is a multilayer paper transaction scheme to camouflage the sale of gasoline by a registered entity to an unregistered distributor using shell companies with fraudulent registration numbers or no assets. Dilution is the mixing of cheap nontaxable fluid in gasoline to increase its volume. The final method of evasion is exaggerated gas loss. Since a small percentage of gasoline evaporates, standard operating procedures permit vapor loss to be written off as an inventory loss. By overstating the vapor loss, handlers evade part of the tax liability.

The tax collection point was moved upward in the chain of distribution by TRA, from the wholesale level to removal from the refinery or terminal, in an effort to improve compliance. When TRA was enacted, the Joint Committee on Taxation estimated that taxing gasoline on its removal from the terminal would raise $300 million in the first year and $200 million in subsequent years. TRA also strengthened IRS registration and auditing procedures. It is still too early to assess the effects of these changes on compliance.

Diesel Fuel

The federal excise tax on diesel fuel is imposed on the sale or use of the fuel by the producer, whichever occurs first. Generally the tax is restricted to on-highway use, with exemptions. The registration and collection process for the diesel tax is similar to that for gasoline.

The point of collection for diesel fuel has also been moved upward in the chain of distribution, for compliance reasons. Collection was moved from the retail level to the wholesale level by the Omnibus Budget Reconciliation Act of 1987. The Treasury Department estimated that this would reduce the number of diesel registrants from 60,000 to 8,000. Preliminary IRS estimates put diesel registrants in fiscal year 1989 at 15,000. However, it is not yet possible to estimate the effect of these changes on compliance.

Diesel fuel taxes are collected later in the distribution chain than gasoline taxes, in part because of the large percentage of diesel fuel exempt from tax. Diesel fuel for off-highway use and for export is tax-exempt. In addition, a large class of tax-exempt users exists, including state and local governments, nonprofit schools, farms, and some railroad, bus, and airline companies.

Highway diesel fuel accounted for about 55 percent of the estimated total consumption of 750 million gallons of diesel fuel in the United States in 1985.[8] Because diesel fuel and home heating fuel are alike (both are classified as No. 2 distillate), opportunities exist for tax evasion. The use of untaxed fuel for highway driving presents a major compliance problem.

Alcohol and Tobacco

The taxes on alcoholic beverages are generally imposed on the producer or importer of the beverage when the beverage is removed from the warehouse or from customs custody for sale or consumption. Certain tax-free transfers among producers and bonded warehouses are permitted before removal. These transfers have not led to serious noncompliance problems.

The tax on tobacco products is imposed on removal from the factory or on release from customs custody. Exemption from the tax is available only for experimental use, consumption by employees of a manufacturer, and production for export. Under other circumstances, the manufacturer or importer of tobacco products is liable for the tax.

The Treasury Department's Bureau of Alcohol, Tobacco, and Firearms (BATF) has long been responsible for the regulation and supervision of alcohol and tobacco manufacturers. In 1987, it became responsible for collecting the federal excise taxes as well. The Customs Service collects federal excise taxes on imports.

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8. Department of Transportation, Federal Highway Administration, *Federal and State Taxation of Highway Diesel Fuel: Administration and Compliance* (August 1988), p. 5.

BATF reports on approximately 2,100 alcoholic beverage and tobacco producing plants, all of which must have a BATF permit. Approximately 25 percent of the alcohol registrants generated 95 percent of the revenue collected from the federal excise tax on alcoholic beverages in fiscal year 1989. Production is even more concentrated in the tobacco industry. While there are about 130 tobacco producers, the bulk of excise revenues are collected from four or five major plants.[9] The concentration of production enables BATF to target its compliance efforts and closely monitor revenue flows. The BATF compliance inspection program includes on-site visits, the frequency of which depends on the size of the plant and the perceived likelihood of evasion. Although no estimates of revenue loss attributable to noncompliance are available, noncompliance with these taxes is apparently not a pressing problem.

Noncompliance with tobacco and alcoholic beverage excise taxes, however, has been a problem for state governments because of the variation in state tax rates. The enactment of the 1978 Cigarettes Contraband Act, which prohibits the transportation, receipt, shipment, possession, distribution, or purchase of more than 60,000 cigarettes not bearing the tax indicia of the state in which the cigarettes are found, has reduced state revenue losses from bootlegging operations.

9. Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms, "Establishments Authorized to Operate Under the Supervision of the Bureau of Alcohol, Tobacco, and Firearms as of September, 1989" (1990).

APPENDIXES

APPENDIX A

BACKGROUND DATA ON EXCISE TAX REVENUES AND TAX RATES

The following tables provide background data for the figures in the text. The first seven tables are about federal revenues and excise tax rates. Tables A-1 through A-4 show various measures of total federal excise tax revenues and revenues from tobacco, alcoholic beverage, and motor fuel taxes for 1950 through 1989. Tables A-5 through A-7 show federal excise tax rates on cigarettes, alcoholic beverages, and motor fuels in nominal and real terms, and as a percentage of prices, for 1950 through 1989.

The next two tables (A-8 and A-9) show total and per capita consumption of cigarettes, distilled spirits, beer, and wine, and gasoline and special fuels for 1950 through 1988.

The next five tables are about state excise tax revenues and tax rates. Tables A-10 and A-11 show total state excise tax revenues, and revenues from tobacco, alcoholic beverage, and motor fuel taxes for 1950 through 1988. Tables A-12 and A-13 show the same data for 1988 by state. Table A-14 shows state excise tax rates on cigarettes, alcoholic beverages, and motor fuels for 1989.

The final five tables (A-15 through A-19) show total tax revenues by source and the tax burden on cigarettes, alcoholic beverages, and motor fuels for member countries of the Organization for Economic Cooperation and Development.

TABLE A-1. TOTAL FEDERAL EXCISE TAX REVENUES, FISCAL YEARS 1950-1989 (In billions of dollars)

	Total Excise Tax Revenues	Total Federal Revenues	Gross National Product	Excise Tax Revenues as a Percentage of Total Federal Revenues	Excise Tax Revenues as a Percentage of Gross National Product
1950	7.550	39.443	266.8	19.14	2.83
1951	8.648	51.616	315.0	16.75	2.75
1952	8.852	66.167	342.4	13.38	2.59
1953	9.877	69.608	365.6	14.19	2.70
1954	9.945	69.701	369.5	14.27	2.69
1955	9.131	65.451	386.4	13.95	2.36
1956	9.929	74.587	418.1	13.31	2.37
1957	10.534	79.990	440.5	13.17	2.39
1958	10.638	79.636	450.2	13.36	2.36
1959	10.578	79.249	481.5	13.35	2.20
1960	11.676	92.492	506.7	12.62	2.30
1961	11.860	94.388	518.2	12.57	2.29
1962	12.534	99.676	557.7	12.57	2.25
1963	13.194	106.560	587.8	12.38	2.24
1964	13.731	112.613	629.2	12.19	2.18
1965	14.570	116.817	672.6	12.47	2.17
1966	13.062	130.835	739.0	9.98	1.77
1967	13.719	148.822	794.6	9.22	1.73
1968	14.079	152.973	849.4	9.20	1.66
1969	15.222	186.882	929.5	8.15	1.64
1970	15.705	192.807	990.2	8.15	1.59
1971	16.614	187.139	1055.9	8.88	1.57
1972	15.477	207.309	1153.1	7.47	1.34
1973	16.260	230.799	1281.4	7.05	1.27
1974	16.844	263.224	1416.5	6.40	1.19
1975	16.551	279.090	1522.5	5.93	1.09
1976	16.963	298.060	1698.2	5.69	1.00
1977	17.548	355.559	1933.0	4.94	0.91
1978	18.376	399.561	2171.8	4.60	0.85
1979	18.745	463.302	2447.8	4.05	0.77
1980	17.395	517.112	2670.6	3.36	0.65
1981	17.587	599.272	2986.4	2.93	0.59
1982	17.904	617.766	3139.1	2.90	0.57
1983	23.165	600.562	3321.9	3.86	0.70
1984	28.455	666.457	3687.7	4.27	0.77
1985	29.644	734.057	3952.4	4.04	0.75
1986	30.668	769.091	4180.9	3.99	0.73
1987	32.457	854.143	4430.2	3.80	0.73
1988	35.227	908.954	4792.2	3.88	0.74
1989	34.084	990.691	5151.3	3.44	0.66

SOURCE: Congressional Budget Office compilation of data from *Budget of the United States Government, Fiscal Year 1991.*

NOTE: In this table, total excise tax revenues exclude windfall profit tax revenues.

TABLE A-2. FEDERAL TOBACCO TAX REVENUES, FISCAL YEARS 1950-1989 (In billions of dollars)

	Billions of Current Dollars	Billions of 1989 Dollars	Tobacco Tax Revenues as a Percentage of Total Excise Tax Revenues	Tobacco Tax Revenues as a Percentage of Total Federal Revenues	Tobacco Tax Revenues as a Percentage of Gross National Product
1950	1.326	6.006	17.56	3.36	0.50
1951	1.378	5.897	15.93	2.67	0.44
1952	1.562	6.556	17.65	2.36	0.46
1953	1.652	6.826	16.73	2.37	0.45
1954	1.578	6.459	15.87	2.26	0.43
1955	1.568	6.398	17.17	2.40	0.41
1956	1.607	6.418	16.18	2.15	0.38
1957	1.669	6.489	15.84	2.09	0.38
1958	1.728	6.563	16.24	2.17	0.38
1959	1.798	6.732	17.00	2.27	0.37
1960	1.927	7.114	16.50	2.08	0.38
1961	1.986	7.251	16.75	2.10	0.38
1962	2.022	7.321	16.13	2.03	0.36
1963	2.075	7.432	15.73	1.95	0.35
1964	2.048	7.256	14.92	1.82	0.33
1965	2.142	7.488	14.70	1.83	0.32
1966	2.066	7.073	15.82	1.58	0.28
1967	2.077	6.930	15.14	1.40	0.26
1968	2.121	6.818	15.06	1.39	0.25
1969	2.136	6.578	14.03	1.14	0.23
1970	2.093	6.171	13.33	1.09	0.21
1971	2.205	6.236	13.27	1.18	0.21
1972	2.205	6.017	14.25	1.06	0.19
1973	2.274	5.877	13.99	0.99	0.18
1974	2.435	5.751	14.46	0.93	0.17
1975	2.312	5.070	13.97	0.83	0.15
1976	2.484	5.156	14.64	0.83	0.15
1977	2.393	4.673	13.64	0.67	0.12
1978	2.444	4.461	13.30	0.61	0.11
1979	2.492	4.179	13.29	0.54	0.10
1980	2.443	3.710	14.04	0.47	0.09
1981	2.581	3.596	14.68	0.43	0.09
1982	2.537	3.344	14.17	0.41	0.08
1983	4.136	5.232	17.85	0.69	0.12
1984	4.660	5.666	16.38	0.70	0.13
1985	4.779	5.614	16.12	0.65	0.12
1986	4.589	5.246	14.96	0.60	0.11
1987	4.763	5.201	14.67	0.56	0.11
1988	4.616	4.832	13.10	0.51	0.10
1989	4.378	4.378	12.84	0.44	0.08

SOURCE: Congressional Budget Office compilation of data from *Budget of the United States Government, Fiscal Year 1991.*

NOTE: In this table, total excise tax revenues exclude windfall profit tax revenues.

33-148 0 - 90 - 5 QL 3

TABLE A-3. FEDERAL ALCOHOLIC BEVERAGE TAX REVENUES, FISCAL YEARS 1950-1989

	Billions of Current Dollars	Billions of 1989 Dollars	Alcoholic Beverage Tax Revenues as a Percentage of Total Excise Tax Revenues	Total Federal Revenues	Gross National Product
1950	2.180	9.874	28.87	5.53	0.82
1951	2.506	10.732	29.00	4.86	0.80
1952	2.515	10.557	28.41	3.80	0.73
1953	2.723	11.251	27.57	3.91	0.74
1954	2.738	11.207	27.53	3.93	0.74
1955	2.689	10.972	29.45	4.11	0.70
1956	2.866	11.447	28.86	3.84	0.69
1957	2.915	11.333	27.67	3.64	0.66
1958	2.882	10.947	27.09	3.62	0.64
1959	2.938	11.001	27.77	3.71	0.61
1960	3.127	11.544	26.78	3.38	0.62
1961	3.146	11.486	26.53	3.33	0.61
1962	3.268	11.833	26.07	3.28	0.59
1963	3.366	12.055	25.51	3.16	0.57
1964	3.499	12.397	25.48	3.11	0.56
1965	3.689	12.897	25.32	3.16	0.55
1966	3.720	12.735	28.48	2.84	0.50
1967	3.980	13.260	29.01	2.67	0.50
1968	4.189	13.466	29.75	2.74	0.49
1969	4.447	13.694	29.21	2.38	0.48
1970	4.646	13.699	29.58	2.41	0.47
1971	4.696	13.282	28.27	2.51	0.44
1972	5.004	13.655	32.33	2.41	0.43
1973	5.040	13.025	31.00	2.18	0.39
1974	5.248	12.396	31.16	1.99	0.37
1975	5.238	11.487	31.65	1.88	0.34
1976	5.318	11.038	31.35	1.78	0.31
1977	5.295	10.339	30.17	1.49	0.27
1978	5.492	10.026	29.89	1.37	0.25
1979	5.531	9.275	29.51	1.19	0.23
1980	5.601	8.505	32.20	1.08	0.21
1981	5.606	7.810	31.88	0.94	0.19
1982	5.382	7.093	30.06	0.87	0.17
1983	5.557	7.029	23.99	0.93	0.17
1984	5.315	6.462	18.68	0.80	0.14
1985	5.562	6.534	18.76	0.76	0.14
1986	5.828	6.662	19.00	0.76	0.14
1987	5.971	6.520	18.40	0.70	0.13
1988	5.709	5.977	16.21	0.63	0.12
1989	5.661	5.661	16.61	0.57	0.11

SOURCE: Congressional Budget Office compilation of data from *Budget of the United States Government, Fiscal Year 1991.*

NOTE: In this table, total excise tax revenues exclude windfall profit tax revenues.

TABLE A-4. FEDERAL MOTOR FUEL TAX REVENUES, FISCAL YEARS 1950-1989

	Billions of Current Dollars	Billions of 1989 Dollars	Motor Fuel Tax Revenues as a Percentage of Total Excise Tax Revenues	Motor Fuel Tax Revenues as a Percentage of Total Federal Revenues	Motor Fuel Tax Revenues as a Percentage of Gross National Product
1950	0.527	2.387	6.98	1.34	0.20
1951	0.569	2.435	6.56	1.10	0.18
1952	0.720	3.022	8.13	1.09	0.21
1953	0.906	3.743	9.17	1.30	0.25
1954	0.855	3.500	8.60	1.23	0.23
1955	0.972	3.966	10.65	1.49	0.25
1956	1.054	4.210	10.62	1.41	0.25
1957	1.497	5.820	14.21	1.87	0.34
1958	1.683	6.392	15.82	2.11	0.37
1959	1.753	6.564	16.57	2.21	0.36
1960	2.088	7.709	17.88	2.26	0.41
1961	2.459	8.978	20.73	2.61	0.47
1962	2.510	9.088	20.03	2.52	0.45
1963	2.610	9.348	19.78	2.45	0.44
1964	2.769	9.811	20.17	2.46	0.44
1965	2.864	10.013	19.66	2.45	0.43
1966	3.017	10.328	23.10	2.31	0.41
1967	3.327	11.101	24.25	2.24	0.42
1968	3.240	10.415	23.01	2.12	0.38
1969	3.418	10.526	22.45	1.83	0.37
1970	3.738	11.022	23.80	1.94	0.38
1971	4.064	11.494	24.46	2.17	0.38
1972	4.048	11.046	26.15	1.95	0.35
1973	4.316	11.154	26.54	1.87	0.34
1974	4.435	10.476	26.33	1.68	0.31
1975	4.500	9.869	27.19	1.61	0.30
1976	4.375	9.081	25.79	1.47	0.26
1977	4.851	9.472	27.64	1.36	0.25
1978	4.868	8.886	26.49	1.22	0.22
1979	4.976	8.344	26.55	1.07	0.20
1980	4.565	6.932	26.24	0.88	0.17
1981	4.609	6.421	26.21	0.77	0.15
1982	4.852	6.395	27.10	0.79	0.15
1983	7.147	9.040	30.85	1.19	0.22
1984	10.578	12.861	37.17	1.59	0.29
1985	11.446	13.445	38.61	1.56	0.29
1986	11.574	13.230	37.74	1.50	0.28
1987	11.526	12.586	35.51	1.35	0.26
1988	11.923	12.482	33.85	1.31	0.25
1989	14.306	14.306	41.97	1.44	0.28

SOURCES: Congressional Budget Office compilation of data from *Budget of the United States Government*, Fiscal Years 1952-1991; and Internal Revenue Service.

NOTE: In this table, total excise tax revenues exclude windfall profit tax revenues.

TABLE A-5. FEDERAL CIGARETTE, ALCOHOLIC BEVERAGE, AND MOTOR FUEL EXCISE TAX RATES AS OF DECEMBER 31, 1950-1989

		Alcoholic Beverages				Motor Fuels (Per gallon)[a]	
	Cigarettes (Per pack)	Distilled Spirits (Per 750-ml bottle)[b]	Beer (Per six-pack)[c]	Still Wines (Per 750-ml bottle)[d]	Carbonated Wines (Per 750-ml bottle)[e]	Gasoline	Highway Diesel
				In Current Dollars			
1950	0.07	1.43	0.15	0.03/0.12	0.48/0.32	0.015	0.00
1951	0.08	1.66	0.16	0.03/0.13	0.54/0.36	0.020	0.02
1952	0.08	1.66	0.16	0.03/0.13	0.54/0.38	0.020	0.02
1953	0.08	1.66	0.16	0.03/0.13	0.54/0.38	0.020	0.02
1954	0.08	1.66	0.16	0.03/0.13	0.54/0.38	0.020	0.02
1955	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.020	0.02
1956	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.030	0.03
1957	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.030	0.03
1958	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.030	0.03
1959	0.08	1.66	0.16	0.03/0.13	0.67.0.48	0.040	0.04
1960	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1961	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1962	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1963	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1964	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1965	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1966	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1967	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1968	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1969	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1970	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1971	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1972	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1973	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1974	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1975	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1976	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1977	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1978	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1979	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1980	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1981	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1982	0.08	1.66	0.16	0.03/0.13	0.67/0.48	0.040	0.04
1983	0.16	1.66	0.16	0.03/0.13	0.67/0.48	0.090	0.09
1984	0.16	1.66	0.16	0.03/0.13	0.67/0.48	0.090	0.15
1985	0.16	1.98	0.16	0.03/0.13	0.67/0.48	0.090	0.15
1986	0.16	1.98	0.16	0.03/0.13	0.67/0.48	0.090	0.15
1987	0.16	1.98	0.16	0.03/0.13	0.67/0.48	0.090	0.15
1988	0.16	1.98	0.16	0.03/0.13	0.67/0.48	0.090	0.15
1989	0.16	1.98	0.16	0.03/0.13	0.67/0.48	0.090	0.15

SOURCES: Congressional Budget Office compilation of data from Congressional Research Service, *Federal Excise Taxes on Alcoholic Beverages* (January 30, 1989); Joint Committee on Taxation, *Schedule of Present Excise Taxes (as of January 1, 1990)* (February 2, 1990); Joint Committee on Taxation, *Background and Description of Present Federal Excise Taxes* (June 25, 1982); Department of Transportation, Federal Highway Administration, *Highway Statistics 1988* (1989); and *Economic Report of the President* (February 1990).

a. The tax rates shown for motor fuels do not include the $0.001 per gallon tax dedicated to the Leaking Underground Storage Tank Trust Fund, which became effective January 1, 1987.

(Continued)

TABLE A-5. (Continued)

	Tobacco (Per pack of cigarettes)	Alcoholic Beverages: Distilled Spirits (Per 750-ml bottle)[b]	Alcoholic Beverages: Beer (Per six-pack)[c]	Alcoholic Beverages: Still Wines (Per 750-ml bottle)[d]	Alcoholic Beverages: Carbonated Wines (Per 750-ml bottle)[e]	Motor Fuels (Per gallon)[a]: Gasoline	Motor Fuels (Per gallon)[a]: Highway Diesel
				In 1989 Dollars			
1950	0.32	6.46	0.66	0.13/0.54	2.15/1.44	0.07	0.00
1951	0.34	7.12	0.70	0.14/0.57	2.31/1.63	0.09	0.09
1952	0.34	6.99	0.68	0.14/0.56	2.26/1.60	0.08	0.08
1953	0.33	6.88	0.67	0.14/0.55	2.23/1.57	0.08	0.08
1954	0.33	6.81	0.67	0.14/0.54	2.21/1.56	0.08	0.08
1955	0.33	6.79	0.67	0.14/0.54	2.75/1.94	0.08	0.08
1956	0.32	6.65	0.65	0.13/0.53	2.69/1.90	0.12	0.12
1957	0.31	6.47	0.63	0.13/0.52	2.62/1.85	0.12	0.12
1958	0.30	6.32	0.62	0.13/0.50	2.56/1.81	0.11	0.11
1959	0.30	6.23	0.61	0.13/0.50	2.52/1.78	0.15	0.15
1960	0.30	6.14	0.60	0.12/0.49	2.49/1.76	0.15	0.15
1961	0.29	6.08	0.60	0.12/0.48	2.46/1.74	0.15	0.15
1962	0.29	6.03	0.59	0.12/0.48	2.44/1.72	0.14	0.14
1963	0.29	5.96	0.58	0.12/0.48	2.41/1.70	0.14	0.14
1964	0.28	5.90	0.58	0.12/0.47	2.39/1.68	0.14	0.14
1965	0.28	5.82	0.57	0.12/0.46	2.36/1.66	0.14	0.14
1966	0.27	5.70	0.56	0.12/0.45	2.31/1.63	0.14	0.14
1967	0.27	5.55	0.54	0.11/0.44	2.25/1.59	0.13	0.13
1968	0.26	5.35	0.52	0.11/0.43	2.17/1.53	0.13	0.13
1969	0.25	5.13	0.50	0.10/0.41	2.07/1.46	0.12	0.12
1970	0.24	4.91	0.48	0.10/0.39	1.99/1.40	0.12	0.12
1971	0.23	4.71	0.46	0.10/0.38	1.91/1.35	0.11	0.11
1972	0.22	4.54	0.45	0.09/0.36	1.84/1.30	0.11	0.11
1973	0.21	4.30	0.42	0.09/0.34	1.74/1.23	0.10	0.10
1974	0.19	3.93	0.39	0.08/0.31	1.59/1.12	0.09	0.09
1975	0.18	3.65	0.36	0.07/0.29	1.48/1.04	0.09	0.09
1976	0.17	3.45	0.34	0.07/0.28	1.40/0.99	0.08	0.08
1977	0.16	3.25	0.32	0.07/0.26	1.32/0.93	0.08	0.08
1978	0.15	3.04	0.30	0.06/0.24	1.23/0.87	0.07	0.07
1979	0.13	2.79	0.27	0.06/0.22	1.13/0.80	0.07	0.07
1980	0.12	2.53	0.25	0.05/0.20	1.02/0.72	0.06	0.06
1981	0.11	2.32	0.23	0.05/0.18	0.94/0.66	0.06	0.06
1982	0.11	2.19	0.21	0.04/0.17	0.89/0.63	0.05	0.05
1983	0.20	2.11	0.21	0.04/0.17	0.85/0.60	0.11	0.11
1984	0.19	2.02	0.20	0.04/0.16	0.82/0.58	0.11	0.18
1985	0.19	2.33	0.19	0.04/0.16	0.79/0.56	0.11	0.18
1986	0.18	2.27	0.19	0.04/0.15	0.77/0.54	0.10	0.17
1987	0.17	2.16	0.18	0.04/0.14	0.74/0.52	0.10	0.16
1988	0.17	2.07	0.17	0.04/0.14	0.71/0.50	0.09	0.16
1989	0.16	1.98	0.16	0.03/0.13	0.67/0.48	0.09	0.15

b. The tax rate shown for distilled spirits applies to a 750-ml bottle of liquor with 40 percent alcohol.

c. The tax rate shown for beer applies to a package of six bottles or cans each containing 12 ounces of beer.

d. Two tax rates are shown for still wines. The lower tax rate applies to still wines containing not more than 14 percent alcohol, and the higher rate applies to still wines containing between 14 percent and 21 percent alcohol. A tax is also applied on wines with 21 percent to 24 percent alcohol.

e. Two tax rates are shown for carbonated wines. The lower rate applies to artificially carbonated wines, and the higher rate applies to champagnes and other sparkling wines.

TABLE A-6. FEDERAL CIGARETTE AND GASOLINE TAXES AS A PERCENTAGE OF CIGARETTE AND GASOLINE PRICES, 1950-1989 (In dollars)

	Prices		Tax Rates		Tax as a Percentage of Price	
	Cigarettes (Per pack)	Gasoline (Per gallon)[a]	Cigarettes (Per pack)	Gasoline (Per gallon)[b]	Cigarettes	Gasoline
1950	0.182	0.27	0.07	0.015	38.46	5.60
1951	0.189	0.27	0.08	0.020	42.33	7.35
1952	0.199	0.27	0.08	0.020	40.20	7.30
1953	0.209	0.29	0.08	0.020	38.28	6.97
1954	0.212	0.29	0.08	0.020	37.74	6.90
1955	0.213	0.29	0.08	0.020	37.56	6.87
1956	0.218	0.30	0.08	0.030	36.70	10.03
1957	0.224	0.31	0.08	0.030	35.71	9.68
1958	0.232	0.30	0.08	0.030	34.48	9.87
1959	0.242	0.31	0.08	0.040	33.06	13.11
1960	0.249	0.31	0.08	0.040	32.13	12.86
1961	0.251	0.31	0.08	0.040	31.87	12.99
1962	0.254	0.31	0.08	0.040	31.50	13.07
1963	0.259	0.30	0.08	0.040	30.89	13.16
1964	0.264	0.30	0.08	0.040	30.30	13.16
1965	0.277	0.31	0.08	0.040	28.88	12.82
1966	0.291	0.32	0.08	0.040	27.49	12.46
1967	0.302	0.33	0.08	0.040	26.49	12.05
1968	0.321	0.34	0.08	0.040	24.92	11.87
1969	0.339	0.35	0.08	0.040	23.60	11.49
1970	0.370	0.36	0.08	0.040	21.62	11.20
1971	0.387	0.36	0.08	0.040	20.67	10.99
1972	0.409	0.36	0.08	0.040	19.56	11.08
1973	0.420	0.39	0.08	0.040	19.05	10.31
1974	0.441	0.53	0.08	0.040	18.14	7.52
1975	0.473	0.57	0.08	0.040	16.91	7.05
1976	0.493	0.59	0.08	0.040	16.23	6.78
1977	0.516	0.62	0.08	0.040	15.50	6.43
1978	0.543	0.65	0.08	0.040	14.73	6.13
1979	0.573	0.88	0.08	0.040	13.96	4.54
1980	0.620	1.22	0.08	0.040	12.90	3.28
1981	0.669	1.35	0.08	0.040	11.96	2.96
1982	0.747	1.28	0.08	0.040	10.71	3.12
1983	0.901	1.23	0.16	0.090	17.76	7.35
1984	0.963	1.20	0.16	0.090	16.61	7.51
1985	1.022	1.20	0.16	0.090	15.66	7.53
1986	1.094	0.93	0.16	0.090	14.63	9.67
1987	1.172	0.96	0.16	0.090	13.65	9.40
1988	1.281	0.96	0.16	0.090	12.49	9.35
1989	1.444	1.06	0.16	0.090	11.08	8.49

SOURCES: Congressional Budget Office compilation of data from Department of Agriculture, Economic Research Service; Department of Energy, Energy Information Agency, *Monthly Energy Review: December 1989* (March 21, 1990); and Department of Energy, Energy Information Agency, *Annual Energy Review: 1988* (May 23, 1989).

a. Gasoline prices for 1950 through 1977 are average retail prices for only leaded regular gasoline; prices for 1978 through 1989 are average retail prices for all types of motor gasoline.

b. The tax rates shown for gasoline do not include the $0.001 per gallon tax dedicated to the Leaking Underground Storage Tank Trust Fund, which became effective January 1, 1987.

TABLE A-7. FEDERAL EXCISE TAX REVENUE PER DOLLAR OF EXPENDITURE ON DISTILLED SPIRITS, BEER, AND WINE, 1950-1988 (In cents)

	Distilled Spirits	Beer	Wine
1950	41.1	14.5	12.1
1951	36.5	14.9	13.1
1952	38.8	14.0	13.5
1953	40.0	13.8	14.4
1954	40.0	13.7	13.7
1955	40.4	13.6	14.1
1956	39.6	13.5	15.1
1957	37.5	13.4	13.4
1958	37.9	13.6	13.1
1959	37.2	13.2	13.1
1960	36.7	13.1	12.9
1961	37.6	12.9	12.1
1962	35.6	12.6	12.6
1963	34.5	13.0	12.7
1964	34.6	13.0	12.7
1965	33.5	12.5	12.5
1966	33.2	12.0	12.9
1967	33.4	12.1	11.2
1968	32.2	11.5	12.1
1969	31.3	11.4	12.3
1970	29.7	10.6	10.0
1971	29.7	10.3	8.2
1972	27.9	10.0	7.3
1973	27.1	9.6	6.1
1974	26.1	8.7	5.5
1975	25.3	7.9	5.0
1976	23.6	7.6	4.8
1977	22.5	7.1	4.5
1978	21.6	6.8	4.0
1979	20.4	6.1	3.7
1980	19.1	5.6	3.6
1981	17.8	5.3	3.3
1982	17.7	5.1	3.0
1983	17.1	4.6	3.6
1984	16.9	4.5	3.7
1985	17.1	4.3	3.2
1986	17.3	4.0	3.2
1987	16.7	3.9	3.0
1988	15.6	3.7	3.1

SOURCES: Congressional Budget Office compilation of data from *Budget of the United States Government*, Fiscal Years 1952-1991; Internal Revenue Service; Distilled Spirits Council of the United States, Inc.; and Department of Commerce, Bureau of Economic Analysis.

TABLE A-8. TOTAL CONSUMPTION OF CIGARETTES, ALCOHOLIC BEVERAGES, AND MOTOR FUELS, 1950-1988 (In billions)

		Alcoholic Beverages			Motor Fuels	
	Cigarettes (Packs)	Distilled Spirits (750-ml bottles)	Beer (Six-packs)	Wine (750-ml bottles)	Gasoline (Gallons)	Special Fuels (Gallons)
1950	18.79	0.959	4.549	0.708	35.12	0.54
1951	19.99	0.978	4.576	0.638	37.43	0.71
1952	20.79	0.927	4.654	0.695	39.76	0.84
1953	20.28	0.982	4.698	0.660	41.81	0.94
1954	19.23	0.956	4.545	0.717	43.32	1.05
1955	19.77	1.007	4.644	0.733	46.53	1.20
1956	20.33	1.086	4.672	0.757	48.81	1.41
1957	21.16	1.070	4.566	0.766	50.23	1.64
1958	22.49	1.087	4.616	0.780	51.64	1.86
1959	23.37	1.138	4.803	0.788	54.10	2.23
1960	24.22	1.185	4.818	0.824	55.43	2.45
1961	25.13	1.219	4.887	0.866	56.61	2.70
1962	25.42	1.280	4.996	0.848	58.75	2.95
1963	26.20	1.307	5.139	0.888	61.27	3.24
1964	25.56	1.392	5.393	0.937	64.27	3.63
1965	26.44	1.485	5.481	0.957	66.98	4.13
1966	27.06	1.559	5.723	0.965	69.97	4.69
1967	27.46	1.637	5.885	1.027	72.68	5.05
1968	27.29	1.747	6.120	1.078	77.26	5.69
1969	26.45	1.826	6.381	1.189	81.81	6.33
1970	26.82	1.870	6.702	1.349	85.60	6.73
1971	27.76	1.930	6.967	1.540	89.98	7.57
1972	28.34	1.988	7.170	1.701	96.54	8.52
1973	29.49	2.054	7.535	1.754	100.64	9.84
1974	29.95	2.106	7.946	1.764	96.50	9.80
1975	30.36	2.137	8.175	1.857	99.35	9.63
1976	30.68	2.152	8.314	1.900	104.98	10.72
1977	30.85	2.178	8.735	2.024	107.98	11.65
1978	30.80	2.238	9.115	2.194	112.24	12.83
1979	31.08	2.258	9.495	2.243	108.13	13.99
1980	31.58	2.268	9.799	2.421	101.18	13.78
1981	32.00	2.268	10.045	2.552	99.60	14.86
1982	31.70	2.209	10.050	2.594	98.48	14.90
1983	30.00	2.177	10.073	2.665	100.11	15.97
1984	30.02	2.154	10.056	2.798	101.42	17.32
1985	29.70	2.109	10.056	2.929	103.57	17.75
1986	29.19	1.991	10.280	2.963	106.76	18.43
1987	28.75	1.959	10.329	2.932	108.70	19.05
1988	28.13	1.909	10.354	2.787	109.82	20.07

SOURCES: Congressional Budget Office compilation of data from The Beer Institute; Distilled Spirits Council of the United States, Inc.; Department of Agriculture, Economic Research Service, *Tobacco Situation and Outlook Report* (December 1989); Department of Transportation, Federal Highway Administration; and Wine Institute.

TABLE A-9. PER CAPITA CONSUMPTION (AGES 16 AND OVER) OF CIGARETTES, ALCOHOLIC BEVERAGES, AND MOTOR FUELS, 1950-1988

		Alcoholic Beverages			Motor Fuels	
	Cigarettes (Packs)	Distilled Spirits (750-ml bottles)	Beer (Six-packs)	Wine (750-ml bottles)	Gasoline (Gallons)	Special Fuels (Gallons)
1950	177.0	9.03	42.85	6.67	330.9	5.1
1951	187.2	9.16	42.86	5.98	350.6	6.6
1952	193.2	8.61	43.24	6.45	369.5	7.8
1953	185.6	8.99	42.98	6.04	382.5	8.6
1954	174.1	8.66	41.15	6.49	392.2	9.5
1955	176.9	9.01	41.55	6.56	416.4	10.8
1956	180.0	9.62	41.37	6.71	432.2	12.5
1957	185.2	9.37	39.98	6.71	439.8	14.3
1958	194.6	9.41	39.94	6.75	446.8	16.1
1959	199.5	9.71	41.01	6.73	461.9	19.1
1960	203.3	9.95	40.45	6.92	465.4	20.6
1961	208.3	10.10	40.50	7.18	469.1	22.4
1962	208.0	10.48	40.88	6.94	480.7	24.1
1963	210.5	10.50	41.30	7.14	492.5	26.1
1964	202.1	11.01	42.63	7.41	508.0	28.7
1965	205.8	11.56	42.67	7.45	521.4	32.1
1966	207.9	11.98	43.97	7.41	537.5	36.0
1967	207.9	12.40	44.55	7.77	550.2	38.2
1968	203.2	13.01	45.58	8.03	575.4	42.4
1969	193.6	13.37	46.73	8.71	599.0	46.3
1970	192.7	13.43	48.14	9.69	614.9	48.4
1971	195.2	13.58	49.00	10.83	632.9	53.3
1972	194.2	13.62	49.13	11.65	661.5	58.4
1973	198.1	13.80	50.62	11.78	676.0	66.1
1974	197.2	13.87	52.33	11.62	635.6	64.5
1975	196.1	13.80	52.80	12.00	641.7	62.2
1976	194.4	13.64	52.68	12.04	665.2	67.9
1977	192.0	13.55	54.36	12.59	672.0	72.5
1978	188.3	13.68	55.73	13.41	686.3	78.4
1979	186.7	13.57	57.04	13.47	649.6	84.0
1980	186.4	13.39	57.87	14.29	597.5	81.4
1981	186.3	13.20	58.48	14.86	579.8	86.5
1982	182.2	12.70	57.78	14.91	566.2	85.7
1983	170.6	12.38	57.27	15.15	569.1	90.8
1984	168.6	12.09	56.47	15.71	569.5	97.3
1985	165.1	11.72	55.90	16.28	575.7	98.7
1986	160.1	10.92	56.39	16.25	585.6	101.1
1987	155.8	10.62	55.99	15.89	589.2	103.2
1988	150.9	10.25	55.57	14.96	589.4	107.7

SOURCES: Congressional Budget Office compilation of data from The Beer Institute; Distilled Spirits Council of the United States, Inc.; Department of Agriculture, Economic Research Service, *Tobacco Situation and Outlook Report* (December 1989); Department of Transportation, Federal Highway Administration; Wine Institute; and *Economic Report of the President* (February 1990).

TABLE A-10. STATE SALES TAX REVENUES, 1950-1988
(In billions of dollars)

	Total Tax Revenues	Sales Tax Revenues						
				Selective				
		Total	General	Total	Tobacco	Alcoholic Beverages	Motor Fuels	Other
1950	7.930	4.670	1.670	2.999	0.414	0.420	1.544	0.621
1951	8.934	5.270	2.001	3.268	0.430	0.469	1.710	0.659
1952	9.857	5.730	2.229	3.501	0.449	0.442	1.870	0.740
1953	10.552	6.209	2.433	3.777	0.469	0.465	2.019	0.824
1954	11.089	6.573	2.540	4.034	0.464	0.463	2.218	0.889
1955	11.597	6.864	2.637	4.227	0.459	0.471	2.353	0.944
1956	13.375	7.801	3.036	4.764	0.515	0.546	2.687	1.016
1957	14.531	8.436	3.373	5.063	0.556	0.569	2.828	1.110
1958	14.919	8.750	3.507	5.243	0.616	0.566	2.919	1.142
1959	15.848	9.287	3.697	5.588	0.675	0.599	3.058	1.256
1960	18.036	10.510	4.302	6.208	0.923	0.650	3.335	1.300
1961	19.057	11.031	4.510	6.522	1.001	0.688	3.431	1.402
1962	20.561	12.038	5.111	6.928	1.075	0.740	3.665	1.448
1963	22.117	12.873	5.539	7.333	1.124	0.793	3.851	1.565
1964	24.243	13.957	6.084	7.873	1.196	0.864	4.059	1.754
1965	26.127	15.059	6.711	8.347	1.284	0.917	4.300	1.846
1966	29.388	17.042	7.873	9.169	1.542	0.985	4.627	2.015
1967	31.926	18.575	8.923	9.652	1.615	1.041	4.837	2.159
1968	36.400	20.979	10.441	10.538	1.886	1.138	5.178	2.336
1969	41.931	24.050	12.443	11.606	2.056	1.246	5.644	2.660
1970	47.962	27.254	14.177	13.077	2.308	1.420	6.283	3.066
1971	51.541	29.570	15.473	14.097	2.536	1.527	6.628	3.406
1972	59.870	33.250	17.619	15.631	2.831	1.684	7.216	3.900
1973	68.069	37.123	19.793	17.330	3.112	1.817	8.058	4.343
1974	74.207	40.556	22.612	17.944	3.250	1.909	8.207	4.578
1975	80.155	43.346	24.780	18.566	3.286	1.963	8.255	5.062
1976	89.256	47.391	27.333	20.058	3.462	2.057	8.660	5.879
1977	101.085	52.362	30.896	21.466	3.500	2.120	9.088	6.758
1978	113.314	58.323	35.333	22.990	3.654	2.286	9.501	7.549
1979	124.893	63.724	39.562	24.162	3.640	2.400	9.980	8.142
1980	137.057	67.855	43.168	24.687	3.738	2.478	9.722	8.749
1981	149.752	72.760	46.412	26.347	3.893	2.613	9.742	10.099
1982	162.607	78.789	50.357	28.432	3.955	2.722	10.473	11.282
1983	171.464	83.876	53.643	30.233	4.001	2.743	10.793	12.696
1984	196.905	95.806	62.564	33.243	3.949	2.900	12.406	13.988
1985	215.893	105.419	69.633	35.787	4.362	3.031	13.344	15.050
1986	228.053	112.373	74.817	37.556	4.449	3.062	14.129	15.916
1987	246.331	119.361	79.228	40.133	4.591	3.109	15.707	16.726
1988	264.055	130.136	87.010	43.126	4.801	3.189	17.196	17.940

SOURCE: Congressional Budget Office compilation of data from Department of Commerce, Bureau of the Census.

TABLE A-11. STATE SALES TAX REVENUES AS A PERCENTAGE OF TOTAL STATE TAX REVENUES, 1950-1988

	Total Tax Revenues	Sales Tax Revenues						
		Total	General	Selective				
				Total	Tobacco	Alcoholic Beverages	Motor Fuels	Other
1950	100.00	58.89	21.06	37.82	5.22	5.30	19.47	7.83
1951	100.00	58.99	22.40	36.58	4.81	5.25	19.14	7.38
1952	100.00	58.13	22.61	35.52	4.56	4.48	18.97	7.51
1953	100.00	58.84	23.06	35.79	4.44	4.41	19.13	7.81
1954	100.00	59.27	22.91	36.38	4.18	4.18	20.00	8.02
1955	100.00	59.19	22.74	36.45	3.96	4.06	20.29	8.14
1956	100.00	58.33	22.70	35.62	3.85	4.08	20.09	7.60
1957	100.00	58.06	23.21	34.84	3.83	3.92	19.46	7.64
1958	100.00	58.65	23.51	35.14	4.13	3.79	19.57	7.65
1959	100.00	58.60	23.33	35.26	4.26	3.78	19.30	7.93
1960	100.00	58.27	23.85	34.42	5.12	3.60	18.49	7.21
1961	100.00	57.88	23.67	34.22	5.25	3.61	18.00	7.36
1962	100.00	58.55	24.86	33.69	5.23	3.60	17.83	7.04
1963	100.00	58.20	25.04	33.16	5.08	3.59	17.41	7.08
1964	100.00	57.57	25.10	32.48	4.93	3.56	16.74	7.24
1965	100.00	57.64	25.69	31.95	4.91	3.51	16.46	7.07
1966	100.00	57.99	26.79	31.20	5.25	3.35	15.74	6.86
1967	100.00	58.18	27.95	30.23	5.06	3.26	15.15	6.76
1968	100.00	57.63	28.68	28.95	5.18	3.13	14.23	6.42
1969	100.00	57.36	29.67	27.68	4.90	2.97	13.46	6.34
1970	100.00	56.82	29.56	27.27	4.81	2.96	13.10	6.39
1971	100.00	57.37	30.02	27.35	4.92	2.96	12.86	6.61
1972	100.00	55.54	29.43	26.11	4.73	2.81	12.05	6.51
1973	100.00	54.54	29.08	25.46	4.57	2.67	11.84	6.38
1974	100.00	54.65	30.47	24.18	4.38	2.57	11.06	6.17
1975	100.00	54.08	30.92	23.16	4.10	2.45	10.30	6.32
1976	100.00	53.10	30.62	22.47	3.88	2.30	9.70	6.59
1977	100.00	51.80	30.56	21.24	3.46	2.10	8.99	6.69
1978	100.00	51.47	31.18	20.29	3.22	2.02	8.38	6.66
1979	100.00	51.02	31.68	19.35	2.91	1.92	7.99	6.52
1980	100.00	49.51	31.50	18.01	2.73	1.81	7.09	6.38
1981	100.00	48.59	30.99	17.59	2.60	1.74	6.51	6.74
1982	100.00	48.45	30.97	17.49	2.43	1.67	6.44	6.94
1983	100.00	48.92	31.29	17.63	2.33	1.60	6.29	7.40
1984	100.00	48.66	31.77	16.88	2.01	1.47	6.30	7.10
1985	100.00	48.83	32.25	16.58	2.02	1.40	6.18	6.97
1986	100.00	49.27	32.81	16.47	1.95	1.34	6.20	6.98
1987	100.00	48.46	32.16	16.29	1.86	1.26	6.38	6.79
1988	100.00	49.28	32.95	16.33	1.82	1.21	6.51	6.79

SOURCE: Congressional Budget Office compilation of data from Department of Commerce, Bureau of the Census.

TABLE A-12. STATE SALES TAX REVENUES, BY STATE, 1988
(In billions of dollars)

	Total Tax Revenues	Sales Tax Revenues			
			Selective		
		Total	Tobacco	Alcoholic Beverages	Motor Fuels
All States	246.055	130.136	4.801	3.189	17.196
Alabama	3.374	1.825	0.072	0.098	0.276
Alaska	1.251	0.082	0.009	0.012	0.034
Arizona	3.722	2.290	0.052	0.041	0.315
Arkansas	2.021	1.148	0.064	0.024	0.217
California	36.075	14.544	0.253	0.129	1.292
Colorado	2.726	1.215	0.064	0.022	0.300
Connecticut	4.376	2.909	0.087	0.032	0.293
Delaware	1.018	0.145	0.012	0.005	0.081
Florida	11.460	9.122	0.340	0.453	0.764
Georgia	5.783	2.629	0.091	0.119	0.412
Hawaii	2.039	1.294	0.021	0.134	0.050
Idaho	0.894	0.478	0.016	0.009	0.095
Illinois	11.079	5.803	0.250	0.068	0.702
Indiana	5.312	3.019	0.116	0.036	0.401
Iowa	2.842	1.302	0.083	0.013	0.266
Kansas	2.445	1.132	0.060	0.047	0.170
Kentucky	3.664	1.685	0.015	0.049	0.323
Louisiana	3.774	2.069	0.075	0.050	0.367
Maine	1.506	0.737	0.041	0.034	0.106
Maryland	5.807	2.552	0.065	0.028	0.442
Massachusetts	8.521	2.914	0.168	0.078	0.306
Michigan	10.515	4.064	0.265	0.120	0.687
Minnesota	6.144	2.703	0.116	0.056	0.392
Mississippi	2.126	1.403	0.053	0.036	0.229
Missouri	4.406	2.287	0.083	0.024	0.340
Montana	0.715	0.182	0.012	0.013	0.102
Nebraska	1.343	0.727	0.039	0.016	0.166
Nevada	1.186	0.982	0.014	0.011	0.099
New Hampshire	0.583	0.257	0.032	0.011	0.083
New Jersey	9.762	5.153	0.222	0.055	0.331
New Mexico	1.793	1.013	0.019	0.017	0.139
New York	26.172	8.379	0.401	0.149	0.500
North Carolina	6.923	2.822	0.016	0.142	0.597
North Dakota	0.633	0.326	0.017	0.006	0.064
Ohio	9.991	5.169	0.229	0.067	0.811
Oklahoma	3.150	1.457	0.084	0.055	0.311
Oregon	2.111	0.315	0.070	0.011	0.166
Pennsylvania	11.825	6.016	0.229	0.138	0.672
Rhode Island	1.121	0.575	0.033	0.008	0.055
South Carolina	3.438	1.866	0.031	0.107	0.306
South Dakota	0.476	0.393	0.014	0.009	0.062
Tennessee	3.855	2.947	0.083	0.063	0.503
Texas	13.426	10.277	0.417	0.316	1.474
Utah	1.602	0.787	0.022	0.016	0.129
Vermont	0.617	0.303	0.012	0.015	0.042
Virginia	6.137	2.527	0.017	0.095	0.594
Washington	5.995	4.512	0.130	0.102	0.435
West Virginia	1.744	0.924	0.034	0.009	0.168
Wisconsin	6.006	2.675	0.147	0.039	0.491
Wyoming	0.573	0.203	0.004	0.001	0.037
District of Columbia	2.060	0.572	0.011	0.006	0.028

SOURCES: Congressional Budget Office compilation of data from Department of Commerce, Bureau of the Census, *State Government Tax Collections in 1988* (1989); *State Government Finances in 1988* (1989).

TABLE A-13. STATE SALES TAX REVENUES, BY STATE, 1988
(As a percentage of total tax revenues)

	Total Tax Revenues	Sales Tax Revenues			
		Total	Selective		
			Tobacco	Alcoholic Beverages	Motor Fuels
All States	100.0	49.3	1.8	1.2	6.5
Alabama	100.0	54.1	2.1	2.9	8.2
Alaska	100.0	6.5	0.7	1.0	2.7
Arizona	100.0	61.5	1.4	1.1	8.5
Arkansas	100.0	56.8	3.2	1.2	10.7
California	100.0	40.3	0.7	0.4	3.6
Colorado	100.0	44.6	2.3	0.8	11.0
Connecticut	100.0	66.5	2.0	0.7	6.7
Delaware	100.0	14.2	1.2	0.5	8.0
Florida	100.0	79.6	3.0	4.0	6.7
Georgia	100.0	45.5	1.6	2.1	7.1
Hawaii	100.0	63.5	1.0	6.6	2.4
Idaho	100.0	53.5	1.8	1.0	10.7
Illinois	100.0	52.4	2.3	0.6	6.3
Indiana	100.0	56.8	2.2	0.7	7.6
Iowa	100.0	45.8	2.9	0.4	9.4
Kansas	100.0	46.3	2.4	1.9	7.0
Kentucky	100.0	46.0	0.4	1.3	8.8
Louisiana	100.0	54.8	2.0	1.3	9.7
Maine	100.0	49.0	2.7	2.3	7.0
Maryland	100.0	44.0	1.1	0.5	7.6
Massachusetts	100.0	34.2	2.0	0.9	3.6
Michigan	100.0	38.7	2.5	1.1	6.5
Minnesota	100.0	44.0	1.9	0.9	6.4
Mississippi	100.0	66.0	2.5	1.7	10.8
Missouri	100.0	51.9	1.9	0.5	7.7
Montana	100.0	25.5	1.7	1.8	14.3
Nebraska	100.0	54.1	2.9	1.2	12.3
Nevada	100.0	82.8	1.2	0.9	8.4
New Hampshire	100.0	44.1	5.4	2.0	14.2
New Jersey	100.0	52.8	2.3	0.6	3.4
New Mexico	100.0	56.5	1.0	1.0	7.7
New York	100.0	32.0	1.5	0.6	1.9
North Carolina	100.0	40.8	0.2	2.0	8.6
North Dakota	100.0	51.5	2.6	0.9	10.1
Ohio	100.0	51.7	2.3	0.7	8.1
Oklahoma	100.0	46.3	2.7	1.8	9.9
Oregon	100.0	14.9	3.3	0.5	7.9
Pennsylvania	100.0	50.9	1.9	1.2	5.7
Rhode Island	100.0	51.3	3.0	0.7	4.9
South Carolina	100.0	54.3	0.9	3.1	8.9
South Dakota	100.0	82.6	3.0	1.9	13.0
Tennessee	100.0	76.4	2.2	1.6	13.1
Texas	100.0	76.5	3.1	2.4	11.0
Utah	100.0	49.1	1.4	1.0	8.1
Vermont	100.0	49.2	2.0	2.4	6.9
Virginia	100.0	41.2	0.3	1.6	9.7
Washington	100.0	75.3	2.2	1.7	7.3
West Virginia	100.0	53.0	2.0	0.5	9.6
Wisconsin	100.0	44.5	2.5	0.6	8.2
Wyoming	100.0	35.4	0.7	0.2	6.4
District of Columbia	100.0	27.8	0.5	0.3	1.3

SOURCES: Congressional Budget Office compilation of data from Department of Commerce, Bureau of the Census, *State Government Tax Collections in 1988* (1989); *State Government Finances in 1988* (1989).

TABLE A-14. STATE TAX RATES FOR CIGARETTES, ALCOHOLIC BEVERAGES, AND GASOLINE (In dollars)

State	Cigarettes (Per pack)[a]	Alcoholic Beverages			Gasoline (Per gallon)[e]
		Distilled Spirits (Per proof gallon)[b]	Beer (Per gallon)[c]	Wine (Per gallon)[d]	
Alabama	0.165	C	0.53	1.70	0.11
Alaska	0.29	5.60	0.35	0.85	0.08
Arizona	0.15	3.00	0.16	0.84	0.17
Arkansas	0.21	2.50	0.24	0.75	0.135
California	0.35	2.00	0.04	0.01	0.09
Colorado	0.20	2.28	0.08	0.27	0.20
Connecticut	0.40	4.50	0.20	0.60	0.20
Delaware	0.14	2.25	0.06	0.40	0.16
Florida	0.24	6.50	0.48	2.25	0.04
Georgia	0.12	3.79	0.48	1.52	0.075
Hawaii	a	5.75	0.89	1.30	0.11
Idaho	0.18	C	0.15	0.45	0.18
Illinois	0.30	2.00	0.07	0.23	0.13
Indiana	0.155	2.68	0.115	0.47	0.15
Iowa	0.31	C	0.19	1.75	0.20
Kansas	0.24	2.50	0.18	0.30	0.15
Kentucky	0.031	1.92	0.08	0.50	0.15
Louisiana	0.16	2.50	0.32	0.11	0.20
Maine	0.31	C	0.35	0.60	0.17
Maryland	0.13	1.50	0.09	0.40	0.185
Massachusetts	0.26	4.05	0.11	0.70	0.11
Michigan	0.25	C	0.20	0.51	0.15
Minnesota	0.38	5.03	0.15	0.30	0.20
Mississippi	0.18	C	0.43	0.35	0.18
Missouri	0.13	2.00	0.06	0.36	0.11

SOURCE: Congressional Budget Office compilation of data from Advisory Commission on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, vol. 1 (January 1990).

NOTES: Tax rates for cigarettes and alcoholic beverages are as of October 1, 1989; tax rates for gasoline are as of December 1, 1989.

C = control states, which have monopolies on the distribution of liquors and assess a combination of excise taxes and markup taxes on alcohol.

a. The following cigarette tax rate changes are scheduled (as of October 1, 1989): Maine, $.33 (1/1/91); North Dakota, $.27 (7/1/90); and Oregon, $.28 (11/1/89). Tennessee assesses an additional $.05 per pack fee on cigarette distributors, and the Hawaii tax is 40 percent of wholesale price, or about $.30 per pack.

b. Distilled spirits tax rates shown in this table apply to spirits containing 40 percent alcohol.

(Continued)

TABLE A-14. (Continued)

State	Cigarettes (Per pack)[a]	Alcoholic Beverages			Gasoline (Per gallon)[e]
		Distilled Spirits (Per proof gallon)[b]	Beer (Per gallon)[c]	Wine (Per gallon)[d]	
Montana	0.16	C	0.14	0.106	0.20
Nebraska	0.27	3.00	0.23	0.75	0.22
Nevada	0.35	2.05	0.09	0.40	0.1625
New Hampshire	0.21	C	0.30	d	0.14
New Jersey	0.27	2.80	0.0333	0.30	0.105
New Mexico	0.15	3.94	0.18	0.95	0.162
New York	0.33	5.29	0.11	0.18	0.08
North Carolina	0.02	C	0.53	0.80	0.209
North Dakota	0.30	2.50	0.16	0.50	0.17
Ohio	0.18	C	0.16	0.26	0.18
Oklahoma	0.23	5.56	0.40	0.72	0.17
Oregon	0.27	C	0.0838	0.67	0.16
Pennsylvania	0.18	C	0.08	d	0.12
Rhode Island	0.37	3.75	0.10	0.60	0.20
South Carolina	0.07	2.72	0.77	0.90	0.16
South Dakota	0.23	3.93	0.27	0.93	0.18
Tennessee	0.13	4.00	0.125	1.10	0.21
Texas	0.26	2.40	0.19	0.204	0.15
Utah	0.23	C	0.355	0.17	0.19
Vermont	0.17	C	0.265	0.55	0.15
Virginia	0.025	C	0.28	1.51	0.175
Washington	0.34	C	0.14	1.65	0.18
West Virginia	0.17	C	0.18	1.00	0.155
Wisconsin	0.30	3.25	0.06	0.25	0.208
Wyoming	0.12	C	0.19	0.28	0.09
District of Columbia	0.17	1.50	0.09	0.40	0.18

c. Beer tax rates shown in this table are levied on bottled and canned beer that contains more than 3.2 percent alcohol. Some states apply different tax rates on draft beer, on beer with less than 3.2 percent alcohol, and on beer bought in bulk. The tax shown for Washington includes an $.08 per gallon tax assessed on beer purchased through private outlets.

d. Tax rates on wine shown in this table apply to still wines with less than 14 percent alcohol. In many states, wine taxes vary by alcohol content, and most states that control distribution of liquors also impose markup taxes on wine. New Hampshire assesses a 55 percent to 63 percent markup tax on wine, and Pennsylvania assesses a 25 percent markup tax on wine.

e. The following gasoline tax rate changes are scheduled (as of December 1, 1989): Connecticut, $.22 (7/1/90); Illinois, $.19 (1/1/90); Kansas, $.16 (7/1/90); Ohio, $.20 (7/1/90); Rhode Island assesses a tax at 11 percent of the wholesale price, and Georgia levies an additional tax at 3 percent of the retail sales price less the $.075 tax. Local rates range from $.01 to $.04 per gallon in Alabama, $.01 to $.06 per gallon in Florida, and $.088 to $.165 per gallon in Hawaii.

TABLE A-15. TAX REVENUES BY SOURCE AS A PERCENTAGE OF TOTAL TAX REVENUES IN OECD COUNTRIES, 1987

	Taxes on Income and Profits[a]	Social Security Taxes[b]	Taxes on Goods and Services			Property Taxes[d]	Other and Unallocable[e]
			Total[c]	General	Specific		
Australia	55.7	0.0	29.8	8.2	17.6	9.2	5.4
Austria	26.0	32.3	32.3	20.9	10.2	2.3	7.2
Belgium	39.3	33.9	24.7	15.7	7.1	2.1	0.0
Canada	47.3	13.3	28.9	14.1	11.2	9.2	1.3
Denmark	56.5	3.7	33.9	18.9	13.8	5.1	0.9
Finland	49.5	9.0	38.2	24.6	13.1	3.2	0.2
France	18.0	43.0	29.3	19.5	8.9	4.7	5.0
Germany	34.0	37.3	25.4	15.7	8.6	3.2	0.0
Greece	17.0	32.6	46.6	26.9	16.8	2.5	1.1
Iceland	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Ireland	37.9	14.0	42.5	20.2	20.5	4.4	1.3
Italy	36.1	34.3	26.4	14.6	10.3	2.6	0.5
Japan	47.0	28.6	12.9	0.0	11.1	11.2	0.3
Luxembourg	42.4	26.4	24.4	13.5	10.3	6.8	0.0
Netherlands	27.4	42.7	26.0	16.4	7.4	3.6	0.3
New Zealand	59.4	0.0	32.6	16.7	15.1	7.0	0.9
Norway	33.1	23.7	40.1	20.8	18.0	2.5	0.7
Portugal	19.4	28.2	49.3	21.0	27.3	2.0	1.0
Spain	29.6	36.2	30.4	16.9	12.4	3.7	0.2
Sweden	41.3	24.2	24.1	13.3	9.8	5.7	4.7
Switzerland	40.3	32.1	19.1	9.7	8.1	8.5	0.0
Turkey	35.6	15.9	32.0	23.4	8.2	3.2	13.3
United Kingdom	37.2	18.1	31.4	16.1	13.6	13.2	0.0
United States	44.3	28.8	16.7	7.4	7.2	10.2	0.0
OECD Total (Weighted Average)	38.0	24.3	30.3	16.3	12.5	5.5	2.0

SOURCE: Congressional Budget Office compilation of data from Organization for Economic Cooperation and Development, *Revenue Statistics of OECD Member Countries: 1965-1988* (Paris: OECD, 1989); and Tax Foundation, Inc., *Facts and Figures on Government Finance*, 1988-1989 ed. (Baltimore: Johns Hopkins University Press, 1988).

NOTE: N.A. = not available.

a. Includes taxes on capital gains.

b. Includes taxes on self-employed.

c. Includes import duties, profits on public fiscal monopolies, licenses, and other business taxes.

d. Includes taxes on movable and immovable property, net wealth taxes, and estate and gift taxes.

e. Includes general and selective taxes on payrolls that are not earmarked for social security purposes, and other taxes not elsewhere classified.

TABLE A-16. PERCENTAGE OF TAXES IN RETAIL CIGARETTE PRICES IN OECD COUNTRIES, 1987

	Total Tax	Excise Tax	Sales Tax or Value-Added Tax
Australia[a]	51.3	32.3	n.a.
Austria	71.1	55.0	16.7
Belgium	70.0	64.4	5.7
Canada	N.A.	N.A.	N.A.
Denmark	87.2	69.2	18.0
Finland	N.A.	N.A.	N.A.
France	74.8	49.2	25.6
Germany	72.0	59.8	12.3
Greece	63.2	36.8	26.5
Iceland	N.A.	N.A.	N.A.
Ireland	73.8	53.8	20.0
Italy	72.0	56.8	15.3
Japan	N.A.	N.A.	N.A.
Luxembourg	66.9	60.9	6.0
Netherlands	71.5	54.8	16.7
New Zealand	N.A.	N.A.	N.A.
Norway	N.A.	N.A.	N.A.
Portugal	71.8	58.0	13.8
Spain	44.7	32.8	11.9
Sweden	N.A.	N.A.	N.A.
Switzerland	N.A.	N.A.	N.A.
Turkey	N.A.	N.A.	N.A.
United Kingdom	74.3	61.3	13.0
United States[b]	34.2	30.1	4.1

SOURCES: Congressional Budget Office compilation of data from Organization for Economic Cooperation and Development, *Taxing Consumption* (Paris: OECD, 1988); Department of Agriculture, Economic Research Service; and The Tobacco Institute, *The Tax Burden on Tobacco*, vol. 22 (1987).

NOTE: n.a. = not applicable; N.A. = not available.

a. The total tax burden shown for Australia includes the specific excise tax and a business franchise fee.

b. Tax burden for the United States is based on Congressional Budget Office calculations from Tobacco Institute and USDA data on taxes and prices.

TABLE A-17. PERCENTAGE OF TAXES IN RETAIL PRICES OF ALCOHOLIC BEVERAGES FOR HOME CONSUMPTION IN OECD COUNTRIES, 1988

	Distilled Spirits	Beer	Wine
Australia	17	35	15
Austria	40	36	31
Belgium	56	27	27
Canada	82	53	69
Denmark	83	50	48
Finland	66	41	66
France	45	18	18
Germany	64	20	12
Greece	N.A.	N.A.	N.A.
Iceland	N.A.	N.A.	N.A.
Ireland	66	64	51
Italy	27	20	8
Japan[a]	23	47	22
Luxembourg	44	14	6
Netherlands	72	34	25
New Zealand	53	30	20
Norway	91	54	59
Portugal	8	14	8
Spain	47	15	11
Sweden	92	34	69
Switzerland	31	14	5
Turkey	N.A.	N.A.	N.A.
United Kingdom	51	31	29
United States	45	15	12

SOURCE: Congressional Budget Office compilation of data from Brewers Association of Canada, *Alcoholic Beverage Taxation and Control Policies*, 7th ed. (Ottawa, 1989).

NOTE: N.A. = not available.

a. For Japan, the tax burden shown includes anticipated effects of 1989 tax reform; the spirits tax burden is for shouchu, and the wine tax burden is for sake.

TABLE A-18. PERCENTAGE OF TAXES IN RETAIL GASOLINE PRICES IN OECD COUNTRIES, FOURTH QUARTER 1988

	Percentage of Price	Price (Dollars per gallon)	Tax (Dollars per gallon)
Australia	49.4	1.62	0.80
Austria	62.5	2.67	1.67
Belgium	64.7	2.54	1.65
Canada	40.5	1.52	0.62
Denmark	75.3	3.67	2.76
Finland	52.0	3.03	1.57
France	76.9	3.04	2.34
Germany	64.0	2.18	1.40
Greece	66.4	1.99	1.32
Iceland	N.A.	N.A.	N.A.
Ireland	70.7	3.31	2.34
Italy	78.3	3.90	3.05
Japan	47.0	3.47	1.63
Luxembourg	56.4	2.21	1.25
Netherlands	70.4	3.00	2.11
New Zealand	51.0	2.11	1.08
Norway	66.6	3.09	2.06
Portugal	66.0	3.07	2.03
Spain	65.2	2.40	1.57
Sweden	62.2	2.81	1.75
Switzerland	64.7	2.43	1.57
Turkey	N.A.	N.A.	N.A.
United Kingdom	67.8	2.52	1.71
United States	31.5	0.95	0.30

SOURCE: Congressional Budget Office compilation of data from Organization for Economic Cooperation and Development, International Energy Agency, *Energy Prices and Taxes: Fourth Quarter 1988* (Paris: OECD, 1989).

NOTE: N.A. = not available.

TABLE A-19. PERCENTAGE OF TAXES IN RETAIL AUTOMOTIVE DIESEL FUEL PRICES IN OECD COUNTRIES, FOURTH QUARTER 1988

	Percentage of Price	Price (Dollars per gallon)	Tax (Dollars per gallon)
Australia	60.0	1.37	0.82
Austria	50.2	1.97	0.99
Belgium	42.0	1.27	0.53
Canada	33.3	1.46	0.49
Denmark	0.0	0.86	0.00
Finland	39.5	1.79	0.71
France	60.3	1.79	1.08
Germany	59.3	1.59	0.94
Greece	24.3	0.71	0.17
Iceland	N.A.	N.A.	N.A.
Ireland	56.6	2.24	1.27
Italy	60.1	1.78	1.07
Japan	35.8	2.02	0.72
Luxembourg	37.9	1.15	0.44
Netherlands	42.4	1.28	0.54
New Zealand	42.8	1.68	0.72
Norway	12.9	1.00	0.13
Portugal	49.3	1.84	0.91
Spain	54.3	1.59	0.87
Sweden	34.7	1.73	0.60
Switzerland	66.6	2.38	1.58
Turkey	N.A.	N.A.	N.A.
United Kingdom	59.0	1.98	1.17
United States	35.7	0.92	0.33

SOURCE: Congressional Budget Office compilation of data from Organization for Economic Cooperation and Development, International Energy Agency, *Energy Prices and Taxes: Fourth Quarter 1988* (Paris: OECD, 1989).

NOTE: N.A. = not available.

APPENDIX B

SOURCES AND TREATMENT OF THE DATA

The projected distribution of family incomes and expenditures for 1990 is based on data from three sources. The primary source was the March 1986 Current Population Survey (CPS). The CPS is a monthly survey of approximately 60,000 families conducted by the Bureau of the Census. Each March, the survey collects detailed information on characteristics of the family and family income in the previous calendar year. The reported data on income from taxable sources from the CPS files were adjusted by the Congressional Budget Office for consistency with reported income from the Internal Revenue Service's Statistics of Income (SOI) 1985 Individual Tax Model File. The SOI is an extensive annual sample (over 100,000 records in 1985) of actual individual income tax returns, selected from all tax returns filed in that year. The sample is designed for making national-level estimates.

Data on consumer expenditures were taken from the combined 1984 and 1985 Consumer Expenditure Survey (CES) Interview Surveys. The CES Interview Survey is a quarterly panel survey conducted by the Bureau of Labor Statistics. Families in the CES Interview Survey are asked about their expenditures over the past three months, and remain in the survey for four consecutive quarters. Information on family income in the past 12 months is collected in the first and fourth interview. Data for four consecutive interviews were used to construct annual expenditure data for each family.

Matching Expenditure Records to the CPS

CES expenditure records were statistically matched to records from the CPS.[1] CPS household records were subdivided into family units

1. The procedures used in the statistical match were based on methods developed by ICF Incorporated, Fairfax, Va. See ICF Incorporated, "The CPS-SOI-CES Statistically Matched Data Files: Technical Documentation," submitted to the Congressional Budget Office (1988).

comparable to units in the CES. In the CES, family units consist of related persons in the same household, and unrelated persons who share responsibilities for major expenditures. In the CPS, household members are classified as belonging to either a primary or a secondary family, or as unrelated individuals. For purposes of matching, all CPS household members were allocated to either a primary or secondary family. Unrelated household members were included as part of the primary family.

Records were matched on the basis of income, family size, age of family head, and region of residence. Each CPS unit was assumed to have the same ratio of expenditures to income as the CES unit to which it was matched. The CPS records were assigned to one of approximately 1,000 different matching groups and a corresponding CES record was selected from that matching group. The probability that a given CES record was matched with a CPS record in the matching group was proportional to the CES household's weight within the matching group.

Adjustments to the Data

Three major problems with the CPS needed to be corrected before simulating taxes and estimating the distribution of post-tax incomes. First, the CPS does not collect sufficient information for simulating individual income taxes, lacking, in particular, data on deductions and capital gains realizations. Second, high incomes on the CPS are top-coded to maintain confidentiality for families included in the sample. Third, less income from interest and dividends and more income from self-employment is reported on the CPS than on the SOI.

The adjustments for nonreported items and top-coding were relatively straightforward. CPS families were split into tax-filing units comparable to those on the SOI. Missing data on deductions and capital gains were assigned to the CPS by imputation. For imputing individual retirement account contributions, employee business expenses, and itemized deductions, the SOI was used to determine the probability that a tax unit with particular attributes had that deduc-

tion and the ratio of the deduction to income. A similar procedure was used to impute capital gains realizations to the CPS.

To correct for top-coding, the SOI was used to construct a distribution of incomes at the top-coded level and higher for each type of income. Any income on the CPS that was at the maximum reported amount was replaced with an amount randomly selected from the appropriate SOI high-income distribution.

A more complex procedure was necessary to adjust underreported incomes on the CPS to match incomes on the SOI. In some cases this required increasing reported negative as well as positive income amounts. Because low-income families are not required to file tax returns, there are many more CPS tax units than SOI units. To make a valid comparison between the two data sets, CPS units that were simulated to owe taxes were compared to SOI units with positive taxes. Each source of income on the CPS was compared to its counterpart on the SOI, and adjustments were made until the level and distribution of income on the two files was approximately the same. Amounts of interest and dividends were increased for families reporting income from those sources, and new recipients were created. After interest income was adjusted upward to match taxable interest on the SOI, an additional amount of tax-exempt interest was imputed to the CPS using the 1983 Survey of Consumer Finances. Rental incomes and incomes from partnerships and sole proprietorships were adjusted downward; in some cases gains were converted into losses and in other cases self-employment losses were added to records that reported no self-employment income. As a final step, the weights and incomes of taxpaying families in the top 1 percent of the income distribution were revised so that the number of such families and their average income was identical on the two files.

Expenditures reported on the CES generally understate personal consumption expenditures reported in the National Income and Product Accounts (NIPA). Personal consumption expenditures in the NIPA represent the market value of all goods and services purchased by the household sector in the United States. The proportion of personal consumption expenditures reported in the CES varies by the type of expenditure. Expenditure data by type were adjusted to match

comparable NIPA totals. If the data were not adjusted for underreporting, taxes on those items for which there was incomplete reporting would appear to be a much smaller percentage of income and total expenditures than taxes on those items for which there was more complete reporting. The adjustment procedure maintained the distribution of each type of expenditure across families reported in the CES survey data. Family incomes were not adjusted to NIPA totals in order to preserve income totals reported on tax return data. As a result, comparisons of total incomes and total expenditures will not match estimates based on aggregate data.

Aging the Data

The 1985 matched file was aged to 1988 using actual growth rates in population, income, and expenditures, and was projected to 1990 using projected growth rates based on the Congressional Budget Office forecast of August 1989.

Population aging factors were based on Social Security Administration forecasts of the number of persons by age, sex, and marital status for future years. These forecasts were used to construct separate growth rates for units based on age and marital status.

Adjustments were also made to reflect the projected growth in the rate of employment. Weights for nonearners and one-earner couples were lowered and weights for couples with two earners and other units with earnings were raised.

Once population weights had been adjusted, incomes from each source were inflated by CBO's projected aggregate growth rate for income from that source. Deductions were raised to be consistent with the projected growth in income. Expenditures of different types were inflated by CBO's forecast for different components of consumer spending.

Simulating Federal Excise, Income, and Payroll taxes

Individual income taxes were simulated using constructed CPS tax filing units after reported CPS incomes had been adjusted to control totals from SOI data. For high-income taxpayers, individual income taxes were simulated using SOI data and then imputed to CPS tax filing units by income classes.

Social Security payroll taxes were simulated using earnings and self-employment income from the adjusted CPS.

Excise taxes were simulated using adjusted expenditure data taken from the CES. For each of the tax increase options, the total change in taxes was estimated, consistent with estimates by the Joint Committee on Taxation reported in the February 1990 CBO annual report.[2] Total tax increases were distributed among families in proportion to their expenditures on the taxed goods.

Excise taxes on tobacco, alcoholic beverages, and motor fuels all are levied per unit rather than as a percent of expenditures. Allocating excise tax increases among families in proportion to their expenditures on the taxed items is correct if all families pay the same price for the taxed goods. If the average price paid increases with increasing income, distributing tax increases by total expenditures will overstate taxes for higher-income families and understate taxes for lower-income families. This will tend to understate the regressivity of an excise tax increase.

This method is probably most problematic for alcoholic beverage tax increases, particularly increases in taxes on wine and distilled spirits. While there is no information on average prices paid for wine and distilled spirits by income class, limited data on average consumption suggest that the quantities of both wine and distilled spirits consumed rise with income, although not as rapidly as total expenditures. Results from one marketing survey regarding purchases of specific alcoholic beverages in 1988 indicated that the reported aver-

2. Congressional Budget Office, *Reducing the Deficit: Spending and Revenue Options* (February 1990).

age number of glasses of wine and glasses of distilled spirits consumed in the past seven days was about twice as high for people earning $60,000 and over than for people earning less than $10,000.[3]

Simulation Results

The simulated distribution of 1990 incomes and expenditures and the distribution of possible excise tax increases are shown in this study for families grouped by adjusted post-tax income, age of family head, and region. Post-tax family income equals the sum of wages, salaries, self-employment income, personal rents, interest, and dividends, plus government cash transfer payments, cash pension benefits, and realized capital gains, minus federal income and payroll taxes. People were assigned to quintiles based on adjusted post-tax family income--post-tax family income divided by the 1990 poverty threshold for the appropriate family size. An equal number of people (not families) were assigned to each quintile. Families were assigned to one of the four major census regions according to the region of residence as reported in the CES. Because the CES does not report region of residence for rural families, rural families were classified separately.

Because the methodology and data used in this study differ somewhat from those used by CBO in other distributional studies, the results are also somewhat different. The major difference is that, in this study, some unrelated individuals are counted as parts of larger units while in other studies all unrelated individuals were treated as separate units. Because the average family unit contains more people, average family incomes are higher in this study. Other differences include a different base year (1985) for the data and a different economic forecast (August 1989) for projection assumptions.

3. Congressional Budget Office calculations based on data from *Simmons Study of Media and Markets* (New York: Simmons Market Research Bureau, Inc., 1988).